

APPENDIX D – INTERSECTION ALTERNATIVE OPERATIONS

EXISTING 2017 TRAFFIC CONDITIONS

PROJECTED 2042 TRAFFIC CONDITIONS

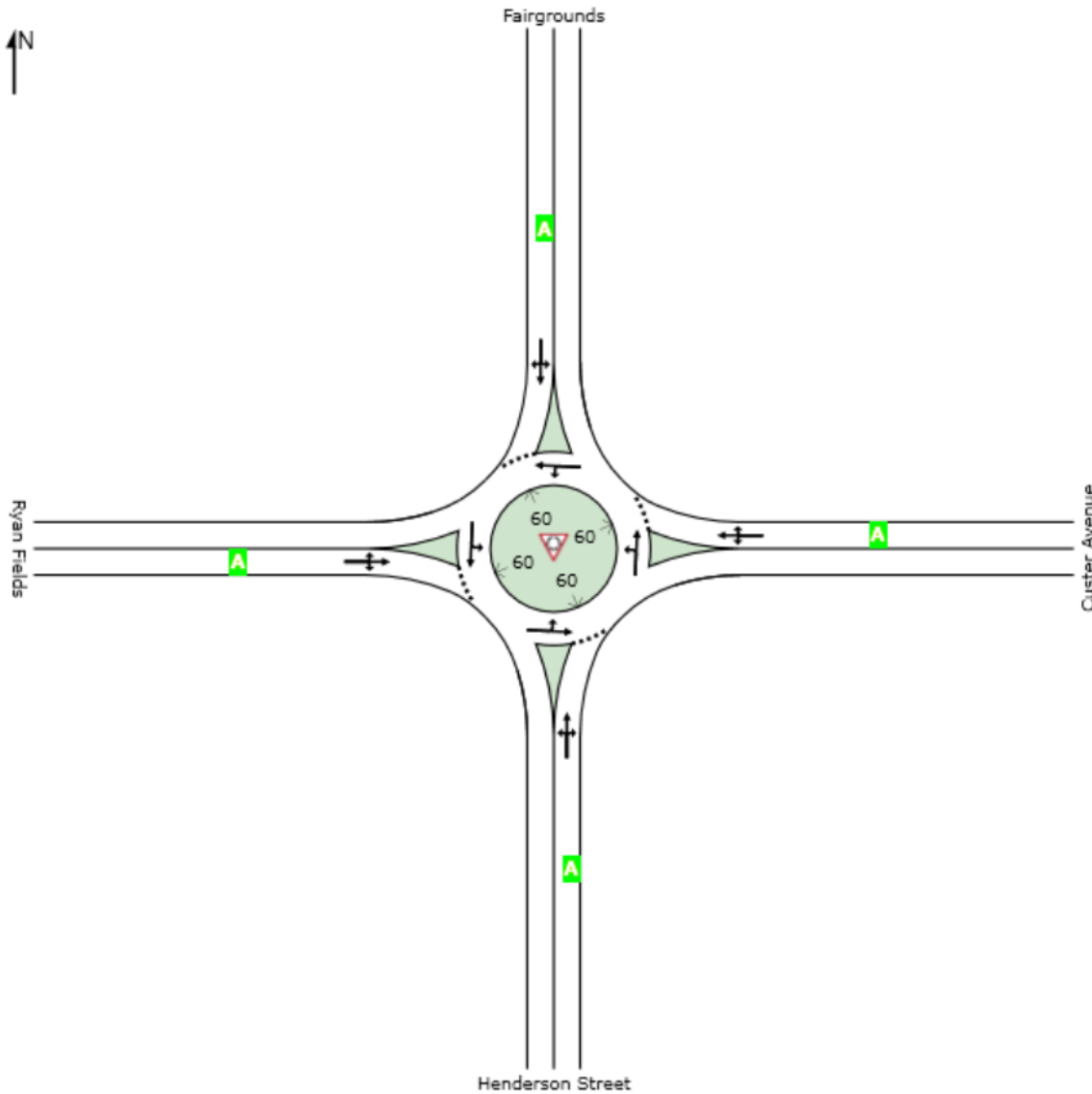
LEVEL OF SERVICE

 Site: Henderson & Custer 2017 AM Alternative 1

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | A | A | A | A | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Henderson & Custer 2017 AM Alternative 1

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|-----------------------|---------------|------------------|----------------------|------------------|--------------------------------------|-------------------------|--------------|--------------------------------|----------------------|
| Mov ID | OD Mov | Demand Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Henderson Street | | | | | | | | | | | |
| 3 | L2 | 1 | 0.0 | 0.335 | 5.7 | LOS A | 2.0 | 51.2 | 0.10 | 0.02 | 33.8 |
| 8 | T1 | 11 | 0.0 | 0.335 | 5.7 | LOS A | 2.0 | 51.2 | 0.10 | 0.02 | 33.9 |
| 18 | R2 | 441 | 0.6 | 0.335 | 5.7 | LOS A | 2.0 | 51.2 | 0.10 | 0.02 | 33.1 |
| Approach | | 454 | 0.6 | 0.335 | 5.7 | LOS A | 2.0 | 51.2 | 0.10 | 0.02 | 33.1 |
| East: Custer Avenue | | | | | | | | | | | |
| 1 | L2 | 633 | 2.0 | 0.490 | 7.7 | LOS A | 3.7 | 94.9 | 0.13 | 0.03 | 30.8 |
| 6 | T1 | 5 | 0.0 | 0.490 | 7.7 | LOS A | 3.7 | 94.9 | 0.13 | 0.03 | 31.0 |
| 16 | R2 | 14 | 18.2 | 0.490 | 7.7 | LOS A | 3.7 | 94.9 | 0.13 | 0.03 | 29.9 |
| Approach | | 652 | 2.3 | 0.490 | 7.7 | LOS A | 3.7 | 94.9 | 0.13 | 0.03 | 30.8 |
| North: Fairgrounds | | | | | | | | | | | |
| 7 | L2 | 9 | 14.3 | 0.028 | 6.0 | LOS A | 0.1 | 2.5 | 0.56 | 0.45 | 32.1 |
| 4 | T1 | 7 | 16.7 | 0.028 | 6.0 | LOS A | 0.1 | 2.5 | 0.56 | 0.45 | 32.3 |
| 14 | R2 | 1 | 0.0 | 0.028 | 6.0 | LOS A | 0.1 | 2.5 | 0.56 | 0.45 | 31.9 |
| Approach | | 17 | 14.3 | 0.028 | 6.0 | LOS A | 0.1 | 2.5 | 0.56 | 0.45 | 32.1 |
| West: Ryan Fields | | | | | | | | | | | |
| 5 | L2 | 1 | 0.0 | 0.007 | 5.1 | LOS A | 0.0 | 0.7 | 0.55 | 0.40 | 33.5 |
| 2 | T1 | 2 | 0.0 | 0.007 | 5.1 | LOS A | 0.0 | 0.7 | 0.55 | 0.40 | 33.6 |
| 12 | R2 | 1 | 0.0 | 0.007 | 5.1 | LOS A | 0.0 | 0.7 | 0.55 | 0.40 | 32.8 |
| Approach | | 5 | 0.0 | 0.007 | 5.1 | LOS A | 0.0 | 0.7 | 0.55 | 0.40 | 33.4 |
| All Vehicles | | 1128 | 1.8 | 0.490 | 6.9 | LOS A | 3.7 | 94.9 | 0.12 | 0.04 | 31.7 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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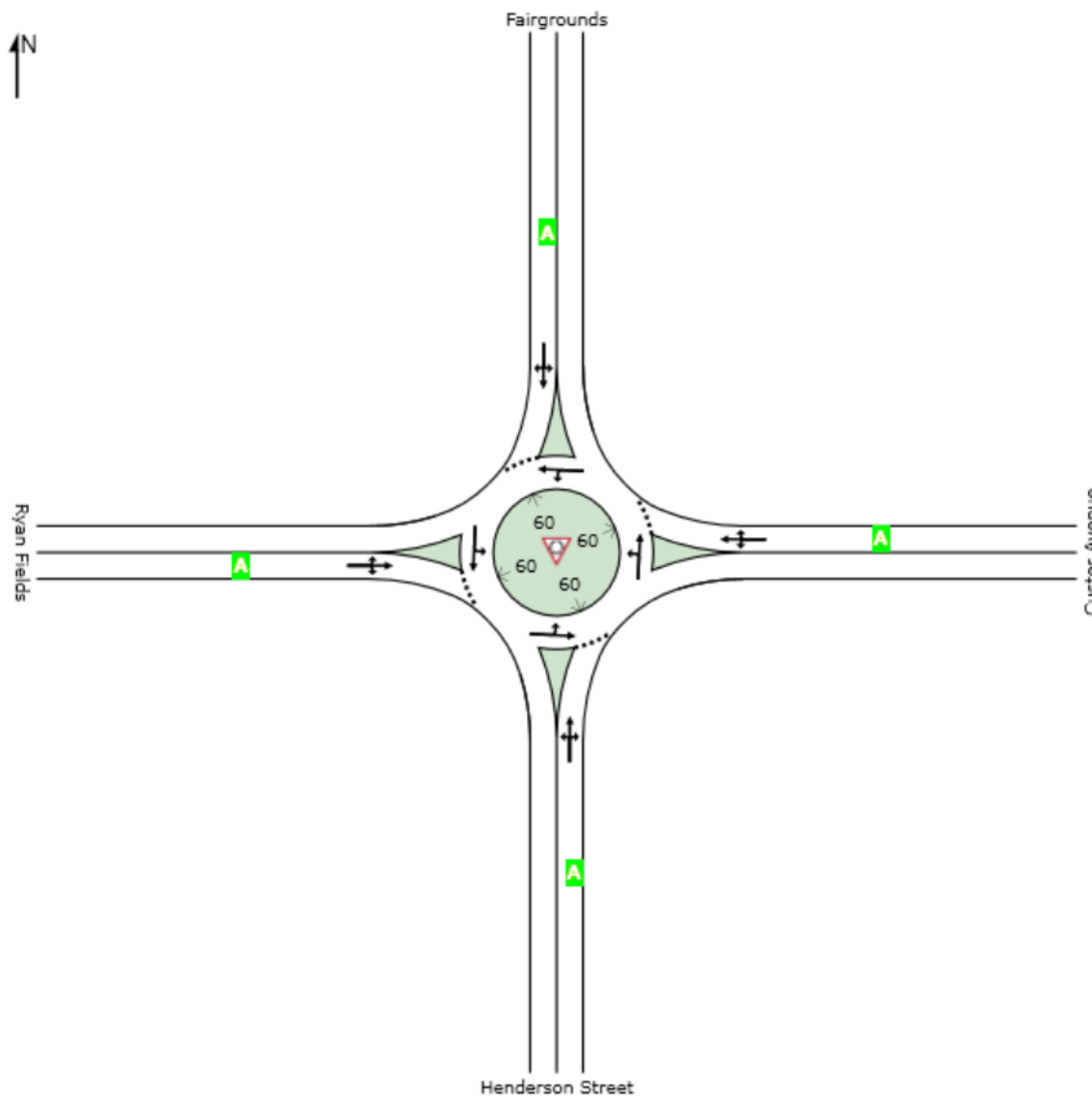
LEVEL OF SERVICE

 Site: Henderson & Custer 2017 School Alternative 1

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | A | A | A | A | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Henderson & Custer 2017 School Alternative 1

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|-----------------------------|------------|------------------|----------------------|------------------|--------------------------------------|-------------------------|--------------|--------------------------------|----------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Henderson Street | | | | | | | | | | | |
| 3 | L2 | 1 | 0.0 | 0.445 | 7.1 | LOS A | 3.2 | 79.9 | 0.17 | 0.05 | 33.1 |
| 8 | T1 | 17 | 0.0 | 0.445 | 7.1 | LOS A | 3.2 | 79.9 | 0.17 | 0.05 | 33.2 |
| 18 | R2 | 576 | 0.8 | 0.445 | 7.1 | LOS A | 3.2 | 79.9 | 0.17 | 0.05 | 32.4 |
| Approach | | 594 | 0.8 | 0.445 | 7.1 | LOS A | 3.2 | 79.9 | 0.17 | 0.05 | 32.5 |
| East: Custer Avenue | | | | | | | | | | | |
| 1 | L2 | 366 | 2.2 | 0.291 | 5.3 | LOS A | 1.6 | 41.3 | 0.11 | 0.03 | 31.9 |
| 6 | T1 | 5 | 0.0 | 0.291 | 5.3 | LOS A | 1.6 | 41.3 | 0.11 | 0.03 | 32.1 |
| 16 | R2 | 15 | 0.0 | 0.291 | 5.3 | LOS A | 1.6 | 41.3 | 0.11 | 0.03 | 31.4 |
| Approach | | 386 | 2.1 | 0.291 | 5.3 | LOS A | 1.6 | 41.3 | 0.11 | 0.03 | 31.9 |
| North: Fairgrounds | | | | | | | | | | | |
| 7 | L2 | 14 | 0.0 | 0.052 | 4.3 | LOS A | 0.2 | 5.2 | 0.45 | 0.33 | 33.8 |
| 4 | T1 | 33 | 0.0 | 0.052 | 4.3 | LOS A | 0.2 | 5.2 | 0.45 | 0.33 | 33.9 |
| 14 | R2 | 1 | 0.0 | 0.052 | 4.3 | LOS A | 0.2 | 5.2 | 0.45 | 0.33 | 33.2 |
| Approach | | 49 | 0.0 | 0.052 | 4.3 | LOS A | 0.2 | 5.2 | 0.45 | 0.33 | 33.9 |
| West: Ryan Fields | | | | | | | | | | | |
| 5 | L2 | 1 | 0.0 | 0.016 | 4.5 | LOS A | 0.1 | 1.5 | 0.46 | 0.31 | 34.1 |
| 2 | T1 | 8 | 14.3 | 0.016 | 4.5 | LOS A | 0.1 | 1.5 | 0.46 | 0.31 | 33.9 |
| 12 | R2 | 4 | 0.0 | 0.016 | 4.5 | LOS A | 0.1 | 1.5 | 0.46 | 0.31 | 33.5 |
| Approach | | 13 | 9.1 | 0.016 | 4.5 | LOS A | 0.1 | 1.5 | 0.46 | 0.31 | 33.8 |
| All Vehicles | | 1042 | 1.3 | 0.445 | 6.2 | LOS A | 3.2 | 79.9 | 0.16 | 0.06 | 32.3 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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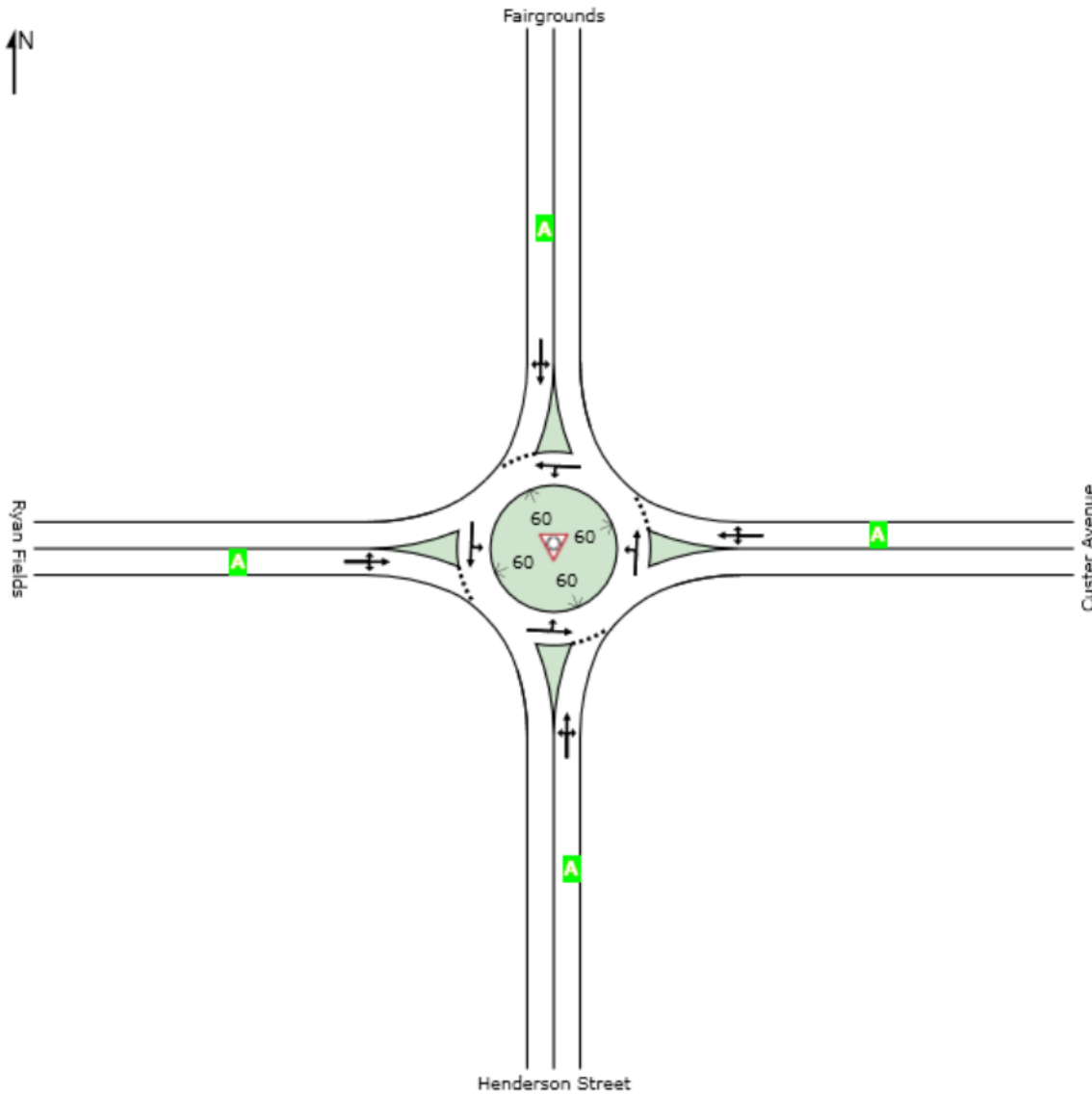
LEVEL OF SERVICE

 Site: Henderson & Custer 2017 PM Alternative 1

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | A | A | A | A | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Henderson & Custer 2017 PM Alternative 1

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Henderson Street | | | | | | | | | | | |
| 3 | L2 | 7 | 0.0 | 0.437 | 7.0 | LOS A | 3.1 | 76.8 | 0.20 | 0.07 | 33.1 |
| 8 | T1 | 16 | 13.3 | 0.437 | 7.0 | LOS A | 3.1 | 76.8 | 0.20 | 0.07 | 32.9 |
| 18 | R2 | 555 | 0.4 | 0.437 | 7.0 | LOS A | 3.1 | 76.8 | 0.20 | 0.07 | 32.5 |
| Approach | | 578 | 0.8 | 0.437 | 7.0 | LOS A | 3.1 | 76.8 | 0.20 | 0.07 | 32.5 |
| East: Custer Avenue | | | | | | | | | | | |
| 1 | L2 | 437 | 0.7 | 0.370 | 6.1 | LOS A | 2.3 | 59.0 | 0.15 | 0.05 | 31.7 |
| 6 | T1 | 30 | 0.0 | 0.370 | 6.1 | LOS A | 2.3 | 59.0 | 0.15 | 0.05 | 31.8 |
| 16 | R2 | 26 | 4.2 | 0.370 | 6.1 | LOS A | 2.3 | 59.0 | 0.15 | 0.05 | 31.1 |
| Approach | | 493 | 0.8 | 0.370 | 6.1 | LOS A | 2.3 | 59.0 | 0.15 | 0.05 | 31.7 |
| North: Fairgrounds | | | | | | | | | | | |
| 7 | L2 | 17 | 0.0 | 0.037 | 4.5 | LOS A | 0.1 | 3.6 | 0.49 | 0.37 | 33.1 |
| 4 | T1 | 13 | 0.0 | 0.037 | 4.5 | LOS A | 0.1 | 3.6 | 0.49 | 0.37 | 33.2 |
| 14 | R2 | 1 | 0.0 | 0.037 | 4.5 | LOS A | 0.1 | 3.6 | 0.49 | 0.37 | 32.5 |
| Approach | | 31 | 0.0 | 0.037 | 4.5 | LOS A | 0.1 | 3.6 | 0.49 | 0.37 | 33.1 |
| West: Ryan Fields | | | | | | | | | | | |
| 5 | L2 | 1 | 0.0 | 0.029 | 4.4 | LOS A | 0.1 | 2.8 | 0.49 | 0.36 | 34.3 |
| 2 | T1 | 15 | 0.0 | 0.029 | 4.4 | LOS A | 0.1 | 2.8 | 0.49 | 0.36 | 34.4 |
| 12 | R2 | 9 | 0.0 | 0.029 | 4.4 | LOS A | 0.1 | 2.8 | 0.49 | 0.36 | 33.6 |
| Approach | | 25 | 0.0 | 0.029 | 4.4 | LOS A | 0.1 | 2.8 | 0.49 | 0.36 | 34.1 |
| All Vehicles | | 1128 | 0.8 | 0.437 | 6.5 | LOS A | 3.1 | 76.8 | 0.19 | 0.08 | 32.2 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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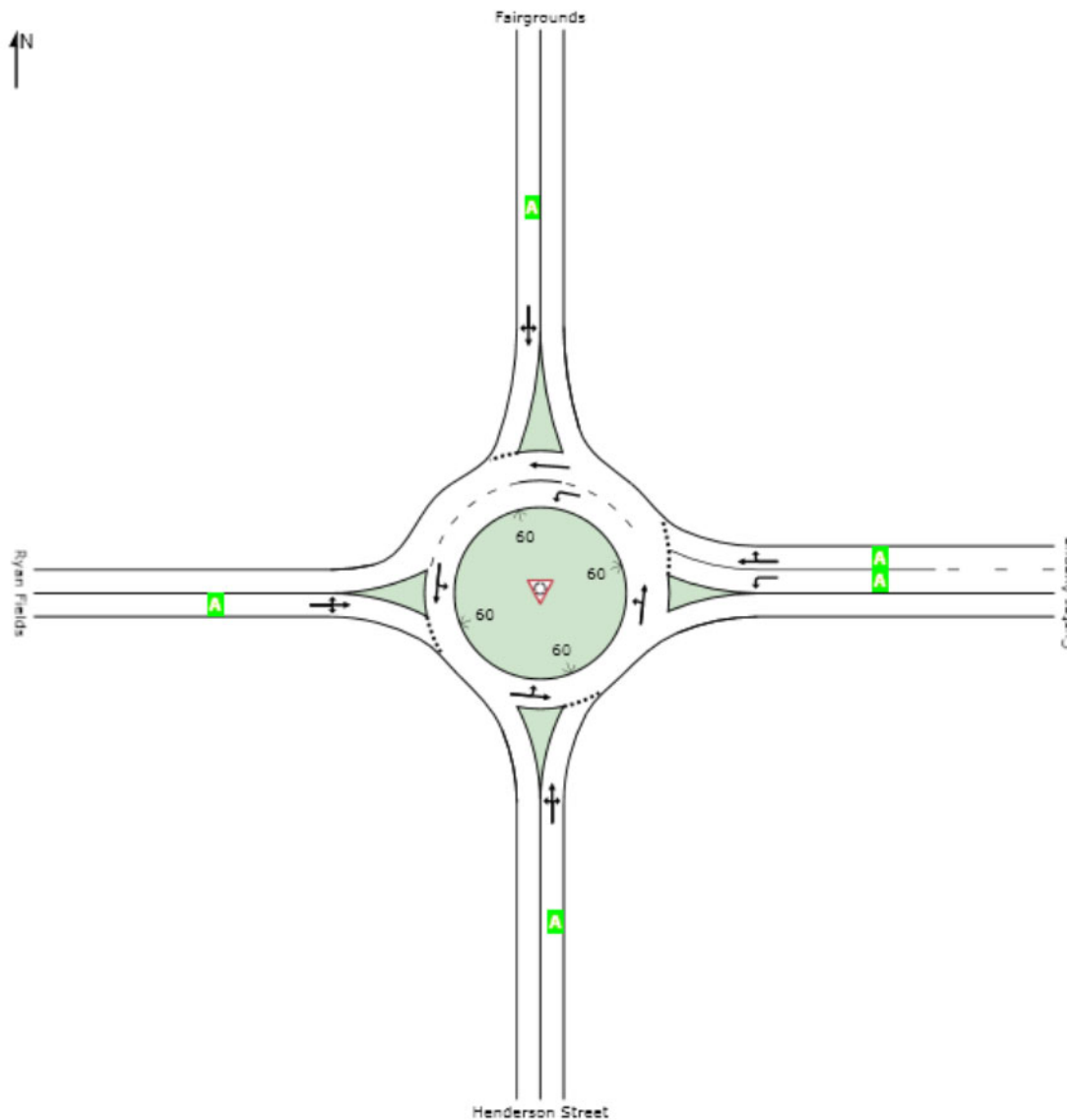
LEVEL OF SERVICE

 Site: Henderson & Custer 2017 AM Alternative 2

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | A | A | A | A | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Henderson & Custer 2017 AM Alternative 2

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Henderson Street | | | | | | | | | | | |
| 3 | L2 | 1 | 0.0 | 0.335 | 5.7 | LOS A | 2.0 | 51.2 | 0.10 | 0.02 | 33.8 |
| 8 | T1 | 11 | 0.0 | 0.335 | 5.7 | LOS A | 2.0 | 51.2 | 0.10 | 0.02 | 33.9 |
| 18 | R2 | 441 | 0.6 | 0.335 | 5.7 | LOS A | 2.0 | 51.2 | 0.10 | 0.02 | 33.1 |
| Approach | | 454 | 0.6 | 0.335 | 5.7 | LOS A | 2.0 | 51.2 | 0.10 | 0.02 | 33.1 |
| East: Custer Avenue | | | | | | | | | | | |
| 1 | L2 | 633 | 2.0 | 0.474 | 7.5 | LOS A | 3.5 | 89.7 | 0.12 | 0.03 | 30.9 |
| 6 | T1 | 5 | 0.0 | 0.015 | 3.1 | LOS A | 0.1 | 1.6 | 0.07 | 0.01 | 35.1 |
| 16 | R2 | 14 | 18.2 | 0.015 | 3.1 | LOS A | 0.1 | 1.6 | 0.07 | 0.01 | 33.6 |
| Approach | | 652 | 2.3 | 0.474 | 7.4 | LOS A | 3.5 | 89.7 | 0.12 | 0.03 | 31.0 |
| North: Fairgrounds | | | | | | | | | | | |
| 7 | L2 | 9 | 14.3 | 0.024 | 5.3 | LOS A | 0.1 | 2.0 | 0.50 | 0.40 | 32.4 |
| 4 | T1 | 7 | 16.7 | 0.024 | 5.3 | LOS A | 0.1 | 2.0 | 0.50 | 0.40 | 32.6 |
| 14 | R2 | 1 | 0.0 | 0.024 | 5.3 | LOS A | 0.1 | 2.0 | 0.50 | 0.40 | 32.3 |
| Approach | | 17 | 14.3 | 0.024 | 5.3 | LOS A | 0.1 | 2.0 | 0.50 | 0.40 | 32.5 |
| West: Ryan Fields | | | | | | | | | | | |
| 5 | L2 | 1 | 0.0 | 0.007 | 5.1 | LOS A | 0.0 | 0.7 | 0.55 | 0.40 | 33.5 |
| 2 | T1 | 2 | 0.0 | 0.007 | 5.1 | LOS A | 0.0 | 0.7 | 0.55 | 0.40 | 33.6 |
| 12 | R2 | 1 | 0.0 | 0.007 | 5.1 | LOS A | 0.0 | 0.7 | 0.55 | 0.40 | 32.8 |
| Approach | | 5 | 0.0 | 0.007 | 5.1 | LOS A | 0.0 | 0.7 | 0.55 | 0.40 | 33.4 |
| All Vehicles | | 1128 | 1.8 | 0.474 | 6.6 | LOS A | 3.5 | 89.7 | 0.12 | 0.04 | 31.8 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

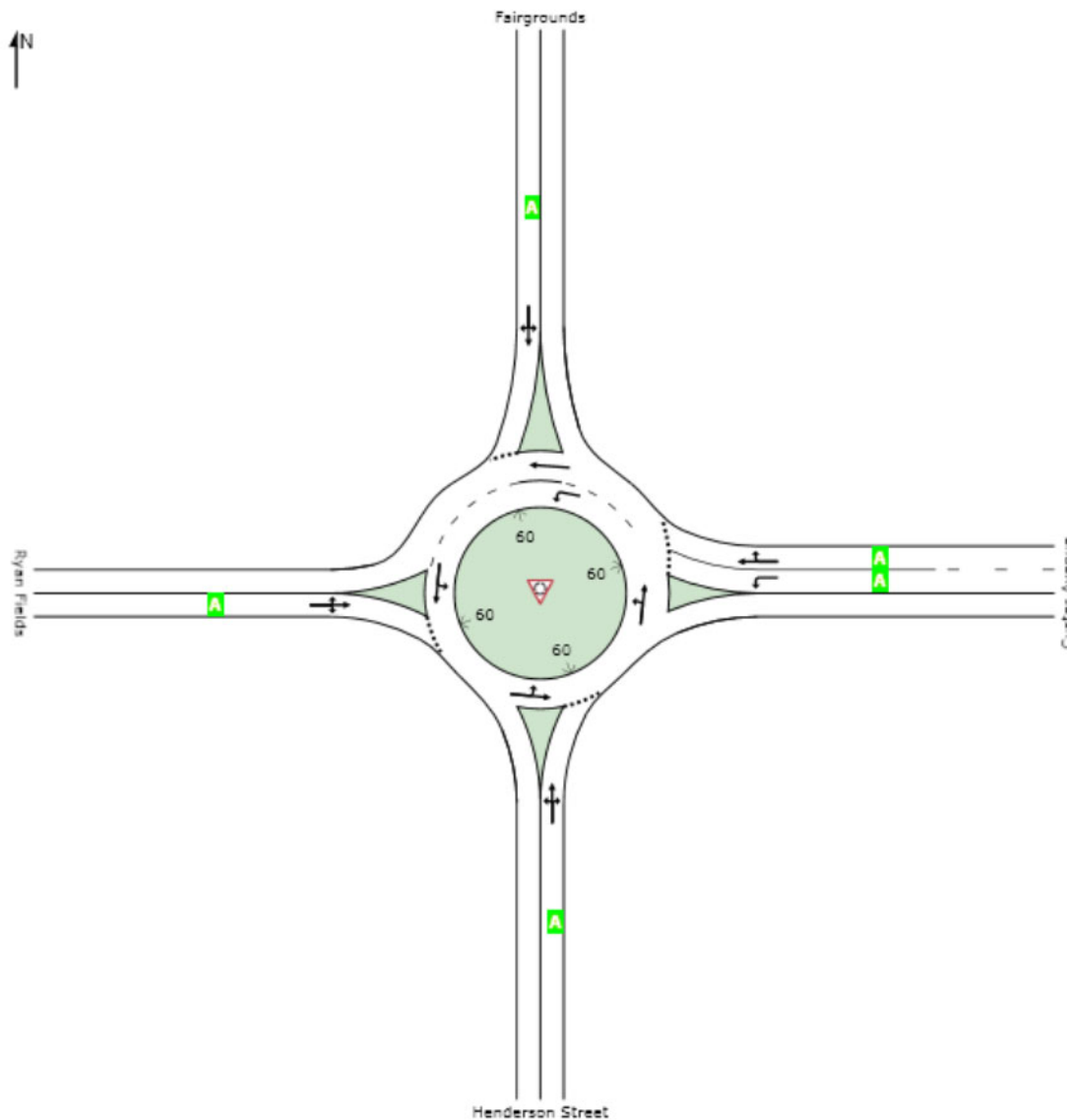
LEVEL OF SERVICE

 Site: Henderson & Custer 2017 School Alternative 2

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | A | A | A | A | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Henderson & Custer 2017 School Alternative 2

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Henderson Street | | | | | | | | | | | |
| 3 | L2 | 1 | 0.0 | 0.445 | 7.1 | LOS A | 3.2 | 79.9 | 0.17 | 0.05 | 33.1 |
| 8 | T1 | 17 | 0.0 | 0.445 | 7.1 | LOS A | 3.2 | 79.9 | 0.17 | 0.05 | 33.2 |
| 18 | R2 | 576 | 0.8 | 0.445 | 7.1 | LOS A | 3.2 | 79.9 | 0.17 | 0.05 | 32.4 |
| Approach | | 594 | 0.8 | 0.445 | 7.1 | LOS A | 3.2 | 79.9 | 0.17 | 0.05 | 32.5 |
| East: Custer Avenue | | | | | | | | | | | |
| 1 | L2 | 366 | 2.2 | 0.276 | 5.1 | LOS A | 1.5 | 38.4 | 0.11 | 0.03 | 31.9 |
| 6 | T1 | 5 | 0.0 | 0.015 | 2.8 | LOS A | 0.1 | 1.6 | 0.08 | 0.02 | 35.3 |
| 16 | R2 | 15 | 0.0 | 0.015 | 2.8 | LOS A | 0.1 | 1.6 | 0.08 | 0.02 | 34.4 |
| Approach | | 386 | 2.1 | 0.276 | 5.0 | LOS A | 1.5 | 38.4 | 0.11 | 0.03 | 32.0 |
| North: Fairgrounds | | | | | | | | | | | |
| 7 | L2 | 14 | 0.0 | 0.047 | 3.9 | LOS A | 0.2 | 4.3 | 0.40 | 0.28 | 34.0 |
| 4 | T1 | 33 | 0.0 | 0.047 | 3.9 | LOS A | 0.2 | 4.3 | 0.40 | 0.28 | 34.1 |
| 14 | R2 | 1 | 0.0 | 0.047 | 3.9 | LOS A | 0.2 | 4.3 | 0.40 | 0.28 | 33.3 |
| Approach | | 49 | 0.0 | 0.047 | 3.9 | LOS A | 0.2 | 4.3 | 0.40 | 0.28 | 34.0 |
| West: Ryan Fields | | | | | | | | | | | |
| 5 | L2 | 1 | 0.0 | 0.016 | 4.5 | LOS A | 0.1 | 1.5 | 0.46 | 0.31 | 34.1 |
| 2 | T1 | 8 | 14.3 | 0.016 | 4.5 | LOS A | 0.1 | 1.5 | 0.46 | 0.31 | 33.9 |
| 12 | R2 | 4 | 0.0 | 0.016 | 4.5 | LOS A | 0.1 | 1.5 | 0.46 | 0.31 | 33.5 |
| Approach | | 13 | 9.1 | 0.016 | 4.5 | LOS A | 0.1 | 1.5 | 0.46 | 0.31 | 33.8 |
| All Vehicles | | 1042 | 1.3 | 0.445 | 6.1 | LOS A | 3.2 | 79.9 | 0.16 | 0.06 | 32.4 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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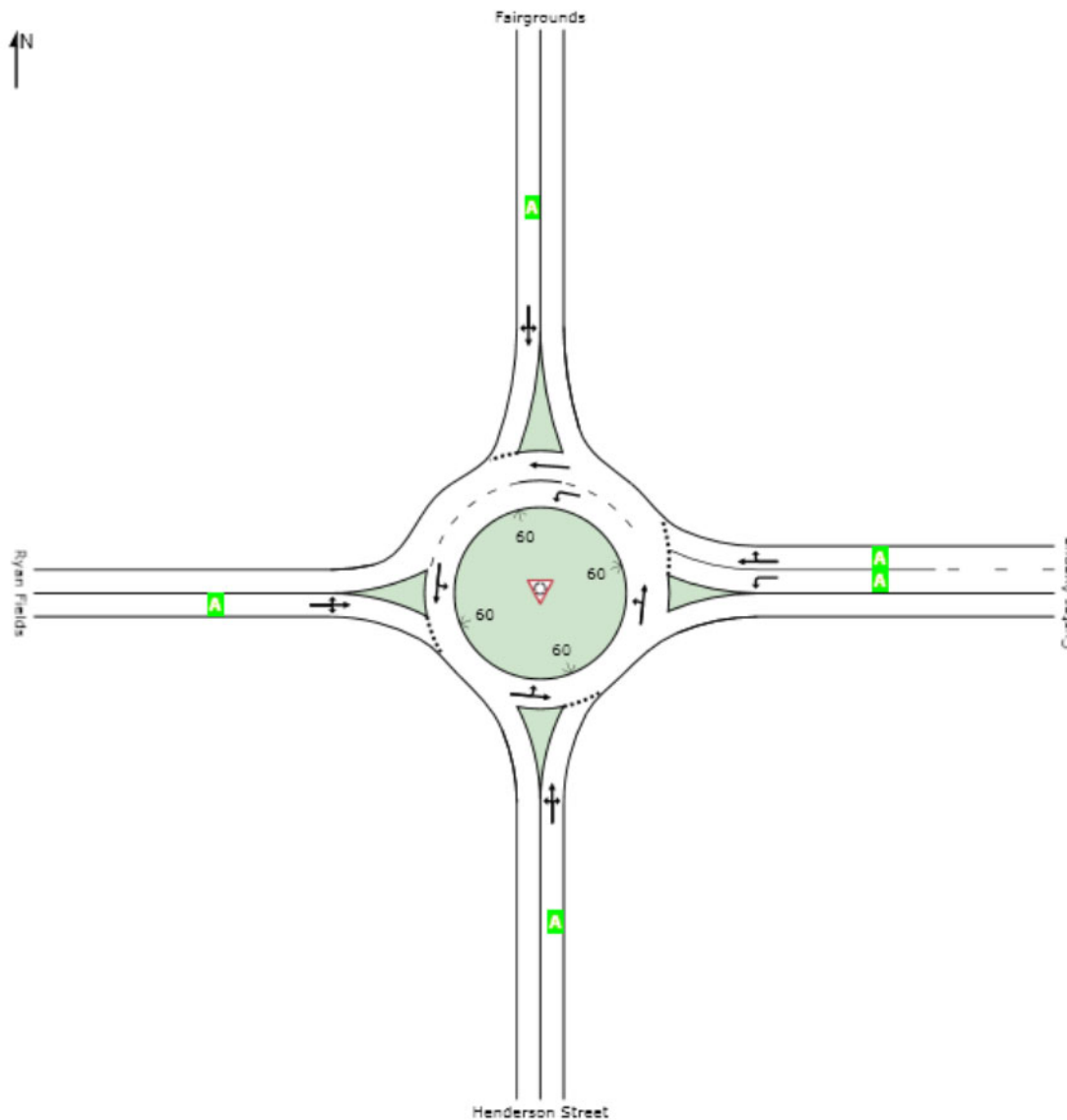
LEVEL OF SERVICE

 Site: Henderson & Custer 2017 PM Alternative 2

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | A | A | A | A | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Henderson & Custer 2017 PM Alternative 2

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Henderson Street | | | | | | | | | | | |
| 3 | L2 | 7 | 0.0 | 0.437 | 7.0 | LOS A | 3.1 | 76.8 | 0.20 | 0.07 | 33.1 |
| 8 | T1 | 16 | 13.3 | 0.437 | 7.0 | LOS A | 3.1 | 76.8 | 0.20 | 0.07 | 32.9 |
| 18 | R2 | 555 | 0.4 | 0.437 | 7.0 | LOS A | 3.1 | 76.8 | 0.20 | 0.07 | 32.5 |
| Approach | | 578 | 0.8 | 0.437 | 7.0 | LOS A | 3.1 | 76.8 | 0.20 | 0.07 | 32.5 |
| East: Custer Avenue | | | | | | | | | | | |
| 1 | L2 | 437 | 0.7 | 0.327 | 5.6 | LOS A | 2.0 | 49.1 | 0.14 | 0.05 | 31.7 |
| 6 | T1 | 30 | 0.0 | 0.043 | 3.1 | LOS A | 0.2 | 4.6 | 0.10 | 0.03 | 35.2 |
| 16 | R2 | 26 | 4.2 | 0.043 | 3.1 | LOS A | 0.2 | 4.6 | 0.10 | 0.03 | 34.1 |
| Approach | | 493 | 0.8 | 0.327 | 5.3 | LOS A | 2.0 | 49.1 | 0.14 | 0.04 | 32.0 |
| North: Fairgrounds | | | | | | | | | | | |
| 7 | L2 | 17 | 0.0 | 0.033 | 4.1 | LOS A | 0.1 | 2.9 | 0.44 | 0.33 | 33.3 |
| 4 | T1 | 13 | 0.0 | 0.033 | 4.1 | LOS A | 0.1 | 2.9 | 0.44 | 0.33 | 33.4 |
| 14 | R2 | 1 | 0.0 | 0.033 | 4.1 | LOS A | 0.1 | 2.9 | 0.44 | 0.33 | 32.7 |
| Approach | | 31 | 0.0 | 0.033 | 4.1 | LOS A | 0.1 | 2.9 | 0.44 | 0.33 | 33.4 |
| West: Ryan Fields | | | | | | | | | | | |
| 5 | L2 | 1 | 0.0 | 0.029 | 4.4 | LOS A | 0.1 | 2.8 | 0.49 | 0.36 | 34.3 |
| 2 | T1 | 15 | 0.0 | 0.029 | 4.4 | LOS A | 0.1 | 2.8 | 0.49 | 0.36 | 34.4 |
| 12 | R2 | 9 | 0.0 | 0.029 | 4.4 | LOS A | 0.1 | 2.8 | 0.49 | 0.36 | 33.6 |
| Approach | | 25 | 0.0 | 0.029 | 4.4 | LOS A | 0.1 | 2.8 | 0.49 | 0.36 | 34.1 |
| All Vehicles | | 1128 | 0.8 | 0.437 | 6.1 | LOS A | 3.1 | 76.8 | 0.18 | 0.07 | 32.3 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 1 2017 - AM
 10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 88 | 256 | 15 | 203 | 288 | 65 | 4 | 37 | 128 | 165 | 192 | 202 |
| Future Volume (veh/h) | 88 | 256 | 15 | 203 | 288 | 65 | 4 | 37 | 128 | 165 | 192 | 202 |
| 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 | 1400 | 1400 | 1400 | 1500 | 1465 | 1477 | 1500 | 1500 | 1500 | 1488 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 104 | 301 | 18 | 239 | 339 | 76 | 5 | 44 | 151 | 194 | 226 | 238 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 1 | 0 | 0 |
| Cap, veh/h | 658 | 578 | 35 | 659 | 721 | 776 | 293 | 49 | 167 | 274 | 427 | 436 |
| Arrive On Green | 0.06 | 0.44 | 0.44 | 0.14 | 0.66 | 0.66 | 0.01 | 0.16 | 0.16 | 0.13 | 0.28 | 0.28 |
| Sat Flow, veh/h | 1333 | 1308 | 78 | 1429 | 1465 | 1251 | 1429 | 297 | 1019 | 1417 | 1500 | 1271 |
| Grp Volume(v), veh/h | 104 | 0 | 319 | 239 | 339 | 76 | 5 | 0 | 195 | 194 | 226 | 238 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 0 | 1386 | 1429 | 1465 | 1251 | 1429 | 0 | 1317 | 1417 | 1500 | 1271 |
| Q Serve(g_s), s | 5.1 | 0.0 | 20.0 | 10.7 | 13.8 | 2.0 | 0.3 | 0.0 | 17.5 | 13.2 | 15.2 | 18.2 |
| Cycle Q Clear(g_c), s | 5.1 | 0.0 | 20.0 | 10.7 | 13.8 | 2.0 | 0.3 | 0.0 | 17.5 | 13.2 | 15.2 | 18.2 |
| Prop In Lane | 1.00 | | 0.06 | 1.00 | | 1.00 | 1.00 | | 0.77 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 658 | 0 | 612 | 659 | 721 | 776 | 293 | 0 | 215 | 274 | 427 | 436 |
| V/C Ratio(X) | 0.16 | 0.00 | 0.52 | 0.36 | 0.47 | 0.10 | 0.02 | 0.00 | 0.91 | 0.71 | 0.53 | 0.55 |
| Avail Cap(c_a), veh/h | 714 | 0 | 612 | 718 | 721 | 776 | 343 | 0 | 230 | 317 | 438 | 444 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 0.85 | 0.85 | 0.85 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 16.6 | 0.0 | 24.3 | 15.3 | 12.9 | 6.1 | 41.5 | 0.0 | 49.3 | 35.1 | 36.1 | 31.9 |
| Incr Delay (d2), s/veh | 0.1 | 0.0 | 3.2 | 0.3 | 1.9 | 0.2 | 0.0 | 0.0 | 33.9 | 6.0 | 1.1 | 1.3 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.5 | 0.0 | 6.9 | 3.1 | 4.1 | 0.6 | 0.1 | 0.0 | 7.8 | 4.8 | 5.5 | 5.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 16.7 | 0.0 | 27.4 | 15.6 | 14.8 | 6.4 | 41.5 | 0.0 | 83.2 | 41.1 | 37.3 | 33.2 |
| LnGrp LOS | B | A | C | B | B | A | D | A | F | D | D | C |
| Approach Vol, veh/h | | 423 | | | 654 | | | 200 | | | 658 | |
| Approach Delay, s/veh | | 24.8 | | | 14.1 | | | 82.1 | | | 36.9 | |
| Approach LOS | | C | | | B | | | F | | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 17.0 | 59.0 | 4.8 | 39.2 | 10.9 | 65.1 | 19.3 | 24.6 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 18.0 | 43.0 | 5.0 | 35.0 | 12.0 | 49.0 | 19.0 | 21.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 12.7 | 22.0 | 2.3 | 20.2 | 7.1 | 15.8 | 15.2 | 19.5 | | | | |
| Green Ext Time (p_c), s | 0.3 | 1.7 | 0.0 | 1.8 | 0.1 | 2.3 | 0.2 | 0.2 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 31.2 | | | | | | | | | |
| HCM 6th LOS | | | C | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 1 2017 School
 10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 182 | 309 | 7 | 102 | 255 | 153 | 5 | 66 | 149 | 106 | 35 | 74 |
| Future Volume (veh/h) | 182 | 309 | 7 | 102 | 255 | 153 | 5 | 66 | 149 | 106 | 35 | 74 |
| 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 | 1339 | 1339 | 1339 | 1500 | 1465 | 1500 | 1500 | 1500 | 1500 | 1465 | 1465 | 1488 |
| Adj Flow Rate, veh/h | 207 | 351 | 8 | 116 | 290 | 174 | 6 | 75 | 169 | 120 | 40 | 84 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Percent Heavy Veh, % | 1 | 1 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | 3 | 1 |
| Cap, veh/h | 423 | 653 | 15 | 403 | 671 | 686 | 275 | 82 | 186 | 194 | 403 | 474 |
| Arrive On Green | 0.10 | 0.50 | 0.50 | 0.08 | 0.61 | 0.61 | 0.01 | 0.20 | 0.20 | 0.08 | 0.28 | 0.28 |
| Sat Flow, veh/h | 1276 | 1304 | 30 | 1429 | 1465 | 1271 | 1429 | 410 | 924 | 1395 | 1465 | 1261 |
| Grp Volume(v), veh/h | 207 | 0 | 359 | 116 | 290 | 174 | 6 | 0 | 244 | 120 | 40 | 84 |
| Grp Sat Flow(s),veh/h/ln | 1276 | 0 | 1334 | 1429 | 1465 | 1271 | 1429 | 0 | 1334 | 1395 | 1465 | 1261 |
| Q Serve(g_s), s | 9.9 | 0.0 | 22.1 | 5.2 | 12.6 | 6.7 | 0.4 | 0.0 | 21.5 | 7.9 | 2.4 | 5.3 |
| Cycle Q Clear(g_c), s | 9.9 | 0.0 | 22.1 | 5.2 | 12.6 | 6.7 | 0.4 | 0.0 | 21.5 | 7.9 | 2.4 | 5.3 |
| Prop In Lane | 1.00 | | 0.02 | 1.00 | | 1.00 | 1.00 | | 0.69 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 423 | 0 | 668 | 403 | 671 | 686 | 275 | 0 | 268 | 194 | 403 | 474 |
| V/C Ratio(X) | 0.49 | 0.00 | 0.54 | 0.29 | 0.43 | 0.25 | 0.02 | 0.00 | 0.91 | 0.62 | 0.10 | 0.18 |
| Avail Cap(c_a), veh/h | 476 | 0 | 668 | 403 | 671 | 686 | 324 | 0 | 322 | 219 | 439 | 506 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 0.88 | 0.88 | 0.88 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 14.2 | 0.0 | 20.5 | 16.3 | 15.2 | 10.3 | 37.7 | 0.0 | 46.9 | 34.9 | 32.4 | 25.0 |
| Incr Delay (d2), s/veh | 0.9 | 0.0 | 3.1 | 0.3 | 1.8 | 0.8 | 0.0 | 0.0 | 25.6 | 4.3 | 0.1 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.8 | 0.0 | 7.1 | 1.6 | 3.9 | 1.9 | 0.1 | 0.0 | 9.1 | 2.8 | 0.9 | 1.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 15.1 | 0.0 | 23.6 | 16.7 | 16.9 | 11.1 | 37.8 | 0.0 | 72.5 | 39.1 | 32.5 | 25.2 |
| LnGrp LOS | B | A | C | B | B | B | D | A | E | D | C | C |
| Approach Vol, veh/h | | 566 | | | 580 | | | 250 | | | 244 | |
| Approach Delay, s/veh | | 20.4 | | | 15.1 | | | 71.6 | | | 33.3 | |
| Approach LOS | | C | | | B | | | E | | | C | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 11.0 | 66.1 | 4.9 | 38.0 | 16.1 | 61.0 | 13.8 | 29.1 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 7.0 | 53.0 | 5.0 | 36.0 | 17.0 | 43.0 | 12.0 | 29.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 7.2 | 24.1 | 2.4 | 7.3 | 11.9 | 14.6 | 9.9 | 23.5 | | | | |
| Green Ext Time (p_c), s | 0.0 | 2.1 | 0.0 | 0.4 | 0.2 | 2.2 | 0.0 | 0.7 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 28.3 | | | | | | | | | |
| HCM 6th LOS | | | C | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 1 2017 PM
 10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 187 | 361 | 6 | 85 | 246 | 199 | 3 | 31 | 87 | 114 | 25 | 100 |
| Future Volume (veh/h) | 187 | 361 | 6 | 85 | 246 | 199 | 3 | 31 | 87 | 114 | 25 | 100 |
| 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 | 1389 | 1400 | 1400 | 1500 | 1488 | 1500 | 1500 | 1500 | 1500 | 1500 | 1453 | 1488 |
| Adj Flow Rate, veh/h | 199 | 384 | 6 | 90 | 262 | 212 | 3 | 33 | 93 | 121 | 27 | 106 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4 | 1 |
| Cap, veh/h | 509 | 824 | 13 | 473 | 835 | 825 | 179 | 39 | 110 | 205 | 286 | 349 |
| Arrive On Green | 0.08 | 0.60 | 0.60 | 0.06 | 0.75 | 0.75 | 0.00 | 0.11 | 0.11 | 0.09 | 0.20 | 0.20 |
| Sat Flow, veh/h | 1323 | 1375 | 21 | 1429 | 1488 | 1271 | 1429 | 347 | 977 | 1429 | 1453 | 1261 |
| Grp Volume(v), veh/h | 199 | 0 | 390 | 90 | 262 | 212 | 3 | 0 | 126 | 121 | 27 | 106 |
| Grp Sat Flow(s),veh/h/ln | 1323 | 0 | 1396 | 1429 | 1488 | 1271 | 1429 | 0 | 1324 | 1429 | 1453 | 1261 |
| Q Serve(g_s), s | 7.3 | 0.0 | 18.6 | 3.2 | 7.0 | 5.2 | 0.2 | 0.0 | 11.2 | 8.7 | 1.8 | 8.0 |
| Cycle Q Clear(g_c), s | 7.3 | 0.0 | 18.6 | 3.2 | 7.0 | 5.2 | 0.2 | 0.0 | 11.2 | 8.7 | 1.8 | 8.0 |
| Prop In Lane | 1.00 | | 0.02 | 1.00 | | 1.00 | 1.00 | | 0.74 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 509 | 0 | 837 | 473 | 835 | 825 | 179 | 0 | 149 | 205 | 286 | 349 |
| V/C Ratio(X) | 0.39 | 0.00 | 0.47 | 0.19 | 0.31 | 0.26 | 0.02 | 0.00 | 0.84 | 0.59 | 0.09 | 0.30 |
| Avail Cap(c_a), veh/h | 591 | 0 | 837 | 485 | 835 | 825 | 233 | 0 | 221 | 246 | 351 | 405 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 0.82 | 0.82 | 0.82 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 8.8 | 0.0 | 13.4 | 10.9 | 7.6 | 4.8 | 46.9 | 0.0 | 52.2 | 41.0 | 39.4 | 34.3 |
| Incr Delay (d2), s/veh | 0.5 | 0.0 | 1.9 | 0.2 | 0.8 | 0.6 | 0.0 | 0.0 | 17.2 | 2.7 | 0.1 | 0.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.0 | 0.0 | 5.8 | 1.0 | 2.1 | 1.4 | 0.1 | 0.0 | 4.5 | 3.1 | 0.6 | 2.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 9.2 | 0.0 | 15.2 | 11.0 | 8.4 | 5.4 | 47.0 | 0.0 | 69.5 | 43.6 | 39.6 | 34.8 |
| LnGrp LOS | A | A | B | B | A | A | D | A | E | D | D | C |
| Approach Vol, veh/h | | 589 | | | 564 | | | 129 | | | 254 | |
| Approach Delay, s/veh | | 13.2 | | | 7.7 | | | 68.9 | | | 39.5 | |
| Approach LOS | | B | | | A | | | E | | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 9.0 | 77.9 | 4.5 | 28.6 | 13.6 | 73.3 | 14.6 | 18.5 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 6.0 | 61.0 | 5.0 | 29.0 | 17.0 | 50.0 | 14.0 | 20.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 5.2 | 20.6 | 2.2 | 10.0 | 9.3 | 9.0 | 10.7 | 13.2 | | | | |
| Green Ext Time (p_c), s | 0.0 | 2.4 | 0.0 | 0.4 | 0.3 | 2.2 | 0.1 | 0.3 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 20.2 | | | | | | | | | |
| HCM 6th LOS | | | C | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 2 2017 - AM

10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 88 | 256 | 15 | 203 | 288 | 65 | 4 | 37 | 128 | 165 | 192 | 202 |
| Future Volume (veh/h) | 88 | 256 | 15 | 203 | 288 | 65 | 4 | 37 | 128 | 165 | 192 | 202 |
| 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 | 1400 | 1400 | 1400 | 1500 | 1465 | 1477 | 1500 | 1500 | 1500 | 1488 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 104 | 301 | 18 | 239 | 339 | 76 | 5 | 44 | 151 | 194 | 226 | 238 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 1 | 0 | 0 |
| Cap, veh/h | 658 | 1129 | 67 | 808 | 721 | 775 | 293 | 49 | 167 | 275 | 428 | 436 |
| Arrive On Green | 0.06 | 0.44 | 0.44 | 0.14 | 0.65 | 0.65 | 0.01 | 0.16 | 0.16 | 0.13 | 0.29 | 0.29 |
| Sat Flow, veh/h | 1333 | 2551 | 152 | 1429 | 1465 | 1251 | 1429 | 297 | 1019 | 1417 | 1500 | 1271 |
| Grp Volume(v), veh/h | 104 | 156 | 163 | 239 | 339 | 76 | 5 | 0 | 195 | 194 | 226 | 238 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 1330 | 1373 | 1429 | 1465 | 1251 | 1429 | 0 | 1317 | 1417 | 1500 | 1271 |
| Q Serve(g_s), s | 5.1 | 8.9 | 9.0 | 10.7 | 13.9 | 2.1 | 0.3 | 0.0 | 17.4 | 13.2 | 15.2 | 18.2 |
| Cycle Q Clear(g_c), s | 5.1 | 8.9 | 9.0 | 10.7 | 13.9 | 2.1 | 0.3 | 0.0 | 17.4 | 13.2 | 15.2 | 18.2 |
| Prop In Lane | 1.00 | | 0.11 | 1.00 | | 1.00 | 1.00 | | 0.77 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 658 | 589 | 608 | 808 | 721 | 775 | 293 | 0 | 216 | 275 | 428 | 436 |
| V/C Ratio(X) | 0.16 | 0.27 | 0.27 | 0.30 | 0.47 | 0.10 | 0.02 | 0.00 | 0.90 | 0.71 | 0.53 | 0.55 |
| Avail Cap(c_a), veh/h | 714 | 589 | 608 | 833 | 721 | 775 | 344 | 0 | 241 | 307 | 438 | 444 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 0.96 | 0.96 | 0.96 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 16.5 | 21.1 | 21.2 | 13.6 | 12.9 | 6.2 | 41.4 | 0.0 | 49.2 | 35.0 | 36.1 | 31.9 |
| Incr Delay (d2), s/veh | 0.1 | 1.1 | 1.1 | 0.2 | 2.1 | 0.2 | 0.0 | 0.0 | 31.2 | 6.4 | 1.1 | 1.3 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.5 | 2.9 | 3.0 | 3.1 | 4.1 | 0.6 | 0.1 | 0.0 | 7.6 | 4.9 | 5.5 | 5.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 16.6 | 22.2 | 22.2 | 13.8 | 15.0 | 6.4 | 41.4 | 0.0 | 80.4 | 41.4 | 37.2 | 33.2 |
| LnGrp LOS | B | C | C | B | B | A | D | A | F | D | D | C |
| Approach Vol, veh/h | | 423 | | | 654 | | | 200 | | | 658 | |
| Approach Delay, s/veh | | 20.9 | | | 13.6 | | | 79.5 | | | 37.0 | |
| Approach LOS | | C | | | B | | | E | | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 16.9 | 59.1 | 4.8 | 39.2 | 10.9 | 65.1 | 19.3 | 24.7 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 15.0 | 46.0 | 5.0 | 35.0 | 12.0 | 49.0 | 18.0 | 22.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 12.7 | 11.0 | 2.3 | 20.2 | 7.1 | 15.9 | 15.2 | 19.4 | | | | |
| Green Ext Time (p_c), s | 0.2 | 1.8 | 0.0 | 1.8 | 0.1 | 2.3 | 0.1 | 0.3 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 29.9 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 2 2017 School
 10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 182 | 309 | 7 | 102 | 255 | 153 | 5 | 66 | 149 | 106 | 35 | 74 |
| Future Volume (veh/h) | 182 | 309 | 7 | 102 | 255 | 153 | 5 | 66 | 149 | 106 | 35 | 74 |
| 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 | 1339 | 1339 | 1339 | 1500 | 1465 | 1500 | 1500 | 1500 | 1500 | 1465 | 1465 | 1488 |
| Adj Flow Rate, veh/h | 207 | 351 | 8 | 116 | 290 | 174 | 6 | 75 | 169 | 120 | 40 | 84 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Percent Heavy Veh, % | 1 | 1 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | 3 | 1 |
| Cap, veh/h | 423 | 1272 | 29 | 488 | 670 | 685 | 276 | 83 | 186 | 194 | 404 | 475 |
| Arrive On Green | 0.10 | 0.50 | 0.50 | 0.08 | 0.61 | 0.61 | 0.01 | 0.20 | 0.20 | 0.08 | 0.28 | 0.28 |
| Sat Flow, veh/h | 1276 | 2544 | 58 | 1429 | 1465 | 1271 | 1429 | 410 | 924 | 1395 | 1465 | 1261 |
| Grp Volume(v), veh/h | 207 | 175 | 184 | 116 | 290 | 174 | 6 | 0 | 244 | 120 | 40 | 84 |
| Grp Sat Flow(s),veh/h/ln | 1276 | 1272 | 1329 | 1429 | 1465 | 1271 | 1429 | 0 | 1334 | 1395 | 1465 | 1261 |
| Q Serve(g_s), s | 9.9 | 9.6 | 9.6 | 5.2 | 12.6 | 6.7 | 0.4 | 0.0 | 21.4 | 7.9 | 2.4 | 5.3 |
| Cycle Q Clear(g_c), s | 9.9 | 9.6 | 9.6 | 5.2 | 12.6 | 6.7 | 0.4 | 0.0 | 21.4 | 7.9 | 2.4 | 5.3 |
| Prop In Lane | 1.00 | | 0.04 | 1.00 | | 1.00 | 1.00 | | 0.69 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 423 | 636 | 665 | 488 | 670 | 685 | 276 | 0 | 269 | 194 | 404 | 475 |
| V/C Ratio(X) | 0.49 | 0.28 | 0.28 | 0.24 | 0.43 | 0.25 | 0.02 | 0.00 | 0.91 | 0.62 | 0.10 | 0.18 |
| Avail Cap(c_a), veh/h | 475 | 636 | 665 | 488 | 670 | 685 | 325 | 0 | 333 | 220 | 452 | 516 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 0.96 | 0.96 | 0.96 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 14.2 | 17.4 | 17.4 | 15.1 | 15.2 | 10.3 | 37.7 | 0.0 | 46.8 | 34.8 | 32.4 | 25.0 |
| Incr Delay (d2), s/veh | 0.9 | 1.1 | 1.0 | 0.2 | 2.0 | 0.9 | 0.0 | 0.0 | 23.9 | 4.2 | 0.1 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.8 | 2.9 | 3.0 | 1.6 | 4.0 | 1.9 | 0.1 | 0.0 | 8.9 | 2.8 | 0.9 | 1.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 15.1 | 18.5 | 18.4 | 15.3 | 17.2 | 11.2 | 37.7 | 0.0 | 70.7 | 39.0 | 32.5 | 25.2 |
| LnGrp LOS | B | B | B | B | B | B | D | A | E | D | C | C |
| Approach Vol, veh/h | | 566 | | | 580 | | | 250 | | | 244 | |
| Approach Delay, s/veh | | 17.2 | | | 15.0 | | | 69.9 | | | 33.2 | |
| Approach LOS | | B | | | B | | | E | | | C | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 11.0 | 66.0 | 4.9 | 38.1 | 16.1 | 60.9 | 13.8 | 29.2 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 7.0 | 52.0 | 5.0 | 37.0 | 17.0 | 42.0 | 12.0 | 30.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 7.2 | 11.6 | 2.4 | 7.3 | 11.9 | 14.6 | 9.9 | 23.4 | | | | |
| Green Ext Time (p_c), s | 0.0 | 2.0 | 0.0 | 0.4 | 0.2 | 2.2 | 0.0 | 0.8 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 26.8 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 2 2017 PM
 10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 187 | 361 | 6 | 85 | 246 | 199 | 3 | 31 | 87 | 114 | 25 | 100 |
| Future Volume (veh/h) | 187 | 361 | 6 | 85 | 246 | 199 | 3 | 31 | 87 | 114 | 25 | 100 |
| 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 | 1389 | 1400 | 1400 | 1500 | 1488 | 1500 | 1500 | 1500 | 1500 | 1500 | 1453 | 1488 |
| Adj Flow Rate, veh/h | 199 | 384 | 6 | 90 | 262 | 212 | 3 | 33 | 93 | 121 | 27 | 106 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4 | 1 |
| Cap, veh/h | 508 | 1603 | 25 | 543 | 833 | 823 | 180 | 39 | 111 | 206 | 287 | 351 |
| Arrive On Green | 0.08 | 0.60 | 0.60 | 0.06 | 0.74 | 0.74 | 0.00 | 0.11 | 0.11 | 0.09 | 0.20 | 0.20 |
| Sat Flow, veh/h | 1323 | 2681 | 42 | 1429 | 1488 | 1271 | 1429 | 347 | 977 | 1429 | 1453 | 1261 |
| Grp Volume(v), veh/h | 199 | 190 | 200 | 90 | 262 | 212 | 3 | 0 | 126 | 121 | 27 | 106 |
| Grp Sat Flow(s),veh/h/ln | 1323 | 1330 | 1392 | 1429 | 1488 | 1271 | 1429 | 0 | 1324 | 1429 | 1453 | 1261 |
| Q Serve(g_s), s | 7.3 | 8.1 | 8.1 | 3.2 | 7.1 | 5.3 | 0.2 | 0.0 | 11.2 | 8.7 | 1.8 | 7.9 |
| Cycle Q Clear(g_c), s | 7.3 | 8.1 | 8.1 | 3.2 | 7.1 | 5.3 | 0.2 | 0.0 | 11.2 | 8.7 | 1.8 | 7.9 |
| Prop In Lane | 1.00 | | 0.03 | 1.00 | | 1.00 | 1.00 | | 0.74 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 508 | 795 | 833 | 543 | 833 | 823 | 180 | 0 | 151 | 206 | 287 | 351 |
| V/C Ratio(X) | 0.39 | 0.24 | 0.24 | 0.17 | 0.31 | 0.26 | 0.02 | 0.00 | 0.84 | 0.59 | 0.09 | 0.30 |
| Avail Cap(c_a), veh/h | 612 | 795 | 833 | 590 | 833 | 823 | 234 | 0 | 276 | 236 | 400 | 448 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 0.93 | 0.93 | 0.93 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 8.8 | 11.3 | 11.3 | 10.1 | 7.7 | 4.9 | 46.8 | 0.0 | 52.1 | 40.9 | 39.3 | 34.1 |
| Incr Delay (d2), s/veh | 0.5 | 0.7 | 0.7 | 0.1 | 0.9 | 0.7 | 0.0 | 0.0 | 11.4 | 2.9 | 0.1 | 0.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.0 | 2.4 | 2.5 | 1.0 | 2.1 | 1.4 | 0.1 | 0.0 | 4.2 | 3.1 | 0.6 | 2.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 9.3 | 12.0 | 12.0 | 10.2 | 8.6 | 5.6 | 46.8 | 0.0 | 63.4 | 43.7 | 39.5 | 34.6 |
| LnGrp LOS | A | B | B | B | A | A | D | A | E | D | D | C |
| Approach Vol, veh/h | | 589 | | | 564 | | | 129 | | | 254 | |
| Approach Delay, s/veh | | 11.1 | | | 7.7 | | | 63.0 | | | 39.5 | |
| Approach LOS | | B | | | A | | | E | | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 9.0 | 77.8 | 4.5 | 28.7 | 13.6 | 73.2 | 14.5 | 18.7 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 9.0 | 54.0 | 5.0 | 33.0 | 19.0 | 44.0 | 13.0 | 25.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 5.2 | 10.1 | 2.2 | 9.9 | 9.3 | 9.1 | 10.7 | 13.2 | | | | |
| Green Ext Time (p_c), s | 0.1 | 2.2 | 0.0 | 0.4 | 0.4 | 2.2 | 0.1 | 0.5 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 18.9 | | | | | | | | |
| HCM 6th LOS | | | | B | | | | | | | | |

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 3 2017 - AM
 01/11/2019



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 88 | 256 | 15 | 203 | 288 | 65 | 4 | 37 | 128 | 165 | 192 | 202 |
| Future Volume (veh/h) | 88 | 256 | 15 | 203 | 288 | 65 | 4 | 37 | 128 | 165 | 192 | 202 |
| 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 | 1400 | 1400 | 1400 | 1500 | 1465 | 1477 | 1500 | 1500 | 1465 | 1488 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 104 | 301 | 18 | 239 | 339 | 76 | 5 | 44 | 151 | 194 | 226 | 238 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 3 | 1 | 0 | 0 |
| Cap, veh/h | 725 | 1226 | 73 | 870 | 773 | 825 | 40 | 183 | 285 | 422 | 438 | 441 |
| Arrive On Green | 0.06 | 0.48 | 0.48 | 0.14 | 0.70 | 0.70 | 0.13 | 0.13 | 0.13 | 0.13 | 0.29 | 0.29 |
| Sat Flow, veh/h | 1333 | 2551 | 152 | 1429 | 1465 | 1251 | 54 | 1443 | 1241 | 1417 | 1500 | 1271 |
| Grp Volume(v), veh/h | 104 | 156 | 163 | 239 | 339 | 76 | 49 | 0 | 151 | 194 | 226 | 238 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 1330 | 1373 | 1429 | 1465 | 1251 | 1497 | 0 | 1241 | 1417 | 1500 | 1271 |
| Q Serve(g_s), s | 4.7 | 8.3 | 8.4 | 9.9 | 11.9 | 1.7 | 0.0 | 0.0 | 12.8 | 13.8 | 15.1 | 18.1 |
| Cycle Q Clear(g_c), s | 4.7 | 8.3 | 8.4 | 9.9 | 11.9 | 1.7 | 3.5 | 0.0 | 12.8 | 13.8 | 15.1 | 18.1 |
| Prop In Lane | 1.00 | | 0.11 | 1.00 | | 1.00 | 0.10 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 725 | 639 | 660 | 870 | 773 | 825 | 223 | 0 | 285 | 422 | 438 | 441 |
| V/C Ratio(X) | 0.14 | 0.24 | 0.25 | 0.27 | 0.44 | 0.09 | 0.22 | 0.00 | 0.53 | 0.46 | 0.52 | 0.54 |
| Avail Cap(c_a), veh/h | 796 | 639 | 660 | 938 | 773 | 825 | 307 | 0 | 355 | 424 | 525 | 515 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 0.96 | 0.96 | 0.96 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 14.2 | 18.3 | 18.4 | 11.7 | 10.2 | 4.6 | 47.3 | 0.0 | 40.5 | 36.7 | 35.4 | 31.5 |
| Incr Delay (d2), s/veh | 0.1 | 0.9 | 0.9 | 0.2 | 1.7 | 0.2 | 0.5 | 0.0 | 1.5 | 0.8 | 0.9 | 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 | 1.4 | 2.6 | 2.7 | 2.8 | 3.5 | 0.5 | 1.4 | 0.0 | 4.1 | 4.7 | 5.4 | 5.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 14.3 | 19.2 | 19.3 | 11.8 | 11.9 | 4.8 | 47.7 | 0.0 | 42.1 | 37.4 | 36.4 | 32.5 |
| LnGrp LOS | B | B | B | B | B | A | D | A | D | D | D | C |
| Approach Vol, veh/h | | 423 | | | 654 | | | 200 | | | 658 | |
| Approach Delay, s/veh | | 18.0 | | | 11.1 | | | 43.5 | | | 35.3 | |
| Approach LOS | | B | | | B | | | D | | | D | |
| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 16.3 | 63.7 | | 40.0 | 10.6 | 69.4 | 19.8 | 20.3 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 18.0 | 45.0 | | 42.0 | 13.0 | 50.0 | 16.0 | 22.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 11.9 | 10.4 | | 20.1 | 6.7 | 13.9 | 15.8 | 14.8 | | | | |
| Green Ext Time (p_c), s | 0.4 | 1.8 | | 2.0 | 0.1 | 2.3 | 0.0 | 0.4 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 24.2 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 3 2017 School
 01/11/2019



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|--|
| Lane Configurations | | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 182 | 309 | 7 | 102 | 255 | 153 | 5 | 66 | 149 | 106 | 35 | 74 | |
| Future Volume (veh/h) | 182 | 309 | 7 | 102 | 255 | 153 | 5 | 66 | 149 | 106 | 35 | 74 | |
| 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 | 1339 | 1339 | 1339 | 1500 | 1465 | 1500 | 1500 | 1500 | 1500 | 1465 | 1465 | 1488 | |
| Adj Flow Rate, veh/h | 207 | 351 | 8 | 116 | 290 | 174 | 6 | 75 | 169 | 120 | 40 | 84 | |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | |
| Percent Heavy Veh, % | 1 | 1 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | 3 | 1 | |
| Cap, veh/h | 467 | 1417 | 32 | 536 | 762 | 771 | 38 | 208 | 252 | 265 | 386 | 448 | |
| Arrive On Green | 0.09 | 0.56 | 0.56 | 0.07 | 0.69 | 0.69 | 0.14 | 0.14 | 0.14 | 0.09 | 0.26 | 0.26 | |
| Sat Flow, veh/h | 1276 | 2544 | 58 | 1429 | 1465 | 1271 | 38 | 1443 | 1271 | 1395 | 1465 | 1261 | |
| Grp Volume(v), veh/h | 207 | 175 | 184 | 116 | 290 | 174 | 81 | 0 | 169 | 120 | 40 | 84 | |
| Grp Sat Flow(s),veh/h/ln | 1276 | 1272 | 1329 | 1429 | 1465 | 1271 | 1482 | 0 | 1271 | 1395 | 1465 | 1261 | |
| Q Serve(g_s), s | 8.6 | 8.5 | 8.5 | 4.6 | 9.9 | 5.1 | 0.0 | 0.0 | 14.8 | 8.5 | 2.5 | 5.5 | |
| Cycle Q Clear(g_c), s | 8.6 | 8.5 | 8.5 | 4.6 | 9.9 | 5.1 | 5.9 | 0.0 | 14.8 | 8.5 | 2.5 | 5.5 | |
| Prop In Lane | 1.00 | | 0.04 | 1.00 | | 1.00 | 0.07 | | 1.00 | 1.00 | | 1.00 | |
| Lane Grp Cap(c), veh/h | 467 | 709 | 740 | 536 | 762 | 771 | 245 | 0 | 252 | 265 | 386 | 448 | |
| V/C Ratio(X) | 0.44 | 0.25 | 0.25 | 0.22 | 0.38 | 0.23 | 0.33 | 0.00 | 0.67 | 0.45 | 0.10 | 0.19 | |
| Avail Cap(c_a), veh/h | 553 | 709 | 740 | 601 | 762 | 771 | 315 | 0 | 313 | 296 | 488 | 536 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 0.96 | 0.96 | 0.96 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Uniform Delay (d), s/veh | 10.8 | 13.7 | 13.7 | 11.7 | 10.4 | 6.6 | 46.5 | 0.0 | 44.5 | 37.5 | 33.5 | 26.7 | |
| Incr Delay (d2), s/veh | 0.7 | 0.8 | 0.8 | 0.2 | 1.4 | 0.7 | 0.8 | 0.0 | 4.0 | 1.2 | 0.1 | 0.2 | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| %ile BackOfQ(50%),veh/ln | 2.3 | 2.5 | 2.6 | 1.4 | 3.0 | 1.4 | 2.3 | 0.0 | 5.0 | 2.9 | 0.9 | 0.0 | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 11.4 | 14.5 | 14.5 | 11.9 | 11.8 | 7.3 | 47.3 | 0.0 | 48.4 | 38.7 | 33.6 | 26.9 | |
| LnGrp LOS | B | B | B | B | B | A | D | A | D | D | C | C | |
| Approach Vol, veh/h | | 566 | | | 580 | | | 250 | | | 244 | | |
| Approach Delay, s/veh | | 13.4 | | | 10.5 | | | 48.1 | | | 33.8 | | |
| Approach LOS | | B | | | B | | | D | | | C | | |
| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | 7 | 8 | | | | | |
| Phs Duration (G+Y+Rc), s | 10.5 | 72.8 | | 36.6 | 15.0 | 68.4 | 14.4 | 22.3 | | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | | |
| Max Green Setting (Gmax), s | 12.0 | 53.0 | | 40.0 | 19.0 | 46.0 | 13.0 | 23.0 | | | | | |
| Max Q Clear Time (g_c+I1), s | 6.6 | 10.5 | | 7.5 | 10.6 | 11.9 | 10.5 | 16.8 | | | | | |
| Green Ext Time (p_c), s | 0.1 | 2.0 | | 0.4 | 0.3 | 2.3 | 0.1 | 0.5 | | | | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 20.7 | | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 3 2017 PM
 01/11/2019



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 187 | 361 | 6 | 85 | 246 | 199 | 3 | 31 | 87 | 114 | 25 | 100 |
| Future Volume (veh/h) | 187 | 361 | 6 | 85 | 246 | 199 | 3 | 31 | 87 | 114 | 25 | 100 |
| 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 | 1389 | 1400 | 1400 | 1500 | 1488 | 1500 | 1500 | 1500 | 1500 | 1500 | 1453 | 1488 |
| Adj Flow Rate, veh/h | 199 | 384 | 6 | 90 | 262 | 212 | 3 | 33 | 93 | 121 | 27 | 106 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4 | 1 |
| Cap, veh/h | 528 | 1671 | 26 | 564 | 874 | 861 | 36 | 127 | 163 | 255 | 307 | 363 |
| Arrive On Green | 0.08 | 0.62 | 0.62 | 0.05 | 0.78 | 0.78 | 0.09 | 0.09 | 0.09 | 0.09 | 0.21 | 0.21 |
| Sat Flow, veh/h | 1323 | 2681 | 42 | 1429 | 1488 | 1271 | 41 | 1438 | 1271 | 1429 | 1453 | 1261 |
| Grp Volume(v), veh/h | 199 | 190 | 200 | 90 | 262 | 212 | 36 | 0 | 93 | 121 | 27 | 106 |
| Grp Sat Flow(s),veh/h/ln | 1323 | 1330 | 1392 | 1429 | 1488 | 1271 | 1480 | 0 | 1271 | 1429 | 1453 | 1261 |
| Q Serve(g_s), s | 6.8 | 7.5 | 7.6 | 3.0 | 6.0 | 4.4 | 0.0 | 0.0 | 8.3 | 8.9 | 1.8 | 7.8 |
| Cycle Q Clear(g_c), s | 6.8 | 7.5 | 7.6 | 3.0 | 6.0 | 4.4 | 2.7 | 0.0 | 8.3 | 8.9 | 1.8 | 7.8 |
| Prop In Lane | 1.00 | | 0.03 | 1.00 | | 1.00 | 0.08 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 528 | 829 | 868 | 564 | 874 | 861 | 163 | 0 | 163 | 255 | 307 | 363 |
| V/C Ratio(X) | 0.38 | 0.23 | 0.23 | 0.16 | 0.30 | 0.25 | 0.22 | 0.00 | 0.57 | 0.47 | 0.09 | 0.29 |
| Avail Cap(c_a), veh/h | 647 | 829 | 868 | 614 | 874 | 861 | 300 | 0 | 284 | 281 | 472 | 506 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 0.93 | 0.93 | 0.93 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 7.6 | 9.9 | 9.9 | 8.8 | 6.1 | 3.7 | 51.1 | 0.0 | 49.2 | 42.6 | 38.0 | 33.2 |
| Incr Delay (d2), s/veh | 0.4 | 0.6 | 0.6 | 0.1 | 0.8 | 0.6 | 0.7 | 0.0 | 3.1 | 1.4 | 0.1 | 0.4 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.8 | 2.2 | 2.3 | 0.9 | 1.8 | 1.1 | 1.1 | 0.0 | 2.8 | 3.2 | 0.6 | 2.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 8.0 | 10.6 | 10.6 | 8.9 | 6.9 | 4.3 | 51.8 | 0.0 | 52.3 | 44.0 | 38.1 | 33.7 |
| LnGrp LOS | A | B | B | A | A | A | D | A | D | D | D | C |
| Approach Vol, veh/h | | 589 | | | 564 | | | 129 | | | 254 | |
| Approach Delay, s/veh | | 9.7 | | | 6.3 | | | 52.2 | | | 39.1 | |
| Approach LOS | | A | | | A | | | D | | | D | |
| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 8.8 | 80.8 | | 30.4 | 13.2 | 76.5 | 14.8 | 15.6 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 9.0 | 57.0 | | 39.0 | 20.0 | 46.0 | 13.0 | 22.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 5.0 | 9.6 | | 9.8 | 8.8 | 8.0 | 10.9 | 10.3 | | | | |
| Green Ext Time (p_c), s | 0.1 | 2.3 | | 0.4 | 0.4 | 2.2 | 0.0 | 0.3 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 16.9 |
| HCM 6th LOS | B |

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 4 2017 - AM
 01/16/2019



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 88 | 256 | 15 | 203 | 288 | 65 | 4 | 37 | 128 | 165 | 192 | 202 |
| Future Volume (veh/h) | 88 | 256 | 15 | 203 | 288 | 65 | 4 | 37 | 128 | 165 | 192 | 202 |
| 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 | 1400 | 1400 | 1400 | 1500 | 1465 | 1465 | 1500 | 1500 | 1465 | 1488 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 104 | 301 | 18 | 239 | 339 | 76 | 5 | 44 | 151 | 194 | 226 | 238 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 3 | 1 | 0 | 0 |
| Cap, veh/h | 809 | 1279 | 76 | 897 | 1240 | 275 | 38 | 201 | 174 | 421 | 433 | 434 |
| Arrive On Green | 0.05 | 0.50 | 0.50 | 0.13 | 0.73 | 0.73 | 0.14 | 0.14 | 0.14 | 0.12 | 0.29 | 0.29 |
| Sat Flow, veh/h | 1333 | 2551 | 152 | 1429 | 2265 | 501 | 62 | 1434 | 1241 | 1417 | 1500 | 1271 |
| Grp Volume(v), veh/h | 104 | 156 | 163 | 239 | 207 | 208 | 49 | 0 | 151 | 194 | 226 | 238 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 1330 | 1373 | 1429 | 1392 | 1375 | 1496 | 0 | 1241 | 1417 | 1500 | 1271 |
| Q Serve(g_s), s | 5.1 | 9.0 | 9.1 | 10.8 | 6.8 | 7.0 | 0.0 | 0.0 | 16.1 | 15.5 | 17.0 | 20.5 |
| Cycle Q Clear(g_c), s | 5.1 | 9.0 | 9.1 | 10.8 | 6.8 | 7.0 | 3.9 | 0.0 | 16.1 | 15.5 | 17.0 | 20.5 |
| Prop In Lane | 1.00 | | 0.11 | 1.00 | | 0.36 | 0.10 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 809 | 667 | 688 | 897 | 762 | 753 | 240 | 0 | 174 | 421 | 433 | 434 |
| V/C Ratio(X) | 0.13 | 0.23 | 0.24 | 0.27 | 0.27 | 0.28 | 0.20 | 0.00 | 0.87 | 0.46 | 0.52 | 0.55 |
| Avail Cap(c_a), veh/h | 907 | 667 | 688 | 1051 | 762 | 753 | 560 | 0 | 441 | 421 | 756 | 707 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 0.96 | 0.96 | 0.96 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 14.6 | 19.0 | 19.0 | 12.1 | 9.2 | 9.2 | 51.6 | 0.0 | 56.8 | 41.4 | 40.2 | 36.0 |
| Incr Delay (d2), s/veh | 0.1 | 0.8 | 0.8 | 0.2 | 0.8 | 0.9 | 0.4 | 0.0 | 12.0 | 0.8 | 1.0 | 1.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.5 | 2.9 | 3.0 | 3.1 | 2.0 | 2.1 | 1.5 | 0.0 | 5.7 | 5.4 | 6.3 | 6.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 14.6 | 19.8 | 19.9 | 12.3 | 10.1 | 10.1 | 52.0 | 0.0 | 68.8 | 42.2 | 41.2 | 37.1 |
| LnGrp LOS | B | B | B | B | B | B | D | A | E | D | D | D |
| Approach Vol, veh/h | | 423 | | | 654 | | | 200 | | | 658 | |
| Approach Delay, s/veh | | 18.6 | | | 10.9 | | | 64.7 | | | 40.0 | |
| Approach LOS | | B | | | B | | | E | | | D | |
| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 17.4 | 73.7 | | 44.0 | 11.1 | 79.9 | 20.0 | 24.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 28.0 | 24.0 | | 68.0 | 17.0 | 35.0 | 16.0 | 48.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 12.8 | 11.1 | | 22.5 | 7.1 | 9.0 | 17.5 | 18.1 | | | | |
| Green Ext Time (p_c), s | 0.6 | 1.3 | | 2.2 | 0.2 | 2.4 | 0.0 | 0.9 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 28.0 |
| HCM 6th LOS | C |

Notes

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

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 4 2017 School
 01/16/2019



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 182 | 309 | 7 | 102 | 255 | 153 | 5 | 66 | 149 | 106 | 35 | 74 |
| Future Volume (veh/h) | 182 | 309 | 7 | 102 | 255 | 153 | 5 | 66 | 149 | 106 | 35 | 74 |
| 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 | 1339 | 1339 | 1339 | 1500 | 1465 | 1465 | 1500 | 1500 | 1500 | 1465 | 1465 | 1488 |
| Adj Flow Rate, veh/h | 207 | 351 | 8 | 116 | 290 | 174 | 6 | 75 | 169 | 120 | 40 | 84 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Percent Heavy Veh, % | 1 | 1 | 1 | 0 | 3 | 3 | 0 | 0 | 0 | 3 | 3 | 1 |
| Cap, veh/h | 468 | 1391 | 32 | 527 | 860 | 502 | 38 | 223 | 196 | 274 | 400 | 463 |
| Arrive On Green | 0.09 | 0.55 | 0.55 | 0.07 | 0.68 | 0.68 | 0.15 | 0.15 | 0.15 | 0.09 | 0.27 | 0.27 |
| Sat Flow, veh/h | 1276 | 2544 | 58 | 1429 | 1692 | 987 | 38 | 1444 | 1271 | 1395 | 1465 | 1261 |
| Grp Volume(v), veh/h | 207 | 175 | 184 | 116 | 237 | 227 | 81 | 0 | 169 | 120 | 40 | 84 |
| Grp Sat Flow(s),veh/h/ln | 1276 | 1272 | 1329 | 1429 | 1392 | 1287 | 1482 | 0 | 1271 | 1395 | 1465 | 1261 |
| Q Serve(g_s), s | 8.9 | 8.7 | 8.7 | 4.7 | 8.6 | 9.0 | 0.0 | 0.0 | 15.6 | 8.4 | 2.4 | 5.4 |
| Cycle Q Clear(g_c), s | 8.9 | 8.7 | 8.7 | 4.7 | 8.6 | 9.0 | 5.8 | 0.0 | 15.6 | 8.4 | 2.4 | 5.4 |
| Prop In Lane | 1.00 | | 0.04 | 1.00 | | 0.77 | 0.07 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 468 | 696 | 727 | 527 | 707 | 654 | 261 | 0 | 196 | 274 | 400 | 463 |
| V/C Ratio(X) | 0.44 | 0.25 | 0.25 | 0.22 | 0.34 | 0.35 | 0.31 | 0.00 | 0.86 | 0.44 | 0.10 | 0.18 |
| Avail Cap(c_a), veh/h | 572 | 696 | 727 | 568 | 707 | 654 | 508 | 0 | 413 | 294 | 671 | 696 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 0.95 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 11.1 | 14.3 | 14.3 | 12.3 | 11.0 | 11.0 | 45.3 | 0.0 | 49.5 | 36.6 | 32.6 | 25.8 |
| Incr Delay (d2), s/veh | 0.7 | 0.9 | 0.8 | 0.2 | 1.2 | 1.4 | 0.7 | 0.0 | 10.5 | 1.1 | 0.1 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.4 | 2.6 | 2.7 | 1.4 | 2.5 | 2.5 | 2.2 | 0.0 | 5.5 | 2.9 | 0.9 | 1.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 11.8 | 15.2 | 15.1 | 12.5 | 12.2 | 12.4 | 46.0 | 0.0 | 60.0 | 37.7 | 32.7 | 26.0 |
| LnGrp LOS | B | B | B | B | B | B | D | A | E | D | C | C |
| Approach Vol, veh/h | | 566 | | | 580 | | | 250 | | | 244 | |
| Approach Delay, s/veh | | 13.9 | | | 12.3 | | | 55.4 | | | 32.8 | |
| Approach LOS | | B | | | B | | | E | | | C | |
| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 10.6 | 71.6 | | 37.8 | 15.2 | 67.0 | 14.2 | 23.5 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 10.0 | 40.0 | | 55.0 | 21.0 | 29.0 | 12.0 | 39.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 6.7 | 10.7 | | 7.4 | 10.9 | 11.0 | 10.4 | 17.6 | | | | |
| Green Ext Time (p_c), s | 0.1 | 2.0 | | 0.5 | 0.4 | 2.5 | 0.0 | 1.0 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 22.5 |
| HCM 6th LOS | C |

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 4 2017 PM
 01/16/2019



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|-------|------|------|------|-------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 187 | 361 | 6 | 85 | 346 | 199 | 3 | 31 | 87 | 114 | 25 | 100 |
| Future Volume (veh/h) | 187 | 361 | 6 | 85 | 346 | 199 | 3 | 31 | 87 | 114 | 25 | 100 |
| 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 | 1389 | 1400 | 1400 | 1500 | 1488 | 1488 | 1500 | 1500 | 1500 | 1500 | 1453 | 1488 |
| Adj Flow Rate, veh/h | 199 | 384 | 6 | 90 | 368 | 212 | 3 | 33 | 93 | 121 | 27 | 106 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 4 | 1 |
| Cap, veh/h | 496 | 1772 | 28 | 580 | 1095 | 621 | 30 | 128 | 113 | 241 | 296 | 341 |
| Arrive On Green | 0.07 | 0.66 | 0.66 | 0.05 | 0.84 | 0.84 | 0.09 | 0.09 | 0.09 | 0.09 | 0.20 | 0.20 |
| Sat Flow, veh/h | 1323 | 2681 | 42 | 1429 | 1739 | 986 | 40 | 1441 | 1271 | 1429 | 1453 | 1261 |
| Grp Volume(v), veh/h | 199 | 190 | 200 | 90 | 298 | 282 | 36 | 0 | 93 | 121 | 27 | 106 |
| Grp Sat Flow(s),veh/h/ln | 1323 | 1330 | 1392 | 1429 | 1414 | 1311 | 1481 | 0 | 1271 | 1429 | 1453 | 1261 |
| Q Serve(g_s), s | 7.7 | 8.5 | 8.5 | 3.4 | 7.1 | 7.3 | 0.0 | 0.0 | 10.8 | 11.2 | 2.3 | 10.0 |
| Cycle Q Clear(g_c), s | 7.7 | 8.5 | 8.5 | 3.4 | 7.1 | 7.3 | 3.4 | 0.0 | 10.8 | 11.2 | 2.3 | 10.0 |
| Prop In Lane | 1.00 | | 0.03 | 1.00 | | 0.75 | 0.08 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 496 | 879 | 920 | 580 | 890 | 825 | 157 | 0 | 113 | 241 | 296 | 341 |
| V/C Ratio(X) | 0.40 | 0.22 | 0.22 | 0.16 | 0.33 | 0.34 | 0.23 | 0.00 | 0.82 | 0.50 | 0.09 | 0.31 |
| Avail Cap(c_a), veh/h | 567 | 879 | 920 | 615 | 890 | 825 | 625 | 0 | 525 | 258 | 785 | 765 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 0.92 | 0.92 | 0.92 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 7.9 | 10.1 | 10.1 | 8.9 | 5.1 | 5.1 | 63.8 | 0.0 | 67.2 | 53.9 | 48.5 | 43.6 |
| Incr Delay (d2), s/veh | 0.5 | 0.6 | 0.5 | 0.1 | 0.9 | 1.0 | 0.7 | 0.0 | 13.7 | 1.6 | 0.1 | 0.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.1 | 2.5 | 2.7 | 1.0 | 2.0 | 1.9 | 1.3 | 0.0 | 4.0 | 4.1 | 0.8 | 3.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 8.4 | 10.6 | 10.6 | 9.0 | 6.0 | 6.1 | 64.5 | 0.0 | 80.9 | 55.5 | 48.6 | 44.1 |
| LnGrp LOS | A | B | B | A | A | A | E | A | F | E | D | D |
| Approach Vol, veh/h | | 589 | | | 670 | | | 129 | | | 254 | |
| Approach Delay, s/veh | | 9.9 | | | 6.5 | | | 76.4 | | | 50.0 | |
| Approach LOS | | A | | | A | | | E | | | D | |
| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 9.3 | 105.2 | | 35.5 | 14.0 | 100.5 | 17.2 | 18.3 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 9.0 | 45.0 | | 81.0 | 18.0 | 36.0 | 15.0 | 62.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 5.4 | 10.5 | | 12.0 | 9.7 | 9.3 | 13.2 | 12.8 | | | | |
| Green Ext Time (p_c), s | 0.1 | 2.2 | | 0.5 | 0.3 | 3.5 | 0.0 | 0.5 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 19.9 |
| HCM 6th LOS | B |

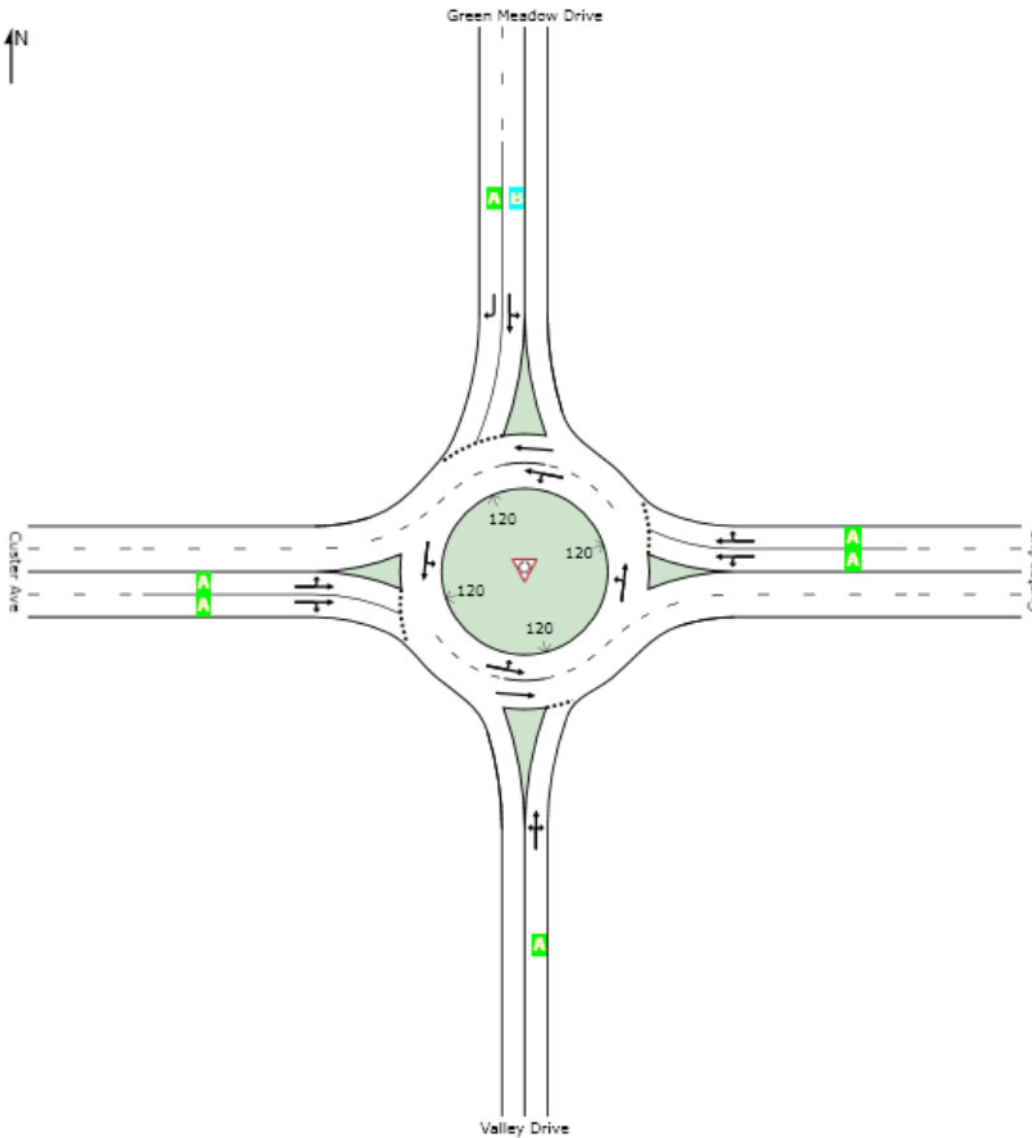
LEVEL OF SERVICE

 Site: Green Meadow 2017 AM Alternative 5

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | A | A | A | A | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Green Meadow 2017 AM Alternative 5

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Valley Drive | | | | | | | | | | | |
| 3 | L2 | 5 | 0.0 | 0.237 | 6.8 | LOS A | 0.9 | 23.4 | 0.55 | 0.54 | 34.9 |
| 8 | T1 | 43 | 0.0 | 0.237 | 6.8 | LOS A | 0.9 | 23.4 | 0.55 | 0.54 | 34.7 |
| 18 | R2 | 150 | 3.2 | 0.237 | 6.8 | LOS A | 0.9 | 23.4 | 0.55 | 0.54 | 33.5 |
| Approach | | 198 | 2.4 | 0.237 | 6.8 | LOS A | 0.9 | 23.4 | 0.55 | 0.54 | 33.7 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 238 | 0.5 | 0.280 | 5.7 | LOS A | 1.5 | 36.9 | 0.36 | 0.22 | 33.5 |
| 6 | T1 | 337 | 3.1 | 0.280 | 5.7 | LOS A | 1.5 | 36.9 | 0.35 | 0.22 | 34.7 |
| 16 | R2 | 76 | 1.5 | 0.280 | 5.7 | LOS A | 1.4 | 36.6 | 0.35 | 0.22 | 34.2 |
| Approach | | 651 | 2.0 | 0.280 | 5.7 | LOS A | 1.5 | 36.9 | 0.35 | 0.22 | 34.2 |
| North: Green Meadow Drive | | | | | | | | | | | |
| 7 | L2 | 193 | 0.6 | 0.488 | 10.6 | LOS B | 2.7 | 67.1 | 0.67 | 0.71 | 31.9 |
| 4 | T1 | 225 | 0.0 | 0.488 | 10.6 | LOS B | 2.7 | 67.1 | 0.67 | 0.71 | 31.7 |
| 14 | R2 | 237 | 0.0 | 0.302 | 8.1 | LOS A | 1.3 | 31.9 | 0.60 | 0.60 | 32.8 |
| Approach | | 655 | 0.2 | 0.488 | 9.7 | LOS A | 2.7 | 67.1 | 0.64 | 0.67 | 32.2 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 103 | 0.0 | 0.296 | 8.6 | LOS A | 1.3 | 32.6 | 0.65 | 0.65 | 32.8 |
| 2 | T1 | 300 | 0.4 | 0.296 | 8.7 | LOS A | 1.3 | 32.6 | 0.65 | 0.65 | 33.4 |
| 12 | R2 | 18 | 6.7 | 0.296 | 8.7 | LOS A | 1.3 | 32.5 | 0.65 | 0.65 | 32.6 |
| Approach | | 420 | 0.6 | 0.296 | 8.7 | LOS A | 1.3 | 32.6 | 0.65 | 0.65 | 33.2 |
| All Vehicles | | 1924 | 1.1 | 0.488 | 7.8 | LOS A | 2.7 | 67.1 | 0.54 | 0.50 | 33.2 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

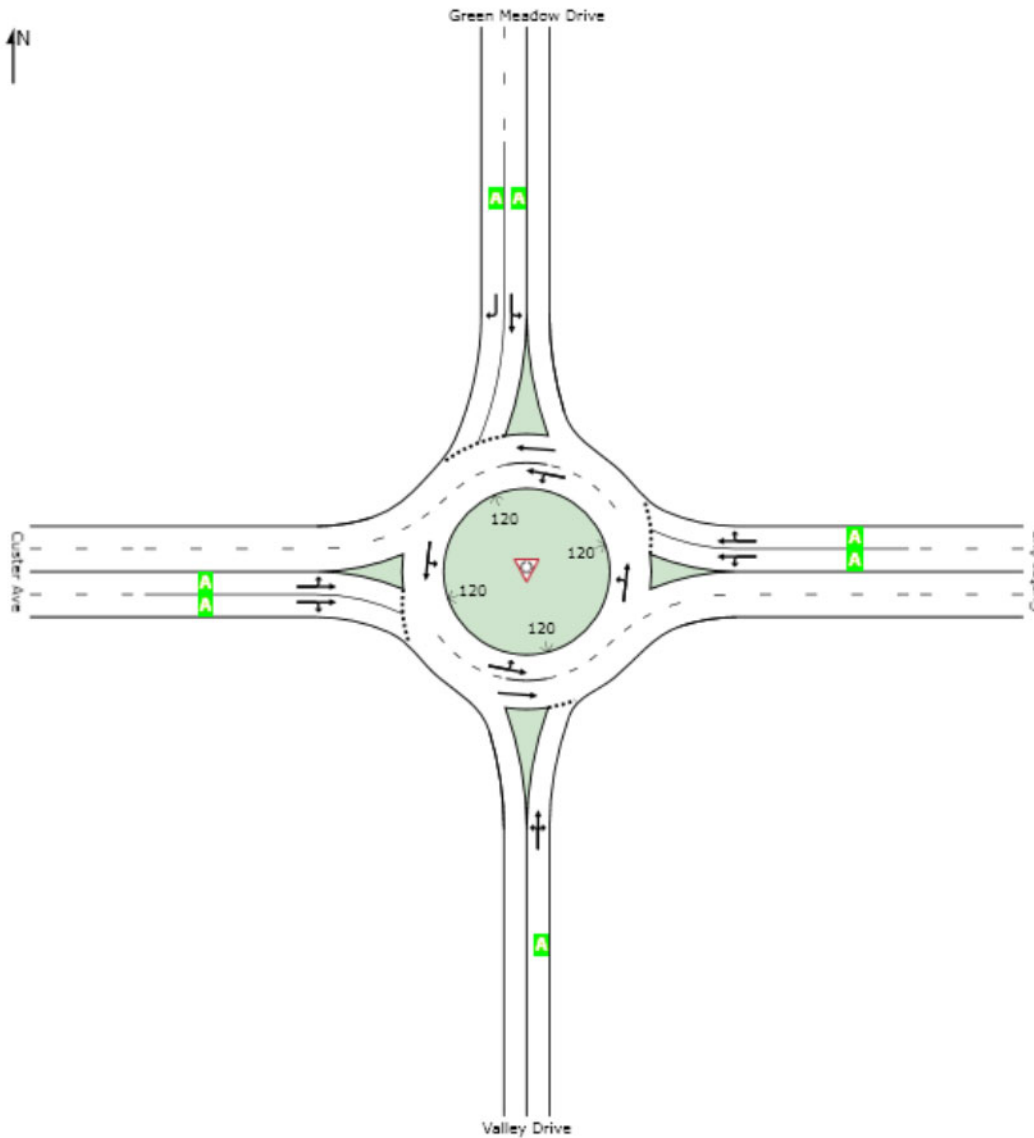
LEVEL OF SERVICE

 Site: Green Meadow 2017 School Alternative 5

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | A | A | A | A | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Green Meadow 2017 School Alternative 5

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Valley Drive | | | | | | | | | | | |
| 3 | L2 | 6 | 0.0 | 0.317 | 8.2 | LOS A | 1.3 | 32.5 | 0.61 | 0.61 | 34.2 |
| 8 | T1 | 75 | 0.0 | 0.317 | 8.2 | LOS A | 1.3 | 32.5 | 0.61 | 0.61 | 34.0 |
| 18 | R2 | 170 | 0.0 | 0.317 | 8.2 | LOS A | 1.3 | 32.5 | 0.61 | 0.61 | 32.9 |
| Approach | | 251 | 0.0 | 0.317 | 8.2 | LOS A | 1.3 | 32.5 | 0.61 | 0.61 | 33.2 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 116 | 0.0 | 0.285 | 6.4 | LOS A | 1.4 | 35.5 | 0.48 | 0.38 | 34.1 |
| 6 | T1 | 290 | 2.8 | 0.285 | 6.4 | LOS A | 1.4 | 35.6 | 0.48 | 0.38 | 34.2 |
| 16 | R2 | 174 | 0.0 | 0.285 | 6.4 | LOS A | 1.4 | 35.6 | 0.48 | 0.38 | 33.8 |
| Approach | | 581 | 1.4 | 0.285 | 6.4 | LOS A | 1.4 | 35.6 | 0.48 | 0.38 | 34.1 |
| North: Green Meadow Drive | | | | | | | | | | | |
| 7 | L2 | 121 | 2.8 | 0.166 | 5.3 | LOS A | 0.6 | 16.2 | 0.45 | 0.38 | 33.5 |
| 4 | T1 | 40 | 2.9 | 0.166 | 5.3 | LOS A | 0.6 | 16.2 | 0.45 | 0.38 | 33.3 |
| 14 | R2 | 84 | 1.4 | 0.093 | 4.9 | LOS A | 0.3 | 8.8 | 0.45 | 0.36 | 34.4 |
| Approach | | 245 | 2.3 | 0.166 | 5.1 | LOS A | 0.6 | 16.2 | 0.45 | 0.37 | 33.8 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 207 | 1.0 | 0.274 | 6.2 | LOS A | 1.4 | 34.0 | 0.47 | 0.36 | 33.2 |
| 2 | T1 | 352 | 0.6 | 0.274 | 6.2 | LOS A | 1.4 | 34.1 | 0.47 | 0.36 | 34.7 |
| 12 | R2 | 8 | 0.0 | 0.274 | 6.2 | LOS A | 1.4 | 34.1 | 0.47 | 0.36 | 34.0 |
| Approach | | 567 | 0.7 | 0.274 | 6.2 | LOS A | 1.4 | 34.1 | 0.47 | 0.36 | 34.1 |
| All Vehicles | | 1644 | 1.1 | 0.317 | 6.4 | LOS A | 1.4 | 35.6 | 0.49 | 0.41 | 33.9 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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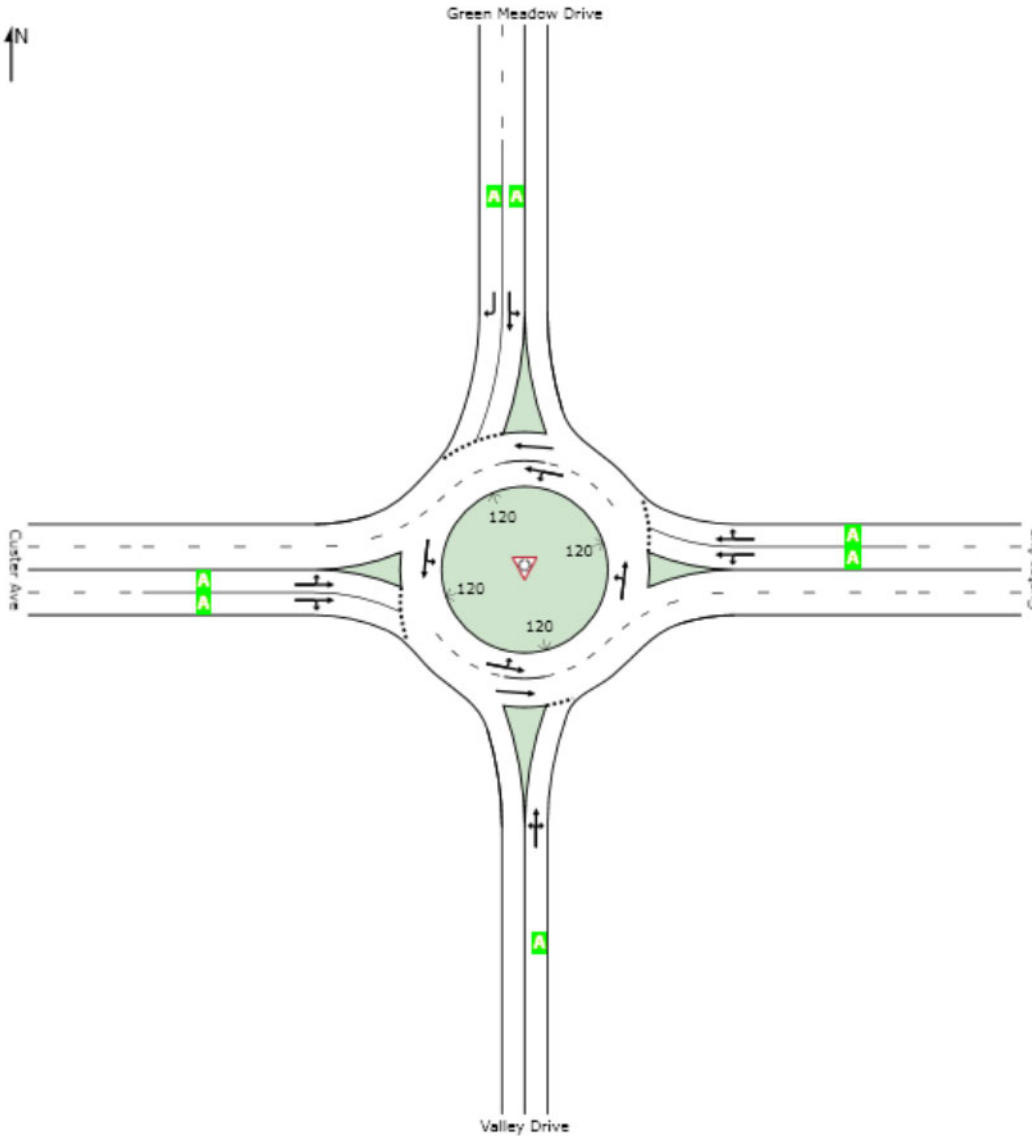
LEVEL OF SERVICE

 Site: Green Meadow 2017 PM Alternative 5

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | A | A | A | A | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Green Meadow 2017 PM Alternative 5

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Valley Drive | | | | | | | | | | | |
| 3 | L2 | 3 | 0.0 | 0.166 | 6.4 | LOS A | 0.6 | 15.4 | 0.56 | 0.56 | 25.0 |
| 8 | T1 | 33 | 0.0 | 0.166 | 6.4 | LOS A | 0.6 | 15.4 | 0.56 | 0.56 | 23.2 |
| 18 | R2 | 93 | 0.0 | 0.166 | 6.4 | LOS A | 0.6 | 15.4 | 0.56 | 0.56 | 23.6 |
| Approach | | 129 | 0.0 | 0.166 | 6.4 | LOS A | 0.6 | 15.4 | 0.56 | 0.56 | 23.5 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 91 | 0.0 | 0.310 | 6.4 | LOS A | 1.6 | 40.6 | 0.45 | 0.33 | 24.8 |
| 6 | T1 | 368 | 0.9 | 0.310 | 6.4 | LOS A | 1.6 | 40.7 | 0.46 | 0.33 | 23.1 |
| 16 | R2 | 212 | 0.0 | 0.310 | 6.4 | LOS A | 1.6 | 40.7 | 0.46 | 0.33 | 23.6 |
| Approach | | 671 | 0.5 | 0.310 | 6.4 | LOS A | 1.6 | 40.7 | 0.46 | 0.33 | 23.5 |
| North: Green Meadow Drive | | | | | | | | | | | |
| 7 | L2 | 121 | 0.0 | 0.156 | 5.3 | LOS A | 0.6 | 15.0 | 0.47 | 0.41 | 24.4 |
| 4 | T1 | 27 | 4.0 | 0.156 | 5.3 | LOS A | 0.6 | 15.0 | 0.47 | 0.41 | 22.7 |
| 14 | R2 | 106 | 1.0 | 0.122 | 5.3 | LOS A | 0.5 | 11.7 | 0.48 | 0.41 | 23.8 |
| Approach | | 255 | 0.8 | 0.156 | 5.3 | LOS A | 0.6 | 15.0 | 0.48 | 0.41 | 23.9 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 199 | 1.1 | 0.273 | 6.0 | LOS A | 1.4 | 34.4 | 0.44 | 0.32 | 24.4 |
| 2 | T1 | 384 | 0.0 | 0.273 | 5.9 | LOS A | 1.4 | 34.5 | 0.44 | 0.32 | 23.3 |
| 12 | R2 | 6 | 0.0 | 0.273 | 5.9 | LOS A | 1.4 | 34.5 | 0.44 | 0.32 | 23.9 |
| Approach | | 590 | 0.4 | 0.273 | 5.9 | LOS A | 1.4 | 34.5 | 0.44 | 0.32 | 23.7 |
| All Vehicles | | 1644 | 0.5 | 0.310 | 6.0 | LOS A | 1.6 | 40.7 | 0.46 | 0.36 | 23.6 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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HCM 6th Signalized Intersection Summary
3: Benton Ave & Custer Ave

Alternatives 1 2017 - AM
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 6 | 409 | 138 | 176 | 465 | 43 | 53 | 37 | 180 | 108 | 79 | 37 |
| Future Volume (veh/h) | 6 | 409 | 138 | 176 | 465 | 43 | 53 | 37 | 180 | 108 | 79 | 37 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1400 | 1389 | 1389 | 1477 | 1477 | 1477 | 1453 | 1371 | 1477 | 1465 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 7 | 470 | 159 | 202 | 534 | 49 | 61 | 43 | 207 | 124 | 91 | 43 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Percent Heavy Veh, % | 0 | 1 | 1 | 2 | 2 | 2 | 4 | 11 | 2 | 3 | 0 | 0 |
| Cap, veh/h | 481 | 721 | 665 | 499 | 934 | 791 | 324 | 230 | 310 | 395 | 185 | 87 |
| Arrive On Green | 0.52 | 0.52 | 0.52 | 0.05 | 0.42 | 0.42 | 0.05 | 0.17 | 0.17 | 0.07 | 0.19 | 0.19 |
| Sat Flow, veh/h | 1183 | 1389 | 1177 | 1406 | 1477 | 1251 | 1384 | 1371 | 1251 | 1395 | 963 | 455 |
| Grp Volume(v), veh/h | 7 | 470 | 159 | 202 | 534 | 49 | 61 | 43 | 207 | 124 | 0 | 134 |
| Grp Sat Flow(s),veh/h/ln | 1183 | 1389 | 1177 | 1406 | 1477 | 1251 | 1384 | 1371 | 1251 | 1395 | 0 | 1418 |
| Q Serve(g_s), s | 0.5 | 29.5 | 8.1 | 7.5 | 33.2 | 2.8 | 4.4 | 3.2 | 17.9 | 8.5 | 0.0 | 10.1 |
| Cycle Q Clear(g_c), s | 20.1 | 29.5 | 8.1 | 7.5 | 33.2 | 2.8 | 4.4 | 3.2 | 17.9 | 8.5 | 0.0 | 10.1 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.32 |
| Lane Grp Cap(c), veh/h | 481 | 721 | 665 | 499 | 934 | 791 | 324 | 230 | 310 | 395 | 0 | 273 |
| V/C Ratio(X) | 0.01 | 0.65 | 0.24 | 0.40 | 0.57 | 0.06 | 0.19 | 0.19 | 0.67 | 0.31 | 0.00 | 0.49 |
| Avail Cap(c_a), veh/h | 481 | 721 | 665 | 515 | 934 | 791 | 354 | 251 | 330 | 395 | 0 | 273 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.79 | 0.79 | 0.79 | 0.94 | 0.94 | 0.94 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 25.1 | 21.0 | 13.1 | 15.8 | 22.5 | 13.7 | 39.0 | 42.9 | 40.7 | 38.0 | 0.0 | 43.2 |
| Incr Delay (d2), s/veh | 0.0 | 3.6 | 0.7 | 0.5 | 2.4 | 0.1 | 0.3 | 0.4 | 4.7 | 0.4 | 0.0 | 1.4 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.1 | 9.9 | 2.2 | 2.4 | 12.8 | 0.8 | 1.5 | 1.1 | 5.9 | 3.1 | 0.0 | 3.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 25.1 | 24.6 | 13.8 | 16.3 | 24.9 | 13.8 | 39.3 | 43.3 | 45.4 | 38.4 | 0.0 | 44.6 |
| LnGrp LOS | C | C | B | B | C | B | D | D | D | D | A | D |
| Approach Vol, veh/h | | 636 | | | 785 | | | 311 | | | | 258 |
| Approach Delay, s/veh | | 21.9 | | | 22.0 | | | 43.9 | | | | 41.6 |
| Approach LOS | | C | | | C | | | D | | | | D |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 13.6 | 68.3 | 10.0 | 28.1 | | 81.9 | 13.0 | 25.1 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.5 | 5.0 | | 6.0 | 4.5 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 11.0 | 59.0 | 8.1 | 22.4 | | 74.0 | 8.5 | 22.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 9.5 | 31.5 | 6.4 | 12.1 | | 35.2 | 10.5 | 19.9 | | | | |
| Green Ext Time (p_c), s | 0.1 | 3.7 | 0.0 | 0.5 | | 3.9 | 0.0 | 0.2 | | | | |

Intersection Summary

























| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 27.9 |
| HCM 6th LOS | C |

Notes

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

HCM 6th Signalized Intersection Summary
3: Benton Ave & Custer Ave

Alternatives 1 2017 School
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h) | 20 | 468 | 87 | 246 | 397 | 58 | 98 | 66 | 293 | 43 | 35 | 14 |
| Future Volume (veh/h) | 20 | 468 | 87 | 246 | 397 | 58 | 98 | 66 | 293 | 43 | 35 | 14 |
| 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 | 1350 | 1339 | 1350 | 1500 | 1477 | 1500 | 1500 | 1477 | 1488 | 1500 | 1465 | 1465 |
| Adj Flow Rate, veh/h | 23 | 538 | 100 | 283 | 456 | 67 | 113 | 76 | 337 | 49 | 40 | 16 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Percent Heavy Veh, % | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 2 | 1 | 0 | 3 | 3 |
| Cap, veh/h | 333 | 686 | 660 | 328 | 961 | 828 | 282 | 271 | 364 | 221 | 155 | 62 |
| Arrive On Green | 0.51 | 0.51 | 0.51 | 0.07 | 0.43 | 0.43 | 0.06 | 0.18 | 0.18 | 0.04 | 0.16 | 0.16 |
| Sat Flow, veh/h | 635 | 1339 | 1144 | 1429 | 1477 | 1271 | 1429 | 1477 | 1261 | 1429 | 995 | 398 |
| Grp Volume(v), veh/h | 23 | 538 | 100 | 283 | 456 | 67 | 113 | 76 | 337 | 49 | 0 | 56 |
| Grp Sat Flow(s),veh/h/ln | 635 | 1339 | 1144 | 1429 | 1477 | 1271 | 1429 | 1477 | 1261 | 1429 | 0 | 1393 |
| Q Serve(g_s), s | 2.6 | 39.3 | 4.9 | 10.4 | 26.5 | 3.7 | 7.7 | 5.3 | 22.0 | 3.4 | 0.0 | 4.2 |
| Cycle Q Clear(g_c), s | 12.5 | 39.3 | 4.9 | 10.4 | 26.5 | 3.7 | 7.7 | 5.3 | 22.0 | 3.4 | 0.0 | 4.2 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.29 |
| Lane Grp Cap(c), veh/h | 333 | 686 | 660 | 328 | 961 | 828 | 282 | 271 | 364 | 221 | 0 | 217 |
| V/C Ratio(X) | 0.07 | 0.78 | 0.15 | 0.86 | 0.47 | 0.08 | 0.40 | 0.28 | 0.93 | 0.22 | 0.00 | 0.26 |
| Avail Cap(c_a), veh/h | 333 | 686 | 660 | 356 | 961 | 828 | 282 | 271 | 364 | 228 | 0 | 224 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.83 | 0.83 | 0.83 | 0.94 | 0.94 | 0.94 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 20.2 | 23.8 | 11.8 | 23.2 | 19.5 | 13.0 | 39.2 | 42.2 | 41.4 | 40.6 | 0.0 | 44.6 |
| Incr Delay (d2), s/veh | 0.3 | 7.3 | 0.4 | 17.3 | 1.6 | 0.2 | 0.9 | 0.6 | 29.2 | 0.5 | 0.0 | 0.6 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.4 | 13.2 | 1.3 | 5.9 | 10.1 | 1.1 | 2.8 | 2.0 | 12.4 | 1.3 | 0.0 | 1.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 20.6 | 31.2 | 12.2 | 40.5 | 21.1 | 13.2 | 40.2 | 42.7 | 70.6 | 41.1 | 0.0 | 45.2 |
| LnGrp LOS | C | C | B | D | C | B | D | D | E | D | A | D |
| Approach Vol, veh/h | | 661 | | | 806 | | | 526 | | | 105 | |
| Approach Delay, s/veh | | 27.9 | | | 27.2 | | | 60.1 | | | 43.3 | |
| Approach LOS | | C | | | C | | | E | | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 16.6 | 67.5 | 12.2 | 23.7 | | 84.1 | 8.9 | 27.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.5 | 5.0 | | 6.0 | 4.5 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 15.0 | 58.5 | 7.7 | 19.3 | | 77.5 | 5.0 | 22.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 12.4 | 41.3 | 9.7 | 6.2 | | 28.5 | 5.4 | 24.0 | | | | |
| Green Ext Time (p_c), s | 0.2 | 3.7 | 0.0 | 0.2 | | 3.3 | 0.0 | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 36.5 | | | | | | | | |
| HCM 6th LOS | | | | D | | | | | | | | |

HCM 6th Signalized Intersection Summary
3: Benton Ave & Custer Ave

Alternatives 1 2017 PM
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|-------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 9 | 493 | 70 | 216 | 484 | 103 | 146 | 95 | 408 | 53 | 42 | 9 |
| Future Volume (veh/h) | 9 | 493 | 70 | 216 | 484 | 103 | 146 | 95 | 408 | 53 | 42 | 9 |
| 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 | 1400 | 1400 | 1400 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 9 | 508 | 72 | 223 | 499 | 106 | 151 | 98 | 421 | 55 | 43 | 9 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 286 | 698 | 685 | 331 | 933 | 791 | 324 | 312 | 379 | 226 | 204 | 43 |
| Arrive On Green | 0.50 | 0.50 | 0.50 | 0.06 | 0.41 | 0.41 | 0.08 | 0.21 | 0.21 | 0.04 | 0.17 | 0.17 |
| Sat Flow, veh/h | 610 | 1400 | 1186 | 1429 | 1500 | 1271 | 1429 | 1500 | 1271 | 1429 | 1203 | 252 |
| Grp Volume(v), veh/h | 9 | 508 | 72 | 223 | 499 | 106 | 151 | 98 | 421 | 55 | 0 | 52 |
| Grp Sat Flow(s),veh/h/ln | 610 | 1400 | 1186 | 1429 | 1500 | 1271 | 1429 | 1500 | 1271 | 1429 | 0 | 1455 |
| Q Serve(g_s), s | 1.1 | 34.3 | 3.3 | 8.5 | 30.2 | 6.2 | 9.5 | 6.6 | 25.0 | 3.8 | 0.0 | 3.7 |
| Cycle Q Clear(g_c), s | 16.5 | 34.3 | 3.3 | 8.5 | 30.2 | 6.2 | 9.5 | 6.6 | 25.0 | 3.8 | 0.0 | 3.7 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.17 |
| Lane Grp Cap(c), veh/h | 286 | 698 | 685 | 331 | 933 | 791 | 324 | 313 | 379 | 226 | 0 | 247 |
| V/C Ratio(X) | 0.03 | 0.73 | 0.11 | 0.67 | 0.53 | 0.13 | 0.47 | 0.31 | 1.11 | 0.24 | 0.00 | 0.21 |
| Avail Cap(c_a), veh/h | 286 | 698 | 685 | 393 | 933 | 791 | 324 | 313 | 379 | 228 | 0 | 249 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.87 | 0.87 | 0.87 | 0.93 | 0.93 | 0.93 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 24.1 | 23.7 | 11.4 | 20.0 | 22.3 | 15.2 | 36.8 | 40.2 | 42.1 | 38.9 | 0.0 | 42.9 |
| Incr Delay (d2), s/veh | 0.2 | 5.7 | 0.3 | 3.3 | 2.0 | 0.3 | 1.0 | 0.6 | 79.4 | 0.6 | 0.0 | 0.4 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.2 | 12.0 | 0.9 | 3.0 | 11.8 | 1.9 | 3.7 | 2.5 | 19.3 | 1.4 | 0.0 | 1.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 24.3 | 29.4 | 11.7 | 23.3 | 24.3 | 15.5 | 37.8 | 40.8 | 121.5 | 39.5 | 0.0 | 43.3 |
| LnGrp LOS | C | C | B | C | C | B | D | D | F | D | A | D |
| Approach Vol, veh/h | | 589 | | | 828 | | | 670 | | | | 107 |
| Approach Delay, s/veh | | 27.2 | | | 22.9 | | | 90.8 | | | | 41.3 |
| Approach LOS | | C | | | C | | | F | | | | D |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 6 | 7 | 8 | | | | | |
| Phs Duration (G+Y+Rc), s | 14.8 | 65.8 | 14.0 | 25.4 | 80.6 | 9.4 | 30.0 | | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.5 | 5.0 | 6.0 | 4.5 | 5.0 | | | | | |
| Max Green Setting (Gmax), s | 16.0 | 54.5 | 9.5 | 20.5 | 74.5 | 5.0 | 25.0 | | | | | |
| Max Q Clear Time (g_c+I1), s | 10.5 | 36.3 | 11.5 | 5.7 | 32.2 | 5.8 | 27.0 | | | | | |
| Green Ext Time (p_c), s | 0.3 | 3.3 | 0.0 | 0.1 | 3.8 | 0.0 | 0.0 | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 45.7 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |

HCM 6th Signalized Intersection Summary
3: Benton Ave & Custer Ave

Alternatives 2 2017 - AM
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 6 | 409 | 138 | 176 | 465 | 43 | 53 | 37 | 180 | 108 | 79 | 37 |
| Future Volume (veh/h) | 6 | 409 | 138 | 176 | 465 | 43 | 53 | 37 | 180 | 108 | 79 | 37 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1400 | 1389 | 1389 | 1477 | 1477 | 1477 | 1453 | 1371 | 1477 | 1465 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 7 | 470 | 159 | 202 | 534 | 49 | 61 | 43 | 207 | 124 | 91 | 43 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Percent Heavy Veh, % | 0 | 1 | 1 | 2 | 2 | 2 | 4 | 11 | 2 | 3 | 0 | 0 |
| Cap, veh/h | 711 | 1113 | 374 | 686 | 1772 | 162 | 188 | 197 | 274 | 261 | 109 | 52 |
| Arrive On Green | 0.57 | 0.57 | 0.57 | 0.05 | 0.45 | 0.45 | 0.07 | 0.14 | 0.14 | 0.04 | 0.11 | 0.11 |
| Sat Flow, veh/h | 1183 | 1940 | 652 | 1406 | 2599 | 238 | 1384 | 1371 | 1251 | 1395 | 963 | 455 |
| Grp Volume(v), veh/h | 7 | 319 | 310 | 202 | 288 | 295 | 61 | 43 | 207 | 124 | 0 | 134 |
| Grp Sat Flow(s),veh/h/ln | 1183 | 1320 | 1272 | 1406 | 1403 | 1434 | 1384 | 1371 | 1251 | 1395 | 0 | 1418 |
| Q Serve(g_s), s | 0.3 | 16.3 | 16.5 | 6.6 | 15.7 | 15.7 | 0.0 | 3.3 | 14.8 | 0.0 | 0.0 | 11.1 |
| Cycle Q Clear(g_c), s | 3.1 | 16.3 | 16.5 | 6.6 | 15.7 | 15.7 | 0.0 | 3.3 | 14.8 | 0.0 | 0.0 | 11.1 |
| Prop In Lane | 1.00 | | 0.51 | 1.00 | | 0.17 | 1.00 | | 1.00 | 1.00 | | 0.32 |
| Lane Grp Cap(c), veh/h | 711 | 757 | 729 | 686 | 956 | 977 | 188 | 197 | 274 | 261 | 0 | 161 |
| V/C Ratio(X) | 0.01 | 0.42 | 0.43 | 0.29 | 0.30 | 0.30 | 0.32 | 0.22 | 0.76 | 0.47 | 0.00 | 0.83 |
| Avail Cap(c_a), veh/h | 711 | 757 | 729 | 827 | 956 | 977 | 188 | 251 | 323 | 321 | 0 | 295 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.90 | 0.90 | 0.90 | 0.94 | 0.94 | 0.94 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 12.2 | 14.4 | 14.4 | 9.8 | 14.8 | 14.8 | 51.3 | 45.4 | 28.4 | 49.4 | 0.0 | 52.1 |
| Incr Delay (d2), s/veh | 0.0 | 1.5 | 1.6 | 0.2 | 0.8 | 0.7 | 1.0 | 0.5 | 8.3 | 1.3 | 0.0 | 10.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.1 | 5.0 | 4.9 | 2.0 | 5.6 | 5.8 | 1.8 | 1.2 | 5.0 | 3.6 | 0.0 | 4.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 12.2 | 15.9 | 16.1 | 10.0 | 15.6 | 15.6 | 52.3 | 45.9 | 36.7 | 50.7 | 0.0 | 62.6 |
| LnGrp LOS | B | B | B | B | B | B | D | D | D | D | A | E |
| Approach Vol, veh/h | | 636 | | | 785 | | | 311 | | | | 258 |
| Approach Delay, s/veh | | 16.0 | | | 14.1 | | | 41.0 | | | | 56.9 |
| Approach LOS | | B | | | B | | | D | | | | E |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 13.0 | 74.8 | 13.6 | 18.6 | | 87.8 | 9.9 | 22.3 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 5.0 | 5.0 | | 6.0 | 5.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 21.0 | 47.0 | 7.0 | 25.0 | | 72.0 | 10.0 | 22.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 8.6 | 18.5 | 2.0 | 13.1 | | 17.7 | 2.0 | 16.8 | | | | |
| Green Ext Time (p_c), s | 0.4 | 4.2 | 0.0 | 0.5 | | 3.9 | 0.2 | 0.4 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 24.5 |
| HCM 6th LOS | C |

Notes

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

HCM 6th Signalized Intersection Summary
3: Benton Ave & Custer Ave

Alternatives 2 2017 School
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 20 | 468 | 87 | 246 | 397 | 58 | 98 | 66 | 293 | 43 | 35 | 14 |
| Future Volume (veh/h) | 20 | 468 | 87 | 246 | 397 | 58 | 98 | 66 | 293 | 43 | 35 | 14 |
| 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 | 1350 | 1339 | 1339 | 1500 | 1477 | 1477 | 1500 | 1477 | 1488 | 1500 | 1465 | 1465 |
| Adj Flow Rate, veh/h | 23 | 538 | 100 | 283 | 456 | 67 | 113 | 76 | 337 | 49 | 40 | 16 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Percent Heavy Veh, % | 0 | 1 | 1 | 0 | 2 | 2 | 0 | 2 | 1 | 0 | 3 | 3 |
| Cap, veh/h | 366 | 1034 | 191 | 419 | 1548 | 226 | 305 | 295 | 397 | 234 | 157 | 63 |
| Arrive On Green | 0.48 | 0.48 | 0.48 | 0.08 | 0.42 | 0.42 | 0.08 | 0.20 | 0.20 | 0.04 | 0.16 | 0.16 |
| Sat Flow, veh/h | 635 | 2144 | 397 | 1429 | 2456 | 359 | 1429 | 1477 | 1261 | 1429 | 995 | 398 |
| Grp Volume(v), veh/h | 23 | 319 | 319 | 283 | 259 | 264 | 113 | 76 | 337 | 49 | 0 | 56 |
| Grp Sat Flow(s),veh/h/ln | 635 | 1272 | 1268 | 1429 | 1403 | 1412 | 1429 | 1477 | 1261 | 1429 | 0 | 1393 |
| Q Serve(g_s), s | 2.3 | 20.7 | 20.9 | 11.0 | 14.8 | 14.9 | 7.7 | 5.2 | 24.0 | 3.4 | 0.0 | 4.2 |
| Cycle Q Clear(g_c), s | 2.3 | 20.7 | 20.9 | 11.0 | 14.8 | 14.9 | 7.7 | 5.2 | 24.0 | 3.4 | 0.0 | 4.2 |
| Prop In Lane | 1.00 | | 0.31 | 1.00 | | 0.25 | 1.00 | | 1.00 | 1.00 | | 0.29 |
| Lane Grp Cap(c), veh/h | 366 | 614 | 612 | 419 | 884 | 890 | 305 | 295 | 397 | 234 | 0 | 219 |
| V/C Ratio(X) | 0.06 | 0.52 | 0.52 | 0.68 | 0.29 | 0.30 | 0.37 | 0.26 | 0.85 | 0.21 | 0.00 | 0.26 |
| Avail Cap(c_a), veh/h | 366 | 614 | 612 | 589 | 884 | 890 | 311 | 295 | 397 | 242 | 0 | 221 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.95 | 0.95 | 0.95 | 0.94 | 0.94 | 0.94 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 16.7 | 21.4 | 21.5 | 15.9 | 17.3 | 17.3 | 36.5 | 40.5 | 38.5 | 40.4 | 0.0 | 44.4 |
| Incr Delay (d2), s/veh | 0.3 | 3.0 | 3.0 | 1.8 | 0.8 | 0.8 | 0.7 | 0.5 | 15.9 | 0.4 | 0.0 | 0.6 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.4 | 6.5 | 6.6 | 3.8 | 5.3 | 5.4 | 2.7 | 1.9 | 10.8 | 1.3 | 0.0 | 1.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 17.0 | 24.4 | 24.5 | 17.7 | 18.1 | 18.1 | 37.3 | 40.9 | 54.4 | 40.8 | 0.0 | 45.0 |
| LnGrp LOS | B | C | C | B | B | B | D | D | D | D | A | D |
| Approach Vol, veh/h | | 661 | | | 806 | | | 526 | | | 105 | |
| Approach Delay, s/veh | | 24.2 | | | 17.9 | | | 48.7 | | | 43.0 | |
| Approach LOS | | C | | | B | | | D | | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 17.7 | 63.9 | 14.5 | 23.9 | | 81.6 | 9.4 | 29.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 5.0 | 5.0 | | 6.0 | 5.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 28.0 | 43.0 | 10.0 | 19.0 | | 75.0 | 5.0 | 24.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 13.0 | 22.9 | 9.7 | 6.2 | | 16.9 | 5.4 | 26.0 | | | | |
| Green Ext Time (p_c), s | 0.7 | 4.0 | 0.0 | 0.2 | | 3.4 | 0.0 | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 28.9 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM 6th Signalized Intersection Summary
3: Benton Ave & Custer Ave

Alternatives 2 2017 PM
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|-------|------|------|------|
| Lane Configurations | ↖ | ↗ | | ↖ | ↗ | | ↖ | ↑ | ↗ | ↖ | ↗ | |
| Traffic Volume (veh/h) | 9 | 493 | 70 | 216 | 484 | 103 | 146 | 95 | 408 | 53 | 42 | 9 |
| Future Volume (veh/h) | 9 | 493 | 70 | 216 | 484 | 103 | 146 | 95 | 408 | 53 | 42 | 9 |
| 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 | 1400 | 1400 | 1400 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 9 | 508 | 72 | 223 | 499 | 106 | 151 | 98 | 421 | 55 | 43 | 9 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 346 | 1148 | 162 | 426 | 1445 | 305 | 331 | 312 | 383 | 225 | 180 | 38 |
| Arrive On Green | 0.49 | 0.49 | 0.49 | 0.06 | 0.41 | 0.41 | 0.10 | 0.21 | 0.21 | 0.04 | 0.15 | 0.15 |
| Sat Flow, veh/h | 610 | 2340 | 330 | 1429 | 2341 | 495 | 1429 | 1500 | 1271 | 1429 | 1203 | 252 |
| Grp Volume(v), veh/h | 9 | 288 | 292 | 223 | 303 | 302 | 151 | 98 | 421 | 55 | 0 | 52 |
| Grp Sat Flow(s),veh/h/ln | 610 | 1330 | 1341 | 1429 | 1425 | 1411 | 1429 | 1500 | 1271 | 1429 | 0 | 1455 |
| Q Serve(g_s), s | 1.0 | 16.9 | 17.0 | 8.6 | 17.6 | 17.7 | 10.4 | 6.6 | 25.0 | 3.9 | 0.0 | 3.8 |
| Cycle Q Clear(g_c), s | 3.5 | 16.9 | 17.0 | 8.6 | 17.6 | 17.7 | 10.4 | 6.6 | 25.0 | 3.9 | 0.0 | 3.8 |
| Prop In Lane | 1.00 | | 0.25 | 1.00 | | 0.35 | 1.00 | | 1.00 | 1.00 | | 0.17 |
| Lane Grp Cap(c), veh/h | 346 | 652 | 658 | 426 | 879 | 871 | 331 | 313 | 383 | 225 | 0 | 218 |
| V/C Ratio(X) | 0.03 | 0.44 | 0.44 | 0.52 | 0.34 | 0.35 | 0.46 | 0.31 | 1.10 | 0.24 | 0.00 | 0.24 |
| Avail Cap(c_a), veh/h | 346 | 652 | 658 | 638 | 879 | 871 | 331 | 313 | 383 | 237 | 0 | 230 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.96 | 0.96 | 0.96 | 0.93 | 0.93 | 0.93 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 17.2 | 19.9 | 19.9 | 14.1 | 18.8 | 18.9 | 36.3 | 40.2 | 41.9 | 40.9 | 0.0 | 45.0 |
| Incr Delay (d2), s/veh | 0.1 | 2.1 | 2.1 | 0.9 | 1.0 | 1.0 | 1.0 | 0.6 | 75.0 | 0.6 | 0.0 | 0.6 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.1 | 5.5 | 5.6 | 2.9 | 6.5 | 6.5 | 3.7 | 2.5 | 19.1 | 1.4 | 0.0 | 1.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 17.3 | 22.0 | 22.0 | 15.0 | 19.8 | 19.9 | 37.3 | 40.8 | 116.9 | 41.4 | 0.0 | 45.6 |
| LnGrp LOS | B | C | C | B | B | B | D | D | F | D | A | D |
| Approach Vol, veh/h | | 589 | | | 828 | | | 670 | | | | 107 |
| Approach Delay, s/veh | | 21.9 | | | 18.6 | | | 87.8 | | | | 43.4 |
| Approach LOS | | C | | | B | | | F | | | | D |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 6 | 7 | 8 | | | | | |
| Phs Duration (G+Y+Rc), s | 15.2 | 64.9 | 17.0 | 22.9 | 80.1 | 9.9 | 30.0 | | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 5.0 | 5.0 | 6.0 | 5.0 | 5.0 | | | | | |
| Max Green Setting (Gmax), s | 29.0 | 40.0 | 12.0 | 19.0 | 73.0 | 6.0 | 25.0 | | | | | |
| Max Q Clear Time (g_c+I1), s | 10.6 | 19.0 | 12.4 | 5.8 | 19.7 | 5.9 | 27.0 | | | | | |
| Green Ext Time (p_c), s | 0.6 | 3.5 | 0.0 | 0.1 | 4.1 | 0.0 | 0.0 | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 41.8 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |

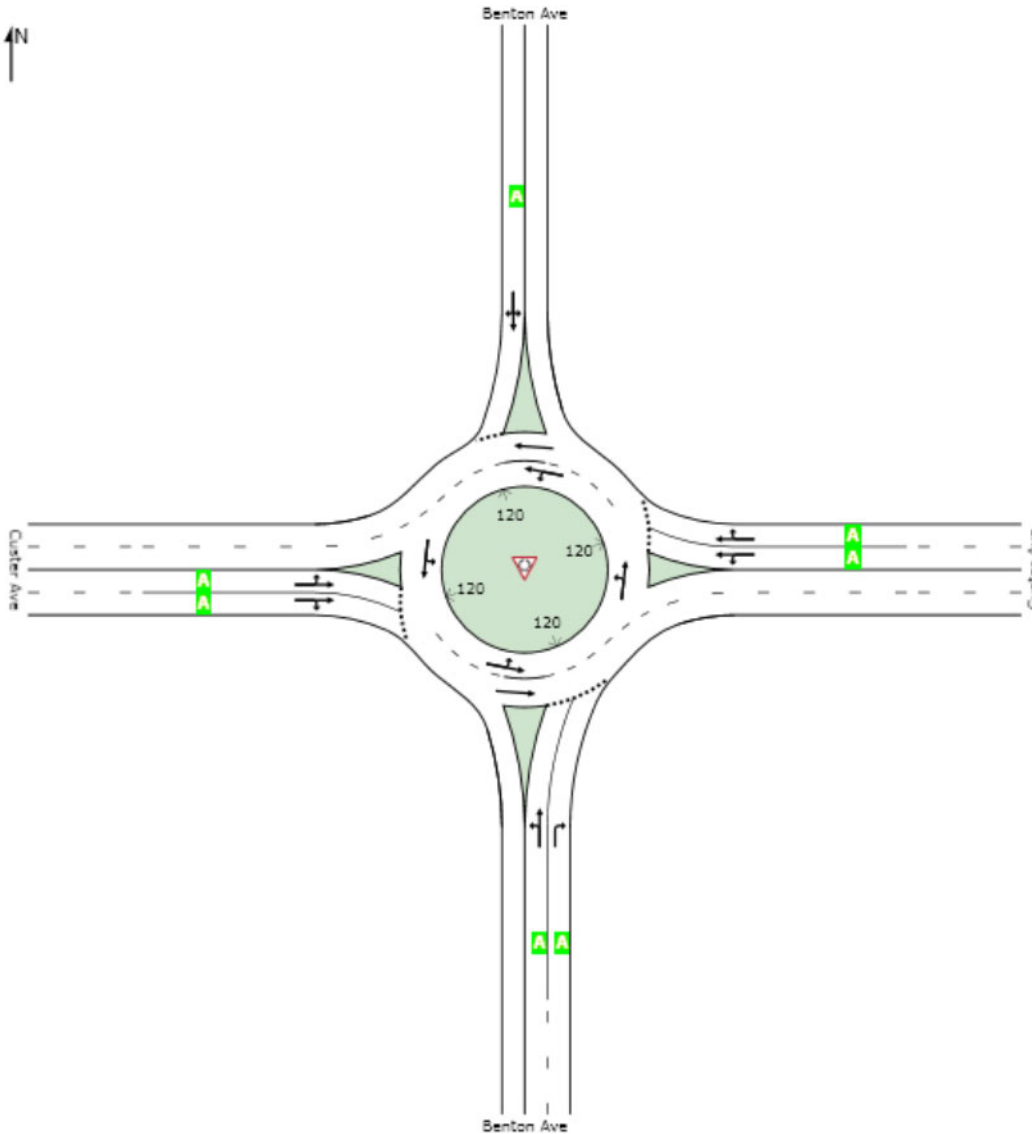
LEVEL OF SERVICE

 Site: Benton 2017 AM Alternative 3

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | A | A | A | A | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Benton 2017 AM Alternative 3

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Benton Ave | | | | | | | | | | | |
| 3 | L2 | 61 | 3.8 | 0.144 | 6.6 | LOS A | 0.5 | 13.4 | 0.54 | 0.52 | 33.3 |
| 8 | T1 | 43 | 10.8 | 0.144 | 6.6 | LOS A | 0.5 | 13.4 | 0.54 | 0.52 | 33.0 |
| 18 | R2 | 208 | 2.2 | 0.251 | 7.1 | LOS A | 1.0 | 25.0 | 0.56 | 0.55 | 33.2 |
| Approach | | 311 | 3.7 | 0.251 | 6.9 | LOS A | 1.0 | 25.0 | 0.55 | 0.54 | 33.2 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 203 | 1.7 | 0.327 | 6.1 | LOS A | 1.8 | 46.2 | 0.33 | 0.19 | 33.9 |
| 6 | T1 | 536 | 1.7 | 0.327 | 6.1 | LOS A | 1.8 | 46.2 | 0.33 | 0.19 | 34.6 |
| 16 | R2 | 50 | 2.3 | 0.327 | 6.1 | LOS A | 1.8 | 46.2 | 0.33 | 0.19 | 34.0 |
| Approach | | 789 | 1.7 | 0.327 | 6.1 | LOS A | 1.8 | 46.2 | 0.33 | 0.19 | 34.4 |
| North: Benton Ave | | | | | | | | | | | |
| 7 | L2 | 125 | 2.8 | 0.369 | 10.0 | LOS A | 1.6 | 40.0 | 0.66 | 0.68 | 32.1 |
| 4 | T1 | 91 | 0.0 | 0.369 | 10.0 | LOS A | 1.6 | 40.0 | 0.66 | 0.68 | 31.9 |
| 14 | R2 | 43 | 0.0 | 0.369 | 10.0 | LOS A | 1.6 | 40.0 | 0.66 | 0.68 | 31.0 |
| Approach | | 258 | 1.4 | 0.369 | 10.0 | LOS A | 1.6 | 40.0 | 0.66 | 0.68 | 31.8 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 7 | 0.0 | 0.358 | 8.0 | LOS A | 1.8 | 44.9 | 0.60 | 0.55 | 34.4 |
| 2 | T1 | 472 | 1.0 | 0.358 | 8.1 | LOS A | 1.8 | 44.9 | 0.60 | 0.55 | 34.1 |
| 12 | R2 | 159 | 1.4 | 0.358 | 8.1 | LOS A | 1.8 | 44.9 | 0.60 | 0.55 | 32.9 |
| Approach | | 638 | 1.1 | 0.358 | 8.1 | LOS A | 1.8 | 44.9 | 0.60 | 0.55 | 33.8 |
| All Vehicles | | 1997 | 1.8 | 0.369 | 7.3 | LOS A | 1.8 | 46.2 | 0.49 | 0.42 | 33.7 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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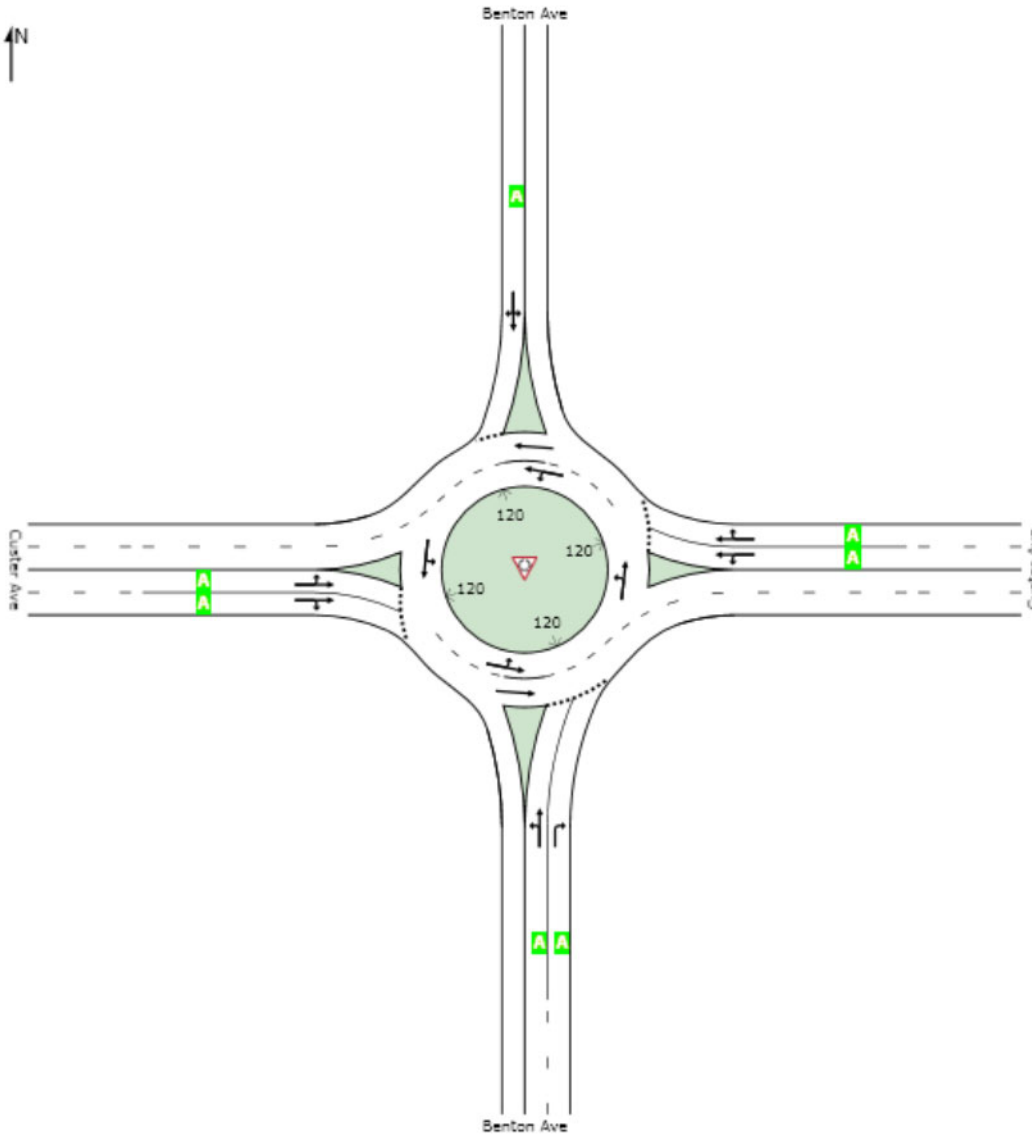
LEVEL OF SERVICE

 Site: Benton 2017 School Alternative 3

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | A | A | A | A | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Benton 2017 School Alternative 3

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Benton Ave | | | | | | | | | | | |
| 3 | L2 | 113 | 0.0 | 0.247 | 7.5 | LOS A | 1.0 | 24.9 | 0.58 | 0.58 | 33.0 |
| 8 | T1 | 76 | 1.5 | 0.247 | 7.5 | LOS A | 1.0 | 24.9 | 0.58 | 0.58 | 32.7 |
| 18 | R2 | 336 | 1.0 | 0.404 | 9.2 | LOS A | 1.9 | 47.9 | 0.63 | 0.65 | 32.2 |
| Approach | | 525 | 0.9 | 0.404 | 8.6 | LOS A | 1.9 | 47.9 | 0.61 | 0.63 | 32.5 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 282 | 0.4 | 0.365 | 6.9 | LOS A | 2.0 | 51.5 | 0.46 | 0.33 | 32.9 |
| 6 | T1 | 456 | 2.1 | 0.365 | 7.0 | LOS A | 2.0 | 51.5 | 0.46 | 0.33 | 34.1 |
| 16 | R2 | 67 | 0.0 | 0.365 | 7.0 | LOS A | 2.0 | 51.2 | 0.46 | 0.33 | 33.6 |
| Approach | | 805 | 1.3 | 0.365 | 7.0 | LOS A | 2.0 | 51.5 | 0.46 | 0.33 | 33.6 |
| North: Benton Ave | | | | | | | | | | | |
| 7 | L2 | 49 | 0.0 | 0.156 | 7.1 | LOS A | 0.6 | 14.0 | 0.59 | 0.59 | 33.5 |
| 4 | T1 | 40 | 2.9 | 0.156 | 7.1 | LOS A | 0.6 | 14.0 | 0.59 | 0.59 | 33.2 |
| 14 | R2 | 16 | 0.0 | 0.156 | 7.1 | LOS A | 0.6 | 14.0 | 0.59 | 0.59 | 32.2 |
| Approach | | 106 | 1.1 | 0.156 | 7.1 | LOS A | 0.6 | 14.0 | 0.59 | 0.59 | 33.2 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 23 | 0.0 | 0.351 | 7.6 | LOS A | 1.8 | 44.8 | 0.57 | 0.50 | 34.5 |
| 2 | T1 | 537 | 1.0 | 0.351 | 7.6 | LOS A | 1.8 | 44.9 | 0.57 | 0.50 | 34.3 |
| 12 | R2 | 100 | 0.0 | 0.351 | 7.6 | LOS A | 1.8 | 44.9 | 0.57 | 0.50 | 33.2 |
| Approach | | 660 | 0.8 | 0.351 | 7.6 | LOS A | 1.8 | 44.9 | 0.57 | 0.50 | 34.1 |
| All Vehicles | | 2095 | 1.0 | 0.404 | 7.6 | LOS A | 2.0 | 51.5 | 0.54 | 0.47 | 33.5 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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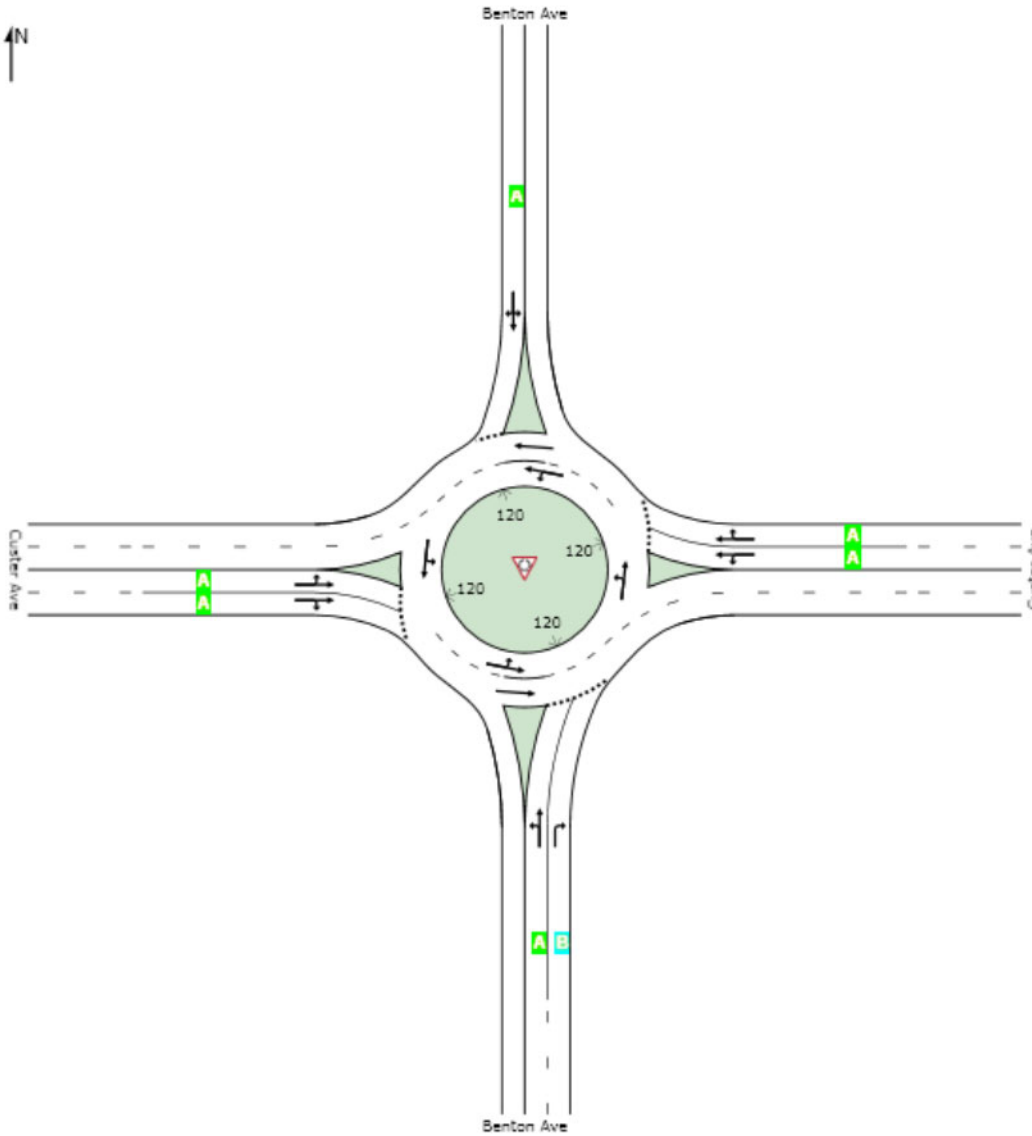
LEVEL OF SERVICE

 Site: Benton 2017 PM Alternative 3

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | A | A | A | A | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Benton 2017 PM Alternative 3

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Benton Ave | | | | | | | | | | | |
| 3 | L2 | 150 | 0.0 | 0.310 | 8.1 | LOS A | 1.3 | 33.1 | 0.59 | 0.59 | 23.9 |
| 8 | T1 | 98 | 0.0 | 0.310 | 8.1 | LOS A | 1.3 | 33.1 | 0.59 | 0.59 | 22.3 |
| 18 | R2 | 419 | 0.5 | 0.481 | 10.3 | LOS B | 2.6 | 65.8 | 0.66 | 0.71 | 22.6 |
| Approach | | 666 | 0.3 | 0.481 | 9.5 | LOS A | 2.6 | 65.8 | 0.63 | 0.67 | 22.9 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 222 | 0.5 | 0.388 | 7.5 | LOS A | 2.2 | 54.7 | 0.51 | 0.39 | 24.2 |
| 6 | T1 | 497 | 0.4 | 0.388 | 7.4 | LOS A | 2.2 | 54.8 | 0.51 | 0.39 | 22.9 |
| 16 | R2 | 106 | 0.0 | 0.388 | 7.4 | LOS A | 2.2 | 54.8 | 0.51 | 0.39 | 23.5 |
| Approach | | 824 | 0.4 | 0.388 | 7.4 | LOS A | 2.2 | 54.8 | 0.51 | 0.39 | 23.3 |
| North: Benton Ave | | | | | | | | | | | |
| 7 | L2 | 54 | 0.0 | 0.159 | 7.2 | LOS A | 0.6 | 14.3 | 0.60 | 0.60 | 24.3 |
| 4 | T1 | 43 | 0.0 | 0.159 | 7.2 | LOS A | 0.6 | 14.3 | 0.60 | 0.60 | 22.6 |
| 14 | R2 | 9 | 11.1 | 0.159 | 7.2 | LOS A | 0.6 | 14.3 | 0.60 | 0.60 | 23.0 |
| Approach | | 107 | 1.0 | 0.159 | 7.2 | LOS A | 0.6 | 14.3 | 0.60 | 0.60 | 23.5 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 9 | 0.0 | 0.293 | 6.5 | LOS A | 1.5 | 36.6 | 0.51 | 0.41 | 25.1 |
| 2 | T1 | 506 | 0.0 | 0.293 | 6.5 | LOS A | 1.5 | 36.6 | 0.51 | 0.41 | 23.3 |
| 12 | R2 | 72 | 0.0 | 0.293 | 6.5 | LOS A | 1.5 | 36.6 | 0.51 | 0.41 | 23.7 |
| Approach | | 587 | 0.0 | 0.293 | 6.5 | LOS A | 1.5 | 36.6 | 0.51 | 0.41 | 23.4 |
| All Vehicles | | 2185 | 0.3 | 0.481 | 7.8 | LOS A | 2.6 | 65.8 | 0.55 | 0.49 | 23.2 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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HCM 6th Signalized Intersection Summary
4: Custer Ave & Cooney Dr

Alternatives 1 2017 - AM
10/12/2018



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------------|------|-------|------|------|------|-------|
| Lane Configurations | ↖ | ↑↑ | ↑↗ | | ↘ | |
| Traffic Volume (veh/h) | 12 | 685 | 674 | 52 | 80 | 5 |
| Future Volume (veh/h) | 12 | 685 | 674 | 52 | 80 | 5 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | | 1.00 | 1.00 | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | No | | No | |
| Adj Sat Flow, veh/h/ln | 1400 | 1378 | 1477 | 1477 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 13 | 737 | 725 | 56 | 86 | 5 |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Percent Heavy Veh, % | 0 | 2 | 2 | 2 | 0 | 0 |
| Cap, veh/h | 813 | 2173 | 2190 | 169 | 104 | 6 |
| Arrive On Green | 0.83 | 0.83 | 0.83 | 0.83 | 0.08 | 0.08 |
| Sat Flow, veh/h | 984 | 2687 | 2713 | 204 | 1327 | 77 |
| Grp Volume(v), veh/h | 13 | 737 | 385 | 396 | 92 | 0 |
| Grp Sat Flow(s),veh/h/ln | 984 | 1309 | 1403 | 1440 | 1420 | 0 |
| Q Serve(g_s), s | 0.4 | 8.0 | 7.7 | 7.7 | 7.7 | 0.0 |
| Cycle Q Clear(g_c), s | 8.1 | 8.0 | 7.7 | 7.7 | 7.7 | 0.0 |
| Prop In Lane | 1.00 | | | 0.14 | 0.93 | 0.05 |
| Lane Grp Cap(c), veh/h | 813 | 2173 | 1164 | 1195 | 112 | 0 |
| V/C Ratio(X) | 0.02 | 0.34 | 0.33 | 0.33 | 0.82 | 0.00 |
| Avail Cap(c_a), veh/h | 813 | 2173 | 1164 | 1195 | 390 | 0 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.80 | 0.80 | 0.90 | 0.90 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 3.4 | 2.4 | 2.4 | 2.4 | 54.5 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 0.3 | 0.7 | 0.7 | 13.9 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.1 | 1.4 | 1.6 | 1.6 | 3.2 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 3.4 | 2.8 | 3.1 | 3.1 | 68.4 | 0.0 |
| LnGrp LOS | A | A | A | A | E | A |
| Approach Vol, veh/h | | 750 | 781 | | 92 | |
| Approach Delay, s/veh | | 2.8 | 3.1 | | 68.4 | |
| Approach LOS | | A | A | | E | |
| Timer - Assigned Phs | | 2 | | 4 | | 6 |
| Phs Duration (G+Y+Rc), s | | 105.6 | | 14.4 | | 105.6 |
| Change Period (Y+Rc), s | | 6.0 | | 5.0 | | 6.0 |
| Max Green Setting (Gmax), s | | 76.0 | | 33.0 | | 76.0 |
| Max Q Clear Time (g_c+I1), s | | 10.1 | | 9.7 | | 9.7 |
| Green Ext Time (p_c), s | | 6.0 | | 0.2 | | 5.6 |
| Intersection Summary | | | | | | |
| HCM 6th Ctrl Delay | | | 6.6 | | | |
| HCM 6th LOS | | | A | | | |

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
4: Custer Ave & Cooney Dr

Alternatives 1 2017 School
10/12/2018



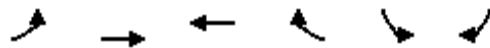
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------------|------|-------|------|------|------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 10 | 791 | 674 | 54 | 74 | 15 |
| Future Volume (veh/h) | 10 | 791 | 674 | 54 | 74 | 15 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | | 1.00 | 1.00 | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | No | | No | |
| Adj Sat Flow, veh/h/ln | 1350 | 1339 | 1488 | 1488 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 11 | 869 | 741 | 59 | 81 | 16 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 0 | 1 | 1 | 1 | 0 | 0 |
| Cap, veh/h | 431 | 2098 | 2187 | 174 | 97 | 19 |
| Arrive On Green | 1.00 | 1.00 | 0.82 | 0.82 | 0.08 | 0.08 |
| Sat Flow, veh/h | 491 | 2612 | 2727 | 211 | 1158 | 229 |
| Grp Volume(v), veh/h | 11 | 869 | 395 | 405 | 98 | 0 |
| Grp Sat Flow(s),veh/h/ln | 491 | 1272 | 1414 | 1450 | 1401 | 0 |
| Q Serve(g_s), s | 0.2 | 0.0 | 8.2 | 8.2 | 8.3 | 0.0 |
| Cycle Q Clear(g_c), s | 8.4 | 0.0 | 8.2 | 8.2 | 8.3 | 0.0 |
| Prop In Lane | 1.00 | | | 0.15 | 0.83 | 0.16 |
| Lane Grp Cap(c), veh/h | 431 | 2098 | 1165 | 1195 | 118 | 0 |
| V/C Ratio(X) | 0.03 | 0.41 | 0.34 | 0.34 | 0.83 | 0.00 |
| Avail Cap(c_a), veh/h | 431 | 2098 | 1165 | 1195 | 339 | 0 |
| HCM Platoon Ratio | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.73 | 0.73 | 0.88 | 0.88 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 0.3 | 0.0 | 2.6 | 2.6 | 54.1 | 0.0 |
| Incr Delay (d2), s/veh | 0.1 | 0.4 | 0.7 | 0.7 | 13.9 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 0.1 | 2.0 | 2.0 | 3.4 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 0.4 | 0.4 | 3.3 | 3.2 | 68.0 | 0.0 |
| LnGrp LOS | A | A | A | A | E | A |
| Approach Vol, veh/h | | 880 | 800 | | 98 | |
| Approach Delay, s/veh | | 0.4 | 3.3 | | 68.0 | |
| Approach LOS | | A | A | | E | |
| Timer - Assigned Phs | | 2 | | 4 | | 6 |
| Phs Duration (G+Y+Rc), s | | 104.9 | | 15.1 | | 104.9 |
| Change Period (Y+Rc), s | | 6.0 | | 5.0 | | 6.0 |
| Max Green Setting (Gmax), s | | 80.0 | | 29.0 | | 80.0 |
| Max Q Clear Time (g_c+I1), s | | 10.4 | | 10.3 | | 10.2 |
| Green Ext Time (p_c), s | | 7.6 | | 0.2 | | 6.5 |
| Intersection Summary | | | | | | |
| HCM 6th Ctrl Delay | | | 5.4 | | | |
| HCM 6th LOS | | | A | | | |

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
4: Custer Ave & Cooney Dr

Alternatives 1 2017 PM
10/12/2018



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|----------------------------------------------------------------------|------|-------|------|------|------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 7 | 938 | 799 | 70 | 82 | 19 |
| Future Volume (veh/h) | 7 | 938 | 799 | 70 | 82 | 19 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | | 1.00 | 1.00 | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | No | | No | |
| Adj Sat Flow, veh/h/ln | 1400 | 1400 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 7 | 947 | 807 | 71 | 83 | 19 |
| Peak Hour Factor | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 411 | 2182 | 2173 | 191 | 99 | 23 |
| Arrive On Green | 0.82 | 0.82 | 0.82 | 0.82 | 0.09 | 0.09 |
| Sat Flow, veh/h | 473 | 2730 | 2725 | 233 | 1126 | 258 |
| Grp Volume(v), veh/h | 7 | 947 | 434 | 444 | 103 | 0 |
| Grp Sat Flow(s),veh/h/ln | 473 | 1330 | 1425 | 1458 | 1397 | 0 |
| Q Serve(g_s), s | 0.5 | 11.9 | 9.4 | 9.5 | 8.7 | 0.0 |
| Cycle Q Clear(g_c), s | 9.9 | 11.9 | 9.4 | 9.5 | 8.7 | 0.0 |
| Prop In Lane | 1.00 | | | 0.16 | 0.81 | 0.18 |
| Lane Grp Cap(c), veh/h | 411 | 2182 | 1169 | 1196 | 123 | 0 |
| V/C Ratio(X) | 0.02 | 0.43 | 0.37 | 0.37 | 0.84 | 0.00 |
| Avail Cap(c_a), veh/h | 411 | 2182 | 1169 | 1196 | 338 | 0 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.69 | 0.69 | 0.84 | 0.84 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 4.1 | 3.0 | 2.8 | 2.8 | 53.9 | 0.0 |
| Incr Delay (d2), s/veh | 0.1 | 0.4 | 0.8 | 0.7 | 13.6 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 2.2 | 2.0 | 2.1 | 3.5 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 4.1 | 3.4 | 3.6 | 3.5 | 67.4 | 0.0 |
| LnGrp LOS | A | A | A | A | E | A |
| Approach Vol, veh/h | | 954 | 878 | | 103 | |
| Approach Delay, s/veh | | 3.5 | 3.5 | | 67.4 | |
| Approach LOS | | A | A | | E | |
| Timer - Assigned Phs | | 2 | | 4 | | 6 |
| Phs Duration (G+Y+Rc), s | | 104.4 | | 15.6 | | 104.4 |
| Change Period (Y+Rc), s | | 6.0 | | 5.0 | | 6.0 |
| Max Green Setting (Gmax), s | | 80.0 | | 29.0 | | 80.0 |
| Max Q Clear Time (g_c+I1), s | | 13.9 | | 10.7 | | 11.5 |
| Green Ext Time (p_c), s | | 8.5 | | 0.2 | | 6.5 |
| Intersection Summary | | | | | | |
| HCM 6th Ctrl Delay | | | 6.9 | | | |
| HCM 6th LOS | | | A | | | |
| Notes | | | | | | |
| User approved volume balancing among the lanes for turning movement. | | | | | | |

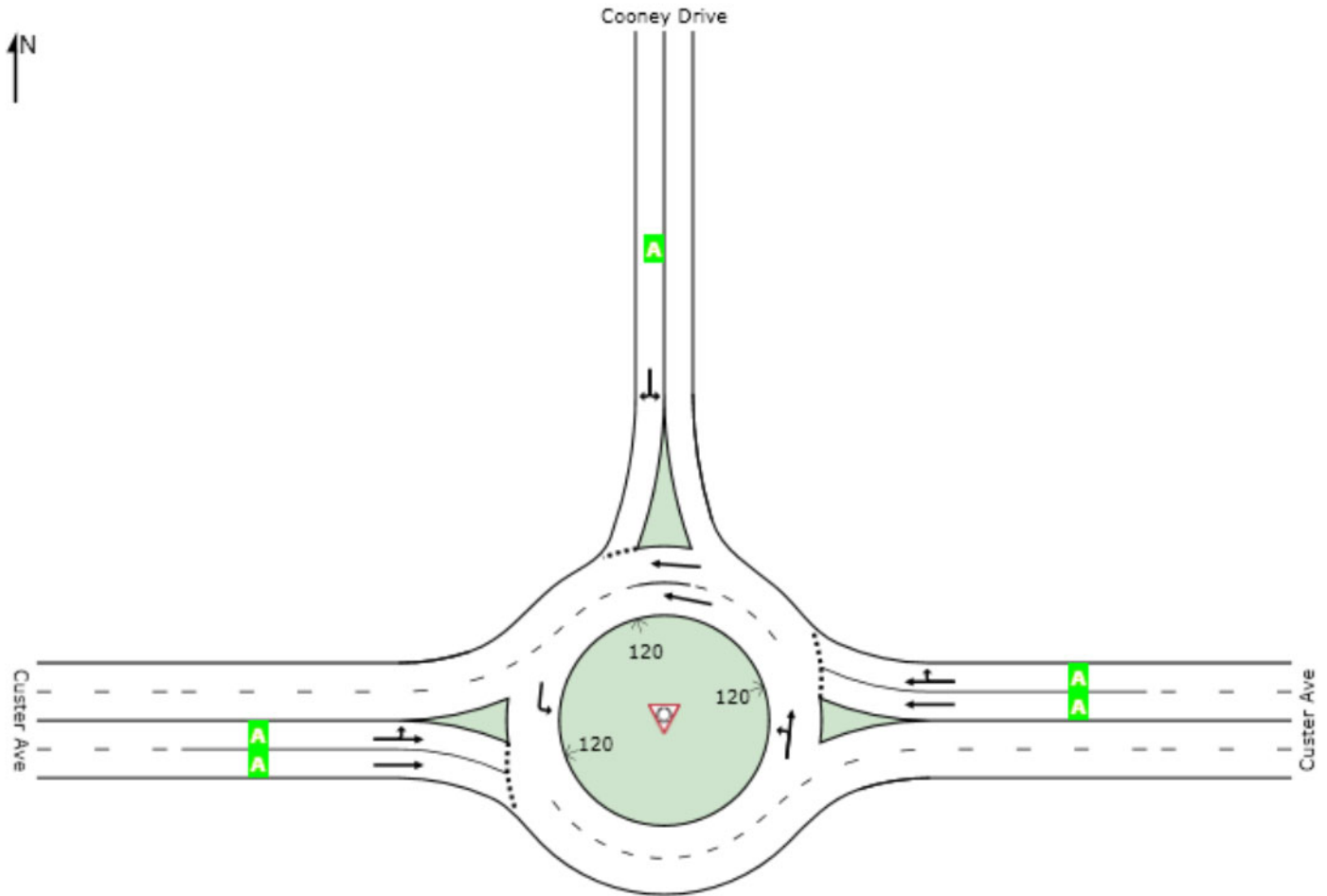
LEVEL OF SERVICE

 Site: Cooney 2017 AM Alternative 2

Roundabout

All Movement Classes

| | East | North | West | Intersection |
|-----|------|-------|------|--------------|
| LOS | A | A | A | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

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MOVEMENT SUMMARY

 Site: Cooney 2017 AM Alternative 2

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| East: Custer Ave | | | | | | | | | | | |
| 6 | T1 | 728 | 2.1 | 0.294 | 5.3 | LOS A | 1.7 | 42.0 | 0.09 | 0.02 | 35.7 |
| 16 | R2 | 56 | 3.8 | 0.294 | 5.3 | LOS A | 1.6 | 42.0 | 0.09 | 0.02 | 34.3 |
| Approach | | 784 | 2.2 | 0.294 | 5.3 | LOS A | 1.7 | 42.0 | 0.09 | 0.02 | 35.6 |
| North: Cooney Drive | | | | | | | | | | | |
| 7 | L2 | 86 | 0.0 | 0.122 | 6.0 | LOS A | 0.4 | 10.9 | 0.56 | 0.54 | 32.7 |
| 14 | R2 | 5 | 0.0 | 0.122 | 6.0 | LOS A | 0.4 | 10.9 | 0.56 | 0.54 | 31.5 |
| Approach | | 92 | 0.0 | 0.122 | 6.0 | LOS A | 0.4 | 10.9 | 0.56 | 0.54 | 32.6 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 13 | 0.0 | 0.302 | 5.6 | LOS A | 1.7 | 42.1 | 0.27 | 0.14 | 35.7 |
| 2 | T1 | 740 | 1.6 | 0.302 | 5.6 | LOS A | 1.7 | 42.1 | 0.27 | 0.14 | 35.4 |
| Approach | | 753 | 1.6 | 0.302 | 5.6 | LOS A | 1.7 | 42.1 | 0.27 | 0.14 | 35.4 |
| All Vehicles | | 1629 | 1.8 | 0.302 | 5.5 | LOS A | 1.7 | 42.1 | 0.20 | 0.10 | 35.3 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

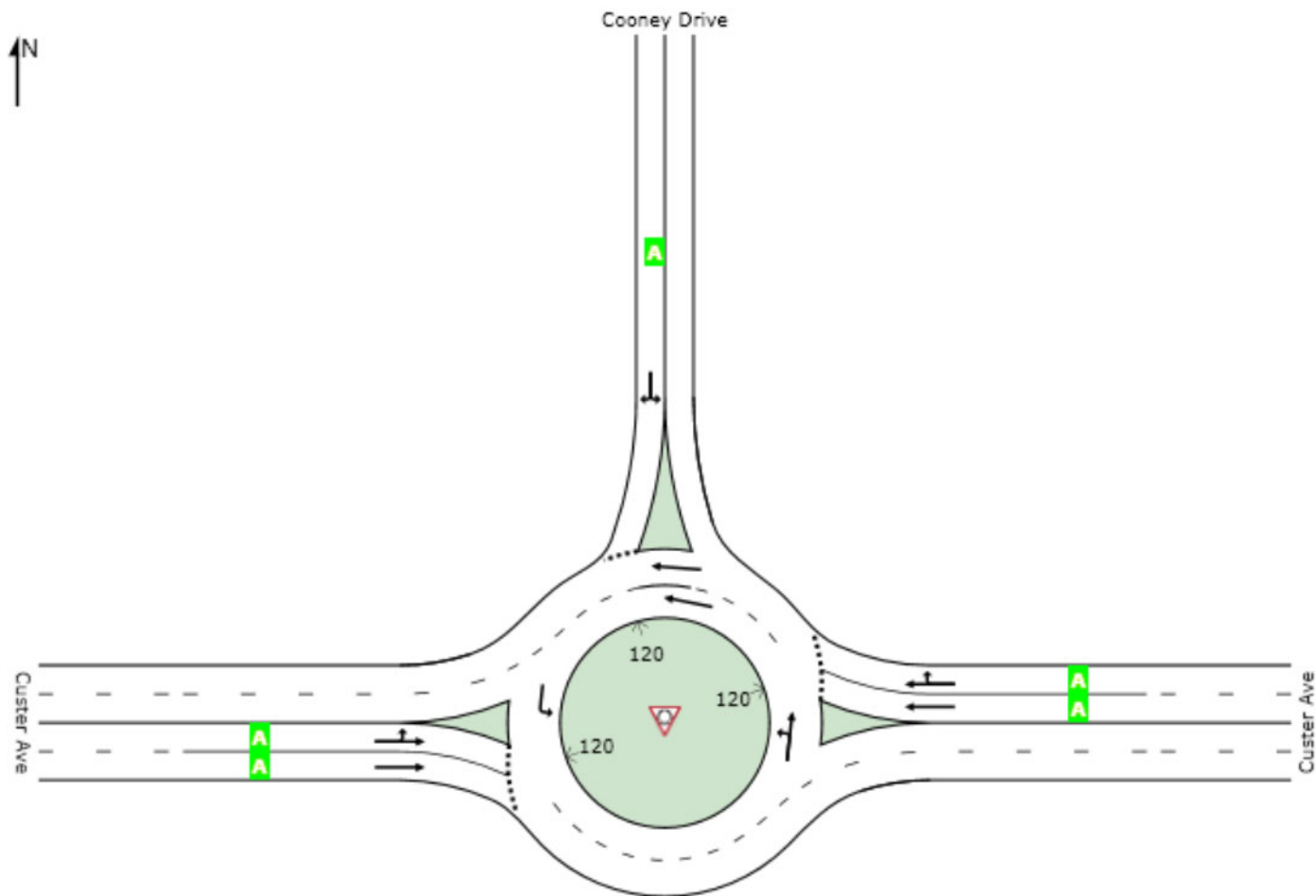
LEVEL OF SERVICE

 Site: Cooney 2017 School Alternative 2

Roundabout

All Movement Classes

| | East | North | West | Intersection |
|-----|------|-------|------|--------------|
| LOS | A | A | A | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

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MOVEMENT SUMMARY

 Site: Cooney 2017 School Alternative 2

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| East: Custer Ave | | | | | | | | | | | |
| 6 | T1 | 745 | 1.0 | 0.298 | 5.3 | LOS A | 1.7 | 43.1 | 0.08 | 0.02 | 35.7 |
| 16 | R2 | 60 | 1.9 | 0.298 | 5.3 | LOS A | 1.7 | 43.1 | 0.08 | 0.02 | 34.4 |
| Approach | | 804 | 1.1 | 0.298 | 5.3 | LOS A | 1.7 | 43.1 | 0.08 | 0.02 | 35.6 |
| North: Cooney Drive | | | | | | | | | | | |
| 7 | L2 | 82 | 0.0 | 0.133 | 6.3 | LOS A | 0.5 | 12.0 | 0.56 | 0.56 | 32.8 |
| 14 | R2 | 17 | 6.7 | 0.133 | 6.3 | LOS A | 0.5 | 12.0 | 0.56 | 0.56 | 31.5 |
| Approach | | 98 | 1.1 | 0.133 | 6.3 | LOS A | 0.5 | 12.0 | 0.56 | 0.56 | 32.6 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 11 | 0.0 | 0.351 | 6.2 | LOS A | 2.1 | 52.5 | 0.28 | 0.14 | 35.4 |
| 2 | T1 | 874 | 1.0 | 0.351 | 6.2 | LOS A | 2.1 | 52.5 | 0.28 | 0.14 | 35.2 |
| Approach | | 885 | 1.0 | 0.351 | 6.2 | LOS A | 2.1 | 52.5 | 0.28 | 0.14 | 35.2 |
| All Vehicles | | 1788 | 1.0 | 0.351 | 5.8 | LOS A | 2.1 | 52.5 | 0.21 | 0.11 | 35.2 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

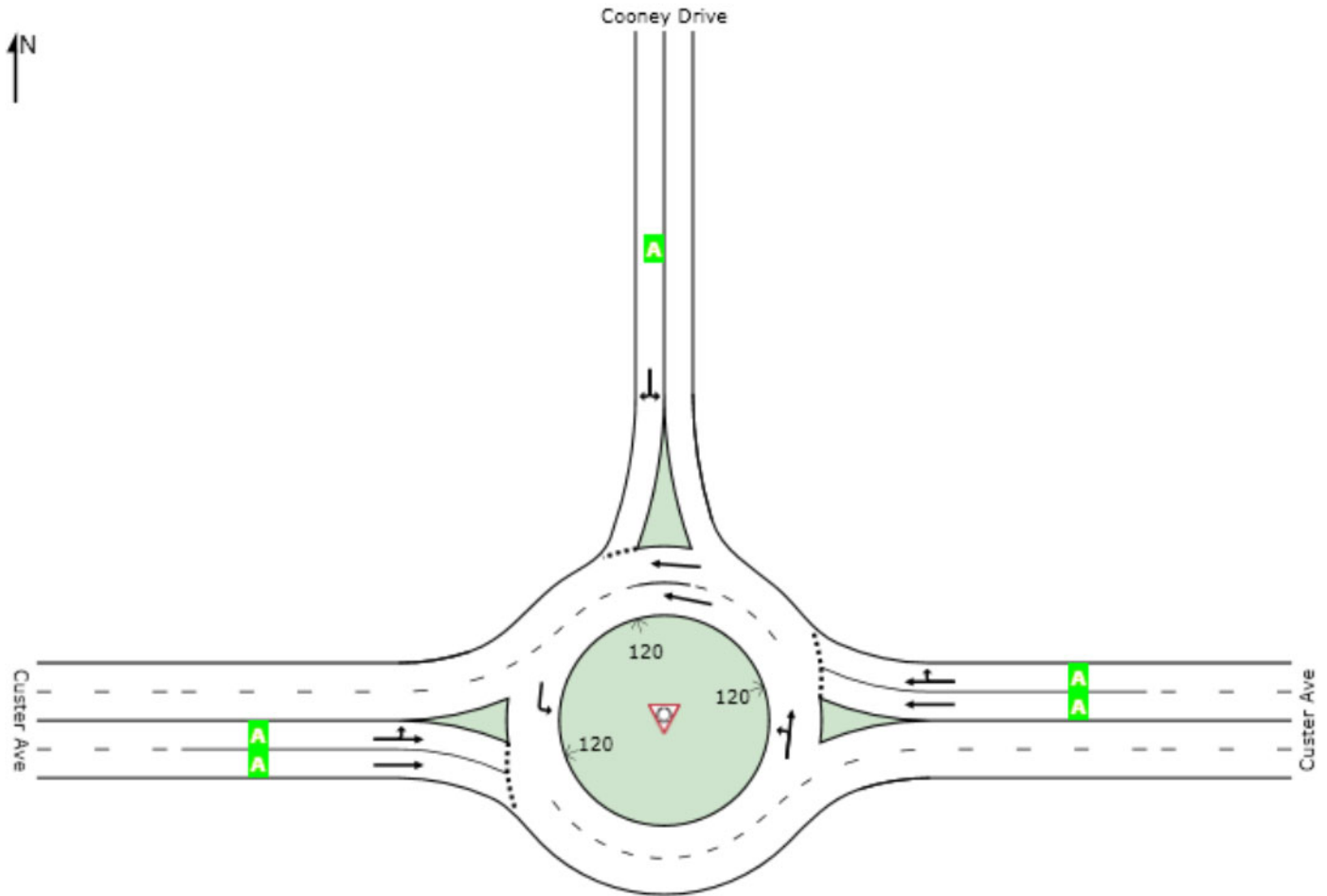
LEVEL OF SERVICE

 Site: Cooney 2017 PM Alternative 2

Roundabout

All Movement Classes

| | East | North | West | Intersection |
|-----|------|-------|------|--------------|
| LOS | A | A | A | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

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MOVEMENT SUMMARY

 Site: Cooney 2017 PM

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| East: Custer Ave | | | | | | | | | | | |
| 6 | T1 | 810 | 0.4 | 0.323 | 5.5 | LOS A | 1.9 | 48.7 | 0.07 | 0.01 | 23.6 |
| 16 | R2 | 71 | 1.4 | 0.323 | 5.5 | LOS A | 1.9 | 48.7 | 0.07 | 0.01 | 24.0 |
| Approach | | 880 | 0.5 | 0.323 | 5.5 | LOS A | 1.9 | 48.7 | 0.07 | 0.01 | 23.6 |
| North: Cooney Drive | | | | | | | | | | | |
| 7 | L2 | 83 | 0.0 | 0.144 | 6.6 | LOS A | 0.5 | 13.0 | 0.58 | 0.58 | 24.0 |
| 14 | R2 | 19 | 0.0 | 0.144 | 6.6 | LOS A | 0.5 | 13.0 | 0.58 | 0.58 | 22.8 |
| Approach | | 102 | 0.0 | 0.144 | 6.6 | LOS A | 0.5 | 13.0 | 0.58 | 0.58 | 23.8 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 7 | 0.0 | 0.378 | 6.4 | LOS A | 2.3 | 58.8 | 0.30 | 0.15 | 25.1 |
| 2 | T1 | 950 | 0.2 | 0.378 | 6.4 | LOS A | 2.3 | 58.8 | 0.30 | 0.15 | 23.4 |
| Approach | | 957 | 0.2 | 0.378 | 6.4 | LOS A | 2.3 | 58.8 | 0.30 | 0.15 | 23.4 |
| All Vehicles | | 1940 | 0.3 | 0.378 | 6.0 | LOS A | 2.3 | 58.8 | 0.21 | 0.11 | 23.5 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.






















HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

HCM 6th Signalized Intersection Summary
5: McHugh Dr & Custer Ave

Alternatives 1 2017 - AM
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | |  |  |  |  |  | |  |  | |
| Traffic Volume (veh/h) | 115 | 572 | 35 | 69 | 471 | 63 | 69 | 58 | 81 | 167 | 110 | 176 |
| Future Volume (veh/h) | 115 | 572 | 35 | 69 | 471 | 63 | 69 | 58 | 81 | 167 | 110 | 176 |
| 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 | 1400 | 1378 | 1378 | 1500 | 1453 | 1500 | 1500 | 1500 | 1500 | 1488 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 124 | 615 | 38 | 74 | 506 | 68 | 74 | 62 | 87 | 180 | 118 | 189 |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Percent Heavy Veh, % | 0 | 2 | 2 | 0 | 4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Cap, veh/h | 418 | 1266 | 78 | 499 | 747 | 801 | 156 | 96 | 134 | 351 | 127 | 203 |
| Arrive On Green | 0.03 | 0.33 | 0.33 | 0.05 | 0.51 | 0.51 | 0.04 | 0.17 | 0.17 | 0.12 | 0.24 | 0.24 |
| Sat Flow, veh/h | 1333 | 2505 | 155 | 1429 | 1453 | 1271 | 1429 | 565 | 793 | 1417 | 519 | 831 |
| Grp Volume(v), veh/h | 124 | 321 | 332 | 74 | 506 | 68 | 74 | 0 | 149 | 180 | 0 | 307 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 1309 | 1350 | 1429 | 1453 | 1271 | 1429 | 0 | 1357 | 1417 | 0 | 1350 |
| Q Serve(g_s), s | 5.0 | 23.4 | 23.5 | 2.9 | 31.2 | 2.5 | 5.0 | 0.0 | 12.3 | 12.2 | 0.0 | 26.7 |
| Cycle Q Clear(g_c), s | 5.0 | 23.4 | 23.5 | 2.9 | 31.2 | 2.5 | 5.0 | 0.0 | 12.3 | 12.2 | 0.0 | 26.7 |
| Prop In Lane | 1.00 | | 0.11 | 1.00 | | 1.00 | 1.00 | | 0.58 | 1.00 | | 0.62 |
| Lane Grp Cap(c), veh/h | 418 | 662 | 682 | 499 | 747 | 801 | 156 | 0 | 230 | 351 | 0 | 330 |
| V/C Ratio(X) | 0.30 | 0.49 | 0.49 | 0.15 | 0.68 | 0.08 | 0.47 | 0.00 | 0.65 | 0.51 | 0.00 | 0.93 |
| Avail Cap(c_a), veh/h | 418 | 662 | 682 | 499 | 747 | 801 | 156 | 0 | 271 | 351 | 0 | 371 |
| HCM Platoon Ratio | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.70 | 0.70 | 0.70 | 0.97 | 0.97 | 0.97 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 19.4 | 27.6 | 27.6 | 15.0 | 21.8 | 8.7 | 41.2 | 0.0 | 46.5 | 34.3 | 0.0 | 44.3 |
| Incr Delay (d2), s/veh | 0.3 | 1.8 | 1.7 | 0.6 | 4.8 | 0.2 | 2.2 | 0.0 | 3.4 | 1.3 | 0.0 | 27.3 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.7 | 8.1 | 8.4 | 1.0 | 11.3 | 0.7 | 1.9 | 0.0 | 4.4 | 4.4 | 0.0 | 11.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 19.6 | 29.4 | 29.3 | 15.6 | 26.5 | 8.9 | 43.4 | 0.0 | 49.9 | 35.6 | 0.0 | 71.7 |
| LnGrp LOS | B | C | C | B | C | A | D | A | D | D | A | E |
| Approach Vol, veh/h | | 777 | | | 648 | | | 223 | | | | 487 |
| Approach Delay, s/veh | | 27.8 | | | 23.4 | | | 47.7 | | | | 58.3 |
| Approach LOS | | C | | | C | | | D | | | | E |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 10.0 | 66.6 | 9.0 | 34.4 | 9.0 | 67.6 | 18.0 | 25.4 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 6.0 | 57.0 | 5.0 | 33.0 | 5.0 | 58.0 | 14.0 | 24.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 4.9 | 25.5 | 7.0 | 28.7 | 7.0 | 33.2 | 14.2 | 14.3 | | | | |
| Green Ext Time (p_c), s | 0.0 | 4.5 | 0.0 | 0.7 | 0.0 | 3.7 | 0.0 | 0.5 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 35.5 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |

HCM 6th Signalized Intersection Summary
5: McHugh Dr & Custer Ave

Alternatives 1 2017 School
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 145 | 664 | 57 | 31 | 540 | 83 | 84 | 54 | 67 | 114 | 38 | 104 |
| Future Volume (veh/h) | 145 | 664 | 57 | 31 | 540 | 83 | 84 | 54 | 67 | 114 | 38 | 104 |
| 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 | 1350 | 1329 | 1329 | 1500 | 1477 | 1488 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 163 | 746 | 64 | 35 | 607 | 93 | 94 | 61 | 75 | 128 | 43 | 117 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Percent Heavy Veh, % | 0 | 2 | 2 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 305 | 1470 | 126 | 311 | 871 | 807 | 151 | 85 | 104 | 174 | 49 | 134 |
| Arrive On Green | 0.04 | 0.41 | 0.41 | 0.03 | 0.59 | 0.59 | 0.05 | 0.14 | 0.14 | 0.05 | 0.14 | 0.14 |
| Sat Flow, veh/h | 1286 | 2353 | 202 | 1429 | 1477 | 1261 | 1429 | 612 | 753 | 1429 | 356 | 969 |
| Grp Volume(v), veh/h | 163 | 400 | 410 | 35 | 607 | 93 | 94 | 0 | 136 | 128 | 0 | 160 |
| Grp Sat Flow(s),veh/h/ln | 1286 | 1262 | 1293 | 1429 | 1477 | 1261 | 1429 | 0 | 1365 | 1429 | 0 | 1326 |
| Q Serve(g_s), s | 5.6 | 28.3 | 28.3 | 1.2 | 34.4 | 3.4 | 6.0 | 0.0 | 11.4 | 6.0 | 0.0 | 14.2 |
| Cycle Q Clear(g_c), s | 5.6 | 28.3 | 28.3 | 1.2 | 34.4 | 3.4 | 6.0 | 0.0 | 11.4 | 6.0 | 0.0 | 14.2 |
| Prop In Lane | 1.00 | | 0.16 | 1.00 | | 1.00 | 1.00 | | 0.55 | 1.00 | | 0.73 |
| Lane Grp Cap(c), veh/h | 305 | 789 | 808 | 311 | 871 | 807 | 151 | 0 | 189 | 174 | 0 | 183 |
| V/C Ratio(X) | 0.53 | 0.51 | 0.51 | 0.11 | 0.70 | 0.12 | 0.62 | 0.00 | 0.72 | 0.73 | 0.00 | 0.87 |
| Avail Cap(c_a), veh/h | 330 | 789 | 808 | 330 | 871 | 807 | 151 | 0 | 262 | 174 | 0 | 254 |
| HCM Platoon Ratio | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.51 | 0.51 | 0.51 | 0.93 | 0.93 | 0.93 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 15.8 | 21.5 | 21.5 | 11.5 | 17.2 | 8.4 | 44.9 | 0.0 | 49.5 | 48.2 | 0.0 | 50.7 |
| Incr Delay (d2), s/veh | 0.7 | 1.2 | 1.2 | 0.1 | 4.3 | 0.3 | 7.7 | 0.0 | 4.6 | 14.8 | 0.0 | 19.2 |
| 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 | 1.9 | 9.3 | 9.5 | 0.4 | 12.2 | 1.0 | 0.8 | 0.0 | 4.2 | 2.3 | 0.0 | 5.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 16.5 | 22.7 | 22.7 | 11.7 | 21.4 | 8.7 | 52.6 | 0.0 | 54.1 | 63.0 | 0.0 | 69.9 |
| LnGrp LOS | B | C | C | B | C | A | D | A | D | E | A | E |
| Approach Vol, veh/h | | 973 | | | 735 | | | 230 | | | 288 | |
| Approach Delay, s/veh | | 21.7 | | | 19.4 | | | 53.5 | | | 66.8 | |
| Approach LOS | | C | | | B | | | D | | | E | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 7.4 | 81.0 | 10.0 | 21.6 | 11.7 | 76.8 | 10.0 | 21.6 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 67.0 | 6.0 | 23.0 | 10.0 | 62.0 | 6.0 | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 3.2 | 30.3 | 8.0 | 16.2 | 7.6 | 36.4 | 8.0 | 13.4 | | | | |
| Green Ext Time (p_c), s | 0.0 | 6.4 | 0.0 | 0.4 | 0.1 | 4.7 | 0.0 | 0.4 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 30.0 | | | | | | | | | |
| HCM 6th LOS | | | C | | | | | | | | | |

HCM 6th Signalized Intersection Summary
5: McHugh Dr & Custer Ave

Alternatives 1 2017 PM
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 186 | 780 | 25 | 17 | 644 | 106 | 74 | 82 | 29 | 182 | 26 | 155 |
| Future Volume (veh/h) | 186 | 780 | 25 | 17 | 644 | 106 | 74 | 82 | 29 | 182 | 26 | 155 |
| 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 | 1400 | 1400 | 1400 | 1500 | 1488 | 1488 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 192 | 804 | 26 | 18 | 664 | 109 | 76 | 85 | 30 | 188 | 27 | 160 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 258 | 1593 | 51 | 286 | 817 | 776 | 160 | 159 | 56 | 234 | 30 | 179 |
| Arrive On Green | 0.05 | 0.40 | 0.40 | 0.02 | 0.55 | 0.55 | 0.06 | 0.15 | 0.15 | 0.07 | 0.16 | 0.16 |
| Sat Flow, veh/h | 1333 | 2630 | 85 | 1429 | 1488 | 1261 | 1429 | 1059 | 374 | 1429 | 188 | 1112 |
| Grp Volume(v), veh/h | 192 | 407 | 423 | 18 | 664 | 109 | 76 | 0 | 115 | 188 | 0 | 187 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 1330 | 1385 | 1429 | 1488 | 1261 | 1429 | 0 | 1433 | 1429 | 0 | 1300 |
| Q Serve(g_s), s | 7.0 | 27.6 | 27.6 | 0.7 | 43.6 | 4.4 | 5.3 | 0.0 | 8.9 | 8.0 | 0.0 | 16.9 |
| Cycle Q Clear(g_c), s | 7.0 | 27.6 | 27.6 | 0.7 | 43.6 | 4.4 | 5.3 | 0.0 | 8.9 | 8.0 | 0.0 | 16.9 |
| Prop In Lane | 1.00 | | 0.06 | 1.00 | | 1.00 | 1.00 | | 0.26 | 1.00 | | 0.86 |
| Lane Grp Cap(c), veh/h | 258 | 805 | 839 | 286 | 817 | 776 | 160 | 0 | 216 | 234 | 0 | 209 |
| V/C Ratio(X) | 0.75 | 0.50 | 0.50 | 0.06 | 0.81 | 0.14 | 0.48 | 0.00 | 0.53 | 0.81 | 0.00 | 0.89 |
| Avail Cap(c_a), veh/h | 268 | 805 | 839 | 319 | 817 | 776 | 162 | 0 | 275 | 234 | 0 | 260 |
| HCM Platoon Ratio | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.45 | 0.45 | 0.45 | 0.92 | 0.92 | 0.92 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 23.4 | 22.5 | 22.5 | 13.2 | 22.1 | 9.7 | 41.0 | 0.0 | 47.1 | 46.9 | 0.0 | 49.3 |
| Incr Delay (d2), s/veh | 4.9 | 1.0 | 1.0 | 0.1 | 8.0 | 0.3 | 2.2 | 0.0 | 1.5 | 18.3 | 0.0 | 25.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 3.5 | 9.5 | 9.8 | 0.2 | 16.4 | 1.3 | 2.0 | 0.0 | 3.3 | 3.8 | 0.0 | 7.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 28.3 | 23.5 | 23.5 | 13.3 | 30.1 | 10.1 | 43.2 | 0.0 | 48.6 | 65.2 | 0.0 | 74.5 |
| LnGrp LOS | C | C | C | B | C | B | D | A | D | E | A | E |
| Approach Vol, veh/h | | 1022 | | | 791 | | | 191 | | | | 375 |
| Approach Delay, s/veh | | 24.4 | | | 27.0 | | | 46.4 | | | | 69.9 |
| Approach LOS | | C | | | C | | | D | | | | E |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 6.3 | 78.7 | 10.8 | 24.3 | 13.1 | 71.9 | 12.0 | 23.1 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 65.0 | 7.0 | 24.0 | 10.0 | 60.0 | 8.0 | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.7 | 29.6 | 7.3 | 18.9 | 9.0 | 45.6 | 10.0 | 10.9 | | | | |
| Green Ext Time (p_c), s | 0.0 | 6.1 | 0.0 | 0.4 | 0.1 | 4.3 | 0.0 | 0.3 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 34.2 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM 6th Signalized Intersection Summary
5: McHugh Dr & Custer Ave

Alternatives 2 2017 - AM
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 115 | 572 | 35 | 69 | 471 | 63 | 69 | 58 | 81 | 167 | 110 | 176 |
| Future Volume (veh/h) | 115 | 572 | 35 | 69 | 471 | 63 | 69 | 58 | 81 | 167 | 110 | 176 |
| 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 | 1400 | 1378 | 1378 | 1500 | 1453 | 1453 | 1500 | 1500 | 1500 | 1488 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 124 | 615 | 38 | 74 | 506 | 68 | 74 | 62 | 87 | 180 | 118 | 189 |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Percent Heavy Veh, % | 0 | 2 | 2 | 0 | 4 | 4 | 0 | 0 | 0 | 1 | 0 | 0 |
| Cap, veh/h | 554 | 1213 | 75 | 482 | 1174 | 157 | 177 | 103 | 145 | 378 | 129 | 207 |
| Arrive On Green | 0.04 | 0.32 | 0.32 | 0.06 | 0.48 | 0.48 | 0.05 | 0.18 | 0.18 | 0.12 | 0.25 | 0.25 |
| Sat Flow, veh/h | 1333 | 2505 | 155 | 1429 | 2447 | 328 | 1429 | 565 | 793 | 1417 | 519 | 831 |
| Grp Volume(v), veh/h | 124 | 321 | 332 | 74 | 285 | 289 | 74 | 0 | 149 | 180 | 0 | 307 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 1309 | 1350 | 1429 | 1381 | 1394 | 1429 | 0 | 1357 | 1417 | 0 | 1350 |
| Q Serve(g_s), s | 5.6 | 23.9 | 24.0 | 3.0 | 16.2 | 16.4 | 5.0 | 0.0 | 12.1 | 11.9 | 0.0 | 26.5 |
| Cycle Q Clear(g_c), s | 5.6 | 23.9 | 24.0 | 3.0 | 16.2 | 16.4 | 5.0 | 0.0 | 12.1 | 11.9 | 0.0 | 26.5 |
| Prop In Lane | 1.00 | | 0.11 | 1.00 | | 0.23 | 1.00 | | 0.58 | 1.00 | | 0.62 |
| Lane Grp Cap(c), veh/h | 554 | 634 | 654 | 482 | 662 | 669 | 177 | 0 | 248 | 378 | 0 | 336 |
| V/C Ratio(X) | 0.22 | 0.51 | 0.51 | 0.15 | 0.43 | 0.43 | 0.42 | 0.00 | 0.60 | 0.48 | 0.00 | 0.91 |
| Avail Cap(c_a), veh/h | 603 | 634 | 654 | 482 | 662 | 669 | 177 | 0 | 362 | 379 | 0 | 450 |
| HCM Platoon Ratio | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.93 | 0.93 | 0.93 | 0.97 | 0.97 | 0.97 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 15.4 | 29.2 | 29.2 | 15.9 | 20.5 | 20.5 | 38.7 | 0.0 | 45.0 | 33.1 | 0.0 | 43.8 |
| Incr Delay (d2), s/veh | 0.2 | 2.7 | 2.6 | 0.7 | 2.0 | 2.0 | 1.6 | 0.0 | 1.7 | 0.9 | 0.0 | 18.0 |
| 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 | 1.8 | 8.4 | 8.7 | 1.1 | 5.5 | 5.6 | 1.9 | 0.0 | 4.2 | 4.2 | 0.0 | 10.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 15.6 | 31.8 | 31.8 | 16.6 | 22.4 | 22.5 | 40.3 | 0.0 | 46.7 | 34.0 | 0.0 | 61.8 |
| LnGrp LOS | B | C | C | B | C | C | D | A | D | C | A | E |
| Approach Vol, veh/h | | 777 | | | 648 | | | 223 | | | | 487 |
| Approach Delay, s/veh | | 29.2 | | | 21.8 | | | 44.6 | | | | 51.5 |
| Approach LOS | | C | | | C | | | D | | | | D |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 11.0 | 64.1 | 10.0 | 34.9 | 11.5 | 63.6 | 17.9 | 27.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 7.0 | 48.0 | 6.0 | 40.0 | 12.0 | 43.0 | 14.0 | 32.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 5.0 | 26.0 | 7.0 | 28.5 | 7.6 | 18.4 | 13.9 | 14.1 | | | | |
| Green Ext Time (p_c), s | 0.0 | 4.1 | 0.0 | 1.4 | 0.1 | 3.7 | 0.0 | 0.7 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 33.7 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM 6th Signalized Intersection Summary
5: McHugh Dr & Custer Ave

Alternatives 2 2017 School
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 145 | 664 | 57 | 31 | 540 | 83 | 84 | 54 | 67 | 114 | 38 | 104 |
| Future Volume (veh/h) | 145 | 664 | 57 | 31 | 540 | 83 | 84 | 54 | 67 | 114 | 38 | 104 |
| 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 | 1350 | 1329 | 1329 | 1500 | 1477 | 1477 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 163 | 746 | 64 | 35 | 607 | 93 | 94 | 61 | 75 | 128 | 43 | 117 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Percent Heavy Veh, % | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 374 | 1420 | 122 | 297 | 1375 | 210 | 177 | 72 | 89 | 211 | 54 | 146 |
| Arrive On Green | 0.05 | 0.40 | 0.40 | 0.03 | 0.56 | 0.56 | 0.06 | 0.12 | 0.12 | 0.09 | 0.15 | 0.15 |
| Sat Flow, veh/h | 1286 | 2353 | 202 | 1429 | 2439 | 373 | 1429 | 612 | 753 | 1429 | 356 | 969 |
| Grp Volume(v), veh/h | 163 | 400 | 410 | 35 | 349 | 351 | 94 | 0 | 136 | 128 | 0 | 160 |
| Grp Sat Flow(s),veh/h/ln | 1286 | 1262 | 1293 | 1429 | 1403 | 1409 | 1429 | 0 | 1365 | 1429 | 0 | 1326 |
| Q Serve(g_s), s | 6.0 | 28.9 | 29.0 | 1.2 | 17.3 | 17.4 | 7.0 | 0.0 | 11.7 | 9.1 | 0.0 | 14.0 |
| Cycle Q Clear(g_c), s | 6.0 | 28.9 | 29.0 | 1.2 | 17.3 | 17.4 | 7.0 | 0.0 | 11.7 | 9.1 | 0.0 | 14.0 |
| Prop In Lane | 1.00 | | 0.16 | 1.00 | | 0.26 | 1.00 | | 0.55 | 1.00 | | 0.73 |
| Lane Grp Cap(c), veh/h | 374 | 762 | 780 | 297 | 791 | 794 | 177 | 0 | 161 | 211 | 0 | 200 |
| V/C Ratio(X) | 0.44 | 0.53 | 0.53 | 0.12 | 0.44 | 0.44 | 0.53 | 0.00 | 0.85 | 0.61 | 0.00 | 0.80 |
| Avail Cap(c_a), veh/h | 478 | 762 | 780 | 315 | 791 | 794 | 177 | 0 | 284 | 211 | 0 | 320 |
| HCM Platoon Ratio | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.90 | 0.90 | 0.90 | 0.93 | 0.93 | 0.93 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 11.0 | 23.0 | 23.0 | 12.8 | 15.2 | 15.2 | 44.0 | 0.0 | 51.9 | 40.4 | 0.0 | 49.2 |
| Incr Delay (d2), s/veh | 0.7 | 2.3 | 2.3 | 0.2 | 1.7 | 1.7 | 3.0 | 0.0 | 8.7 | 4.9 | 0.0 | 5.4 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.8 | 9.8 | 10.0 | 0.4 | 5.8 | 5.8 | 2.6 | 0.0 | 4.4 | 3.5 | 0.0 | 5.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 11.7 | 25.3 | 25.3 | 13.0 | 16.9 | 16.9 | 47.0 | 0.0 | 60.6 | 45.3 | 0.0 | 54.6 |
| LnGrp LOS | B | C | C | B | B | B | D | A | E | D | A | D |
| Approach Vol, veh/h | | 973 | | | 735 | | | 230 | | | 288 | |
| Approach Delay, s/veh | | 23.0 | | | 16.7 | | | 55.0 | | | 50.4 | |
| Approach LOS | | C | | | B | | | E | | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 7.4 | 78.4 | 11.0 | 23.1 | 12.2 | 73.6 | 15.0 | 19.1 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 60.0 | 7.0 | 29.0 | 18.0 | 47.0 | 11.0 | 25.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 3.2 | 31.0 | 9.0 | 16.0 | 8.0 | 19.4 | 11.1 | 13.7 | | | | |
| Green Ext Time (p_c), s | 0.0 | 6.1 | 0.0 | 0.6 | 0.3 | 4.8 | 0.0 | 0.4 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 27.8 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM 6th Signalized Intersection Summary
5: McHugh Dr & Custer Ave

Alternatives 2 2017 PM
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 186 | 780 | 25 | 17 | 644 | 106 | 74 | 82 | 29 | 182 | 26 | 155 |
| Future Volume (veh/h) | 186 | 780 | 25 | 17 | 644 | 106 | 74 | 82 | 29 | 182 | 26 | 155 |
| 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 | 1400 | 1400 | 1400 | 1500 | 1488 | 1488 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 192 | 804 | 26 | 18 | 664 | 109 | 76 | 85 | 30 | 188 | 27 | 160 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 357 | 1580 | 51 | 283 | 1316 | 216 | 165 | 120 | 42 | 252 | 31 | 182 |
| Arrive On Green | 0.05 | 0.40 | 0.40 | 0.02 | 0.54 | 0.54 | 0.06 | 0.11 | 0.11 | 0.11 | 0.16 | 0.16 |
| Sat Flow, veh/h | 1333 | 2630 | 85 | 1429 | 2432 | 399 | 1429 | 1059 | 374 | 1429 | 188 | 1112 |
| Grp Volume(v), veh/h | 192 | 407 | 423 | 18 | 386 | 387 | 76 | 0 | 115 | 188 | 0 | 187 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 1330 | 1385 | 1429 | 1414 | 1417 | 1429 | 0 | 1433 | 1429 | 0 | 1300 |
| Q Serve(g_s), s | 7.1 | 27.7 | 27.7 | 0.7 | 20.7 | 20.7 | 5.6 | 0.0 | 9.3 | 13.0 | 0.0 | 16.9 |
| Cycle Q Clear(g_c), s | 7.1 | 27.7 | 27.7 | 0.7 | 20.7 | 20.7 | 5.6 | 0.0 | 9.3 | 13.0 | 0.0 | 16.9 |
| Prop In Lane | 1.00 | | 0.06 | 1.00 | | 0.28 | 1.00 | | 0.26 | 1.00 | | 0.86 |
| Lane Grp Cap(c), veh/h | 357 | 799 | 832 | 283 | 765 | 767 | 165 | 0 | 163 | 252 | 0 | 213 |
| V/C Ratio(X) | 0.54 | 0.51 | 0.51 | 0.06 | 0.50 | 0.51 | 0.46 | 0.00 | 0.71 | 0.75 | 0.00 | 0.88 |
| Avail Cap(c_a), veh/h | 441 | 799 | 832 | 327 | 765 | 767 | 166 | 0 | 322 | 252 | 0 | 357 |
| HCM Platoon Ratio | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.88 | 0.88 | 0.88 | 0.92 | 0.92 | 0.92 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 13.1 | 22.8 | 22.8 | 13.6 | 17.4 | 17.4 | 44.0 | 0.0 | 51.3 | 41.4 | 0.0 | 49.0 |
| Incr Delay (d2), s/veh | 1.1 | 2.0 | 2.0 | 0.1 | 2.2 | 2.2 | 2.0 | 0.0 | 4.2 | 11.5 | 0.0 | 10.3 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.2 | 9.7 | 10.1 | 0.2 | 7.0 | 7.1 | 2.1 | 0.0 | 3.5 | 5.7 | 0.0 | 6.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 14.2 | 24.8 | 24.8 | 13.7 | 19.5 | 19.6 | 46.0 | 0.0 | 55.4 | 52.9 | 0.0 | 59.3 |
| LnGrp LOS | B | C | C | B | B | B | D | A | E | D | A | E |
| Approach Vol, veh/h | | 1022 | | | 791 | | | 191 | | | | 375 |
| Approach Delay, s/veh | | 22.8 | | | 19.4 | | | 51.7 | | | | 56.1 |
| Approach LOS | | C | | | B | | | D | | | | E |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 6.3 | 78.1 | 11.0 | 24.6 | 13.4 | 70.9 | 17.0 | 18.6 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 6.0 | 55.0 | 7.0 | 33.0 | 17.0 | 44.0 | 13.0 | 27.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.7 | 29.7 | 7.6 | 18.9 | 9.1 | 22.7 | 15.0 | 11.3 | | | | |
| Green Ext Time (p_c), s | 0.0 | 5.7 | 0.0 | 0.8 | 0.3 | 5.0 | 0.0 | 0.4 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 29.2 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM 6th Signalized Intersection Summary
5: McHugh Dr & Custer Ave

Alternatives 3 2017 - AM
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 115 | 572 | 35 | 69 | 471 | 63 | 69 | 58 | 81 | 167 | 110 | 176 |
| Future Volume (veh/h) | 115 | 572 | 35 | 69 | 471 | 63 | 69 | 58 | 81 | 167 | 110 | 176 |
| 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 | 1400 | 1378 | 1378 | 1500 | 1453 | 1500 | 1500 | 1500 | 1500 | 1488 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 124 | 615 | 38 | 74 | 506 | 68 | 74 | 62 | 87 | 180 | 118 | 189 |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Percent Heavy Veh, % | 0 | 2 | 2 | 0 | 4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Cap, veh/h | 646 | 1351 | 83 | 548 | 1466 | 833 | 341 | 72 | 102 | 274 | 303 | 331 |
| Arrive On Green | 0.04 | 0.36 | 0.36 | 0.05 | 0.53 | 0.53 | 0.05 | 0.13 | 0.13 | 0.12 | 0.20 | 0.20 |
| Sat Flow, veh/h | 1333 | 2505 | 155 | 1429 | 2761 | 1271 | 1429 | 565 | 793 | 1417 | 1500 | 1271 |
| Grp Volume(v), veh/h | 124 | 321 | 332 | 74 | 506 | 68 | 74 | 0 | 149 | 180 | 118 | 189 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 1309 | 1350 | 1429 | 1381 | 1271 | 1429 | 0 | 1357 | 1417 | 1500 | 1271 |
| Q Serve(g_s), s | 5.0 | 22.6 | 22.7 | 2.7 | 12.6 | 2.3 | 5.4 | 0.0 | 12.9 | 12.8 | 8.2 | 15.5 |
| Cycle Q Clear(g_c), s | 5.0 | 22.6 | 22.7 | 2.7 | 12.6 | 2.3 | 5.4 | 0.0 | 12.9 | 12.8 | 8.2 | 15.5 |
| Prop In Lane | 1.00 | | 0.11 | 1.00 | | 1.00 | 1.00 | | 0.58 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 646 | 706 | 729 | 548 | 1466 | 833 | 341 | 0 | 174 | 274 | 303 | 331 |
| V/C Ratio(X) | 0.19 | 0.45 | 0.46 | 0.14 | 0.35 | 0.08 | 0.22 | 0.00 | 0.86 | 0.66 | 0.39 | 0.57 |
| Avail Cap(c_a), veh/h | 712 | 706 | 729 | 548 | 1466 | 833 | 341 | 0 | 283 | 311 | 463 | 466 |
| HCM Platoon Ratio | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.93 | 0.93 | 0.93 | 0.97 | 0.97 | 0.97 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 12.1 | 25.1 | 25.1 | 13.2 | 16.2 | 7.5 | 42.7 | 0.0 | 51.2 | 37.8 | 41.5 | 38.5 |
| Incr Delay (d2), s/veh | 0.1 | 2.0 | 1.9 | 0.5 | 0.6 | 0.2 | 0.3 | 0.0 | 10.9 | 4.1 | 0.6 | 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 | 1.5 | 7.9 | 8.1 | 0.9 | 4.1 | 0.7 | 2.0 | 0.0 | 4.9 | 4.8 | 3.1 | 5.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 12.3 | 27.0 | 27.0 | 13.7 | 16.8 | 7.7 | 43.1 | 0.0 | 62.1 | 41.9 | 42.1 | 39.7 |
| LnGrp LOS | B | C | C | B | B | A | D | A | E | D | D | D |
| Approach Vol, veh/h | | 777 | | | 648 | | | 223 | | | 487 | |
| Approach Delay, s/veh | | 24.7 | | | 15.5 | | | 55.8 | | | 41.1 | |
| Approach LOS | | C | | | B | | | E | | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 10.0 | 70.7 | 10.0 | 29.3 | 11.0 | 69.7 | 18.9 | 20.4 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 6.0 | 52.0 | 6.0 | 37.0 | 13.0 | 45.0 | 18.0 | 25.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 4.7 | 24.7 | 7.4 | 17.5 | 7.0 | 14.6 | 14.8 | 14.9 | | | | |
| Green Ext Time (p_c), s | 0.0 | 4.4 | 0.0 | 1.1 | 0.1 | 4.0 | 0.2 | 0.5 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 28.9 | | | | | | | | | |
| HCM 6th LOS | | | C | | | | | | | | | |

HCM 6th Signalized Intersection Summary
5: McHugh Dr & Custer Ave

Alternatives 3 2017 School
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 145 | 664 | 57 | 31 | 540 | 83 | 84 | 54 | 67 | 114 | 38 | 104 |
| Future Volume (veh/h) | 145 | 664 | 57 | 31 | 540 | 83 | 84 | 54 | 67 | 114 | 38 | 104 |
| 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 | 1350 | 1329 | 1329 | 1500 | 1477 | 1488 | 1500 | 1500 | 1500 | 1500 | 1500 | 1488 |
| Adj Flow Rate, veh/h | 163 | 746 | 64 | 35 | 607 | 93 | 94 | 61 | 75 | 128 | 43 | 117 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Percent Heavy Veh, % | 0 | 2 | 2 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Cap, veh/h | 387 | 1420 | 122 | 297 | 1582 | 827 | 259 | 72 | 89 | 211 | 227 | 277 |
| Arrive On Green | 0.05 | 0.40 | 0.40 | 0.03 | 0.56 | 0.56 | 0.06 | 0.12 | 0.12 | 0.09 | 0.15 | 0.15 |
| Sat Flow, veh/h | 1286 | 2353 | 202 | 1429 | 2806 | 1261 | 1429 | 612 | 753 | 1429 | 1500 | 1261 |
| Grp Volume(v), veh/h | 163 | 400 | 410 | 35 | 607 | 93 | 94 | 0 | 136 | 128 | 43 | 117 |
| Grp Sat Flow(s),veh/h/ln | 1286 | 1262 | 1293 | 1429 | 1403 | 1261 | 1429 | 0 | 1365 | 1429 | 1500 | 1261 |
| Q Serve(g_s), s | 6.0 | 28.9 | 29.0 | 1.2 | 14.5 | 3.3 | 7.0 | 0.0 | 11.7 | 9.1 | 3.0 | 9.6 |
| Cycle Q Clear(g_c), s | 6.0 | 28.9 | 29.0 | 1.2 | 14.5 | 3.3 | 7.0 | 0.0 | 11.7 | 9.1 | 3.0 | 9.6 |
| Prop In Lane | 1.00 | | 0.16 | 1.00 | | 1.00 | 1.00 | | 0.55 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 387 | 762 | 780 | 297 | 1582 | 827 | 259 | 0 | 161 | 211 | 227 | 277 |
| V/C Ratio(X) | 0.42 | 0.53 | 0.53 | 0.12 | 0.38 | 0.11 | 0.36 | 0.00 | 0.85 | 0.61 | 0.19 | 0.42 |
| Avail Cap(c_a), veh/h | 481 | 762 | 780 | 315 | 1582 | 827 | 259 | 0 | 284 | 211 | 363 | 391 |
| HCM Platoon Ratio | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.90 | 0.90 | 0.90 | 0.93 | 0.93 | 0.93 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 10.3 | 23.0 | 23.0 | 12.8 | 14.6 | 7.7 | 43.6 | 0.0 | 51.9 | 40.4 | 44.5 | 40.3 |
| Incr Delay (d2), s/veh | 0.7 | 2.3 | 2.3 | 0.2 | 0.7 | 0.3 | 0.9 | 0.0 | 8.7 | 4.9 | 0.3 | 0.8 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.8 | 9.8 | 10.0 | 0.4 | 4.7 | 0.9 | 2.5 | 0.0 | 4.4 | 3.5 | 1.2 | 3.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 11.0 | 25.3 | 25.3 | 13.0 | 15.2 | 8.0 | 44.4 | 0.0 | 60.6 | 45.3 | 44.8 | 41.0 |
| LnGrp LOS | B | C | C | B | B | A | D | A | E | D | D | D |
| Approach Vol, veh/h | | 973 | | | 735 | | | 230 | | | 288 | |
| Approach Delay, s/veh | | 22.9 | | | 14.2 | | | 54.0 | | | 43.5 | |
| Approach LOS | | C | | | B | | | D | | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 7.4 | 78.4 | 11.0 | 23.1 | 12.2 | 73.7 | 15.0 | 19.1 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 60.0 | 7.0 | 29.0 | 17.0 | 48.0 | 11.0 | 25.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 3.2 | 31.0 | 9.0 | 11.6 | 8.0 | 16.5 | 11.1 | 13.7 | | | | |
| Green Ext Time (p_c), s | 0.0 | 6.1 | 0.0 | 0.4 | 0.3 | 4.9 | 0.0 | 0.4 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 25.9 | | | | | | | | | |
| HCM 6th LOS | | | C | | | | | | | | | |

HCM 6th Signalized Intersection Summary
5: McHugh Dr & Custer Ave

Alternatives 3 2017 PM
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 186 | 780 | 25 | 17 | 644 | 106 | 74 | 82 | 29 | 182 | 26 | 155 |
| Future Volume (veh/h) | 186 | 780 | 25 | 17 | 644 | 106 | 74 | 82 | 29 | 182 | 26 | 155 |
| 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 | 1400 | 1400 | 1400 | 1500 | 1488 | 1488 | 1500 | 1500 | 1500 | 1500 | 1500 | 1488 |
| Adj Flow Rate, veh/h | 192 | 804 | 26 | 18 | 664 | 109 | 76 | 85 | 30 | 188 | 27 | 160 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Cap, veh/h | 373 | 1577 | 51 | 282 | 1525 | 838 | 226 | 104 | 37 | 258 | 260 | 318 |
| Arrive On Green | 0.05 | 0.40 | 0.40 | 0.02 | 0.54 | 0.54 | 0.05 | 0.10 | 0.10 | 0.13 | 0.17 | 0.17 |
| Sat Flow, veh/h | 1333 | 2630 | 85 | 1429 | 2828 | 1261 | 1429 | 1059 | 374 | 1429 | 1500 | 1261 |
| Grp Volume(v), veh/h | 192 | 407 | 423 | 18 | 664 | 109 | 76 | 0 | 115 | 188 | 27 | 160 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 1330 | 1385 | 1429 | 1414 | 1261 | 1429 | 0 | 1433 | 1429 | 1500 | 1261 |
| Q Serve(g_s), s | 7.2 | 27.8 | 27.8 | 0.7 | 17.0 | 3.8 | 5.7 | 0.0 | 9.4 | 13.8 | 1.8 | 13.0 |
| Cycle Q Clear(g_c), s | 7.2 | 27.8 | 27.8 | 0.7 | 17.0 | 3.8 | 5.7 | 0.0 | 9.4 | 13.8 | 1.8 | 13.0 |
| Prop In Lane | 1.00 | | 0.06 | 1.00 | | 1.00 | 1.00 | | 0.26 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 373 | 798 | 830 | 282 | 1525 | 838 | 226 | 0 | 141 | 258 | 260 | 318 |
| V/C Ratio(X) | 0.51 | 0.51 | 0.51 | 0.06 | 0.44 | 0.13 | 0.34 | 0.00 | 0.82 | 0.73 | 0.10 | 0.50 |
| Avail Cap(c_a), veh/h | 479 | 798 | 830 | 315 | 1525 | 838 | 226 | 0 | 275 | 258 | 400 | 436 |
| HCM Platoon Ratio | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.88 | 0.88 | 0.88 | 0.92 | 0.92 | 0.92 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 12.0 | 22.9 | 22.9 | 13.7 | 16.6 | 7.4 | 46.0 | 0.0 | 53.1 | 40.6 | 41.8 | 38.4 |
| Incr Delay (d2), s/veh | 1.0 | 2.0 | 2.0 | 0.1 | 0.8 | 0.3 | 0.9 | 0.0 | 8.4 | 9.8 | 0.1 | 0.9 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.2 | 9.7 | 10.1 | 0.2 | 5.6 | 1.1 | 2.1 | 0.0 | 3.8 | 5.6 | 0.7 | 4.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 13.0 | 24.9 | 24.9 | 13.8 | 17.5 | 7.7 | 46.9 | 0.0 | 61.4 | 50.4 | 41.9 | 39.3 |
| LnGrp LOS | B | C | C | B | B | A | D | A | E | D | D | D |
| Approach Vol, veh/h | | 1022 | | | 791 | | | 191 | | | 375 | |
| Approach Delay, s/veh | | 22.7 | | | 16.0 | | | 55.6 | | | 45.1 | |
| Approach LOS | | C | | | B | | | E | | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 6.3 | 78.0 | 10.0 | 25.8 | 13.5 | 70.7 | 19.0 | 16.8 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 58.0 | 6.0 | 32.0 | 19.0 | 44.0 | 15.0 | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.7 | 29.8 | 7.7 | 15.0 | 9.2 | 19.0 | 15.8 | 11.4 | | | | |
| Green Ext Time (p_c), s | 0.0 | 5.8 | 0.0 | 0.4 | 0.4 | 5.3 | 0.0 | 0.3 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 26.6 | | | | | | | | | |
| HCM 6th LOS | | | C | | | | | | | | | |

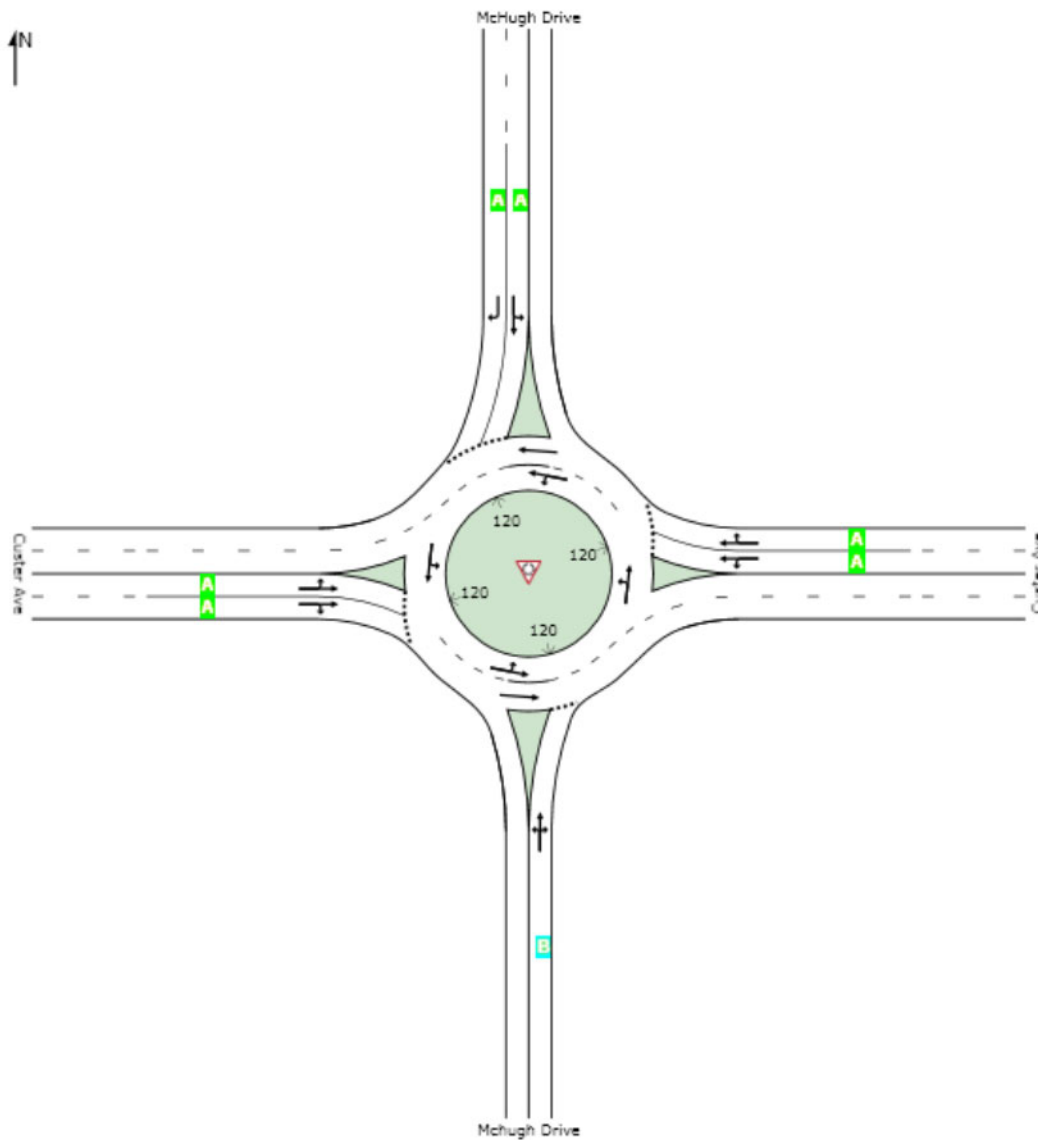
LEVEL OF SERVICE

Site: McHugh 2017 AM Alternative 4

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | B | A | A | A | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: McHugh 2017 AM Alternative 4

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Mchugh Drive | | | | | | | | | | | |
| 3 | L2 | 74 | 0.0 | 0.346 | 10.2 | LOS B | 1.4 | 35.9 | 0.67 | 0.69 | 32.4 |
| 8 | T1 | 62 | 0.0 | 0.346 | 10.2 | LOS B | 1.4 | 35.9 | 0.67 | 0.69 | 32.1 |
| 18 | R2 | 87 | 0.0 | 0.346 | 10.2 | LOS B | 1.4 | 35.9 | 0.67 | 0.69 | 31.2 |
| Approach | | 223 | 0.0 | 0.346 | 10.2 | LOS B | 1.4 | 35.9 | 0.67 | 0.69 | 31.8 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 74 | 0.0 | 0.312 | 6.6 | LOS A | 1.6 | 40.3 | 0.47 | 0.36 | 34.5 |
| 6 | T1 | 505 | 3.6 | 0.312 | 6.6 | LOS A | 1.6 | 40.3 | 0.47 | 0.36 | 34.5 |
| 16 | R2 | 68 | 0.0 | 0.312 | 6.6 | LOS A | 1.6 | 40.2 | 0.47 | 0.36 | 33.7 |
| Approach | | 647 | 2.8 | 0.312 | 6.6 | LOS A | 1.6 | 40.3 | 0.47 | 0.36 | 34.4 |
| North: McHugh Drive | | | | | | | | | | | |
| 7 | L2 | 179 | 0.6 | 0.372 | 9.0 | LOS A | 1.7 | 41.7 | 0.63 | 0.65 | 32.3 |
| 4 | T1 | 118 | 0.0 | 0.372 | 9.0 | LOS A | 1.7 | 41.7 | 0.63 | 0.65 | 32.1 |
| 14 | R2 | 189 | 0.0 | 0.259 | 8.0 | LOS A | 1.0 | 26.0 | 0.60 | 0.60 | 32.9 |
| Approach | | 486 | 0.2 | 0.372 | 8.6 | LOS A | 1.7 | 41.7 | 0.62 | 0.63 | 32.4 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 123 | 0.0 | 0.413 | 8.6 | LOS A | 2.2 | 55.9 | 0.60 | 0.53 | 33.3 |
| 2 | T1 | 614 | 1.9 | 0.413 | 8.6 | LOS A | 2.2 | 55.9 | 0.60 | 0.53 | 33.5 |
| 12 | R2 | 38 | 0.0 | 0.413 | 8.6 | LOS A | 2.2 | 55.8 | 0.60 | 0.53 | 32.8 |
| Approach | | 775 | 1.5 | 0.413 | 8.6 | LOS A | 2.2 | 55.9 | 0.60 | 0.53 | 33.4 |
| All Vehicles | | 2131 | 1.5 | 0.413 | 8.2 | LOS A | 2.2 | 55.9 | 0.57 | 0.52 | 33.3 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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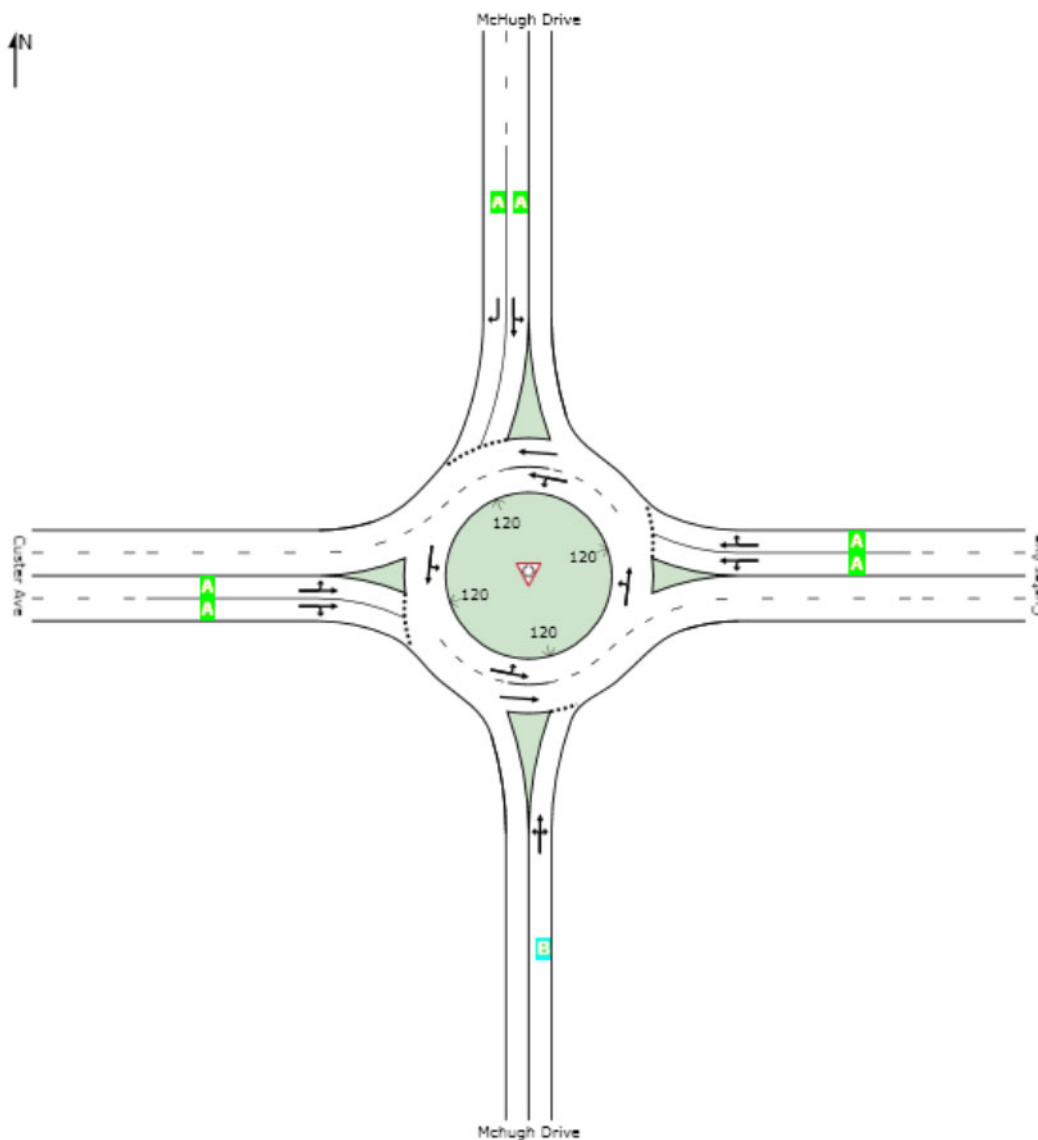
LEVEL OF SERVICE

 Site: McHugh 2017 School Alternative 4

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | B | A | A | A | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c > 1$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: McHugh 2017 School Alternative 4

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Mchugh Drive | | | | | | | | | | | |
| 3 | L2 | 94 | 0.0 | 0.399 | 12.3 | LOS B | 1.7 | 42.7 | 0.71 | 0.75 | 31.3 |
| 8 | T1 | 61 | 0.0 | 0.399 | 12.3 | LOS B | 1.7 | 42.7 | 0.71 | 0.75 | 31.1 |
| 18 | R2 | 75 | 1.5 | 0.399 | 12.3 | LOS B | 1.7 | 42.7 | 0.71 | 0.75 | 30.1 |
| Approach | | 231 | 0.5 | 0.399 | 12.3 | LOS B | 1.7 | 42.7 | 0.71 | 0.75 | 30.8 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 35 | 0.0 | 0.372 | 7.6 | LOS A | 2.0 | 49.7 | 0.54 | 0.45 | 34.4 |
| 6 | T1 | 607 | 1.5 | 0.372 | 7.6 | LOS A | 2.0 | 49.7 | 0.54 | 0.45 | 34.2 |
| 16 | R2 | 93 | 1.2 | 0.372 | 7.6 | LOS A | 2.0 | 49.6 | 0.54 | 0.45 | 33.2 |
| Approach | | 736 | 1.4 | 0.372 | 7.6 | LOS A | 2.0 | 49.7 | 0.54 | 0.45 | 34.1 |
| North: McHugh Drive | | | | | | | | | | | |
| 7 | L2 | 128 | 0.0 | 0.227 | 7.3 | LOS A | 0.9 | 21.7 | 0.59 | 0.59 | 32.6 |
| 4 | T1 | 43 | 0.0 | 0.227 | 7.3 | LOS A | 0.9 | 21.7 | 0.59 | 0.59 | 32.4 |
| 14 | R2 | 117 | 1.0 | 0.174 | 7.3 | LOS A | 0.6 | 16.2 | 0.59 | 0.59 | 33.1 |
| Approach | | 288 | 0.4 | 0.227 | 7.3 | LOS A | 0.9 | 21.7 | 0.59 | 0.59 | 32.8 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 163 | 0.0 | 0.440 | 8.0 | LOS A | 2.7 | 67.9 | 0.49 | 0.36 | 33.5 |
| 2 | T1 | 747 | 1.7 | 0.440 | 8.0 | LOS A | 2.7 | 67.9 | 0.49 | 0.36 | 33.8 |
| 12 | R2 | 64 | 1.8 | 0.440 | 8.0 | LOS A | 2.7 | 67.6 | 0.49 | 0.35 | 33.1 |
| Approach | | 974 | 1.4 | 0.440 | 8.0 | LOS A | 2.7 | 67.9 | 0.49 | 0.36 | 33.7 |
| All Vehicles | | 2228 | 1.2 | 0.440 | 8.2 | LOS A | 2.7 | 67.9 | 0.55 | 0.46 | 33.4 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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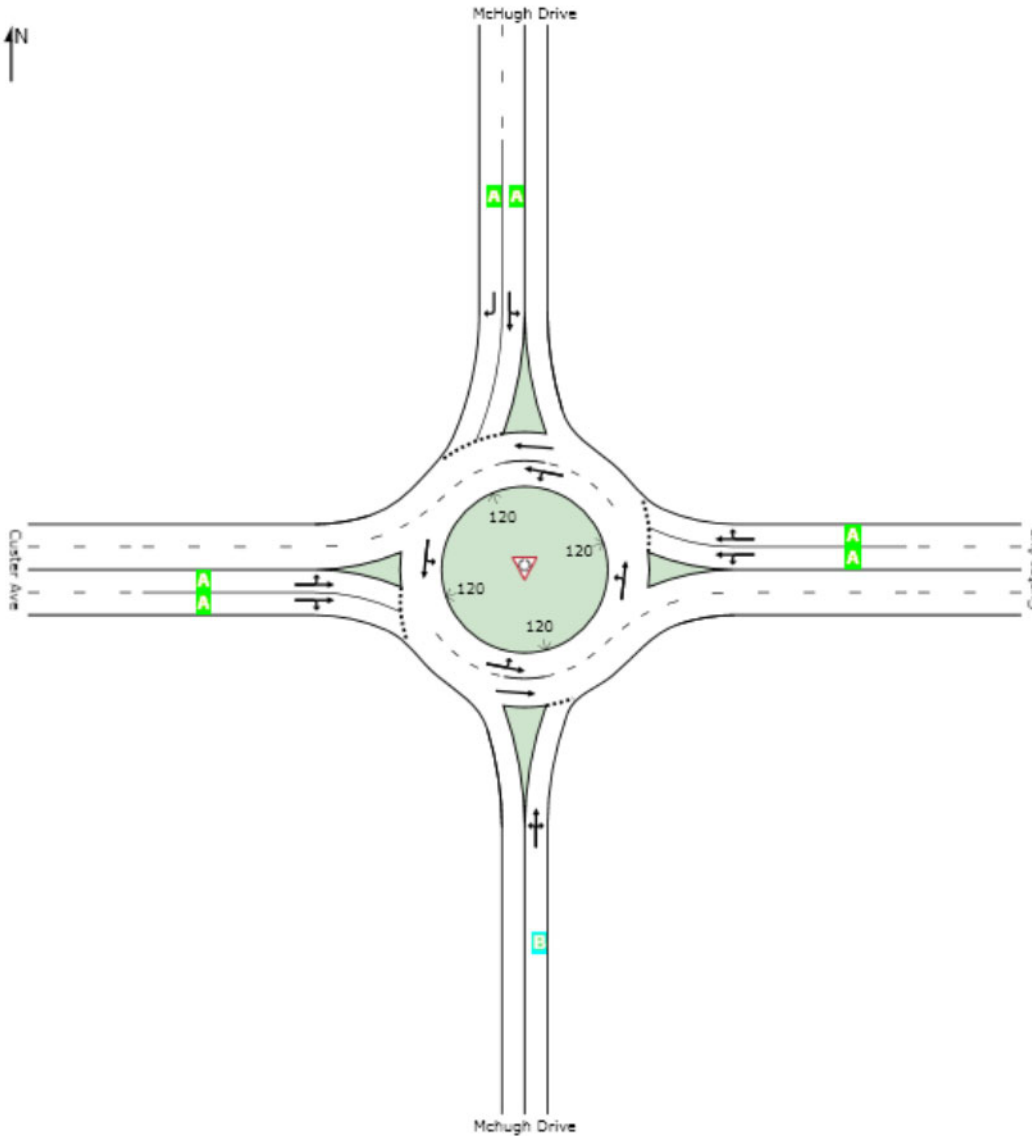
LEVEL OF SERVICE

 Site: McHugh 2017 PM Alternative 4

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | B | A | A | A | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: McHugh 2017 PM Alternative 4

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Mchugh Drive | | | | | | | | | | | |
| 3 | L2 | 76 | 0.0 | 0.369 | 12.8 | LOS B | 1.5 | 37.1 | 0.73 | 0.79 | 23.0 |
| 8 | T1 | 85 | 0.0 | 0.369 | 12.8 | LOS B | 1.5 | 37.1 | 0.73 | 0.79 | 21.5 |
| 18 | R2 | 30 | 0.0 | 0.369 | 12.8 | LOS B | 1.5 | 37.1 | 0.73 | 0.79 | 21.9 |
| Approach | | 191 | 0.0 | 0.369 | 12.8 | LOS B | 1.5 | 37.1 | 0.73 | 0.79 | 22.2 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 18 | 0.0 | 0.411 | 8.4 | LOS A | 2.2 | 56.3 | 0.59 | 0.51 | 24.6 |
| 6 | T1 | 665 | 0.8 | 0.411 | 8.4 | LOS A | 2.2 | 56.3 | 0.59 | 0.51 | 22.8 |
| 16 | R2 | 109 | 0.9 | 0.411 | 8.4 | LOS A | 2.2 | 56.3 | 0.59 | 0.51 | 23.2 |
| Approach | | 792 | 0.8 | 0.411 | 8.4 | LOS A | 2.2 | 56.3 | 0.59 | 0.51 | 22.9 |
| North: McHugh Drive | | | | | | | | | | | |
| 7 | L2 | 188 | 0.0 | 0.289 | 8.3 | LOS A | 1.1 | 28.6 | 0.62 | 0.62 | 23.6 |
| 4 | T1 | 27 | 0.0 | 0.289 | 8.3 | LOS A | 1.1 | 28.6 | 0.62 | 0.62 | 22.0 |
| 14 | R2 | 160 | 0.6 | 0.241 | 8.3 | LOS A | 0.9 | 23.3 | 0.62 | 0.62 | 23.1 |
| Approach | | 375 | 0.3 | 0.289 | 8.3 | LOS A | 1.1 | 28.6 | 0.62 | 0.62 | 23.2 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 192 | 0.0 | 0.468 | 8.5 | LOS A | 3.0 | 74.1 | 0.54 | 0.41 | 24.1 |
| 2 | T1 | 805 | 0.3 | 0.468 | 8.5 | LOS A | 3.0 | 74.1 | 0.54 | 0.41 | 22.7 |
| 12 | R2 | 26 | 0.0 | 0.468 | 8.5 | LOS A | 3.0 | 74.0 | 0.54 | 0.41 | 23.3 |
| Approach | | 1023 | 0.2 | 0.468 | 8.5 | LOS A | 3.0 | 74.1 | 0.54 | 0.41 | 23.0 |
| All Vehicles | | 2380 | 0.4 | 0.468 | 8.8 | LOS A | 3.0 | 74.1 | 0.58 | 0.51 | 22.9 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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HCM 6th Signalized Intersection Summary
6: Villard Ave/Private Approach & Custer Ave

Alternatives 1 2017 - AM
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|-------|------|------|------|-------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 10 | 739 | 80 | 51 | 607 | 15 | 17 | 5 | 60 | 5 | 15 | 10 |
| Future Volume (veh/h) | 10 | 739 | 80 | 51 | 607 | 15 | 17 | 5 | 60 | 5 | 15 | 10 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1400 | 1389 | 1389 | 1383 | 1477 | 1477 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 11 | 821 | 89 | 57 | 674 | 17 | 19 | 6 | 67 | 6 | 17 | 11 |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Percent Heavy Veh, % | 0 | 1 | 1 | 10 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 895 | 2001 | 217 | 778 | 2329 | 59 | 149 | 8 | 89 | 40 | 51 | 27 |
| Arrive On Green | 1.00 | 1.00 | 1.00 | 0.83 | 0.83 | 0.83 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| Sat Flow, veh/h | 1070 | 2402 | 260 | 861 | 2796 | 71 | 2106 | 106 | 1182 | 65 | 675 | 354 |
| Grp Volume(v), veh/h | 11 | 451 | 459 | 57 | 338 | 353 | 19 | 0 | 73 | 34 | 0 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1070 | 1320 | 1342 | 861 | 1403 | 1464 | 2106 | 0 | 1287 | 1094 | 0 | 0 |
| Q Serve(g_s), s | 0.1 | 0.0 | 0.0 | 1.4 | 6.4 | 6.4 | 0.0 | 0.0 | 6.7 | 0.1 | 0.0 | 0.0 |
| Cycle Q Clear(g_c), s | 6.4 | 0.0 | 0.0 | 1.4 | 6.4 | 6.4 | 2.5 | 0.0 | 6.7 | 6.7 | 0.0 | 0.0 |
| Prop In Lane | 1.00 | | 0.19 | 1.00 | | 0.05 | 1.00 | | 0.92 | 0.18 | | 0.32 |
| Lane Grp Cap(c), veh/h | 895 | 1099 | 1118 | 778 | 1169 | 1220 | 149 | 0 | 97 | 118 | 0 | 0 |
| V/C Ratio(X) | 0.01 | 0.41 | 0.41 | 0.07 | 0.29 | 0.29 | 0.13 | 0.00 | 0.75 | 0.29 | 0.00 | 0.00 |
| Avail Cap(c_a), veh/h | 895 | 1099 | 1118 | 778 | 1169 | 1220 | 421 | 0 | 263 | 300 | 0 | 0 |
| HCM Platoon Ratio | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.81 | 0.81 | 0.81 | 0.85 | 0.85 | 0.85 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |
| Uniform Delay (d), s/veh | 0.2 | 0.0 | 0.0 | 1.8 | 2.2 | 2.2 | 52.5 | 0.0 | 54.4 | 52.6 | 0.0 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 0.9 | 0.9 | 0.2 | 0.5 | 0.5 | 0.4 | 0.0 | 11.1 | 1.3 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 0.3 | 0.3 | 0.2 | 1.3 | 1.3 | 0.6 | 0.0 | 2.5 | 1.0 | 0.0 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.2 | 0.9 | 0.9 | 1.9 | 2.7 | 2.7 | 52.8 | 0.0 | 65.5 | 53.9 | 0.0 | 0.0 |
| LnGrp LOS | A | A | A | A | A | A | D | A | E | D | A | A |
| Approach Vol, veh/h | | 921 | | | 748 | | | 92 | | | | 34 |
| Approach Delay, s/veh | | 0.9 | | | 2.7 | | | 62.9 | | | | 53.9 |
| Approach LOS | | A | | | A | | | E | | | | D |
| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 105.5 | | 14.5 | | 105.5 | | 14.5 | | | | |
| Change Period (Y+Rc), s | | 5.5 | | 5.5 | | 5.5 | | 5.5 | | | | |
| Max Green Setting (Gmax), s | | 84.5 | | 24.5 | | 84.5 | | 24.5 | | | | |
| Max Q Clear Time (g_c+I1), s | | 8.4 | | 8.7 | | 8.4 | | 8.7 | | | | |
| Green Ext Time (p_c), s | | 7.5 | | 0.1 | | 5.2 | | 0.4 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 5.8 | | | | | | | | |
| HCM 6th LOS | | | | A | | | | | | | | |

HCM 6th Signalized Intersection Summary
6: Villard Ave/Private Approach & Custer Ave

Alternatives 1 2017 School
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 10 | 820 | 42 | 43 | 651 | 15 | 20 | 5 | 81 | 5 | 15 | 10 |
| Future Volume (veh/h) | 10 | 820 | 42 | 43 | 651 | 15 | 20 | 5 | 81 | 5 | 15 | 10 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1350 | 1339 | 1339 | 1500 | 1477 | 1477 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 11 | 932 | 48 | 49 | 740 | 17 | 23 | 6 | 92 | 6 | 17 | 11 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Percent Heavy Veh, % | 0 | 1 | 1 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 360 | 1713 | 88 | 380 | 1951 | 45 | 302 | 17 | 256 | 68 | 162 | 93 |
| Arrive On Green | 1.00 | 1.00 | 1.00 | 0.70 | 0.70 | 0.70 | 0.21 | 0.21 | 0.21 | 0.21 | 0.21 | 0.21 |
| Sat Flow, veh/h | 511 | 2462 | 127 | 460 | 2803 | 64 | 1108 | 79 | 1205 | 155 | 760 | 438 |
| Grp Volume(v), veh/h | 11 | 482 | 498 | 49 | 370 | 387 | 23 | 0 | 98 | 34 | 0 | 0 |
| Grp Sat Flow(s),veh/h/ln | 511 | 1272 | 1317 | 460 | 1403 | 1465 | 1108 | 0 | 1283 | 1353 | 0 | 0 |
| Q Serve(g_s), s | 0.4 | 0.0 | 0.0 | 4.3 | 13.1 | 13.1 | 0.0 | 0.0 | 7.8 | 0.0 | 0.0 | 0.0 |
| Cycle Q Clear(g_c), s | 13.5 | 0.0 | 0.0 | 4.3 | 13.1 | 13.1 | 1.5 | 0.0 | 7.8 | 2.3 | 0.0 | 0.0 |
| Prop In Lane | 1.00 | | 0.10 | 1.00 | | 0.04 | 1.00 | | 0.94 | 0.18 | | 0.32 |
| Lane Grp Cap(c), veh/h | 360 | 885 | 916 | 380 | 976 | 1019 | 302 | 0 | 273 | 323 | 0 | 0 |
| V/C Ratio(X) | 0.03 | 0.54 | 0.54 | 0.13 | 0.38 | 0.38 | 0.08 | 0.00 | 0.36 | 0.11 | 0.00 | 0.00 |
| Avail Cap(c_a), veh/h | 360 | 885 | 916 | 380 | 976 | 1019 | 302 | 0 | 273 | 323 | 0 | 0 |
| HCM Platoon Ratio | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.83 | 0.83 | 0.83 | 0.86 | 0.86 | 0.86 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |
| Uniform Delay (d), s/veh | 1.1 | 0.0 | 0.0 | 6.2 | 7.5 | 7.5 | 37.8 | 0.0 | 40.3 | 38.1 | 0.0 | 0.0 |
| Incr Delay (d2), s/veh | 0.1 | 2.0 | 1.9 | 0.6 | 1.0 | 0.9 | 0.5 | 0.0 | 3.7 | 0.7 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 0.5 | 0.5 | 0.5 | 3.8 | 3.9 | 0.6 | 0.0 | 2.8 | 0.9 | 0.0 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 1.2 | 2.0 | 1.9 | 6.8 | 8.5 | 8.5 | 38.3 | 0.0 | 43.9 | 38.8 | 0.0 | 0.0 |
| LnGrp LOS | A | A | A | A | A | A | D | A | D | D | A | A |
| Approach Vol, veh/h | | 991 | | | 806 | | | 121 | | | | 34 |
| Approach Delay, s/veh | | 2.0 | | | 8.4 | | | 42.9 | | | | 38.8 |
| Approach LOS | | A | | | A | | | D | | | | D |
| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 89.0 | | 31.0 | | 89.0 | | 31.0 | | | | |
| Change Period (Y+Rc), s | | 5.5 | | 5.5 | | 5.5 | | 5.5 | | | | |
| Max Green Setting (Gmax), s | | 83.5 | | 25.5 | | 83.5 | | 25.5 | | | | |
| Max Q Clear Time (g_c+I1), s | | 15.5 | | 4.3 | | 15.1 | | 9.8 | | | | |
| Green Ext Time (p_c), s | | 8.4 | | 0.1 | | 6.3 | | 0.5 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 7.8 | | | | | | | | |
| HCM 6th LOS | | | | A | | | | | | | | |

HCM 6th Signalized Intersection Summary
6: Villard Ave/Private Approach & Custer Ave

Alternatives 1 2017 PM
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | ↖ | ↗ | | ↖ | ↗ | | ↖ | ↗ | | | ↕ | |
| Traffic Volume (veh/h) | 10 | 938 | 51 | 76 | 757 | 15 | 13 | 5 | 106 | 5 | 15 | 10 |
| Future Volume (veh/h) | 10 | 938 | 51 | 76 | 757 | 15 | 13 | 5 | 106 | 5 | 15 | 10 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1400 | 1400 | 1400 | 1500 | 1488 | 1488 | 1406 | 1500 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 10 | 967 | 53 | 78 | 780 | 15 | 13 | 5 | 109 | 5 | 15 | 10 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 1 | 1 | 8 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 363 | 1806 | 99 | 372 | 1998 | 38 | 240 | 11 | 250 | 63 | 154 | 91 |
| Arrive On Green | 1.00 | 1.00 | 1.00 | 0.70 | 0.70 | 0.70 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| Sat Flow, veh/h | 511 | 2564 | 141 | 443 | 2838 | 55 | 1042 | 56 | 1224 | 136 | 752 | 444 |
| Grp Volume(v), veh/h | 10 | 502 | 518 | 78 | 389 | 406 | 13 | 0 | 114 | 30 | 0 | 0 |
| Grp Sat Flow(s),veh/h/ln | 511 | 1330 | 1375 | 443 | 1414 | 1478 | 1042 | 0 | 1280 | 1332 | 0 | 0 |
| Q Serve(g_s), s | 0.4 | 0.0 | 0.0 | 7.6 | 13.5 | 13.5 | 0.0 | 0.0 | 9.3 | 0.0 | 0.0 | 0.0 |
| Cycle Q Clear(g_c), s | 13.8 | 0.0 | 0.0 | 7.6 | 13.5 | 13.5 | 2.0 | 0.0 | 9.3 | 9.3 | 0.0 | 0.0 |
| Prop In Lane | 1.00 | | 0.10 | 1.00 | | 0.04 | 1.00 | | 0.96 | 0.17 | | 0.33 |
| Lane Grp Cap(c), veh/h | 363 | 937 | 968 | 372 | 996 | 1041 | 240 | 0 | 261 | 307 | 0 | 0 |
| V/C Ratio(X) | 0.03 | 0.54 | 0.54 | 0.21 | 0.39 | 0.39 | 0.05 | 0.00 | 0.44 | 0.10 | 0.00 | 0.00 |
| Avail Cap(c_a), veh/h | 363 | 937 | 968 | 372 | 996 | 1041 | 240 | 0 | 261 | 307 | 0 | 0 |
| HCM Platoon Ratio | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.80 | 0.80 | 0.80 | 0.84 | 0.84 | 0.84 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |
| Uniform Delay (d), s/veh | 1.1 | 0.0 | 0.0 | 6.4 | 7.2 | 7.2 | 38.8 | 0.0 | 41.7 | 38.8 | 0.0 | 0.0 |
| Incr Delay (d2), s/veh | 0.1 | 1.8 | 1.7 | 1.1 | 1.0 | 0.9 | 0.4 | 0.0 | 5.2 | 0.6 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 0.5 | 0.5 | 0.8 | 3.9 | 4.1 | 0.3 | 0.0 | 3.4 | 0.8 | 0.0 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 1.2 | 1.8 | 1.7 | 7.4 | 8.2 | 8.2 | 39.2 | 0.0 | 46.9 | 39.5 | 0.0 | 0.0 |
| LnGrp LOS | A | A | A | A | A | A | D | A | D | D | A | A |
| Approach Vol, veh/h | | 1030 | | | 873 | | | 127 | | | | 30 |
| Approach Delay, s/veh | | 1.7 | | | 8.1 | | | 46.2 | | | | 39.5 |
| Approach LOS | | A | | | A | | | D | | | | D |
| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 90.0 | | 30.0 | | 90.0 | | 30.0 | | | | |
| Change Period (Y+Rc), s | | 5.5 | | 5.5 | | 5.5 | | 5.5 | | | | |
| Max Green Setting (Gmax), s | | 84.5 | | 24.5 | | 84.5 | | 24.5 | | | | |
| Max Q Clear Time (g_c+I1), s | | 15.8 | | 11.3 | | 15.5 | | 11.3 | | | | |
| Green Ext Time (p_c), s | | 8.9 | | 0.1 | | 7.4 | | 0.5 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 7.7 | | | | | | | | |
| HCM 6th LOS | | | | A | | | | | | | | |

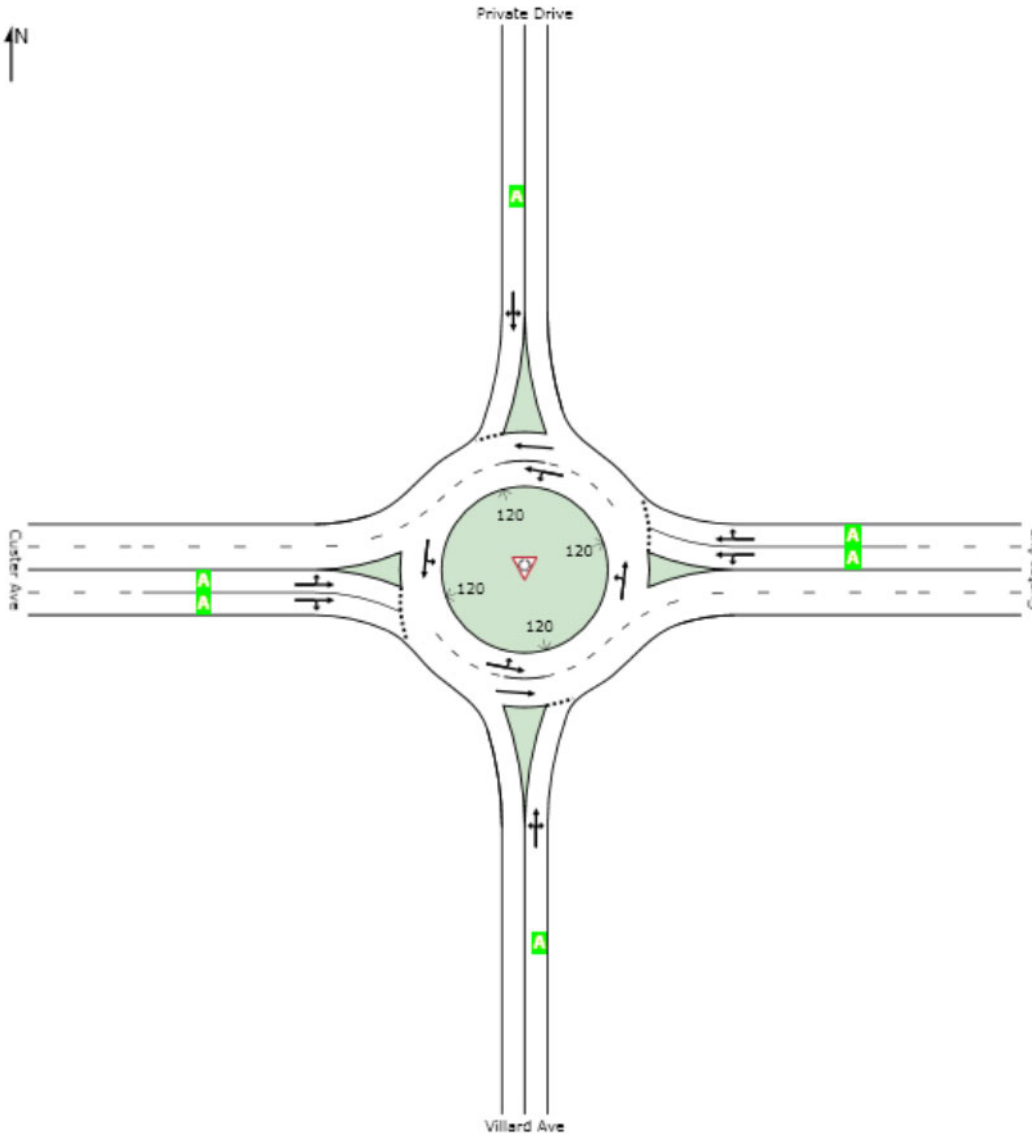
LEVEL OF SERVICE

 Site: Villard 2017 AM Alternative 2

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | A | A | A | A | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Villard 2017 AM Alternative 2

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Villard Ave | | | | | | | | | | | |
| 3 | L2 | 19 | 0.0 | 0.131 | 6.6 | LOS A | 0.5 | 11.7 | 0.58 | 0.58 | 34.4 |
| 8 | T1 | 6 | 0.0 | 0.131 | 6.6 | LOS A | 0.5 | 11.7 | 0.58 | 0.58 | 34.2 |
| 18 | R2 | 66 | 0.0 | 0.131 | 6.6 | LOS A | 0.5 | 11.7 | 0.58 | 0.58 | 33.1 |
| Approach | | 91 | 0.0 | 0.131 | 6.6 | LOS A | 0.5 | 11.7 | 0.58 | 0.58 | 33.4 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 56 | 9.8 | 0.288 | 5.4 | LOS A | 1.6 | 40.0 | 0.16 | 0.06 | 35.1 |
| 6 | T1 | 672 | 2.4 | 0.288 | 5.3 | LOS A | 1.6 | 40.3 | 0.16 | 0.06 | 35.4 |
| 16 | R2 | 17 | 0.0 | 0.288 | 5.3 | LOS A | 1.6 | 40.3 | 0.16 | 0.06 | 34.4 |
| Approach | | 745 | 2.9 | 0.288 | 5.3 | LOS A | 1.6 | 40.3 | 0.16 | 0.06 | 35.4 |
| North: Private Drive | | | | | | | | | | | |
| 7 | L2 | 6 | 0.0 | 0.045 | 5.3 | LOS A | 0.2 | 3.9 | 0.54 | 0.48 | 35.3 |
| 4 | T1 | 17 | 0.0 | 0.045 | 5.3 | LOS A | 0.2 | 3.9 | 0.54 | 0.48 | 35.1 |
| 14 | R2 | 11 | 0.0 | 0.045 | 5.3 | LOS A | 0.2 | 3.9 | 0.54 | 0.48 | 33.9 |
| Approach | | 33 | 0.0 | 0.045 | 5.3 | LOS A | 0.2 | 3.9 | 0.54 | 0.48 | 34.7 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 11 | 0.0 | 0.366 | 6.4 | LOS A | 2.2 | 55.6 | 0.29 | 0.15 | 35.3 |
| 2 | T1 | 818 | 1.4 | 0.366 | 6.4 | LOS A | 2.2 | 55.7 | 0.29 | 0.15 | 35.0 |
| 12 | R2 | 89 | 0.0 | 0.366 | 6.4 | LOS A | 2.2 | 55.7 | 0.29 | 0.15 | 33.9 |
| Approach | | 918 | 1.2 | 0.366 | 6.4 | LOS A | 2.2 | 55.7 | 0.29 | 0.15 | 34.9 |
| All Vehicles | | 1787 | 1.9 | 0.366 | 5.9 | LOS A | 2.2 | 55.7 | 0.26 | 0.14 | 35.0 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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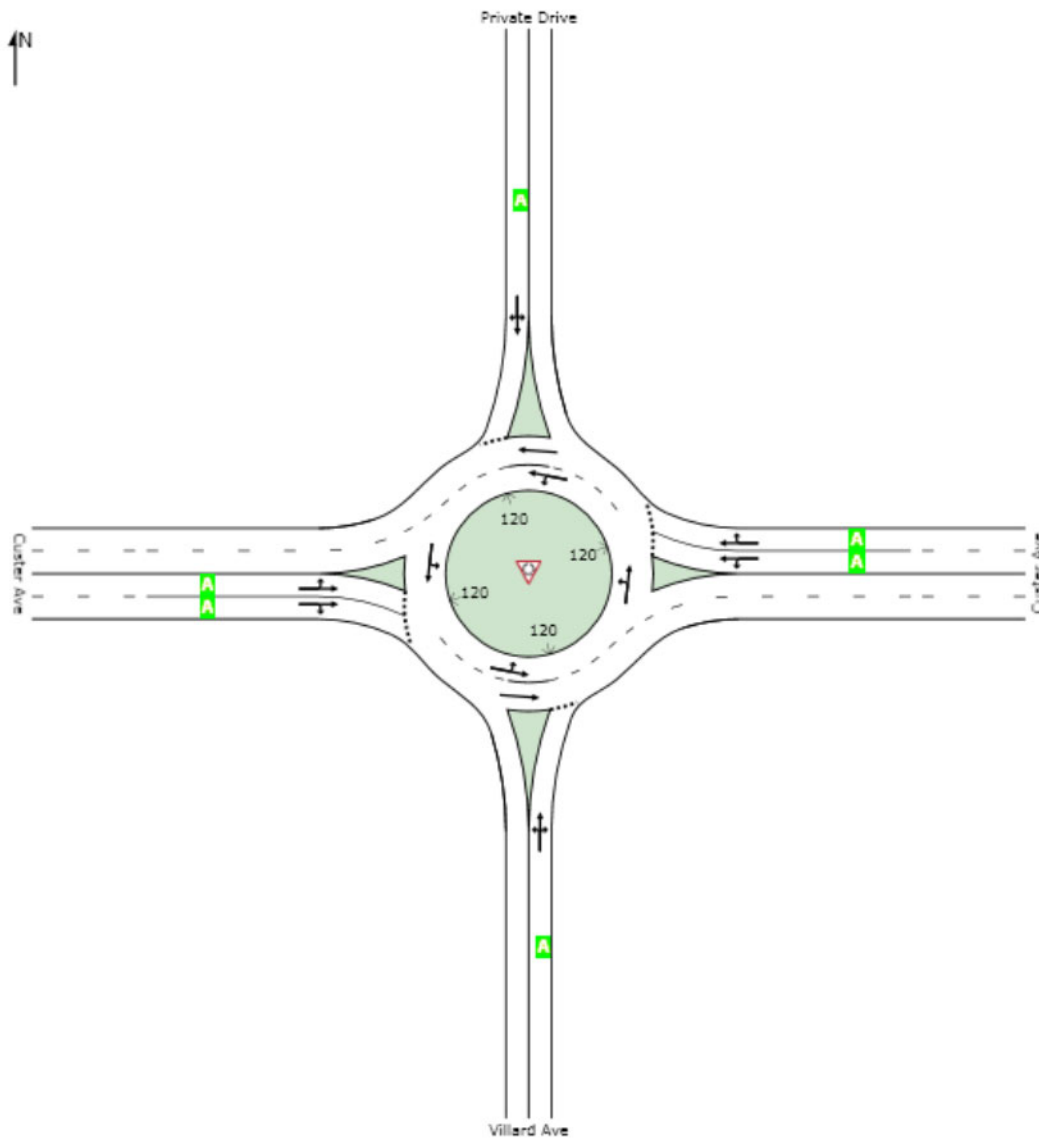
LEVEL OF SERVICE

 Site: Villard 2017 School Alternative 2

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | A | A | A | A | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Villard 2017 School Alternative 2

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Villard Ave | | | | | | | | | | | |
| 3 | L2 | 23 | 0.0 | 0.193 | 8.1 | LOS A | 0.7 | 17.3 | 0.62 | 0.62 | 33.7 |
| 8 | T1 | 6 | 0.0 | 0.193 | 8.1 | LOS A | 0.7 | 17.3 | 0.62 | 0.62 | 33.5 |
| 18 | R2 | 92 | 1.2 | 0.193 | 8.1 | LOS A | 0.7 | 17.3 | 0.62 | 0.62 | 32.4 |
| Approach | | 120 | 0.9 | 0.193 | 8.1 | LOS A | 0.7 | 17.3 | 0.62 | 0.62 | 32.7 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 49 | 0.0 | 0.310 | 5.6 | LOS A | 1.8 | 44.6 | 0.18 | 0.07 | 35.4 |
| 6 | T1 | 740 | 2.2 | 0.310 | 5.6 | LOS A | 1.8 | 44.6 | 0.18 | 0.07 | 35.3 |
| 16 | R2 | 17 | 0.0 | 0.310 | 5.6 | LOS A | 1.8 | 44.6 | 0.18 | 0.07 | 34.3 |
| Approach | | 806 | 2.0 | 0.310 | 5.6 | LOS A | 1.8 | 44.6 | 0.18 | 0.07 | 35.3 |
| North: Private Drive | | | | | | | | | | | |
| 7 | L2 | 6 | 0.0 | 0.049 | 5.6 | LOS A | 0.2 | 4.1 | 0.55 | 0.51 | 35.2 |
| 4 | T1 | 17 | 0.0 | 0.049 | 5.6 | LOS A | 0.2 | 4.1 | 0.55 | 0.51 | 34.9 |
| 14 | R2 | 11 | 0.0 | 0.049 | 5.6 | LOS A | 0.2 | 4.1 | 0.55 | 0.51 | 33.8 |
| Approach | | 34 | 0.0 | 0.049 | 5.6 | LOS A | 0.2 | 4.1 | 0.55 | 0.51 | 34.6 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 11 | 0.0 | 0.389 | 6.6 | LOS A | 2.5 | 61.7 | 0.28 | 0.13 | 35.2 |
| 2 | T1 | 932 | 0.9 | 0.389 | 6.6 | LOS A | 2.5 | 61.7 | 0.28 | 0.13 | 34.9 |
| 12 | R2 | 48 | 0.0 | 0.389 | 6.6 | LOS A | 2.5 | 61.7 | 0.28 | 0.13 | 33.8 |
| Approach | | 991 | 0.8 | 0.389 | 6.6 | LOS A | 2.5 | 61.7 | 0.28 | 0.13 | 34.9 |
| All Vehicles | | 1951 | 1.3 | 0.389 | 6.2 | LOS A | 2.5 | 61.7 | 0.26 | 0.14 | 34.9 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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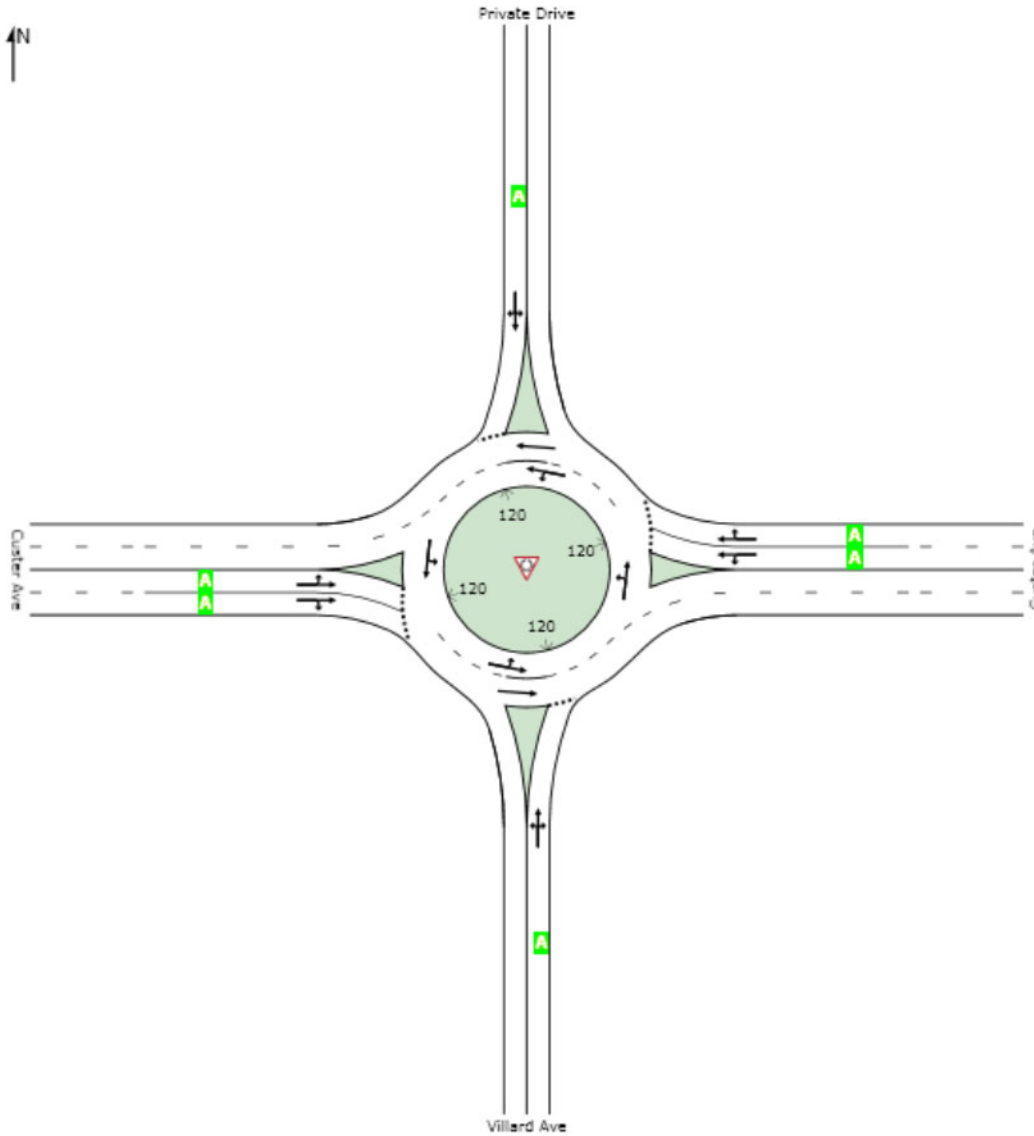
LEVEL OF SERVICE

 Site: Villard 2017 PM Alternative 2

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | A | A | A | A | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Villard 2017 PM Alternative 2

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Villard Ave | | | | | | | | | | | |
| 3 | L2 | 13 | 7.7 | 0.212 | 8.6 | LOS A | 0.7 | 19.0 | 0.63 | 0.63 | 24.3 |
| 8 | T1 | 5 | 0.0 | 0.212 | 8.6 | LOS A | 0.7 | 19.0 | 0.63 | 0.63 | 22.6 |
| 18 | R2 | 109 | 1.8 | 0.212 | 8.6 | LOS A | 0.7 | 19.0 | 0.63 | 0.63 | 23.0 |
| Approach | | 127 | 2.3 | 0.212 | 8.6 | LOS A | 0.7 | 19.0 | 0.63 | 0.63 | 23.1 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 78 | 0.0 | 0.327 | 5.6 | LOS A | 2.0 | 48.9 | 0.16 | 0.05 | 25.1 |
| 6 | T1 | 778 | 0.6 | 0.327 | 5.6 | LOS A | 2.0 | 48.9 | 0.16 | 0.05 | 23.4 |
| 16 | R2 | 15 | 0.0 | 0.327 | 5.6 | LOS A | 1.9 | 48.9 | 0.16 | 0.05 | 24.0 |
| Approach | | 872 | 0.5 | 0.327 | 5.6 | LOS A | 2.0 | 48.9 | 0.16 | 0.05 | 23.6 |
| North: Private Drive | | | | | | | | | | | |
| 7 | L2 | 5 | 0.0 | 0.046 | 5.8 | LOS A | 0.2 | 3.9 | 0.57 | 0.53 | 25.0 |
| 4 | T1 | 15 | 0.0 | 0.046 | 5.8 | LOS A | 0.2 | 3.9 | 0.57 | 0.53 | 23.2 |
| 14 | R2 | 10 | 0.0 | 0.046 | 5.8 | LOS A | 0.2 | 3.9 | 0.57 | 0.53 | 23.7 |
| Approach | | 31 | 0.0 | 0.046 | 5.8 | LOS A | 0.2 | 3.9 | 0.57 | 0.53 | 23.7 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 10 | 0.0 | 0.411 | 6.9 | LOS A | 2.7 | 66.4 | 0.34 | 0.18 | 25.0 |
| 2 | T1 | 964 | 0.2 | 0.411 | 6.9 | LOS A | 2.7 | 66.5 | 0.34 | 0.18 | 23.2 |
| 12 | R2 | 52 | 0.0 | 0.411 | 6.9 | LOS A | 2.7 | 66.5 | 0.34 | 0.18 | 23.6 |
| Approach | | 1027 | 0.2 | 0.411 | 6.9 | LOS A | 2.7 | 66.5 | 0.34 | 0.18 | 23.3 |
| All Vehicles | | 2057 | 0.5 | 0.411 | 6.5 | LOS A | 2.7 | 66.5 | 0.28 | 0.16 | 23.4 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

























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






















HCM 6th Signalized Intersection Summary
7: Montana Ave & Custer Ave

Alternatives 1 2017 - AM
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h) | 75 | 478 | 176 | 222 | 475 | 192 | 110 | 185 | 66 | 295 | 552 | 82 |
| Future Volume (veh/h) | 75 | 478 | 176 | 222 | 475 | 192 | 110 | 185 | 66 | 295 | 552 | 82 |
| 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 | 1389 | 1367 | 1378 | 1477 | 1453 | 1477 | 1465 | 1477 | 1442 | 1477 | 1488 | 1442 |
| Adj Flow Rate, veh/h | 86 | 549 | 202 | 255 | 546 | 221 | 126 | 213 | 76 | 339 | 634 | 94 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Percent Heavy Veh, % | 1 | 3 | 2 | 2 | 4 | 2 | 3 | 2 | 5 | 2 | 1 | 5 |
| Cap, veh/h | 314 | 605 | 361 | 297 | 911 | 596 | 366 | 844 | 552 | 659 | 1048 | 528 |
| Arrive On Green | 0.06 | 0.23 | 0.23 | 0.20 | 0.44 | 0.44 | 0.08 | 0.30 | 0.30 | 0.15 | 0.37 | 0.37 |
| Sat Flow, veh/h | 1323 | 2598 | 1168 | 1406 | 2761 | 1251 | 1395 | 2806 | 1222 | 1406 | 2828 | 1222 |
| Grp Volume(v), veh/h | 86 | 549 | 202 | 255 | 546 | 221 | 126 | 213 | 76 | 339 | 634 | 94 |
| Grp Sat Flow(s),veh/h/ln | 1323 | 1299 | 1168 | 1406 | 1381 | 1251 | 1395 | 1403 | 1222 | 1406 | 1414 | 1222 |
| Q Serve(g_s), s | 6.4 | 26.7 | 18.8 | 17.6 | 19.6 | 13.2 | 8.0 | 7.5 | 4.7 | 19.0 | 23.6 | 6.2 |
| Cycle Q Clear(g_c), s | 6.4 | 26.7 | 18.8 | 17.6 | 19.6 | 13.2 | 8.0 | 7.5 | 4.7 | 19.0 | 23.6 | 6.2 |
| 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 | 314 | 605 | 361 | 297 | 911 | 596 | 366 | 844 | 552 | 659 | 1048 | 528 |
| V/C Ratio(X) | 0.27 | 0.91 | 0.56 | 0.86 | 0.60 | 0.37 | 0.34 | 0.25 | 0.14 | 0.51 | 0.60 | 0.18 |
| Avail Cap(c_a), veh/h | 314 | 689 | 399 | 301 | 1009 | 640 | 367 | 844 | 552 | 659 | 1048 | 528 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.91 | 0.91 | 0.91 | 0.79 | 0.79 | 0.79 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 34.8 | 48.5 | 37.5 | 30.6 | 29.9 | 17.8 | 28.6 | 34.4 | 20.8 | 26.1 | 33.2 | 22.7 |
| Incr Delay (d2), s/veh | 0.3 | 13.2 | 1.0 | 17.1 | 0.5 | 0.2 | 0.4 | 0.7 | 0.5 | 0.5 | 2.6 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.1 | 9.7 | 5.4 | 6.8 | 5.9 | 3.4 | 2.7 | 2.6 | 1.4 | 7.3 | 8.3 | 1.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 35.1 | 61.7 | 38.5 | 47.8 | 30.5 | 18.1 | 29.1 | 35.1 | 21.4 | 26.6 | 35.8 | 23.4 |
| LnGrp LOS | D | E | D | D | C | B | C | D | C | C | D | C |
| Approach Vol, veh/h | | 837 | | | 1022 | | | 415 | | | 1067 | |
| Approach Delay, s/veh | | 53.4 | | | 32.1 | | | 30.7 | | | 31.8 | |
| Approach LOS | | D | | | C | | | C | | | C | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 23.0 | 45.6 | 24.6 | 36.8 | 13.9 | 54.7 | 12.0 | 49.4 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.5 | 5.0 | 6.5 | 4.0 | 6.5 | 4.0 | 6.5 | | | | |
| Max Green Setting (Gmax), s | 19.0 | 34.5 | 20.0 | 34.5 | 10.0 | 43.5 | 8.0 | 47.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 21.0 | 9.5 | 19.6 | 28.7 | 10.0 | 25.6 | 8.4 | 21.6 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.9 | 0.0 | 1.6 | 0.0 | 2.4 | 0.0 | 2.8 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 37.2 | | | | | | | | |
| HCM 6th LOS | | | | D | | | | | | | | |

























HCM 6th Signalized Intersection Summary
7: Montana Ave & Custer Ave

Alternatives 1 2017 School
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h) | 169 | 546 | 126 | 220 | 431 | 302 | 165 | 519 | 202 | 271 | 411 | 78 |
| Future Volume (veh/h) | 169 | 546 | 126 | 220 | 431 | 302 | 165 | 519 | 202 | 271 | 411 | 78 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1350 | 1329 | 1350 | 1488 | 1477 | 1477 | 1488 | 1500 | 1500 | 1477 | 1488 | 1500 |
| Adj Flow Rate, veh/h | 180 | 581 | 134 | 234 | 459 | 321 | 176 | 552 | 215 | 288 | 437 | 83 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 0 | 2 | 0 | 1 | 2 | 2 | 1 | 0 | 0 | 2 | 1 | 0 |
| Cap, veh/h | 271 | 633 | 396 | 256 | 775 | 521 | 363 | 931 | 588 | 336 | 1050 | 621 |
| Arrive On Green | 0.12 | 0.25 | 0.25 | 0.18 | 0.37 | 0.37 | 0.10 | 0.33 | 0.33 | 0.14 | 0.37 | 0.37 |
| Sat Flow, veh/h | 1286 | 2525 | 1144 | 1417 | 2806 | 1251 | 1417 | 2850 | 1271 | 1406 | 2828 | 1271 |
| Grp Volume(v), veh/h | 180 | 581 | 134 | 234 | 459 | 321 | 176 | 552 | 215 | 288 | 437 | 83 |
| Grp Sat Flow(s),veh/h/ln | 1286 | 1262 | 1144 | 1417 | 1403 | 1251 | 1417 | 1425 | 1271 | 1406 | 1414 | 1271 |
| Q Serve(g_s), s | 15.4 | 33.6 | 13.0 | 18.3 | 19.8 | 29.8 | 12.3 | 24.3 | 16.4 | 20.1 | 17.2 | 5.4 |
| Cycle Q Clear(g_c), s | 15.4 | 33.6 | 13.0 | 18.3 | 19.8 | 29.8 | 12.3 | 24.3 | 16.4 | 20.1 | 17.2 | 5.4 |
| 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 | 633 | 396 | 256 | 775 | 521 | 363 | 931 | 588 | 336 | 1050 | 621 |
| V/C Ratio(X) | 0.67 | 0.92 | 0.34 | 0.91 | 0.59 | 0.62 | 0.48 | 0.59 | 0.37 | 0.86 | 0.42 | 0.13 |
| Avail Cap(c_a), veh/h | 309 | 715 | 433 | 272 | 814 | 538 | 370 | 931 | 588 | 336 | 1050 | 621 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.81 | 0.81 | 0.81 | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 36.2 | 54.7 | 36.3 | 36.1 | 40.6 | 29.9 | 29.1 | 42.2 | 26.1 | 30.3 | 35.1 | 21.0 |
| Incr Delay (d2), s/veh | 3.2 | 12.9 | 0.3 | 23.3 | 0.6 | 1.2 | 0.7 | 2.8 | 1.8 | 18.8 | 1.2 | 0.4 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 5.1 | 11.7 | 3.7 | 7.5 | 6.5 | 8.4 | 4.2 | 8.8 | 5.2 | 8.4 | 6.1 | 1.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 39.3 | 67.6 | 36.6 | 59.4 | 41.2 | 31.1 | 29.8 | 45.0 | 27.8 | 49.1 | 36.3 | 21.5 |
| LnGrp LOS | D | E | D | E | D | C | C | D | C | D | D | C |
| Approach Vol, veh/h | | 895 | | | 1014 | | | 943 | | | 808 | |
| Approach Delay, s/veh | | 57.3 | | | 42.2 | | | 38.2 | | | 39.3 | |
| Approach LOS | | E | | | D | | | D | | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 25.0 | 55.5 | 25.4 | 44.1 | 18.3 | 62.2 | 21.6 | 47.9 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.5 | 5.0 | 6.5 | 4.0 | 6.5 | 4.0 | 6.5 | | | | |
| Max Green Setting (Gmax), s | 21.0 | 42.5 | 22.0 | 42.5 | 15.0 | 48.5 | 22.0 | 43.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 22.1 | 26.3 | 20.3 | 35.6 | 14.3 | 19.2 | 17.4 | 31.8 | | | | |
| Green Ext Time (p_c), s | 0.0 | 3.1 | 0.1 | 2.0 | 0.0 | 2.5 | 0.1 | 2.6 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 44.2 | | | | | | | | |
| HCM 6th LOS | | | | D | | | | | | | | |

























HCM 6th Signalized Intersection Summary
7: Montana Ave & Custer Ave

Alternatives 1 2017 PM
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h) | 186 | 678 | 141 | 269 | 525 | 402 | 171 | 640 | 264 | 250 | 436 | 84 |
| Future Volume (veh/h) | 186 | 678 | 141 | 269 | 525 | 402 | 171 | 640 | 264 | 250 | 436 | 84 |
| 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 | 1400 | 1389 | 1400 | 1500 | 1488 | 1500 | 1500 | 1488 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 192 | 699 | 145 | 277 | 541 | 414 | 176 | 660 | 272 | 258 | 449 | 87 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, % | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 276 | 734 | 447 | 267 | 891 | 574 | 332 | 826 | 558 | 280 | 940 | 567 |
| Arrive On Green | 0.12 | 0.28 | 0.28 | 0.20 | 0.42 | 0.42 | 0.10 | 0.29 | 0.29 | 0.14 | 0.33 | 0.33 |
| Sat Flow, veh/h | 1333 | 2639 | 1186 | 1429 | 2828 | 1271 | 1429 | 2828 | 1271 | 1429 | 2850 | 1271 |
| Grp Volume(v), veh/h | 192 | 699 | 145 | 277 | 541 | 414 | 176 | 660 | 272 | 258 | 449 | 87 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 1320 | 1186 | 1429 | 1414 | 1271 | 1429 | 1414 | 1271 | 1429 | 1425 | 1271 |
| Q Serve(g_s), s | 15.3 | 39.0 | 13.0 | 22.0 | 22.4 | 40.1 | 12.8 | 32.3 | 22.9 | 18.4 | 18.8 | 6.1 |
| Cycle Q Clear(g_c), s | 15.3 | 39.0 | 13.0 | 22.0 | 22.4 | 40.1 | 12.8 | 32.3 | 22.9 | 18.4 | 18.8 | 6.1 |
| 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 | 276 | 734 | 447 | 267 | 891 | 574 | 332 | 826 | 558 | 280 | 940 | 567 |
| V/C Ratio(X) | 0.70 | 0.95 | 0.32 | 1.04 | 0.61 | 0.72 | 0.53 | 0.80 | 0.49 | 0.92 | 0.48 | 0.15 |
| Avail Cap(c_a), veh/h | 317 | 748 | 453 | 267 | 891 | 574 | 333 | 826 | 558 | 285 | 940 | 567 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.82 | 0.82 | 0.82 | 0.43 | 0.43 | 0.43 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 33.8 | 53.2 | 33.2 | 39.8 | 36.3 | 28.4 | 32.5 | 49.0 | 30.1 | 34.7 | 40.0 | 24.7 |
| Incr Delay (d2), s/veh | 4.0 | 19.0 | 0.3 | 46.3 | 0.5 | 1.8 | 1.3 | 8.0 | 3.0 | 32.9 | 1.7 | 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 | 5.3 | 14.8 | 3.8 | 10.6 | 7.2 | 11.2 | 4.5 | 12.2 | 7.4 | 8.8 | 6.8 | 1.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 37.8 | 72.2 | 33.4 | 86.1 | 36.8 | 30.3 | 33.8 | 57.0 | 33.1 | 67.6 | 41.7 | 25.3 |
| LnGrp LOS | D | E | C | F | D | C | C | E | C | E | D | C |
| Approach Vol, veh/h | | 1036 | | | 1232 | | | 1108 | | | 794 | |
| Approach Delay, s/veh | | 60.4 | | | 45.7 | | | 47.4 | | | 48.3 | |
| Approach LOS | | E | | | D | | | D | | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 24.5 | 50.3 | 27.0 | 48.2 | 18.8 | 56.0 | 21.4 | 53.8 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.5 | 5.0 | 6.5 | 4.0 | 6.5 | 4.0 | 6.5 | | | | |
| Max Green Setting (Gmax), s | 21.0 | 42.5 | 22.0 | 42.5 | 15.0 | 48.5 | 22.0 | 43.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 20.4 | 34.3 | 24.0 | 41.0 | 14.8 | 20.8 | 17.3 | 42.1 | | | | |
| Green Ext Time (p_c), s | 0.0 | 2.8 | 0.0 | 0.7 | 0.0 | 2.5 | 0.2 | 0.7 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 50.3 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |































HCM 6th Signalized Intersection Summary
7: Montana Ave & Custer Ave

Alternatives 2 2017 - AM
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h) | 75 | 478 | 176 | 222 | 475 | 192 | 110 | 185 | 66 | 295 | 552 | 82 |
| Future Volume (veh/h) | 75 | 478 | 176 | 222 | 475 | 192 | 110 | 185 | 66 | 295 | 552 | 82 |
| 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 | 1389 | 1367 | 1378 | 1477 | 1453 | 1477 | 1465 | 1477 | 1442 | 1477 | 1488 | 1442 |
| Adj Flow Rate, veh/h | 86 | 549 | 202 | 255 | 546 | 221 | 126 | 213 | 76 | 339 | 634 | 94 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Percent Heavy Veh, % | 1 | 3 | 2 | 2 | 4 | 2 | 3 | 2 | 5 | 2 | 1 | 5 |
| Cap, veh/h | 120 | 608 | 362 | 295 | 869 | 606 | 408 | 863 | 508 | 704 | 1133 | 547 |
| Arrive On Green | 0.05 | 0.23 | 0.23 | 0.14 | 0.42 | 0.42 | 0.08 | 0.31 | 0.31 | 0.17 | 0.40 | 0.40 |
| Sat Flow, veh/h | 2566 | 2598 | 1168 | 2728 | 2761 | 1251 | 1395 | 2806 | 1222 | 1406 | 2828 | 1222 |
| Grp Volume(v), veh/h | 86 | 549 | 202 | 255 | 546 | 221 | 126 | 213 | 76 | 339 | 634 | 94 |
| Grp Sat Flow(s),veh/h/ln | 1283 | 1299 | 1168 | 1364 | 1381 | 1251 | 1395 | 1403 | 1222 | 1406 | 1414 | 1222 |
| Q Serve(g_s), s | 4.3 | 26.7 | 12.3 | 11.9 | 20.3 | 13.1 | 8.0 | 7.4 | 1.7 | 21.0 | 22.5 | 6.0 |
| Cycle Q Clear(g_c), s | 4.3 | 26.7 | 12.3 | 11.9 | 20.3 | 13.1 | 8.0 | 7.4 | 1.7 | 21.0 | 22.5 | 6.0 |
| 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 | 120 | 608 | 362 | 295 | 869 | 606 | 408 | 863 | 508 | 704 | 1133 | 547 |
| V/C Ratio(X) | 0.72 | 0.90 | 0.56 | 0.86 | 0.63 | 0.36 | 0.31 | 0.25 | 0.15 | 0.48 | 0.56 | 0.17 |
| Avail Cap(c_a), veh/h | 178 | 709 | 408 | 336 | 924 | 630 | 430 | 863 | 508 | 704 | 1133 | 547 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.91 | 0.91 | 0.91 | 0.79 | 0.79 | 0.79 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 61.1 | 48.4 | 17.9 | 54.7 | 31.8 | 17.6 | 27.6 | 33.7 | 8.4 | 22.5 | 30.1 | 21.5 |
| Incr Delay (d2), s/veh | 5.4 | 12.2 | 0.9 | 14.7 | 0.9 | 0.2 | 0.3 | 0.7 | 0.6 | 0.4 | 2.0 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.5 | 9.6 | 3.3 | 4.5 | 6.2 | 3.4 | 2.6 | 2.6 | 0.7 | 6.7 | 7.8 | 1.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 66.5 | 60.5 | 18.9 | 69.4 | 32.6 | 17.8 | 27.9 | 34.4 | 9.0 | 22.9 | 32.1 | 22.2 |
| LnGrp LOS | E | E | B | E | C | B | C | C | A | C | C | C |
| Approach Vol, veh/h | | 837 | | | 1022 | | | 415 | | | 1067 | |
| Approach Delay, s/veh | | 51.1 | | | 38.6 | | | 27.8 | | | 28.3 | |
| Approach LOS | | D | | | D | | | C | | | C | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 26.0 | 46.5 | 20.6 | 36.9 | 13.9 | 58.6 | 10.1 | 47.4 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.5 | 6.5 | * 6.5 | 4.0 | 6.5 | 4.0 | 6.5 | | | | |
| Max Green Setting (Gmax), s | 22.0 | 34.5 | 16.0 | * 36 | 12.0 | 44.5 | 9.0 | 43.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 23.0 | 9.4 | 13.9 | 28.7 | 10.0 | 24.5 | 6.3 | 22.3 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.9 | 0.2 | 1.7 | 0.1 | 2.4 | 0.0 | 2.8 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 37.1 | | | | | | | | |
| HCM 6th LOS | | | | D | | | | | | | | |
| Notes | | | | | | | | | | | | |
| * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier. | | | | | | | | | | | | |































HCM 6th Signalized Intersection Summary
7: Montana Ave & Custer Ave

Alternatives 2 2017 School
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |   |   |  |   |   |  |  |   |  |  |   |  |
| Traffic Volume (veh/h) | 169 | 546 | 126 | 220 | 431 | 302 | 165 | 519 | 202 | 271 | 411 | 78 |
| Future Volume (veh/h) | 169 | 546 | 126 | 220 | 431 | 302 | 165 | 519 | 202 | 271 | 411 | 78 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1350 | 1329 | 1350 | 1488 | 1477 | 1477 | 1488 | 1500 | 1500 | 1477 | 1488 | 1500 |
| Adj Flow Rate, veh/h | 180 | 581 | 134 | 234 | 459 | 321 | 176 | 552 | 215 | 288 | 437 | 83 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 0 | 2 | 0 | 1 | 2 | 2 | 1 | 0 | 0 | 2 | 1 | 0 |
| Cap, veh/h | 214 | 633 | 393 | 269 | 785 | 528 | 384 | 1003 | 572 | 357 | 1138 | 620 |
| Arrive On Green | 0.09 | 0.25 | 0.25 | 0.13 | 0.37 | 0.37 | 0.09 | 0.35 | 0.35 | 0.14 | 0.40 | 0.40 |
| Sat Flow, veh/h | 2494 | 2525 | 1144 | 2750 | 2806 | 1251 | 1417 | 2850 | 1271 | 1406 | 2828 | 1271 |
| Grp Volume(v), veh/h | 180 | 581 | 134 | 234 | 459 | 321 | 176 | 552 | 215 | 288 | 437 | 83 |
| Grp Sat Flow(s),veh/h/ln | 1247 | 1262 | 1144 | 1375 | 1403 | 1251 | 1417 | 1425 | 1271 | 1406 | 1414 | 1271 |
| Q Serve(g_s), s | 10.7 | 33.6 | 8.9 | 12.5 | 19.7 | 29.4 | 11.8 | 23.3 | 5.2 | 19.0 | 16.4 | 5.4 |
| Cycle Q Clear(g_c), s | 10.7 | 33.6 | 8.9 | 12.5 | 19.7 | 29.4 | 11.8 | 23.3 | 5.2 | 19.0 | 16.4 | 5.4 |
| 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 | 214 | 633 | 393 | 269 | 785 | 528 | 385 | 1003 | 572 | 357 | 1138 | 620 |
| V/C Ratio(X) | 0.84 | 0.92 | 0.34 | 0.87 | 0.59 | 0.61 | 0.46 | 0.55 | 0.38 | 0.81 | 0.38 | 0.13 |
| Avail Cap(c_a), veh/h | 299 | 715 | 430 | 312 | 795 | 533 | 395 | 1003 | 572 | 429 | 1138 | 620 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.82 | 0.82 | 0.82 | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 67.6 | 54.7 | 18.6 | 64.3 | 40.1 | 29.2 | 26.8 | 39.0 | 10.4 | 27.3 | 31.7 | 21.0 |
| Incr Delay (d2), s/veh | 10.6 | 13.1 | 0.3 | 13.9 | 0.6 | 1.1 | 0.6 | 2.2 | 1.9 | 8.6 | 1.0 | 0.4 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 3.7 | 11.8 | 2.3 | 4.7 | 6.4 | 8.2 | 4.0 | 8.4 | 2.6 | 7.1 | 5.7 | 1.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 78.2 | 67.7 | 18.9 | 78.2 | 40.7 | 30.4 | 27.4 | 41.2 | 12.3 | 35.9 | 32.7 | 21.5 |
| LnGrp LOS | E | E | B | E | D | C | C | D | B | D | C | C |
| Approach Vol, veh/h | | 895 | | | 1014 | | | 943 | | | 808 | |
| Approach Delay, s/veh | | 62.5 | | | 46.1 | | | 32.0 | | | 32.7 | |
| Approach LOS | | E | | | D | | | C | | | C | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 25.4 | 59.3 | 21.2 | 44.1 | 17.8 | 66.9 | 16.8 | 48.4 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.5 | 6.5 | * 6.5 | 4.0 | 6.5 | 4.0 | 6.5 | | | | |
| Max Green Setting (Gmax), s | 29.0 | 39.5 | 17.0 | * 43 | 15.0 | 53.5 | 18.0 | 42.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 21.0 | 25.3 | 14.5 | 35.6 | 13.8 | 18.4 | 12.7 | 31.4 | | | | |
| Green Ext Time (p_c), s | 0.4 | 2.9 | 0.1 | 2.0 | 0.0 | 2.5 | 0.2 | 2.5 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 43.5 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |
| Notes | | | | | | | | | | | | |
| * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier. | | | | | | | | | | | | |

























HCM 6th Signalized Intersection Summary
7: Montana Ave & Custer Ave

Alternatives 2 2017 PM
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |   |   |  |   |   |  |  |   |  |  |   |  |
| Traffic Volume (veh/h) | 186 | 678 | 141 | 269 | 525 | 402 | 171 | 640 | 264 | 250 | 436 | 84 |
| Future Volume (veh/h) | 186 | 678 | 141 | 269 | 525 | 402 | 171 | 640 | 264 | 250 | 436 | 84 |
| 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 | 1400 | 1389 | 1400 | 1500 | 1488 | 1500 | 1500 | 1488 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 192 | 699 | 145 | 277 | 541 | 414 | 176 | 660 | 272 | 258 | 449 | 87 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, % | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 312 | 757 | 448 | 308 | 854 | 543 | 374 | 1020 | 548 | 307 | 1128 | 594 |
| Arrive On Green | 0.07 | 0.29 | 0.29 | 0.09 | 0.40 | 0.40 | 0.09 | 0.36 | 0.36 | 0.13 | 0.40 | 0.40 |
| Sat Flow, veh/h | 2587 | 2639 | 1186 | 2771 | 2828 | 1271 | 1429 | 2828 | 1271 | 1429 | 2850 | 1271 |
| Grp Volume(v), veh/h | 192 | 699 | 145 | 277 | 541 | 414 | 176 | 660 | 272 | 258 | 449 | 87 |
| Grp Sat Flow(s),veh/h/ln | 1293 | 1320 | 1186 | 1386 | 1414 | 1271 | 1429 | 1414 | 1271 | 1429 | 1425 | 1271 |
| Q Serve(g_s), s | 8.7 | 38.5 | 9.2 | 8.6 | 23.0 | 42.3 | 11.6 | 29.2 | 9.1 | 16.5 | 17.0 | 5.9 |
| Cycle Q Clear(g_c), s | 8.7 | 38.5 | 9.2 | 8.6 | 23.0 | 42.3 | 11.6 | 29.2 | 9.1 | 16.5 | 17.0 | 5.9 |
| 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 | 312 | 757 | 448 | 308 | 854 | 543 | 374 | 1020 | 548 | 307 | 1128 | 594 |
| V/C Ratio(X) | 0.62 | 0.92 | 0.32 | 0.90 | 0.63 | 0.76 | 0.47 | 0.65 | 0.50 | 0.84 | 0.40 | 0.15 |
| Avail Cap(c_a), veh/h | 332 | 836 | 483 | 308 | 877 | 554 | 378 | 1020 | 548 | 366 | 1128 | 594 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.82 | 0.82 | 0.82 | 0.43 | 0.43 | 0.43 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 45.4 | 51.9 | 17.6 | 65.3 | 38.2 | 31.5 | 26.4 | 40.0 | 14.7 | 29.6 | 32.5 | 22.8 |
| Incr Delay (d2), s/veh | 2.2 | 12.5 | 0.3 | 14.3 | 0.6 | 2.6 | 0.7 | 3.2 | 3.2 | 13.1 | 1.1 | 0.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.9 | 14.0 | 2.5 | 5.6 | 7.5 | 12.1 | 4.0 | 10.5 | 4.1 | 6.6 | 6.0 | 1.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 47.6 | 64.4 | 17.8 | 79.6 | 38.8 | 34.0 | 27.1 | 43.2 | 17.9 | 42.6 | 33.6 | 23.3 |
| LnGrp LOS | D | E | B | E | D | C | C | D | B | D | C | C |
| Approach Vol, veh/h | | 1036 | | | 1232 | | | 1108 | | | 794 | |
| Approach Delay, s/veh | | 54.8 | | | 46.4 | | | 34.4 | | | 35.4 | |
| Approach LOS | | D | | | D | | | C | | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 22.8 | 60.6 | 17.1 | 49.5 | 17.6 | 65.9 | 14.8 | 51.8 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.5 | 6.5 | * 6.5 | 4.0 | 6.5 | 4.0 | 6.5 | | | | |
| Max Green Setting (Gmax), s | 25.0 | 45.5 | 10.0 | * 48 | 14.0 | 56.5 | 12.0 | 46.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 18.5 | 31.2 | 10.6 | 40.5 | 13.6 | 19.0 | 10.7 | 44.3 | | | | |
| Green Ext Time (p_c), s | 0.3 | 3.7 | 0.0 | 2.5 | 0.0 | 2.6 | 0.1 | 1.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 43.2 | | | | | | | | |
| HCM 6th LOS | | | | D | | | | | | | | |
| Notes | | | | | | | | | | | | |
| * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier. | | | | | | | | | | | | |






























HCM 6th Signalized Intersection Summary
7: Montana Ave & Custer Ave

Alternatives 3 2017 - AM
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h) | 75 | 478 | 176 | 222 | 475 | 192 | 110 | 185 | 66 | 295 | 552 | 82 |
| Future Volume (veh/h) | 75 | 478 | 176 | 222 | 475 | 192 | 110 | 185 | 66 | 295 | 552 | 82 |
| 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 | 1389 | 1367 | 1378 | 1477 | 1453 | 1477 | 1465 | 1477 | 1442 | 1477 | 1488 | 1442 |
| Adj Flow Rate, veh/h | 86 | 549 | 202 | 255 | 546 | 221 | 126 | 213 | 76 | 339 | 634 | 94 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Percent Heavy Veh, % | 1 | 3 | 2 | 2 | 4 | 2 | 3 | 2 | 5 | 2 | 1 | 5 |
| Cap, veh/h | 297 | 604 | 360 | 279 | 875 | 571 | 373 | 877 | 551 | 381 | 1065 | 535 |
| Arrive On Green | 0.06 | 0.23 | 0.23 | 0.18 | 0.42 | 0.42 | 0.08 | 0.31 | 0.31 | 0.14 | 0.38 | 0.38 |
| Sat Flow, veh/h | 1323 | 2598 | 1168 | 1406 | 2761 | 1251 | 1395 | 2806 | 1222 | 2728 | 2828 | 1222 |
| Grp Volume(v), veh/h | 86 | 549 | 202 | 255 | 546 | 221 | 126 | 213 | 76 | 339 | 634 | 94 |
| Grp Sat Flow(s),veh/h/ln | 1323 | 1299 | 1168 | 1406 | 1381 | 1251 | 1395 | 1403 | 1222 | 1364 | 1414 | 1222 |
| Q Serve(g_s), s | 6.4 | 26.7 | 18.8 | 18.0 | 20.2 | 13.8 | 7.9 | 7.3 | 4.7 | 15.9 | 23.4 | 6.1 |
| Cycle Q Clear(g_c), s | 6.4 | 26.7 | 18.8 | 18.0 | 20.2 | 13.8 | 7.9 | 7.3 | 4.7 | 15.9 | 23.4 | 6.1 |
| 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 | 297 | 604 | 360 | 279 | 875 | 571 | 373 | 877 | 551 | 381 | 1065 | 535 |
| V/C Ratio(X) | 0.29 | 0.91 | 0.56 | 0.92 | 0.62 | 0.39 | 0.34 | 0.24 | 0.14 | 0.89 | 0.60 | 0.18 |
| Avail Cap(c_a), veh/h | 297 | 679 | 394 | 279 | 956 | 608 | 397 | 877 | 551 | 420 | 1065 | 535 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.91 | 0.91 | 0.91 | 0.79 | 0.79 | 0.79 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 35.0 | 48.6 | 37.6 | 32.1 | 31.5 | 19.4 | 27.7 | 33.2 | 20.9 | 54.9 | 32.6 | 22.2 |
| Incr Delay (d2), s/veh | 0.4 | 13.8 | 1.1 | 27.5 | 0.8 | 0.3 | 0.4 | 0.7 | 0.5 | 18.8 | 2.5 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.1 | 9.7 | 5.4 | 7.7 | 6.2 | 3.6 | 2.6 | 2.6 | 1.4 | 6.4 | 8.2 | 1.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 35.4 | 62.4 | 38.7 | 59.6 | 32.3 | 19.7 | 28.1 | 33.9 | 21.4 | 73.7 | 35.0 | 23.0 |
| LnGrp LOS | D | E | D | E | C | B | C | C | C | E | D | C |
| Approach Vol, veh/h | | 837 | | | 1022 | | | 415 | | | 1067 | |
| Approach Delay, s/veh | | 53.9 | | | 36.4 | | | 29.9 | | | 46.3 | |
| Approach LOS | | D | | | D | | | C | | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 22.1 | 47.6 | 23.0 | 37.2 | 13.8 | 55.9 | 12.0 | 48.2 | | | | |
| Change Period (Y+Rc), s | 4.0 | 7.0 | 5.0 | 7.0 | 4.0 | 7.0 | 4.0 | 7.0 | | | | |
| Max Green Setting (Gmax), s | 20.0 | 35.0 | 18.0 | 34.0 | 12.0 | 43.0 | 8.0 | 45.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 17.9 | 9.3 | 20.0 | 28.7 | 9.9 | 25.4 | 8.4 | 22.2 | | | | |
| Green Ext Time (p_c), s | 0.3 | 0.9 | 0.0 | 1.5 | 0.1 | 2.4 | 0.0 | 2.8 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 43.1 | | | | | | | | |
| HCM 6th LOS | | | | D | | | | | | | | |






























HCM 6th Signalized Intersection Summary
7: Montana Ave & Custer Ave

Alternatives 3 2017 School
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |   |  |  |   |  |  |   |  |   |   |  |
| Traffic Volume (veh/h) | 169 | 546 | 126 | 220 | 431 | 302 | 165 | 519 | 202 | 271 | 411 | 78 |
| Future Volume (veh/h) | 169 | 546 | 126 | 220 | 431 | 302 | 165 | 519 | 202 | 271 | 411 | 78 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1350 | 1329 | 1350 | 1488 | 1477 | 1477 | 1488 | 1500 | 1500 | 1477 | 1488 | 1500 |
| Adj Flow Rate, veh/h | 180 | 581 | 134 | 234 | 459 | 321 | 176 | 552 | 215 | 288 | 437 | 83 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 0 | 2 | 0 | 1 | 2 | 2 | 1 | 0 | 0 | 2 | 1 | 0 |
| Cap, veh/h | 271 | 637 | 396 | 257 | 780 | 497 | 356 | 967 | 604 | 326 | 1031 | 612 |
| Arrive On Green | 0.12 | 0.25 | 0.25 | 0.18 | 0.37 | 0.37 | 0.09 | 0.34 | 0.34 | 0.12 | 0.36 | 0.36 |
| Sat Flow, veh/h | 1286 | 2525 | 1144 | 1417 | 2806 | 1251 | 1417 | 2850 | 1271 | 2728 | 2828 | 1271 |
| Grp Volume(v), veh/h | 180 | 581 | 134 | 234 | 459 | 321 | 176 | 552 | 215 | 288 | 437 | 83 |
| Grp Sat Flow(s),veh/h/ln | 1286 | 1262 | 1144 | 1417 | 1403 | 1251 | 1417 | 1425 | 1271 | 1364 | 1414 | 1271 |
| Q Serve(g_s), s | 15.4 | 33.5 | 13.0 | 18.2 | 19.8 | 30.7 | 12.1 | 23.8 | 16.0 | 15.6 | 17.4 | 5.4 |
| Cycle Q Clear(g_c), s | 15.4 | 33.5 | 13.0 | 18.2 | 19.8 | 30.7 | 12.1 | 23.8 | 16.0 | 15.6 | 17.4 | 5.4 |
| 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 | 637 | 396 | 257 | 780 | 497 | 356 | 967 | 604 | 326 | 1031 | 612 |
| V/C Ratio(X) | 0.66 | 0.91 | 0.34 | 0.91 | 0.59 | 0.65 | 0.50 | 0.57 | 0.36 | 0.88 | 0.42 | 0.14 |
| Avail Cap(c_a), veh/h | 293 | 741 | 443 | 282 | 898 | 550 | 373 | 967 | 604 | 400 | 1031 | 612 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.82 | 0.82 | 0.82 | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 36.0 | 54.5 | 36.3 | 35.9 | 40.3 | 31.8 | 28.3 | 40.6 | 24.9 | 65.0 | 35.8 | 21.6 |
| Incr Delay (d2), s/veh | 3.7 | 11.8 | 0.3 | 21.6 | 0.4 | 1.3 | 0.8 | 2.4 | 1.6 | 16.9 | 1.3 | 0.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 5.1 | 11.6 | 3.7 | 7.4 | 6.4 | 8.7 | 4.1 | 8.6 | 5.1 | 6.1 | 6.2 | 1.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 39.8 | 66.3 | 36.6 | 57.5 | 40.7 | 33.1 | 29.1 | 43.1 | 26.5 | 81.9 | 37.1 | 22.1 |
| LnGrp LOS | D | E | D | E | D | C | C | D | C | F | D | C |
| Approach Vol, veh/h | | 895 | | | 1014 | | | 943 | | | 808 | |
| Approach Delay, s/veh | | 56.5 | | | 42.2 | | | 36.7 | | | 51.5 | |
| Approach LOS | | E | | | D | | | D | | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 21.9 | 57.9 | 25.4 | 44.8 | 18.1 | 61.7 | 21.5 | 48.7 | | | | |
| Change Period (Y+Rc), s | 4.0 | 7.0 | 5.0 | 7.0 | 4.0 | 7.0 | 4.0 | 7.0 | | | | |
| Max Green Setting (Gmax), s | 22.0 | 38.0 | 23.0 | 44.0 | 16.0 | 44.0 | 20.0 | 48.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 17.6 | 25.8 | 20.2 | 35.5 | 14.1 | 19.4 | 17.4 | 32.7 | | | | |
| Green Ext Time (p_c), s | 0.3 | 2.8 | 0.1 | 2.3 | 0.1 | 2.4 | 0.1 | 2.9 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 46.3 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |
































HCM 6th Signalized Intersection Summary
7: Montana Ave & Custer Ave

Alternatives 3 2017 PM
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |   |  |  |   |  |  |   |  |   |   |  |
| Traffic Volume (veh/h) | 186 | 678 | 141 | 269 | 525 | 402 | 171 | 640 | 264 | 250 | 436 | 84 |
| Future Volume (veh/h) | 186 | 678 | 141 | 269 | 525 | 402 | 171 | 640 | 264 | 250 | 436 | 84 |
| 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 | 1400 | 1389 | 1400 | 1500 | 1488 | 1500 | 1500 | 1488 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 192 | 699 | 145 | 277 | 541 | 414 | 176 | 660 | 272 | 258 | 449 | 87 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, % | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 285 | 742 | 450 | 288 | 940 | 557 | 312 | 847 | 584 | 293 | 876 | 538 |
| Arrive On Green | 0.12 | 0.28 | 0.28 | 0.21 | 0.44 | 0.44 | 0.10 | 0.30 | 0.30 | 0.11 | 0.31 | 0.31 |
| Sat Flow, veh/h | 1333 | 2639 | 1186 | 1429 | 2828 | 1271 | 1429 | 2828 | 1271 | 2771 | 2850 | 1271 |
| Grp Volume(v), veh/h | 192 | 699 | 145 | 277 | 541 | 414 | 176 | 660 | 272 | 258 | 449 | 87 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 1320 | 1186 | 1429 | 1414 | 1271 | 1429 | 1414 | 1271 | 1386 | 1425 | 1271 |
| Q Serve(g_s), s | 15.2 | 38.8 | 13.0 | 22.4 | 21.5 | 40.5 | 12.7 | 32.0 | 22.1 | 13.8 | 19.4 | 6.4 |
| Cycle Q Clear(g_c), s | 15.2 | 38.8 | 13.0 | 22.4 | 21.5 | 40.5 | 12.7 | 32.0 | 22.1 | 13.8 | 19.4 | 6.4 |
| 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 | 285 | 742 | 450 | 288 | 940 | 557 | 312 | 847 | 584 | 293 | 876 | 538 |
| V/C Ratio(X) | 0.67 | 0.94 | 0.32 | 0.96 | 0.58 | 0.74 | 0.56 | 0.78 | 0.47 | 0.88 | 0.51 | 0.16 |
| Avail Cap(c_a), veh/h | 318 | 774 | 464 | 288 | 940 | 557 | 324 | 847 | 584 | 314 | 876 | 538 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.82 | 0.82 | 0.82 | 0.43 | 0.43 | 0.43 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 33.0 | 52.7 | 32.9 | 38.3 | 33.9 | 29.3 | 32.5 | 48.0 | 27.9 | 66.1 | 42.7 | 26.8 |
| Incr Delay (d2), s/veh | 3.5 | 16.5 | 0.2 | 25.3 | 0.3 | 2.3 | 1.7 | 7.0 | 2.7 | 22.4 | 2.1 | 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 | 5.2 | 14.5 | 3.7 | 9.3 | 6.9 | 11.4 | 4.5 | 12.0 | 7.1 | 5.7 | 7.1 | 2.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 36.5 | 69.2 | 33.2 | 63.6 | 34.3 | 31.6 | 34.2 | 55.0 | 30.5 | 88.5 | 44.9 | 27.5 |
| LnGrp LOS | D | E | C | E | C | C | C | D | C | F | D | C |
| Approach Vol, veh/h | | 1036 | | | 1232 | | | 1108 | | | 794 | |
| Approach Delay, s/veh | | 58.1 | | | 39.9 | | | 45.7 | | | 57.1 | |
| Approach LOS | | E | | | D | | | D | | | E | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 19.9 | 52.0 | 29.0 | 49.2 | 18.7 | 53.1 | 21.3 | 56.8 | | | | |
| Change Period (Y+Rc), s | 4.0 | 7.0 | 5.0 | 7.0 | 4.0 | 7.0 | 4.0 | 7.0 | | | | |
| Max Green Setting (Gmax), s | 17.0 | 42.0 | 24.0 | 44.0 | 16.0 | 43.0 | 21.0 | 48.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 15.8 | 34.0 | 24.4 | 40.8 | 14.7 | 21.4 | 17.2 | 42.5 | | | | |
| Green Ext Time (p_c), s | 0.1 | 2.7 | 0.0 | 1.3 | 0.0 | 2.4 | 0.1 | 2.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 49.3 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |
































HCM 6th Signalized Intersection Summary
7: Montana Ave & Custer Ave

Alternatives 4 2017 - AM
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |   |   |  |   |   |  |  |   |  |   |   |  |
| Traffic Volume (veh/h) | 75 | 478 | 176 | 222 | 475 | 192 | 110 | 185 | 66 | 295 | 552 | 82 |
| Future Volume (veh/h) | 75 | 478 | 176 | 222 | 475 | 192 | 110 | 185 | 66 | 295 | 552 | 82 |
| 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 | 1389 | 1367 | 1378 | 1477 | 1453 | 1477 | 1465 | 1477 | 1442 | 1477 | 1488 | 1442 |
| Adj Flow Rate, veh/h | 86 | 549 | 202 | 255 | 546 | 221 | 126 | 213 | 76 | 339 | 634 | 94 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Percent Heavy Veh, % | 1 | 3 | 2 | 2 | 4 | 2 | 3 | 2 | 5 | 2 | 1 | 5 |
| Cap, veh/h | 120 | 608 | 394 | 295 | 869 | 846 | 200 | 272 | 250 | 985 | 1057 | 513 |
| Arrive On Green | 0.05 | 0.23 | 0.23 | 0.14 | 0.42 | 0.42 | 0.10 | 0.10 | 0.10 | 0.36 | 0.37 | 0.37 |
| Sat Flow, veh/h | 2566 | 2598 | 1168 | 2728 | 2761 | 1251 | 1395 | 2806 | 1222 | 2728 | 2828 | 1222 |
| Grp Volume(v), veh/h | 86 | 549 | 202 | 255 | 546 | 221 | 126 | 213 | 76 | 339 | 634 | 94 |
| Grp Sat Flow(s),veh/h/ln | 1283 | 1299 | 1168 | 1364 | 1381 | 1251 | 1395 | 1403 | 1222 | 1364 | 1414 | 1222 |
| Q Serve(g_s), s | 4.3 | 26.7 | 11.5 | 11.9 | 20.3 | 2.0 | 11.6 | 9.6 | 0.0 | 11.8 | 23.5 | 6.3 |
| Cycle Q Clear(g_c), s | 4.3 | 26.7 | 11.5 | 11.9 | 20.3 | 2.0 | 11.6 | 9.6 | 0.0 | 11.8 | 23.5 | 6.3 |
| 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 | 120 | 608 | 394 | 295 | 869 | 846 | 200 | 272 | 250 | 985 | 1057 | 513 |
| V/C Ratio(X) | 0.72 | 0.90 | 0.51 | 0.86 | 0.63 | 0.26 | 0.63 | 0.78 | 0.30 | 0.34 | 0.60 | 0.18 |
| Avail Cap(c_a), veh/h | 178 | 709 | 440 | 336 | 924 | 870 | 206 | 766 | 466 | 985 | 1057 | 513 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.91 | 0.91 | 0.91 | 0.79 | 0.79 | 0.79 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 61.1 | 48.4 | 16.1 | 54.7 | 31.8 | 1.8 | 57.4 | 57.4 | 43.8 | 30.3 | 32.9 | 23.7 |
| Incr Delay (d2), s/veh | 5.4 | 12.2 | 0.7 | 14.7 | 0.9 | 0.1 | 5.2 | 20.0 | 3.1 | 0.2 | 2.5 | 0.8 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.5 | 9.6 | 3.0 | 4.5 | 6.2 | 0.6 | 4.3 | 4.1 | 2.3 | 3.8 | 8.2 | 1.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 66.5 | 60.5 | 16.8 | 69.4 | 32.6 | 1.9 | 62.6 | 77.4 | 46.9 | 30.5 | 35.4 | 24.4 |
| LnGrp LOS | E | E | B | E | C | A | E | E | D | C | D | C |
| Approach Vol, veh/h | | 837 | | | 1022 | | | 415 | | | 1067 | |
| Approach Delay, s/veh | | 50.6 | | | 35.2 | | | 67.3 | | | 32.9 | |
| Approach LOS | | D | | | D | | | E | | | C | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 53.4 | 19.1 | 20.6 | 36.9 | 17.4 | 55.1 | 10.1 | 47.4 | | | | |
| Change Period (Y+Rc), s | 6.5 | * 6.5 | 6.5 | * 6.5 | 4.0 | 6.5 | 4.0 | 6.5 | | | | |
| Max Green Setting (Gmax), s | 21.0 | * 36 | 16.0 | * 36 | 14.0 | 42.5 | 9.0 | 43.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 13.8 | 11.6 | 13.9 | 28.7 | 13.6 | 25.5 | 6.3 | 22.3 | | | | |
| Green Ext Time (p_c), s | 0.7 | 0.9 | 0.2 | 1.7 | 0.0 | 2.3 | 0.0 | 2.8 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 42.3 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |
| Notes | | | | | | | | | | | | |
| * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier. | | | | | | | | | | | | |

























HCM 6th Signalized Intersection Summary
7: Montana Ave & Custer Ave

Alternatives 4 2017 School
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |   |   |  |   |   |  |  |   |  |   |   |  |
| Traffic Volume (veh/h) | 169 | 546 | 126 | 220 | 431 | 302 | 165 | 519 | 202 | 271 | 411 | 78 |
| Future Volume (veh/h) | 169 | 546 | 126 | 220 | 431 | 302 | 165 | 519 | 202 | 271 | 411 | 78 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1350 | 1329 | 1350 | 1488 | 1477 | 1477 | 1488 | 1500 | 1500 | 1477 | 1488 | 1500 |
| Adj Flow Rate, veh/h | 180 | 581 | 134 | 234 | 459 | 321 | 176 | 552 | 215 | 288 | 437 | 83 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 0 | 2 | 0 | 1 | 2 | 2 | 1 | 0 | 0 | 2 | 1 | 0 |
| Cap, veh/h | 214 | 639 | 434 | 270 | 801 | 661 | 227 | 626 | 404 | 661 | 1005 | 561 |
| Arrive On Green | 0.09 | 0.25 | 0.25 | 0.13 | 0.38 | 0.38 | 0.13 | 0.22 | 0.22 | 0.24 | 0.36 | 0.36 |
| Sat Flow, veh/h | 2494 | 2525 | 1144 | 2750 | 2806 | 1251 | 1417 | 2850 | 1271 | 2728 | 2828 | 1271 |
| Grp Volume(v), veh/h | 180 | 581 | 134 | 234 | 459 | 321 | 176 | 552 | 215 | 288 | 437 | 83 |
| Grp Sat Flow(s),veh/h/ln | 1247 | 1262 | 1144 | 1375 | 1403 | 1251 | 1417 | 1425 | 1271 | 1364 | 1414 | 1271 |
| Q Serve(g_s), s | 10.7 | 33.5 | 8.0 | 12.5 | 19.5 | 5.7 | 16.9 | 28.1 | 6.1 | 13.4 | 17.7 | 5.9 |
| Cycle Q Clear(g_c), s | 10.7 | 33.5 | 8.0 | 12.5 | 19.5 | 5.7 | 16.9 | 28.1 | 6.1 | 13.4 | 17.7 | 5.9 |
| 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 | 214 | 639 | 434 | 270 | 801 | 661 | 227 | 626 | 404 | 661 | 1005 | 561 |
| V/C Ratio(X) | 0.84 | 0.91 | 0.31 | 0.87 | 0.57 | 0.49 | 0.77 | 0.88 | 0.53 | 0.44 | 0.43 | 0.15 |
| Avail Cap(c_a), veh/h | 299 | 757 | 488 | 330 | 860 | 687 | 265 | 817 | 489 | 661 | 1005 | 561 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.82 | 0.82 | 0.82 | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 67.6 | 54.3 | 15.5 | 64.3 | 39.3 | 7.0 | 54.4 | 56.6 | 42.0 | 48.1 | 36.8 | 25.1 |
| Incr Delay (d2), s/veh | 10.6 | 11.1 | 0.2 | 12.3 | 0.4 | 0.3 | 10.7 | 16.4 | 5.0 | 0.3 | 1.4 | 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 | 3.7 | 11.6 | 2.1 | 4.7 | 6.3 | 2.8 | 6.6 | 11.4 | 7.0 | 4.6 | 6.3 | 1.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 78.2 | 65.4 | 15.8 | 76.5 | 39.7 | 7.3 | 65.1 | 73.0 | 47.0 | 48.5 | 38.2 | 25.6 |
| LnGrp LOS | E | E | B | E | D | A | E | E | D | D | D | C |
| Approach Vol, veh/h | | 895 | | | 1014 | | | 943 | | | 808 | |
| Approach Delay, s/veh | | 60.5 | | | 37.9 | | | 65.6 | | | 40.6 | |
| Approach LOS | | E | | | D | | | E | | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 43.4 | 40.0 | 21.7 | 45.0 | 23.0 | 60.3 | 16.8 | 49.8 | | | | |
| Change Period (Y+Rc), s | 7.0 | * 7 | 7.0 | * 7 | 4.0 | 7.0 | 4.0 | 7.0 | | | | |
| Max Green Setting (Gmax), s | 21.0 | * 43 | 18.0 | * 45 | 23.0 | 41.0 | 18.0 | 46.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 15.4 | 30.1 | 14.5 | 35.5 | 18.9 | 19.7 | 12.7 | 21.5 | | | | |
| Green Ext Time (p_c), s | 0.4 | 2.8 | 0.2 | 2.5 | 0.1 | 2.3 | 0.2 | 3.2 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 51.2 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |
| Notes | | | | | | | | | | | | |
| * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier. | | | | | | | | | | | | |

HCM 6th Signalized Intersection Summary
7: Montana Ave & Custer Ave

Alternatives 4 2017 PM
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h) | 186 | 678 | 141 | 269 | 525 | 402 | 171 | 640 | 264 | 250 | 436 | 84 |
| Future Volume (veh/h) | 186 | 678 | 141 | 269 | 525 | 402 | 171 | 640 | 264 | 250 | 436 | 84 |
| 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 | 1400 | 1389 | 1400 | 1500 | 1488 | 1500 | 1500 | 1488 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 192 | 699 | 145 | 277 | 541 | 414 | 176 | 660 | 272 | 258 | 449 | 87 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, % | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 227 | 747 | 479 | 311 | 926 | 622 | 220 | 725 | 469 | 448 | 905 | 515 |
| Arrive On Green | 0.09 | 0.28 | 0.28 | 0.15 | 0.44 | 0.44 | 0.12 | 0.26 | 0.26 | 0.16 | 0.32 | 0.32 |
| Sat Flow, veh/h | 2587 | 2639 | 1186 | 2771 | 2828 | 1271 | 1429 | 2828 | 1271 | 2771 | 2850 | 1271 |
| Grp Volume(v), veh/h | 192 | 699 | 145 | 277 | 541 | 414 | 176 | 660 | 272 | 258 | 449 | 87 |
| Grp Sat Flow(s),veh/h/ln | 1293 | 1320 | 1186 | 1386 | 1414 | 1271 | 1429 | 1414 | 1271 | 1386 | 1425 | 1271 |
| Q Serve(g_s), s | 11.0 | 38.7 | 7.6 | 14.7 | 21.7 | 8.3 | 16.0 | 34.0 | 9.0 | 12.9 | 19.1 | 6.6 |
| Cycle Q Clear(g_c), s | 11.0 | 38.7 | 7.6 | 14.7 | 21.7 | 8.3 | 16.0 | 34.0 | 9.0 | 12.9 | 19.1 | 6.6 |
| 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 | 227 | 747 | 479 | 311 | 926 | 622 | 220 | 725 | 469 | 448 | 905 | 515 |
| V/C Ratio(X) | 0.85 | 0.94 | 0.30 | 0.89 | 0.58 | 0.67 | 0.80 | 0.91 | 0.58 | 0.58 | 0.50 | 0.17 |
| Avail Cap(c_a), veh/h | 310 | 792 | 499 | 333 | 926 | 622 | 267 | 811 | 507 | 448 | 905 | 515 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.82 | 0.82 | 0.82 | 0.43 | 0.43 | 0.43 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 67.4 | 52.4 | 13.5 | 62.9 | 34.6 | 9.2 | 50.1 | 54.1 | 38.0 | 58.1 | 41.5 | 28.5 |
| Incr Delay (d2), s/veh | 11.1 | 15.1 | 0.2 | 11.9 | 0.4 | 1.1 | 12.2 | 17.5 | 5.2 | 1.6 | 1.9 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 4.0 | 14.3 | 2.4 | 5.5 | 7.0 | 4.6 | 6.4 | 13.7 | 8.6 | 4.6 | 6.9 | 2.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 78.5 | 67.6 | 13.7 | 74.8 | 35.0 | 10.3 | 62.4 | 71.6 | 43.2 | 59.7 | 43.4 | 29.2 |
| LnGrp LOS | E | E | B | E | C | B | E | E | D | E | D | C |
| Approach Vol, veh/h | | 1036 | | | 1232 | | | 1108 | | | 794 | |
| Approach Delay, s/veh | | 62.1 | | | 35.6 | | | 63.2 | | | 47.1 | |
| Approach LOS | | E | | | D | | | E | | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 31.3 | 45.5 | 23.8 | 49.5 | 22.1 | 54.6 | 17.2 | 56.1 | | | | |
| Change Period (Y+Rc), s | 7.0 | * 7 | 7.0 | * 7 | 4.0 | 7.0 | 4.0 | 7.0 | | | | |
| Max Green Setting (Gmax), s | 21.0 | * 43 | 18.0 | * 45 | 23.0 | 41.0 | 18.0 | 46.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 14.9 | 36.0 | 16.7 | 40.7 | 18.0 | 21.1 | 13.0 | 23.7 | | | | |
| Green Ext Time (p_c), s | 0.3 | 2.5 | 0.1 | 1.7 | 0.1 | 2.4 | 0.2 | 3.9 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 51.7 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |
| Notes | | | | | | | | | | | | |
| * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier. | | | | | | | | | | | | |

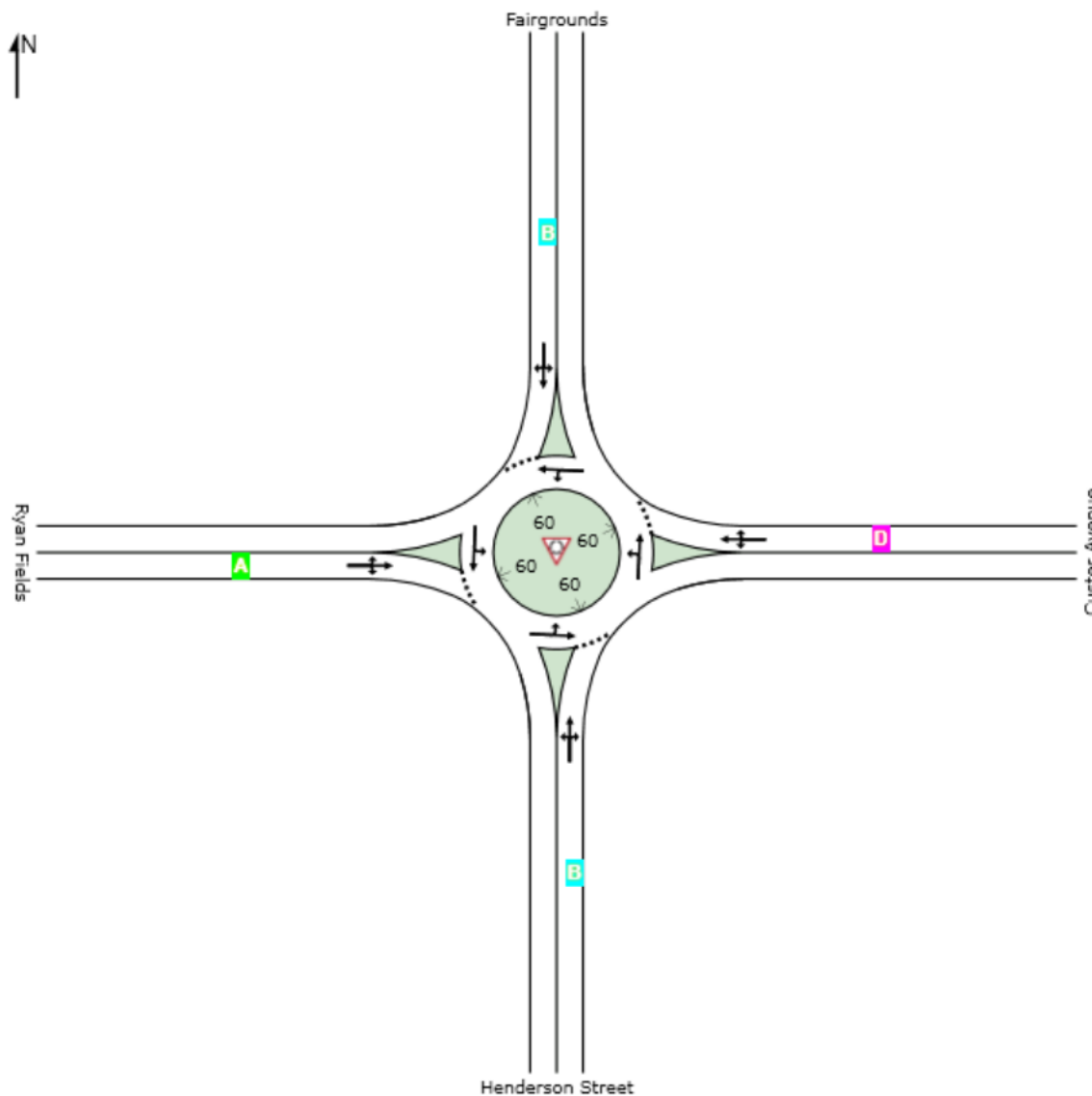
LEVEL OF SERVICE

 Site: Henderson & Custer 2042 AM Alternative 1

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | B | D | B | A | C |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c > 1$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Henderson & Custer 2042 AM Alternative 1

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|-----------------------------|------------|------------------|----------------------|------------------|--------------------------------------|-------------------------|--------------|--------------------------------|----------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Henderson Street | | | | | | | | | | | |
| 3 | L2 | 1 | 0.0 | 0.629 | 10.3 | LOS B | 6.5 | 163.1 | 0.29 | 0.11 | 31.5 |
| 8 | T1 | 33 | 0.0 | 0.629 | 10.3 | LOS B | 6.5 | 163.1 | 0.29 | 0.11 | 31.6 |
| 18 | R2 | 800 | 0.6 | 0.629 | 10.3 | LOS B | 6.5 | 163.1 | 0.29 | 0.11 | 31.0 |
| Approach | | 835 | 0.6 | 0.629 | 10.3 | LOS B | 6.5 | 163.1 | 0.29 | 0.11 | 31.0 |
| East: Custer Avenue | | | | | | | | | | | |
| 1 | L2 | 1185 | 2.0 | 0.948 | 32.1 | LOS D | 34.9 | 891.1 | 1.00 | 0.40 | 23.2 |
| 6 | T1 | 5 | 0.0 | 0.948 | 32.1 | LOS D | 34.9 | 891.1 | 1.00 | 0.40 | 23.3 |
| 16 | R2 | 41 | 18.2 | 0.948 | 32.1 | LOS D | 34.9 | 891.1 | 1.00 | 0.40 | 22.7 |
| Approach | | 1230 | 2.5 | 0.948 | 32.1 | LOS D | 34.9 | 891.1 | 1.00 | 0.40 | 23.2 |
| North: Fairgrounds | | | | | | | | | | | |
| 7 | L2 | 26 | 14.3 | 0.136 | 12.4 | LOS B | 0.4 | 11.7 | 0.73 | 0.73 | 29.4 |
| 4 | T1 | 21 | 16.7 | 0.136 | 12.4 | LOS B | 0.4 | 11.7 | 0.73 | 0.73 | 29.5 |
| 14 | R2 | 1 | 0.0 | 0.136 | 12.4 | LOS B | 0.4 | 11.7 | 0.73 | 0.73 | 29.3 |
| Approach | | 48 | 15.0 | 0.136 | 12.4 | LOS B | 0.4 | 11.7 | 0.73 | 0.73 | 29.4 |
| West: Ryan Fields | | | | | | | | | | | |
| 5 | L2 | 1 | 0.0 | 0.013 | 9.4 | LOS A | 0.0 | 1.1 | 0.72 | 0.66 | 31.5 |
| 2 | T1 | 2 | 0.0 | 0.013 | 9.4 | LOS A | 0.0 | 1.1 | 0.72 | 0.66 | 31.6 |
| 12 | R2 | 1 | 0.0 | 0.013 | 9.4 | LOS A | 0.0 | 1.1 | 0.72 | 0.66 | 30.9 |
| Approach | | 5 | 0.0 | 0.013 | 9.4 | LOS A | 0.0 | 1.1 | 0.72 | 0.66 | 31.4 |
| All Vehicles | | 2119 | 2.0 | 0.948 | 23.0 | LOS C | 34.9 | 891.1 | 0.71 | 0.29 | 25.8 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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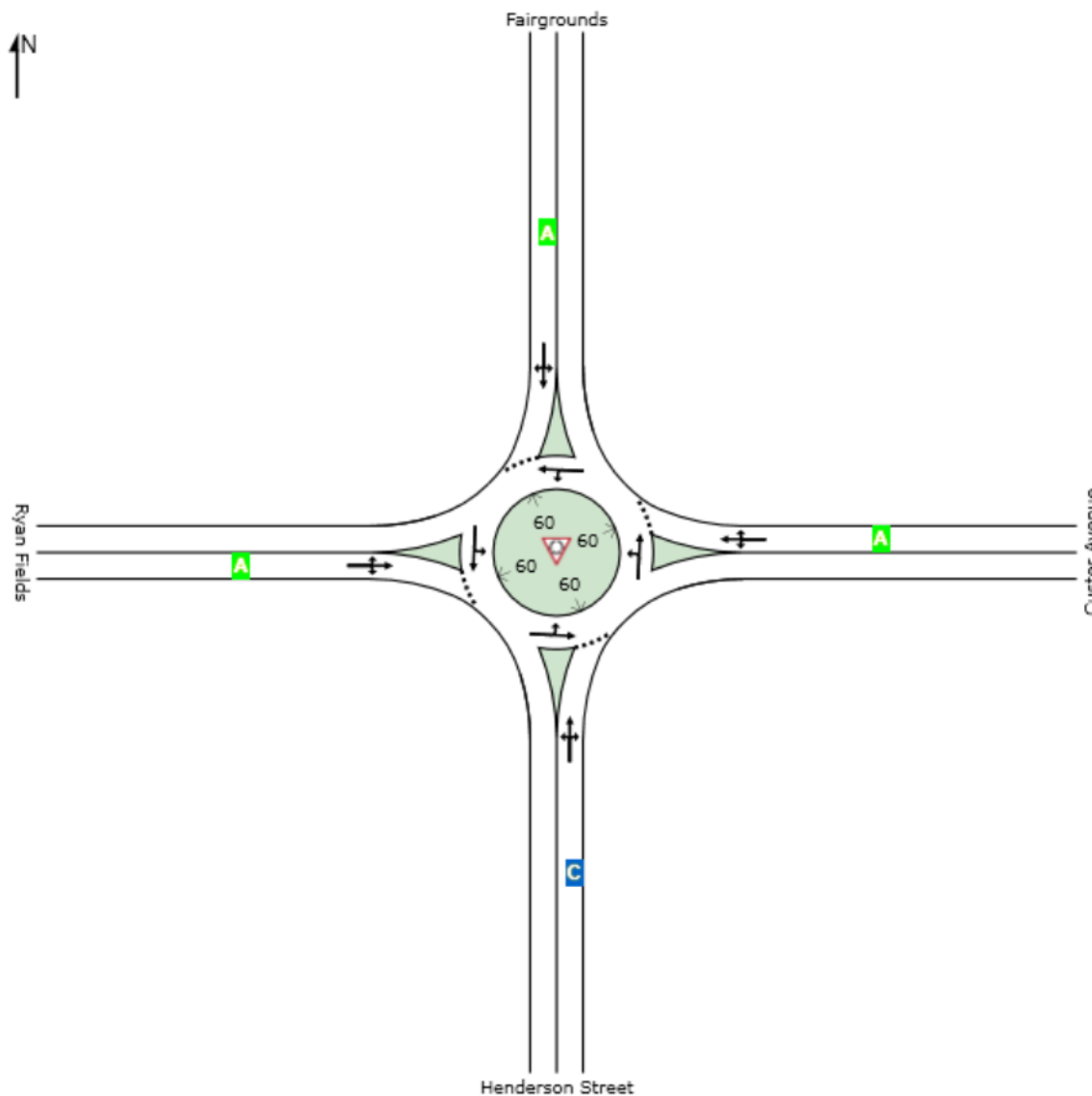
LEVEL OF SERVICE

 Site: Henderson & Custer 2042 School Alternative 1

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | C | A | A | A | B |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Henderson & Custer 2042 School Alternative 1

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Henderson Street | | | | | | | | | | | |
| 3 | L2 | 1 | 0.0 | 0.843 | 19.7 | LOS C | 16.6 | 416.5 | 0.73 | 0.33 | 27.8 |
| 8 | T1 | 49 | 0.0 | 0.843 | 19.7 | LOS C | 16.6 | 416.5 | 0.73 | 0.33 | 27.9 |
| 18 | R2 | 1045 | 0.8 | 0.843 | 19.7 | LOS C | 16.6 | 416.5 | 0.73 | 0.33 | 27.4 |
| Approach | | 1095 | 0.8 | 0.843 | 19.7 | LOS C | 16.6 | 416.5 | 0.73 | 0.33 | 27.4 |
| East: Custer Avenue | | | | | | | | | | | |
| 1 | L2 | 701 | 2.2 | 0.587 | 9.6 | LOS A | 5.2 | 131.4 | 0.33 | 0.14 | 30.1 |
| 6 | T1 | 5 | 0.0 | 0.587 | 9.6 | LOS A | 5.2 | 131.4 | 0.33 | 0.14 | 30.3 |
| 16 | R2 | 48 | 0.0 | 0.587 | 9.6 | LOS A | 5.2 | 131.4 | 0.33 | 0.14 | 29.7 |
| Approach | | 753 | 2.0 | 0.587 | 9.6 | LOS A | 5.2 | 131.4 | 0.33 | 0.14 | 30.1 |
| North: Fairgrounds | | | | | | | | | | | |
| 7 | L2 | 42 | 0.0 | 0.211 | 7.9 | LOS A | 0.9 | 21.7 | 0.64 | 0.64 | 32.1 |
| 4 | T1 | 99 | 0.0 | 0.211 | 7.9 | LOS A | 0.9 | 21.7 | 0.64 | 0.64 | 32.2 |
| 14 | R2 | 1 | 0.0 | 0.211 | 7.9 | LOS A | 0.9 | 21.7 | 0.64 | 0.64 | 31.5 |
| Approach | | 141 | 0.0 | 0.211 | 7.9 | LOS A | 0.9 | 21.7 | 0.64 | 0.64 | 32.1 |
| West: Ryan Fields | | | | | | | | | | | |
| 5 | L2 | 2 | 0.0 | 0.026 | 7.0 | LOS A | 0.1 | 2.4 | 0.61 | 0.54 | 32.7 |
| 2 | T1 | 8 | 14.3 | 0.026 | 7.0 | LOS A | 0.1 | 2.4 | 0.61 | 0.54 | 32.5 |
| 12 | R2 | 4 | 0.0 | 0.026 | 7.0 | LOS A | 0.1 | 2.4 | 0.61 | 0.54 | 32.1 |
| Approach | | 14 | 8.3 | 0.026 | 7.0 | LOS A | 0.1 | 2.4 | 0.61 | 0.54 | 32.4 |
| All Vehicles | | 2004 | 1.2 | 0.843 | 15.0 | LOS B | 16.6 | 416.5 | 0.57 | 0.28 | 28.7 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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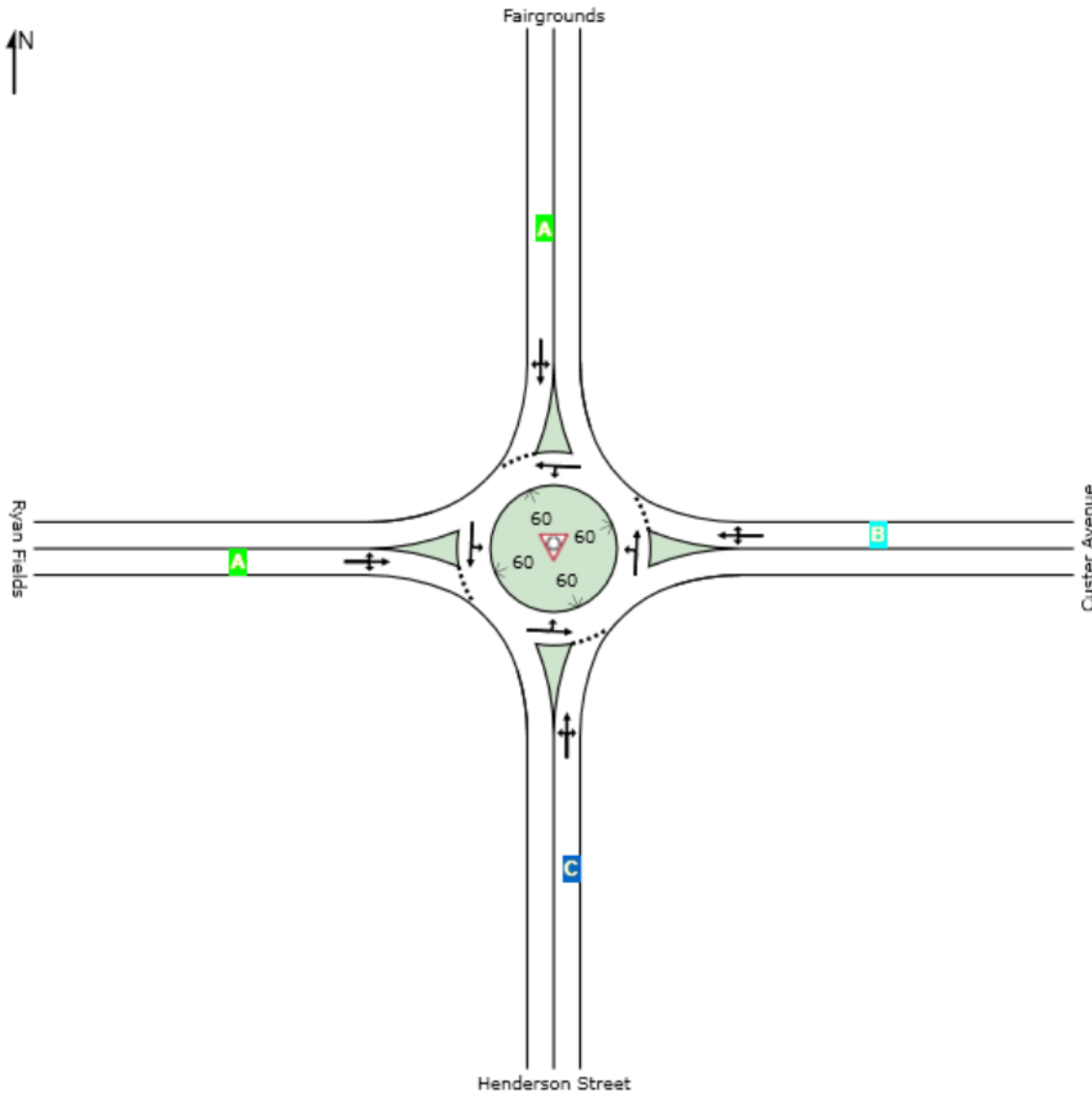
LEVEL OF SERVICE

 Site: Henderson & Custer 2042 PM Alternative 1

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | C | B | A | A | C |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c > 1$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Henderson & Custer 2042 PM Alternative 1

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Henderson Street | | | | | | | | | | | |
| 3 | L2 | 7 | 0.0 | 0.845 | 20.2 | LOS C | 15.0 | 377.5 | 0.83 | 0.45 | 27.6 |
| 8 | T1 | 48 | 13.3 | 0.845 | 20.2 | LOS C | 15.0 | 377.5 | 0.83 | 0.45 | 27.5 |
| 18 | R2 | 1012 | 0.4 | 0.845 | 20.2 | LOS C | 15.0 | 377.5 | 0.83 | 0.45 | 27.2 |
| Approach | | 1066 | 1.0 | 0.845 | 20.2 | LOS C | 15.0 | 377.5 | 0.83 | 0.45 | 27.2 |
| East: Custer Avenue | | | | | | | | | | | |
| 1 | L2 | 812 | 0.7 | 0.724 | 13.5 | LOS B | 8.8 | 220.8 | 0.54 | 0.28 | 28.8 |
| 6 | T1 | 30 | 0.0 | 0.724 | 13.5 | LOS B | 8.8 | 220.8 | 0.54 | 0.28 | 28.9 |
| 16 | R2 | 77 | 4.2 | 0.724 | 13.5 | LOS B | 8.8 | 220.8 | 0.54 | 0.28 | 28.2 |
| Approach | | 920 | 1.0 | 0.724 | 13.5 | LOS B | 8.8 | 220.8 | 0.54 | 0.28 | 28.7 |
| North: Fairgrounds | | | | | | | | | | | |
| 7 | L2 | 52 | 0.0 | 0.159 | 8.1 | LOS A | 0.6 | 15.4 | 0.65 | 0.65 | 31.5 |
| 4 | T1 | 39 | 0.0 | 0.159 | 8.1 | LOS A | 0.6 | 15.4 | 0.65 | 0.65 | 31.6 |
| 14 | R2 | 2 | 0.0 | 0.159 | 8.1 | LOS A | 0.6 | 15.4 | 0.65 | 0.65 | 30.9 |
| Approach | | 93 | 0.0 | 0.159 | 8.1 | LOS A | 0.6 | 15.4 | 0.65 | 0.65 | 31.5 |
| West: Ryan Fields | | | | | | | | | | | |
| 5 | L2 | 13 | 0.0 | 0.066 | 7.3 | LOS A | 0.2 | 6.1 | 0.63 | 0.63 | 32.2 |
| 2 | T1 | 15 | 0.0 | 0.066 | 7.3 | LOS A | 0.2 | 6.1 | 0.63 | 0.63 | 32.3 |
| 12 | R2 | 9 | 0.0 | 0.066 | 7.3 | LOS A | 0.2 | 6.1 | 0.63 | 0.63 | 31.7 |
| Approach | | 37 | 0.0 | 0.066 | 7.3 | LOS A | 0.2 | 6.1 | 0.63 | 0.63 | 32.1 |
| All Vehicles | | 2116 | 0.9 | 0.845 | 16.5 | LOS C | 15.0 | 377.5 | 0.70 | 0.39 | 28.1 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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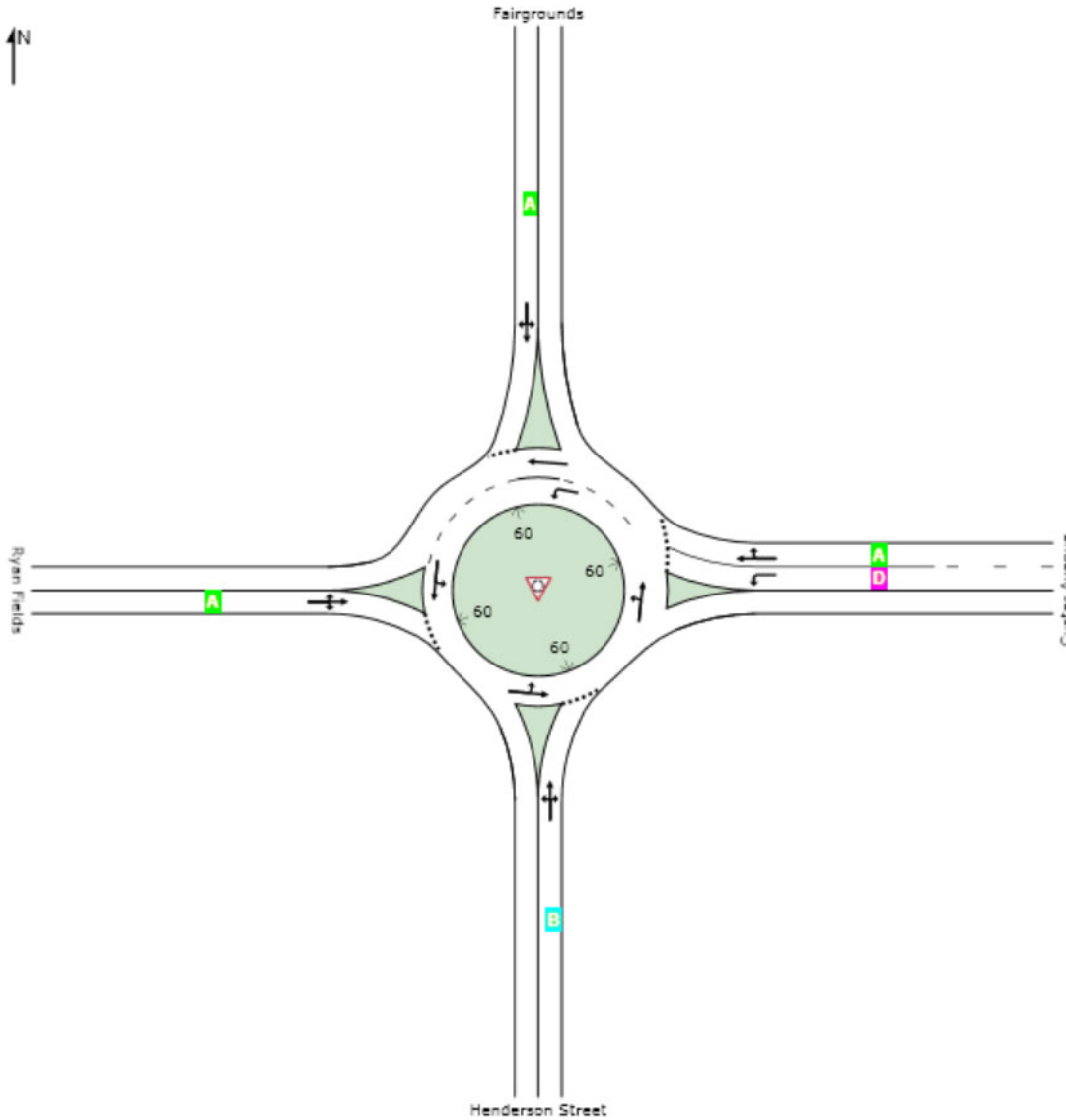
LEVEL OF SERVICE

Site: Henderson & Custer 2042 AM Alternative 2

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | B | D | A | A | C |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Henderson & Custer 2042 AM Alternative 2

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|-----------------------------|------------|------------------|----------------------|------------------|--------------------------------------|-------------------------|--------------|--------------------------------|----------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Henderson Street | | | | | | | | | | | |
| 3 | L2 | 1 | 0.0 | 0.629 | 10.3 | LOS B | 6.5 | 163.1 | 0.29 | 0.11 | 31.5 |
| 8 | T1 | 33 | 0.0 | 0.629 | 10.3 | LOS B | 6.5 | 163.1 | 0.29 | 0.11 | 31.6 |
| 18 | R2 | 800 | 0.6 | 0.629 | 10.3 | LOS B | 6.5 | 163.1 | 0.29 | 0.11 | 31.0 |
| Approach | | 835 | 0.6 | 0.629 | 10.3 | LOS B | 6.5 | 163.1 | 0.29 | 0.11 | 31.0 |
| East: Custer Avenue | | | | | | | | | | | |
| 1 | L2 | 1185 | 2.0 | 0.908 | 26.0 | LOS D | 25.7 | 653.8 | 0.84 | 0.33 | 24.7 |
| 6 | T1 | 5 | 0.0 | 0.040 | 3.5 | LOS A | 0.1 | 4.1 | 0.12 | 0.04 | 34.9 |
| 16 | R2 | 41 | 18.2 | 0.040 | 3.5 | LOS A | 0.1 | 4.1 | 0.12 | 0.04 | 33.4 |
| Approach | | 1230 | 2.5 | 0.908 | 25.2 | LOS D | 25.7 | 653.8 | 0.81 | 0.32 | 25.0 |
| North: Fairgrounds | | | | | | | | | | | |
| 7 | L2 | 26 | 14.3 | 0.110 | 9.7 | LOS A | 0.3 | 8.9 | 0.67 | 0.67 | 30.4 |
| 4 | T1 | 21 | 16.7 | 0.110 | 9.7 | LOS A | 0.3 | 8.9 | 0.67 | 0.67 | 30.6 |
| 14 | R2 | 1 | 0.0 | 0.110 | 9.7 | LOS A | 0.3 | 8.9 | 0.67 | 0.67 | 30.3 |
| Approach | | 48 | 15.0 | 0.110 | 9.7 | LOS A | 0.3 | 8.9 | 0.67 | 0.67 | 30.5 |
| West: Ryan Fields | | | | | | | | | | | |
| 5 | L2 | 1 | 0.0 | 0.013 | 9.4 | LOS A | 0.0 | 1.1 | 0.72 | 0.66 | 31.5 |
| 2 | T1 | 2 | 0.0 | 0.013 | 9.4 | LOS A | 0.0 | 1.1 | 0.72 | 0.66 | 31.6 |
| 12 | R2 | 1 | 0.0 | 0.013 | 9.4 | LOS A | 0.0 | 1.1 | 0.72 | 0.66 | 30.9 |
| Approach | | 5 | 0.0 | 0.013 | 9.4 | LOS A | 0.0 | 1.1 | 0.72 | 0.66 | 31.4 |
| All Vehicles | | 2119 | 2.0 | 0.908 | 18.9 | LOS C | 25.7 | 653.8 | 0.60 | 0.24 | 27.1 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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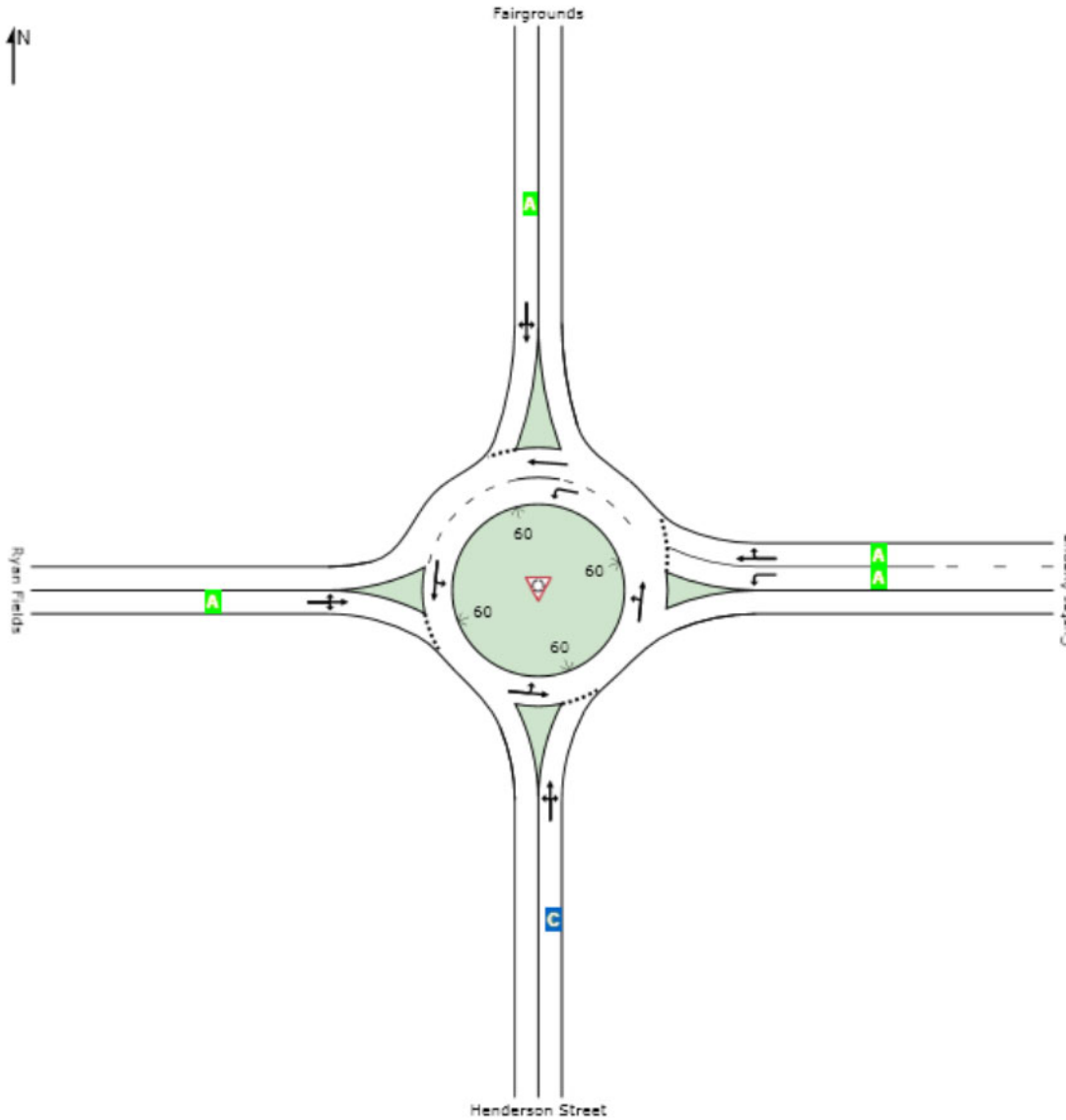
LEVEL OF SERVICE

 Site: Henderson & Custer 2042 School Alternative 2

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | C | A | A | A | B |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Henderson & Custer 2042 School Alternative 2

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Henderson Street | | | | | | | | | | | |
| 3 | L2 | 1 | 0.0 | 0.843 | 19.7 | LOS C | 16.6 | 416.5 | 0.73 | 0.33 | 27.8 |
| 8 | T1 | 49 | 0.0 | 0.843 | 19.7 | LOS C | 16.6 | 416.5 | 0.73 | 0.33 | 27.9 |
| 18 | R2 | 1045 | 0.8 | 0.843 | 19.7 | LOS C | 16.6 | 416.5 | 0.73 | 0.33 | 27.4 |
| Approach | | 1095 | 0.8 | 0.843 | 19.7 | LOS C | 16.6 | 416.5 | 0.73 | 0.33 | 27.4 |
| East: Custer Avenue | | | | | | | | | | | |
| 1 | L2 | 701 | 2.2 | 0.547 | 8.9 | LOS A | 4.4 | 113.0 | 0.30 | 0.13 | 30.3 |
| 6 | T1 | 5 | 0.0 | 0.040 | 3.1 | LOS A | 0.2 | 4.2 | 0.15 | 0.05 | 35.2 |
| 16 | R2 | 48 | 0.0 | 0.040 | 3.1 | LOS A | 0.2 | 4.2 | 0.15 | 0.05 | 34.2 |
| Approach | | 753 | 2.0 | 0.547 | 8.5 | LOS A | 4.4 | 113.0 | 0.29 | 0.13 | 30.6 |
| North: Fairgrounds | | | | | | | | | | | |
| 7 | L2 | 42 | 0.0 | 0.184 | 6.7 | LOS A | 0.7 | 17.2 | 0.57 | 0.57 | 32.6 |
| 4 | T1 | 99 | 0.0 | 0.184 | 6.7 | LOS A | 0.7 | 17.2 | 0.57 | 0.57 | 32.7 |
| 14 | R2 | 1 | 0.0 | 0.184 | 6.7 | LOS A | 0.7 | 17.2 | 0.57 | 0.57 | 32.0 |
| Approach | | 141 | 0.0 | 0.184 | 6.7 | LOS A | 0.7 | 17.2 | 0.57 | 0.57 | 32.7 |
| West: Ryan Fields | | | | | | | | | | | |
| 5 | L2 | 2 | 0.0 | 0.026 | 7.0 | LOS A | 0.1 | 2.4 | 0.61 | 0.54 | 32.7 |
| 2 | T1 | 8 | 14.3 | 0.026 | 7.0 | LOS A | 0.1 | 2.4 | 0.61 | 0.54 | 32.5 |
| 12 | R2 | 4 | 0.0 | 0.026 | 7.0 | LOS A | 0.1 | 2.4 | 0.61 | 0.54 | 32.1 |
| Approach | | 14 | 8.3 | 0.026 | 7.0 | LOS A | 0.1 | 2.4 | 0.61 | 0.54 | 32.4 |
| All Vehicles | | 2004 | 1.2 | 0.843 | 14.4 | LOS B | 16.6 | 416.5 | 0.55 | 0.27 | 28.9 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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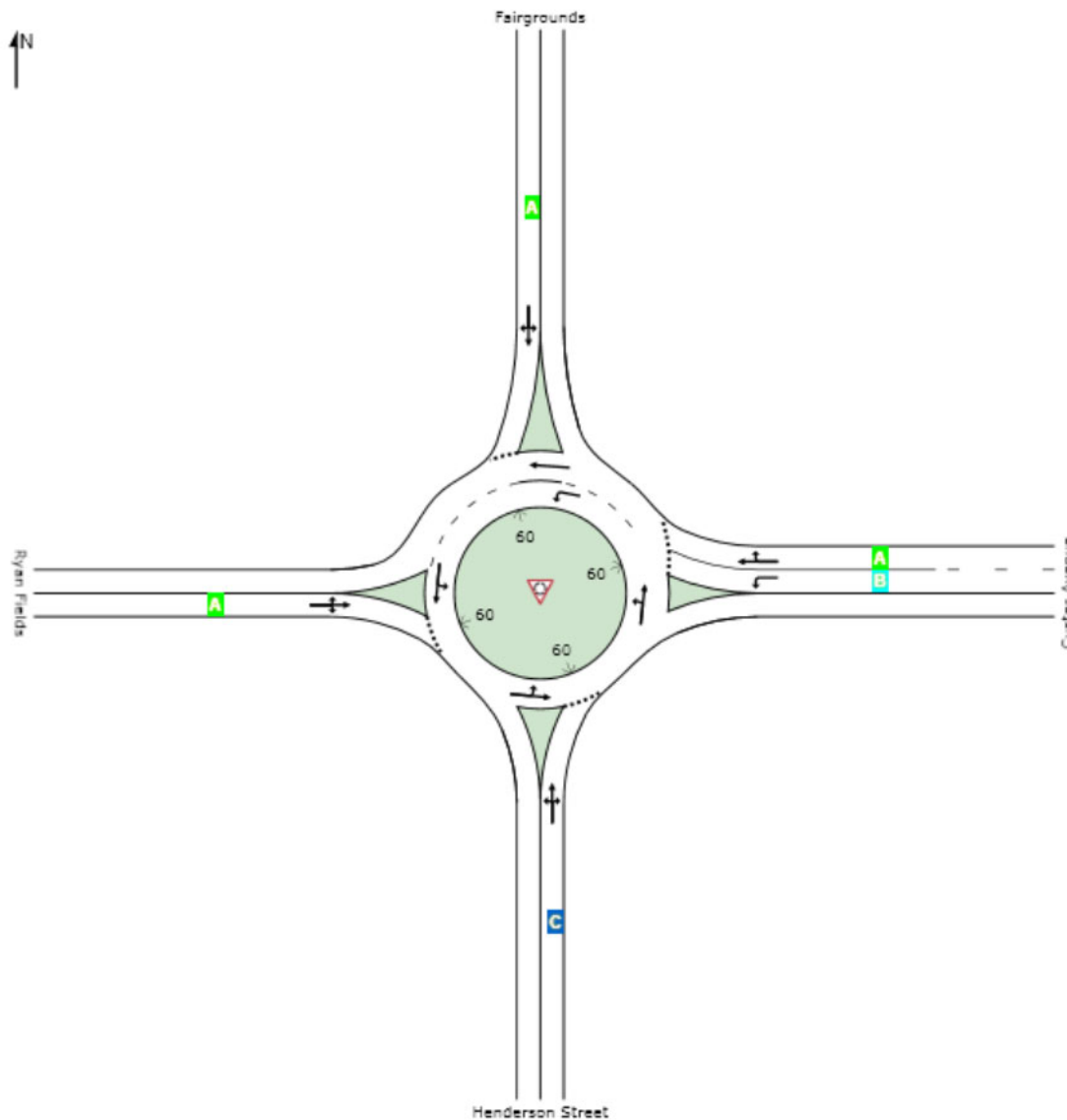
LEVEL OF SERVICE

Site: Henderson & Custer 2042 PM Alternative 2

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | C | B | A | A | B |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Henderson & Custer 2042 PM Alternative 2

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|-----------------------------|------------|------------------|----------------------|------------------|--------------------------------------|-------------------------|--------------|--------------------------------|----------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Henderson Street | | | | | | | | | | | |
| 3 | L2 | 7 | 0.0 | 0.845 | 20.2 | LOS C | 15.0 | 377.5 | 0.83 | 0.45 | 27.6 |
| 8 | T1 | 48 | 13.3 | 0.845 | 20.2 | LOS C | 15.0 | 377.5 | 0.83 | 0.45 | 27.5 |
| 18 | R2 | 1012 | 0.4 | 0.845 | 20.2 | LOS C | 15.0 | 377.5 | 0.83 | 0.45 | 27.2 |
| Approach | | 1066 | 1.0 | 0.845 | 20.2 | LOS C | 15.0 | 377.5 | 0.83 | 0.45 | 27.2 |
| East: Custer Avenue | | | | | | | | | | | |
| 1 | L2 | 812 | 0.7 | 0.638 | 10.9 | LOS B | 6.3 | 157.8 | 0.44 | 0.22 | 29.6 |
| 6 | T1 | 30 | 0.0 | 0.086 | 3.6 | LOS A | 0.4 | 9.5 | 0.20 | 0.08 | 34.9 |
| 16 | R2 | 77 | 4.2 | 0.086 | 3.6 | LOS A | 0.4 | 9.5 | 0.20 | 0.08 | 33.8 |
| Approach | | 920 | 1.0 | 0.638 | 10.0 | LOS B | 6.3 | 157.8 | 0.41 | 0.20 | 30.0 |
| North: Fairgrounds | | | | | | | | | | | |
| 7 | L2 | 52 | 0.0 | 0.136 | 6.7 | LOS A | 0.5 | 12.1 | 0.59 | 0.59 | 32.1 |
| 4 | T1 | 39 | 0.0 | 0.136 | 6.7 | LOS A | 0.5 | 12.1 | 0.59 | 0.59 | 32.2 |
| 14 | R2 | 2 | 0.0 | 0.136 | 6.7 | LOS A | 0.5 | 12.1 | 0.59 | 0.59 | 31.5 |
| Approach | | 93 | 0.0 | 0.136 | 6.7 | LOS A | 0.5 | 12.1 | 0.59 | 0.59 | 32.1 |
| West: Ryan Fields | | | | | | | | | | | |
| 5 | L2 | 13 | 0.0 | 0.066 | 7.3 | LOS A | 0.2 | 6.1 | 0.63 | 0.63 | 32.2 |
| 2 | T1 | 15 | 0.0 | 0.066 | 7.3 | LOS A | 0.2 | 6.1 | 0.63 | 0.63 | 32.3 |
| 12 | R2 | 9 | 0.0 | 0.066 | 7.3 | LOS A | 0.2 | 6.1 | 0.63 | 0.63 | 31.7 |
| Approach | | 37 | 0.0 | 0.066 | 7.3 | LOS A | 0.2 | 6.1 | 0.63 | 0.63 | 32.1 |
| All Vehicles | | 2116 | 0.9 | 0.845 | 15.0 | LOS B | 15.0 | 377.5 | 0.64 | 0.35 | 28.7 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: ROBERT PECCIA AND ASSOCIATES | Processed: Wednesday, October 10, 2018 1:30:59 PM

Project: C:\Users\shane\Desktop\Custer\SIDRA\Henderson Alt 2.sip6

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 1 2042 - AM

10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|-------|------|------|------|-------|-------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 142 | 494 | 22 | 273 | 591 | 94 | 6 | 41 | 169 | 219 | 206 | 337 |
| Future Volume (veh/h) | 142 | 494 | 22 | 273 | 591 | 94 | 6 | 41 | 169 | 219 | 206 | 337 |
| 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 | 1400 | 1400 | 1400 | 1500 | 1465 | 1477 | 1500 | 1500 | 1500 | 1488 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 167 | 581 | 26 | 321 | 695 | 111 | 7 | 48 | 199 | 258 | 242 | 396 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 1 | 0 | 0 |
| Cap, veh/h | 248 | 601 | 27 | 277 | 749 | 806 | 215 | 36 | 149 | 242 | 398 | 432 |
| Arrive On Green | 0.07 | 0.45 | 0.45 | 0.18 | 0.68 | 0.68 | 0.01 | 0.14 | 0.14 | 0.13 | 0.27 | 0.27 |
| Sat Flow, veh/h | 1333 | 1330 | 60 | 1429 | 1465 | 1251 | 1429 | 255 | 1055 | 1417 | 1500 | 1271 |
| Grp Volume(v), veh/h | 167 | 0 | 607 | 321 | 695 | 111 | 7 | 0 | 247 | 258 | 242 | 396 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 0 | 1389 | 1429 | 1465 | 1251 | 1429 | 0 | 1310 | 1417 | 1500 | 1271 |
| Q Serve(g_s), s | 9.2 | 0.0 | 57.4 | 18.0 | 55.6 | 3.2 | 0.6 | 0.0 | 19.0 | 18.0 | 19.1 | 35.8 |
| Cycle Q Clear(g_c), s | 9.2 | 0.0 | 57.4 | 18.0 | 55.6 | 3.2 | 0.6 | 0.0 | 19.0 | 18.0 | 19.1 | 35.8 |
| Prop In Lane | 1.00 | | 0.04 | 1.00 | | 1.00 | 1.00 | | 0.81 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 248 | 0 | 628 | 277 | 749 | 806 | 215 | 0 | 184 | 242 | 398 | 432 |
| V/C Ratio(X) | 0.67 | 0.00 | 0.97 | 1.16 | 0.93 | 0.14 | 0.03 | 0.00 | 1.34 | 1.06 | 0.61 | 0.92 |
| Avail Cap(c_a), veh/h | 248 | 0 | 628 | 277 | 749 | 806 | 256 | 0 | 184 | 242 | 398 | 432 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 0.31 | 0.31 | 0.31 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 27.5 | 0.0 | 36.0 | 35.7 | 19.5 | 6.0 | 49.1 | 0.0 | 58.0 | 44.1 | 43.4 | 42.8 |
| Incr Delay (d2), s/veh | 7.0 | 0.0 | 28.7 | 84.5 | 7.8 | 0.1 | 0.1 | 0.0 | 184.7 | 76.0 | 2.7 | 24.3 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 3.2 | 0.0 | 23.5 | 10.2 | 15.9 | 0.8 | 0.2 | 0.0 | 15.8 | 11.9 | 7.2 | 15.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 34.5 | 0.0 | 64.7 | 120.2 | 27.2 | 6.1 | 49.2 | 0.0 | 242.7 | 120.1 | 46.1 | 67.1 |
| LnGrp LOS | C | A | E | F | C | A | D | A | F | F | D | E |
| Approach Vol, veh/h | | 774 | | | 1127 | | | 254 | | | | 896 |
| Approach Delay, s/veh | | 58.2 | | | 51.6 | | | 237.4 | | | | 76.7 |
| Approach LOS | | E | | | D | | | F | | | | E |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 22.0 | 67.0 | 5.2 | 40.8 | 14.0 | 75.0 | 22.0 | 24.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 18.0 | 61.0 | 5.0 | 32.0 | 10.0 | 69.0 | 18.0 | 19.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 20.0 | 59.4 | 2.6 | 37.8 | 11.2 | 57.6 | 20.0 | 21.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.6 | 0.0 | 0.0 | 0.0 | 3.8 | 0.0 | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 76.1 | | | | | | | | |
| HCM 6th LOS | | | | E | | | | | | | | |

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 1 2042 School
 10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|-------|------|------|-------|------|------|------|-------|-------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 295 | 605 | 11 | 131 | 524 | 214 | 8 | 73 | 199 | 142 | 36 | 119 |
| Future Volume (veh/h) | 295 | 605 | 11 | 131 | 524 | 214 | 8 | 73 | 199 | 142 | 36 | 119 |
| 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 | 1339 | 1339 | 1339 | 1500 | 1465 | 1500 | 1500 | 1500 | 1500 | 1465 | 1465 | 1488 |
| Adj Flow Rate, veh/h | 335 | 688 | 12 | 149 | 595 | 243 | 9 | 83 | 226 | 161 | 41 | 135 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Percent Heavy Veh, % | 1 | 1 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | 3 | 1 |
| Cap, veh/h | 285 | 744 | 13 | 149 | 654 | 686 | 237 | 64 | 175 | 178 | 385 | 525 |
| Arrive On Green | 0.15 | 0.57 | 0.57 | 0.04 | 0.59 | 0.59 | 0.01 | 0.18 | 0.18 | 0.09 | 0.26 | 0.26 |
| Sat Flow, veh/h | 1276 | 1312 | 23 | 1429 | 1465 | 1271 | 1429 | 356 | 969 | 1395 | 1465 | 1261 |
| Grp Volume(v), veh/h | 335 | 0 | 700 | 149 | 595 | 243 | 9 | 0 | 309 | 161 | 41 | 135 |
| Grp Sat Flow(s),veh/h/ln | 1276 | 0 | 1335 | 1429 | 1465 | 1271 | 1429 | 0 | 1325 | 1395 | 1465 | 1261 |
| Q Serve(g_s), s | 23.0 | 0.0 | 71.6 | 5.0 | 53.8 | 13.0 | 0.8 | 0.0 | 27.0 | 14.0 | 3.2 | 10.5 |
| Cycle Q Clear(g_c), s | 23.0 | 0.0 | 71.6 | 5.0 | 53.8 | 13.0 | 0.8 | 0.0 | 27.0 | 14.0 | 3.2 | 10.5 |
| Prop In Lane | 1.00 | | 0.02 | 1.00 | | 1.00 | 1.00 | | 0.73 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 285 | 0 | 757 | 149 | 654 | 686 | 237 | 0 | 239 | 178 | 385 | 525 |
| V/C Ratio(X) | 1.18 | 0.00 | 0.93 | 1.00 | 0.91 | 0.35 | 0.04 | 0.00 | 1.30 | 0.90 | 0.11 | 0.26 |
| Avail Cap(c_a), veh/h | 285 | 0 | 757 | 149 | 654 | 686 | 270 | 0 | 239 | 178 | 385 | 525 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 0.57 | 0.57 | 0.57 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 40.7 | 0.0 | 29.6 | 50.3 | 27.8 | 13.8 | 49.5 | 0.0 | 61.5 | 45.9 | 41.9 | 28.6 |
| Incr Delay (d2), s/veh | 109.5 | 0.0 | 18.8 | 55.6 | 12.1 | 0.8 | 0.1 | 0.0 | 160.2 | 41.2 | 0.1 | 0.3 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 13.3 | 0.0 | 25.6 | 6.0 | 18.3 | 3.6 | 0.3 | 0.0 | 19.8 | 6.8 | 1.2 | 3.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 150.2 | 0.0 | 48.4 | 106.0 | 39.9 | 14.6 | 49.5 | 0.0 | 221.7 | 87.1 | 42.0 | 28.9 |
| LnGrp LOS | F | A | D | F | D | B | D | A | F | F | D | C |
| Approach Vol, veh/h | | 1035 | | | 987 | | | 318 | | | | 337 |
| Approach Delay, s/veh | | 81.4 | | | 43.6 | | | 216.9 | | | | 58.3 |
| Approach LOS | | F | | | D | | | F | | | | E |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 9.0 | 91.0 | 5.6 | 44.4 | 27.0 | 73.0 | 18.0 | 32.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 85.0 | 5.0 | 36.0 | 23.0 | 67.0 | 14.0 | 27.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 7.0 | 73.6 | 2.8 | 12.5 | 25.0 | 55.8 | 16.0 | 29.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 3.5 | 0.0 | 0.6 | 0.0 | 3.5 | 0.0 | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 80.7 | | | | | | | | | |
| HCM 6th LOS | | | F | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 1 2042 PM
 10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|-------|-------|------|------|------|------|------|-------|-------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 303 | 704 | 9 | 106 | 676 | 270 | 5 | 35 | 116 | 149 | 25 | 156 |
| Future Volume (veh/h) | 303 | 704 | 9 | 106 | 676 | 270 | 5 | 35 | 116 | 149 | 25 | 156 |
| 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 | 1389 | 1400 | 1400 | 1500 | 1488 | 1500 | 1500 | 1500 | 1500 | 1500 | 1453 | 1488 |
| Adj Flow Rate, veh/h | 322 | 749 | 10 | 113 | 719 | 287 | 5 | 37 | 123 | 159 | 27 | 166 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4 | 1 |
| Cap, veh/h | 286 | 873 | 12 | 207 | 764 | 754 | 178 | 39 | 128 | 168 | 291 | 446 |
| Arrive On Green | 0.15 | 0.63 | 0.63 | 0.04 | 0.68 | 0.68 | 0.01 | 0.13 | 0.13 | 0.08 | 0.20 | 0.20 |
| Sat Flow, veh/h | 1323 | 1378 | 18 | 1429 | 1488 | 1271 | 1429 | 305 | 1013 | 1429 | 1453 | 1261 |
| Grp Volume(v), veh/h | 322 | 0 | 759 | 113 | 719 | 287 | 5 | 0 | 160 | 159 | 27 | 166 |
| Grp Sat Flow(s),veh/h/ln | 1323 | 0 | 1397 | 1429 | 1488 | 1271 | 1429 | 0 | 1318 | 1429 | 1453 | 1261 |
| Q Serve(g_s), s | 23.0 | 0.0 | 65.5 | 5.0 | 64.3 | 12.8 | 0.5 | 0.0 | 18.1 | 12.0 | 2.3 | 14.7 |
| Cycle Q Clear(g_c), s | 23.0 | 0.0 | 65.5 | 5.0 | 64.3 | 12.8 | 0.5 | 0.0 | 18.1 | 12.0 | 2.3 | 14.7 |
| Prop In Lane | 1.00 | | 0.01 | 1.00 | | 1.00 | 1.00 | | 0.77 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 286 | 0 | 885 | 207 | 764 | 754 | 178 | 0 | 167 | 168 | 291 | 446 |
| V/C Ratio(X) | 1.13 | 0.00 | 0.86 | 0.55 | 0.94 | 0.38 | 0.03 | 0.00 | 0.96 | 0.95 | 0.09 | 0.37 |
| Avail Cap(c_a), veh/h | 286 | 0 | 885 | 207 | 764 | 754 | 217 | 0 | 167 | 168 | 291 | 446 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 0.40 | 0.40 | 0.40 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 45.4 | 0.0 | 22.1 | 30.1 | 21.8 | 9.8 | 56.6 | 0.0 | 65.1 | 55.6 | 48.9 | 36.1 |
| Incr Delay (d2), s/veh | 91.4 | 0.0 | 10.6 | 1.2 | 10.7 | 0.6 | 0.1 | 0.0 | 57.3 | 53.5 | 0.1 | 0.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 12.6 | 0.0 | 22.4 | 1.9 | 19.9 | 3.3 | 0.2 | 0.0 | 8.8 | 3.8 | 0.8 | 4.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 136.9 | 0.0 | 32.6 | 31.3 | 32.5 | 10.4 | 56.6 | 0.0 | 122.4 | 109.0 | 49.0 | 36.6 |
| LnGrp LOS | F | A | C | C | C | B | E | A | F | F | D | D |
| Approach Vol, veh/h | | 1081 | | | 1119 | | | 165 | | | | 352 |
| Approach Delay, s/veh | | 63.7 | | | 26.7 | | | 120.4 | | | | 70.3 |
| Approach LOS | | E | | | C | | | F | | | | E |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 9.0 | 101.0 | 4.9 | 35.1 | 27.0 | 83.0 | 16.0 | 24.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 95.0 | 5.0 | 26.0 | 23.0 | 77.0 | 12.0 | 19.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 7.0 | 67.5 | 2.5 | 16.7 | 25.0 | 66.3 | 14.0 | 20.1 | | | | |
| Green Ext Time (p_c), s | 0.0 | 5.6 | 0.0 | 0.4 | 0.0 | 4.2 | 0.0 | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 52.8 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 2 2042 AM
 10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|-------|-------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 142 | 494 | 22 | 273 | 591 | 94 | 6 | 41 | 169 | 219 | 206 | 337 |
| Future Volume (veh/h) | 142 | 494 | 22 | 273 | 591 | 94 | 6 | 41 | 169 | 219 | 206 | 337 |
| 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 | 1400 | 1400 | 1400 | 1500 | 1465 | 1477 | 1500 | 1500 | 1500 | 1488 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 167 | 581 | 26 | 321 | 695 | 111 | 7 | 48 | 199 | 258 | 242 | 396 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 1 | 0 | 0 |
| Cap, veh/h | 199 | 1077 | 48 | 570 | 727 | 788 | 247 | 41 | 172 | 242 | 432 | 451 |
| Arrive On Green | 0.07 | 0.42 | 0.42 | 0.20 | 0.66 | 0.66 | 0.01 | 0.16 | 0.16 | 0.13 | 0.29 | 0.29 |
| Sat Flow, veh/h | 1333 | 2593 | 116 | 1429 | 1465 | 1251 | 1429 | 255 | 1055 | 1417 | 1500 | 1271 |
| Grp Volume(v), veh/h | 167 | 298 | 309 | 321 | 695 | 111 | 7 | 0 | 247 | 258 | 242 | 396 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 1330 | 1379 | 1429 | 1465 | 1251 | 1429 | 0 | 1310 | 1417 | 1500 | 1271 |
| Q Serve(g_s), s | 9.0 | 22.8 | 22.8 | 17.2 | 59.0 | 3.4 | 0.6 | 0.0 | 22.0 | 18.0 | 18.5 | 38.8 |
| Cycle Q Clear(g_c), s | 9.0 | 22.8 | 22.8 | 17.2 | 59.0 | 3.4 | 0.6 | 0.0 | 22.0 | 18.0 | 18.5 | 38.8 |
| Prop In Lane | 1.00 | | 0.08 | 1.00 | | 1.00 | 1.00 | | 0.81 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 199 | 552 | 573 | 570 | 727 | 788 | 247 | 0 | 213 | 242 | 432 | 451 |
| V/C Ratio(X) | 0.84 | 0.54 | 0.54 | 0.56 | 0.96 | 0.14 | 0.03 | 0.00 | 1.16 | 1.06 | 0.56 | 0.88 |
| Avail Cap(c_a), veh/h | 199 | 552 | 573 | 666 | 727 | 788 | 288 | 0 | 213 | 242 | 432 | 451 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 0.82 | 0.82 | 0.82 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 33.9 | 29.7 | 29.7 | 17.6 | 21.6 | 6.7 | 46.6 | 0.0 | 56.5 | 41.8 | 40.8 | 40.9 |
| Incr Delay (d2), s/veh | 25.8 | 3.7 | 3.6 | 0.7 | 21.3 | 0.3 | 0.0 | 0.0 | 110.4 | 76.0 | 1.6 | 17.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 4.5 | 7.7 | 8.0 | 4.9 | 19.9 | 1.0 | 0.2 | 0.0 | 13.9 | 11.6 | 6.9 | 14.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 59.7 | 33.5 | 33.4 | 18.3 | 42.8 | 7.0 | 46.6 | 0.0 | 166.9 | 117.7 | 42.5 | 58.6 |
| LnGrp LOS | E | C | C | B | D | A | D | A | F | F | D | E |
| Approach Vol, veh/h | | 774 | | | 1127 | | | 254 | | | | 896 |
| Approach Delay, s/veh | | 39.1 | | | 32.3 | | | 163.6 | | | | 71.3 |
| Approach LOS | | D | | | C | | | F | | | | E |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 23.9 | 62.1 | 5.2 | 43.8 | 13.0 | 73.0 | 22.0 | 27.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 29.0 | 47.0 | 5.0 | 35.0 | 9.0 | 67.0 | 18.0 | 22.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 19.2 | 24.8 | 2.6 | 40.8 | 11.0 | 61.0 | 20.0 | 24.0 | | | | |
| Green Ext Time (p_c), s | 0.7 | 3.4 | 0.0 | 0.0 | 0.0 | 2.5 | 0.0 | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 56.4 | | | | | | | | |
| HCM 6th LOS | | | | E | | | | | | | | |

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 2 2042 School
 10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|-------|------|------|------|------|------|------|-------|-------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 295 | 605 | 11 | 131 | 524 | 214 | 8 | 73 | 199 | 142 | 36 | 119 |
| Future Volume (veh/h) | 295 | 605 | 11 | 131 | 524 | 214 | 8 | 73 | 199 | 142 | 36 | 119 |
| 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 | 1339 | 1339 | 1339 | 1500 | 1465 | 1500 | 1500 | 1500 | 1500 | 1465 | 1465 | 1488 |
| Adj Flow Rate, veh/h | 335 | 688 | 12 | 149 | 595 | 243 | 9 | 83 | 226 | 161 | 41 | 135 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Percent Heavy Veh, % | 1 | 1 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | 3 | 1 |
| Cap, veh/h | 285 | 1356 | 24 | 362 | 654 | 686 | 237 | 64 | 175 | 178 | 385 | 525 |
| Arrive On Green | 0.15 | 0.53 | 0.53 | 0.09 | 0.59 | 0.59 | 0.01 | 0.18 | 0.18 | 0.09 | 0.26 | 0.26 |
| Sat Flow, veh/h | 1276 | 2559 | 45 | 1429 | 1465 | 1271 | 1429 | 356 | 969 | 1395 | 1465 | 1261 |
| Grp Volume(v), veh/h | 335 | 342 | 358 | 149 | 595 | 243 | 9 | 0 | 309 | 161 | 41 | 135 |
| Grp Sat Flow(s),veh/h/ln | 1276 | 1272 | 1331 | 1429 | 1465 | 1271 | 1429 | 0 | 1325 | 1395 | 1465 | 1261 |
| Q Serve(g_s), s | 23.0 | 25.9 | 25.9 | 8.6 | 53.8 | 13.0 | 0.8 | 0.0 | 27.0 | 14.0 | 3.2 | 10.5 |
| Cycle Q Clear(g_c), s | 23.0 | 25.9 | 25.9 | 8.6 | 53.8 | 13.0 | 0.8 | 0.0 | 27.0 | 14.0 | 3.2 | 10.5 |
| Prop In Lane | 1.00 | | 0.03 | 1.00 | | 1.00 | 1.00 | | 0.73 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 285 | 674 | 705 | 362 | 654 | 686 | 237 | 0 | 239 | 178 | 385 | 525 |
| V/C Ratio(X) | 1.18 | 0.51 | 0.51 | 0.41 | 0.91 | 0.35 | 0.04 | 0.00 | 1.30 | 0.90 | 0.11 | 0.26 |
| Avail Cap(c_a), veh/h | 285 | 674 | 705 | 366 | 654 | 686 | 270 | 0 | 239 | 178 | 385 | 525 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 0.86 | 0.86 | 0.86 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 40.7 | 22.7 | 22.7 | 19.9 | 27.8 | 13.8 | 49.5 | 0.0 | 61.5 | 45.9 | 41.9 | 28.6 |
| Incr Delay (d2), s/veh | 109.5 | 2.7 | 2.6 | 0.6 | 16.8 | 1.2 | 0.1 | 0.0 | 160.2 | 41.2 | 0.1 | 0.3 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 13.3 | 8.1 | 8.5 | 2.8 | 19.2 | 3.7 | 0.3 | 0.0 | 19.8 | 6.8 | 1.2 | 3.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 150.2 | 25.4 | 25.3 | 20.5 | 44.6 | 15.1 | 49.5 | 0.0 | 221.7 | 87.1 | 42.0 | 28.9 |
| LnGrp LOS | F | C | C | C | D | B | D | A | F | F | D | C |
| Approach Vol, veh/h | | 1035 | | | 987 | | | 318 | | | 337 | |
| Approach Delay, s/veh | | 65.8 | | | 33.7 | | | 216.9 | | | 58.3 | |
| Approach LOS | | E | | | C | | | F | | | E | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 14.5 | 85.5 | 5.6 | 44.4 | 27.0 | 73.0 | 18.0 | 32.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 11.0 | 79.0 | 5.0 | 36.0 | 23.0 | 67.0 | 14.0 | 27.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 10.6 | 27.9 | 2.8 | 12.5 | 25.0 | 55.8 | 16.0 | 29.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 4.5 | 0.0 | 0.6 | 0.0 | 3.5 | 0.0 | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 70.9 | | | | | | | | |
| HCM 6th LOS | | | | E | | | | | | | | |

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 2 2042 PM
 10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|-------|------|------|------|------|------|------|-------|-------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 303 | 704 | 9 | 106 | 676 | 270 | 5 | 35 | 116 | 149 | 25 | 156 |
| Future Volume (veh/h) | 303 | 704 | 9 | 106 | 676 | 270 | 5 | 35 | 116 | 149 | 25 | 156 |
| 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 | 1389 | 1400 | 1400 | 1500 | 1488 | 1500 | 1500 | 1500 | 1500 | 1500 | 1453 | 1488 |
| Adj Flow Rate, veh/h | 322 | 749 | 10 | 113 | 719 | 287 | 5 | 37 | 123 | 159 | 27 | 166 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4 | 1 |
| Cap, veh/h | 293 | 1682 | 22 | 387 | 773 | 745 | 185 | 41 | 136 | 157 | 283 | 439 |
| Arrive On Green | 0.15 | 0.63 | 0.63 | 0.06 | 0.69 | 0.69 | 0.01 | 0.13 | 0.13 | 0.07 | 0.19 | 0.19 |
| Sat Flow, veh/h | 1323 | 2688 | 36 | 1429 | 1488 | 1271 | 1429 | 305 | 1013 | 1429 | 1453 | 1261 |
| Grp Volume(v), veh/h | 322 | 371 | 388 | 113 | 719 | 287 | 5 | 0 | 160 | 159 | 27 | 166 |
| Grp Sat Flow(s),veh/h/ln | 1323 | 1330 | 1394 | 1429 | 1488 | 1271 | 1429 | 0 | 1318 | 1429 | 1453 | 1261 |
| Q Serve(g_s), s | 23.0 | 21.7 | 21.7 | 5.7 | 62.7 | 12.9 | 0.5 | 0.0 | 18.0 | 10.0 | 2.3 | 14.8 |
| Cycle Q Clear(g_c), s | 23.0 | 21.7 | 21.7 | 5.7 | 62.7 | 12.9 | 0.5 | 0.0 | 18.0 | 10.0 | 2.3 | 14.8 |
| Prop In Lane | 1.00 | | 0.03 | 1.00 | | 1.00 | 1.00 | | 0.77 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 293 | 832 | 872 | 387 | 773 | 745 | 185 | 0 | 177 | 157 | 283 | 439 |
| V/C Ratio(X) | 1.10 | 0.45 | 0.45 | 0.29 | 0.93 | 0.39 | 0.03 | 0.00 | 0.91 | 1.01 | 0.10 | 0.38 |
| Avail Cap(c_a), veh/h | 293 | 832 | 872 | 387 | 773 | 745 | 224 | 0 | 193 | 157 | 283 | 439 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 0.79 | 0.79 | 0.79 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 44.4 | 14.5 | 14.6 | 15.2 | 20.9 | 10.0 | 55.6 | 0.0 | 64.0 | 58.5 | 49.6 | 36.7 |
| Incr Delay (d2), s/veh | 81.8 | 1.7 | 1.6 | 0.3 | 16.2 | 1.2 | 0.1 | 0.0 | 37.8 | 74.4 | 0.1 | 0.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 17.6 | 6.7 | 7.0 | 1.8 | 20.5 | 3.4 | 0.2 | 0.0 | 7.9 | 5.3 | 0.8 | 4.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 126.2 | 16.3 | 16.2 | 15.6 | 37.1 | 11.2 | 55.7 | 0.0 | 101.8 | 132.9 | 49.7 | 37.3 |
| LnGrp LOS | F | B | B | B | D | B | E | A | F | F | D | D |
| Approach Vol, veh/h | | 1081 | | | 1119 | | | 165 | | | | 352 |
| Approach Delay, s/veh | | 49.0 | | | 28.3 | | | 100.4 | | | | 81.4 |
| Approach LOS | | D | | | C | | | F | | | | F |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 11.0 | 99.9 | 4.9 | 34.2 | 27.0 | 83.9 | 14.0 | 25.1 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 7.0 | 92.0 | 5.0 | 27.0 | 23.0 | 76.0 | 10.0 | 22.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 7.7 | 23.7 | 2.5 | 16.8 | 25.0 | 64.7 | 12.0 | 20.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 5.0 | 0.0 | 0.4 | 0.0 | 4.4 | 0.0 | 0.2 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 47.8 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 3 2042 AM
 01/11/2019



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 142 | 494 | 22 | 273 | 591 | 94 | 6 | 41 | 169 | 219 | 206 | 337 |
| Future Volume (veh/h) | 142 | 494 | 22 | 273 | 591 | 94 | 6 | 41 | 169 | 219 | 206 | 337 |
| 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 | 1400 | 1400 | 1400 | 1500 | 1465 | 1477 | 1500 | 1500 | 1465 | 1488 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 167 | 581 | 26 | 321 | 695 | 111 | 7 | 48 | 199 | 258 | 242 | 396 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 3 | 1 | 0 | 0 |
| Cap, veh/h | 306 | 1225 | 55 | 643 | 781 | 779 | 46 | 225 | 370 | 404 | 422 | 452 |
| Arrive On Green | 0.07 | 0.47 | 0.47 | 0.18 | 0.71 | 0.71 | 0.16 | 0.16 | 0.16 | 0.09 | 0.28 | 0.28 |
| Sat Flow, veh/h | 1333 | 2593 | 116 | 1429 | 1465 | 1251 | 96 | 1381 | 1241 | 1417 | 1500 | 1271 |
| Grp Volume(v), veh/h | 167 | 298 | 309 | 321 | 695 | 111 | 55 | 0 | 199 | 258 | 242 | 396 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 1330 | 1379 | 1429 | 1465 | 1251 | 1477 | 0 | 1241 | 1417 | 1500 | 1271 |
| Q Serve(g_s), s | 8.8 | 20.5 | 20.6 | 15.5 | 50.5 | 3.2 | 0.0 | 0.0 | 18.1 | 12.0 | 18.7 | 38.0 |
| Cycle Q Clear(g_c), s | 8.8 | 20.5 | 20.6 | 15.5 | 50.5 | 3.2 | 4.3 | 0.0 | 18.1 | 12.0 | 18.7 | 38.0 |
| Prop In Lane | 1.00 | | 0.08 | 1.00 | | 1.00 | 0.13 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 306 | 628 | 651 | 643 | 781 | 779 | 271 | 0 | 370 | 404 | 422 | 452 |
| V/C Ratio(X) | 0.55 | 0.47 | 0.47 | 0.50 | 0.89 | 0.14 | 0.20 | 0.00 | 0.54 | 0.64 | 0.57 | 0.88 |
| Avail Cap(c_a), veh/h | 306 | 628 | 651 | 746 | 781 | 779 | 271 | 0 | 370 | 404 | 422 | 452 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 0.82 | 0.82 | 0.82 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 23.9 | 24.2 | 24.2 | 14.3 | 16.5 | 6.4 | 49.1 | 0.0 | 39.6 | 46.7 | 41.6 | 40.7 |
| Incr Delay (d2), s/veh | 2.0 | 2.6 | 2.5 | 0.5 | 12.2 | 0.3 | 0.4 | 0.0 | 1.5 | 3.4 | 1.9 | 17.3 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.8 | 6.7 | 7.0 | 4.3 | 14.8 | 0.9 | 1.7 | 0.0 | 5.8 | 3.6 | 7.0 | 14.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 25.9 | 26.8 | 26.7 | 14.8 | 28.7 | 6.7 | 49.5 | 0.0 | 41.2 | 50.0 | 43.4 | 58.0 |
| LnGrp LOS | C | C | C | B | C | A | D | A | D | D | D | E |
| Approach Vol, veh/h | | 774 | | | 1127 | | | 254 | | | 896 | |
| Approach Delay, s/veh | | 26.6 | | | 22.6 | | | 43.0 | | | 51.8 | |
| Approach LOS | | C | | | C | | | D | | | D | |
| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 22.2 | 69.8 | | 43.0 | 14.0 | 78.0 | 16.0 | 27.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 28.0 | 54.0 | | 38.0 | 10.0 | 72.0 | 12.0 | 22.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 17.5 | 22.6 | | 40.0 | 10.8 | 52.5 | 14.0 | 20.1 | | | | |
| Green Ext Time (p_c), s | 0.7 | 3.7 | | 0.0 | 0.0 | 4.9 | 0.0 | 0.2 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 33.9 |
| HCM 6th LOS | C |

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 3 2042 School
 01/11/2019



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 295 | 605 | 11 | 131 | 524 | 214 | 8 | 73 | 199 | 142 | 36 | 119 |
| Future Volume (veh/h) | 295 | 605 | 11 | 131 | 524 | 214 | 8 | 73 | 199 | 142 | 36 | 119 |
| 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 | 1339 | 1339 | 1339 | 1500 | 1465 | 1500 | 1500 | 1500 | 1500 | 1465 | 1465 | 1488 |
| Adj Flow Rate, veh/h | 335 | 688 | 12 | 149 | 595 | 243 | 9 | 83 | 226 | 161 | 41 | 135 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Percent Heavy Veh, % | 1 | 1 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | 3 | 1 |
| Cap, veh/h | 349 | 1494 | 26 | 405 | 679 | 682 | 35 | 206 | 275 | 227 | 361 | 551 |
| Arrive On Green | 0.19 | 0.58 | 0.58 | 0.09 | 0.62 | 0.62 | 0.15 | 0.15 | 0.15 | 0.07 | 0.25 | 0.25 |
| Sat Flow, veh/h | 1276 | 2559 | 45 | 1429 | 1465 | 1271 | 62 | 1404 | 1271 | 1395 | 1465 | 1261 |
| Grp Volume(v), veh/h | 335 | 342 | 358 | 149 | 595 | 243 | 92 | 0 | 226 | 161 | 41 | 135 |
| Grp Sat Flow(s),veh/h/ln | 1276 | 1272 | 1331 | 1429 | 1465 | 1271 | 1466 | 0 | 1271 | 1395 | 1465 | 1261 |
| Q Serve(g_s), s | 26.3 | 22.9 | 23.0 | 8.3 | 50.9 | 12.7 | 0.0 | 0.0 | 22.0 | 11.0 | 3.3 | 10.1 |
| Cycle Q Clear(g_c), s | 26.3 | 22.9 | 23.0 | 8.3 | 50.9 | 12.7 | 8.4 | 0.0 | 22.0 | 11.0 | 3.3 | 10.1 |
| Prop In Lane | 1.00 | | 0.03 | 1.00 | | 1.00 | 0.10 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 349 | 743 | 777 | 405 | 679 | 682 | 241 | 0 | 275 | 227 | 361 | 551 |
| V/C Ratio(X) | 0.96 | 0.46 | 0.46 | 0.37 | 0.88 | 0.36 | 0.38 | 0.00 | 0.82 | 0.71 | 0.11 | 0.25 |
| Avail Cap(c_a), veh/h | 361 | 743 | 777 | 458 | 679 | 682 | 241 | 0 | 275 | 227 | 361 | 551 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 0.86 | 0.86 | 0.86 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 38.2 | 17.8 | 17.8 | 18.0 | 25.2 | 13.6 | 58.2 | 0.0 | 56.0 | 53.2 | 43.8 | 26.6 |
| Incr Delay (d2), s/veh | 36.4 | 2.0 | 2.0 | 0.5 | 13.1 | 1.3 | 1.0 | 0.0 | 17.9 | 9.9 | 0.1 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 15.8 | 7.0 | 7.3 | 2.7 | 17.4 | 3.6 | 3.3 | 0.0 | 9.6 | 2.2 | 1.2 | 3.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 74.6 | 19.8 | 19.7 | 18.4 | 38.3 | 14.9 | 59.2 | 0.0 | 73.9 | 63.2 | 43.9 | 26.9 |
| LnGrp LOS | E | B | B | B | D | B | E | A | E | E | D | C |
| Approach Vol, veh/h | | 1035 | | | 987 | | | 318 | | | | 337 |
| Approach Delay, s/veh | | 37.5 | | | 29.6 | | | 69.7 | | | | 46.3 |
| Approach LOS | | D | | | C | | | E | | | | D |
| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 14.4 | 93.6 | | 42.0 | 32.5 | 75.5 | 15.0 | 27.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 16.0 | 82.0 | | 37.0 | 30.0 | 68.0 | 11.0 | 22.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 10.3 | 25.0 | | 12.1 | 28.3 | 52.9 | 13.0 | 24.0 | | | | |
| Green Ext Time (p_c), s | 0.2 | 4.5 | | 0.6 | 0.2 | 4.0 | 0.0 | 0.0 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 39.5 |
| HCM 6th LOS | D |

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 3 2042 PM
 01/11/2019



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|-------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 303 | 704 | 9 | 106 | 676 | 270 | 5 | 35 | 116 | 149 | 25 | 156 |
| Future Volume (veh/h) | 303 | 704 | 9 | 106 | 676 | 270 | 5 | 35 | 116 | 149 | 25 | 156 |
| 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 | 1389 | 1400 | 1400 | 1500 | 1488 | 1500 | 1500 | 1500 | 1500 | 1500 | 1453 | 1488 |
| Adj Flow Rate, veh/h | 322 | 749 | 10 | 113 | 719 | 287 | 5 | 37 | 123 | 159 | 27 | 166 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4 | 1 |
| Cap, veh/h | 341 | 1819 | 24 | 423 | 905 | 832 | 34 | 148 | 190 | 194 | 261 | 368 |
| Arrive On Green | 0.11 | 0.68 | 0.68 | 0.06 | 0.81 | 0.81 | 0.11 | 0.11 | 0.11 | 0.05 | 0.18 | 0.18 |
| Sat Flow, veh/h | 1323 | 2688 | 36 | 1429 | 1488 | 1271 | 68 | 1392 | 1271 | 1429 | 1453 | 1261 |
| Grp Volume(v), veh/h | 322 | 371 | 388 | 113 | 719 | 287 | 42 | 0 | 123 | 159 | 27 | 166 |
| Grp Sat Flow(s),veh/h/ln | 1323 | 1330 | 1394 | 1429 | 1488 | 1271 | 1461 | 0 | 1271 | 1429 | 1453 | 1261 |
| Q Serve(g_s), s | 14.0 | 18.7 | 18.7 | 4.6 | 38.8 | 8.2 | 0.0 | 0.0 | 13.7 | 7.0 | 2.3 | 16.1 |
| Cycle Q Clear(g_c), s | 14.0 | 18.7 | 18.7 | 4.6 | 38.8 | 8.2 | 3.9 | 0.0 | 13.7 | 7.0 | 2.3 | 16.1 |
| Prop In Lane | 1.00 | | 0.03 | 1.00 | | 1.00 | 0.12 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 341 | 900 | 943 | 423 | 905 | 832 | 182 | 0 | 190 | 194 | 261 | 368 |
| V/C Ratio(X) | 0.95 | 0.41 | 0.41 | 0.27 | 0.79 | 0.34 | 0.23 | 0.00 | 0.65 | 0.82 | 0.10 | 0.45 |
| Avail Cap(c_a), veh/h | 404 | 900 | 943 | 427 | 905 | 832 | 239 | 0 | 242 | 194 | 320 | 419 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 0.79 | 0.79 | 0.79 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 25.7 | 10.9 | 10.9 | 10.0 | 9.3 | 5.0 | 61.6 | 0.0 | 60.0 | 63.0 | 51.4 | 43.3 |
| Incr Delay (d2), s/veh | 28.7 | 1.4 | 1.3 | 0.3 | 5.7 | 0.9 | 0.6 | 0.0 | 3.9 | 23.5 | 0.2 | 0.9 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 10.0 | 5.5 | 5.8 | 1.4 | 8.5 | 2.1 | 1.5 | 0.0 | 4.7 | 4.5 | 0.9 | 5.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 54.4 | 12.2 | 12.2 | 10.3 | 15.0 | 5.9 | 62.3 | 0.0 | 63.9 | 86.5 | 51.6 | 44.2 |
| LnGrp LOS | D | B | B | B | B | A | E | A | E | F | D | D |
| Approach Vol, veh/h | | 1081 | | | 1119 | | | 165 | | | 352 | |
| Approach Delay, s/veh | | 24.8 | | | 12.2 | | | 63.5 | | | 63.9 | |
| Approach LOS | | C | | | B | | | E | | | E | |
| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 10.5 | 107.5 | | 31.9 | 20.7 | 97.3 | 11.0 | 20.9 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 7.0 | 95.0 | | 33.0 | 24.0 | 78.0 | 7.0 | 22.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 6.6 | 20.7 | | 18.1 | 16.0 | 40.8 | 9.0 | 15.7 | | | | |
| Green Ext Time (p_c), s | 0.0 | 5.0 | | 0.5 | 0.6 | 6.6 | 0.0 | 0.3 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 27.0 |
| HCM 6th LOS | C |

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 4 2042 AM
 01/16/2019



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 142 | 494 | 22 | 273 | 591 | 94 | 6 | 41 | 169 | 219 | 206 | 337 |
| Future Volume (veh/h) | 142 | 494 | 22 | 273 | 591 | 94 | 6 | 41 | 169 | 219 | 206 | 337 |
| 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 | 1400 | 1400 | 1400 | 1500 | 1465 | 1465 | 1500 | 1500 | 1465 | 1488 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 167 | 581 | 26 | 321 | 695 | 111 | 7 | 48 | 199 | 258 | 242 | 396 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 3 | 1 | 0 | 0 |
| Cap, veh/h | 485 | 1134 | 51 | 595 | 1187 | 189 | 50 | 264 | 239 | 456 | 466 | 502 |
| Arrive On Green | 0.08 | 0.44 | 0.44 | 0.19 | 0.66 | 0.66 | 0.19 | 0.19 | 0.19 | 0.09 | 0.31 | 0.31 |
| Sat Flow, veh/h | 1333 | 2593 | 116 | 1429 | 2404 | 384 | 104 | 1370 | 1241 | 1417 | 1500 | 1271 |
| Grp Volume(v), veh/h | 167 | 298 | 309 | 321 | 402 | 404 | 55 | 0 | 199 | 258 | 242 | 396 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 1330 | 1379 | 1429 | 1392 | 1396 | 1474 | 0 | 1241 | 1417 | 1500 | 1271 |
| Q Serve(g_s), s | 9.3 | 21.9 | 22.0 | 16.7 | 21.8 | 21.8 | 0.0 | 0.0 | 20.8 | 12.0 | 17.9 | 36.9 |
| Cycle Q Clear(g_c), s | 9.3 | 21.9 | 22.0 | 16.7 | 21.8 | 21.8 | 4.1 | 0.0 | 20.8 | 12.0 | 17.9 | 36.9 |
| Prop In Lane | 1.00 | | 0.08 | 1.00 | | 0.27 | 0.13 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 485 | 582 | 603 | 595 | 687 | 689 | 314 | 0 | 239 | 456 | 466 | 502 |
| V/C Ratio(X) | 0.34 | 0.51 | 0.51 | 0.54 | 0.59 | 0.59 | 0.18 | 0.00 | 0.83 | 0.57 | 0.52 | 0.79 |
| Avail Cap(c_a), veh/h | 521 | 582 | 603 | 626 | 687 | 689 | 616 | 0 | 497 | 456 | 778 | 766 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 0.82 | 0.82 | 0.82 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 18.6 | 27.5 | 27.6 | 16.5 | 15.5 | 15.5 | 45.7 | 0.0 | 52.4 | 43.0 | 38.2 | 35.9 |
| Incr Delay (d2), s/veh | 0.4 | 3.2 | 3.1 | 0.7 | 3.0 | 3.0 | 0.3 | 0.0 | 7.4 | 1.6 | 0.9 | 3.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.8 | 7.3 | 7.6 | 4.7 | 6.1 | 6.1 | 1.6 | 0.0 | 7.0 | 3.1 | 6.5 | 11.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 19.0 | 30.7 | 30.7 | 17.1 | 18.5 | 18.5 | 46.0 | 0.0 | 59.8 | 44.6 | 39.1 | 39.0 |
| LnGrp LOS | B | C | C | B | B | B | D | A | E | D | D | D |
| Approach Vol, veh/h | | 774 | | | 1127 | | | 254 | | | 896 | |
| Approach Delay, s/veh | | 28.2 | | | 18.1 | | | 56.8 | | | 40.6 | |
| Approach LOS | | C | | | B | | | E | | | D | |
| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 23.0 | 65.0 | | 47.0 | 15.4 | 72.7 | 16.0 | 31.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 22.0 | 28.0 | | 70.0 | 15.0 | 35.0 | 12.0 | 54.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 18.7 | 24.0 | | 38.9 | 11.3 | 23.8 | 14.0 | 22.8 | | | | |
| Green Ext Time (p_c), s | 0.3 | 1.3 | | 3.0 | 0.1 | 3.7 | 0.0 | 1.2 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 30.5 |
| HCM 6th LOS | C |

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 4 2042 School
 01/16/2019



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 295 | 605 | 11 | 131 | 524 | 214 | 8 | 73 | 199 | 142 | 36 | 119 |
| Future Volume (veh/h) | 295 | 605 | 11 | 131 | 524 | 214 | 8 | 73 | 199 | 142 | 36 | 119 |
| 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 | 1339 | 1339 | 1339 | 1500 | 1465 | 1465 | 1500 | 1500 | 1500 | 1465 | 1465 | 1488 |
| Adj Flow Rate, veh/h | 335 | 688 | 12 | 149 | 595 | 243 | 9 | 83 | 226 | 161 | 41 | 135 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Percent Heavy Veh, % | 1 | 1 | 1 | 0 | 3 | 3 | 0 | 0 | 0 | 3 | 3 | 1 |
| Cap, veh/h | 339 | 1289 | 22 | 346 | 805 | 328 | 40 | 272 | 249 | 308 | 472 | 609 |
| Arrive On Green | 0.16 | 0.50 | 0.50 | 0.10 | 0.56 | 0.56 | 0.20 | 0.20 | 0.20 | 0.10 | 0.32 | 0.32 |
| Sat Flow, veh/h | 1276 | 2559 | 45 | 1429 | 1928 | 787 | 71 | 1390 | 1271 | 1395 | 1465 | 1261 |
| Grp Volume(v), veh/h | 335 | 342 | 358 | 149 | 429 | 409 | 92 | 0 | 226 | 161 | 41 | 135 |
| Grp Sat Flow(s),veh/h/ln | 1276 | 1272 | 1331 | 1429 | 1392 | 1323 | 1461 | 0 | 1271 | 1395 | 1465 | 1261 |
| Q Serve(g_s), s | 23.4 | 27.4 | 27.4 | 9.0 | 34.9 | 35.0 | 0.0 | 0.0 | 26.1 | 13.5 | 2.9 | 9.3 |
| Cycle Q Clear(g_c), s | 23.4 | 27.4 | 27.4 | 9.0 | 34.9 | 35.0 | 7.9 | 0.0 | 26.1 | 13.5 | 2.9 | 9.3 |
| Prop In Lane | 1.00 | | 0.03 | 1.00 | | 0.59 | 0.10 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 339 | 641 | 671 | 346 | 581 | 553 | 312 | 0 | 249 | 308 | 472 | 609 |
| V/C Ratio(X) | 0.99 | 0.53 | 0.53 | 0.43 | 0.74 | 0.74 | 0.29 | 0.00 | 0.91 | 0.52 | 0.09 | 0.22 |
| Avail Cap(c_a), veh/h | 339 | 641 | 671 | 374 | 581 | 553 | 518 | 0 | 432 | 308 | 684 | 790 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 0.86 | 0.86 | 0.86 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 29.8 | 25.3 | 25.3 | 22.0 | 27.2 | 27.2 | 51.7 | 0.0 | 59.0 | 40.9 | 35.4 | 22.5 |
| Incr Delay (d2), s/veh | 45.8 | 3.2 | 3.0 | 0.7 | 7.1 | 7.5 | 0.5 | 0.0 | 13.5 | 1.6 | 0.1 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 11.1 | 8.7 | 9.1 | 2.9 | 11.4 | 10.9 | 3.1 | 0.0 | 9.4 | 4.7 | 1.1 | 2.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 75.7 | 28.4 | 28.3 | 22.7 | 34.3 | 34.7 | 52.2 | 0.0 | 72.5 | 42.5 | 35.5 | 22.7 |
| LnGrp LOS | E | C | C | C | C | C | D | A | E | D | D | C |
| Approach Vol, veh/h | | 1035 | | | 987 | | | 318 | | | | 337 |
| Approach Delay, s/veh | | 43.7 | | | 32.7 | | | 66.6 | | | | 33.7 |
| Approach LOS | | D | | | C | | | E | | | | C |
| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 15.1 | 81.6 | | 53.4 | 28.0 | 68.6 | 19.0 | 34.4 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 14.0 | 51.0 | | 70.0 | 24.0 | 41.0 | 15.0 | 51.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 11.0 | 29.4 | | 11.3 | 25.4 | 37.0 | 15.5 | 28.1 | | | | |
| Green Ext Time (p_c), s | 0.1 | 4.0 | | 0.6 | 0.0 | 1.9 | 0.0 | 1.3 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 41.1 |
| HCM 6th LOS | D |

HCM 6th Signalized Intersection Summary
 2: Valley Dr/Green Meadow Dr & Custer Ave/Custer Ave

Alternatives 4 2042 PM
 01/16/2019



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|-------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 303 | 704 | 9 | 106 | 676 | 270 | 5 | 35 | 116 | 149 | 25 | 156 |
| Future Volume (veh/h) | 303 | 704 | 9 | 106 | 676 | 270 | 5 | 35 | 116 | 149 | 25 | 156 |
| 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 | 1389 | 1400 | 1400 | 1500 | 1488 | 1488 | 1500 | 1500 | 1500 | 1500 | 1453 | 1488 |
| Adj Flow Rate, veh/h | 322 | 749 | 10 | 113 | 719 | 287 | 5 | 37 | 123 | 159 | 27 | 166 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 4 | 1 |
| Cap, veh/h | 361 | 1703 | 23 | 394 | 1120 | 447 | 35 | 157 | 143 | 248 | 319 | 419 |
| Arrive On Green | 0.11 | 0.63 | 0.63 | 0.06 | 0.76 | 0.76 | 0.11 | 0.11 | 0.11 | 0.08 | 0.22 | 0.22 |
| Sat Flow, veh/h | 1323 | 2688 | 36 | 1429 | 1973 | 787 | 71 | 1388 | 1271 | 1429 | 1453 | 1261 |
| Grp Volume(v), veh/h | 322 | 371 | 388 | 113 | 515 | 491 | 42 | 0 | 123 | 159 | 27 | 166 |
| Grp Sat Flow(s),veh/h/ln | 1323 | 1330 | 1394 | 1429 | 1414 | 1347 | 1459 | 0 | 1271 | 1429 | 1453 | 1261 |
| Q Serve(g_s), s | 14.8 | 21.2 | 21.2 | 5.0 | 26.0 | 26.0 | 0.0 | 0.0 | 14.3 | 12.0 | 2.2 | 15.2 |
| Cycle Q Clear(g_c), s | 14.8 | 21.2 | 21.2 | 5.0 | 26.0 | 26.0 | 3.8 | 0.0 | 14.3 | 12.0 | 2.2 | 15.2 |
| Prop In Lane | 1.00 | | 0.03 | 1.00 | | 0.58 | 0.12 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 361 | 843 | 883 | 394 | 803 | 765 | 192 | 0 | 143 | 248 | 319 | 419 |
| V/C Ratio(X) | 0.89 | 0.44 | 0.44 | 0.29 | 0.64 | 0.64 | 0.22 | 0.00 | 0.86 | 0.64 | 0.08 | 0.40 |
| Avail Cap(c_a), veh/h | 371 | 843 | 883 | 413 | 803 | 765 | 567 | 0 | 483 | 248 | 707 | 756 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 0.79 | 0.79 | 0.79 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 19.5 | 13.9 | 13.9 | 12.4 | 11.1 | 11.1 | 60.7 | 0.0 | 65.4 | 54.5 | 46.6 | 38.5 |
| Incr Delay (d2), s/veh | 22.3 | 1.7 | 1.6 | 0.3 | 3.1 | 3.3 | 0.6 | 0.0 | 13.5 | 5.5 | 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 | 8.6 | 6.5 | 6.8 | 1.6 | 6.5 | 6.2 | 1.5 | 0.0 | 5.2 | 1.2 | 0.8 | 4.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 41.8 | 15.6 | 15.5 | 12.8 | 14.2 | 14.4 | 61.3 | 0.0 | 78.8 | 60.0 | 46.7 | 39.1 |
| LnGrp LOS | D | B | B | B | B | B | E | A | E | E | D | D |
| Approach Vol, veh/h | | 1081 | | | 1119 | | | 165 | | | 352 | |
| Approach Delay, s/veh | | 23.4 | | | 14.2 | | | 74.4 | | | 49.1 | |
| Approach LOS | | C | | | B | | | E | | | D | |
| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 11.0 | 101.1 | | 37.9 | 20.9 | 91.2 | 16.0 | 21.9 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 9.0 | 53.0 | | 73.0 | 18.0 | 44.0 | 12.0 | 57.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 7.0 | 23.2 | | 17.2 | 16.8 | 28.0 | 14.0 | 16.3 | | | | |
| Green Ext Time (p_c), s | 0.0 | 4.7 | | 0.7 | 0.1 | 5.7 | 0.0 | 0.7 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 26.0 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

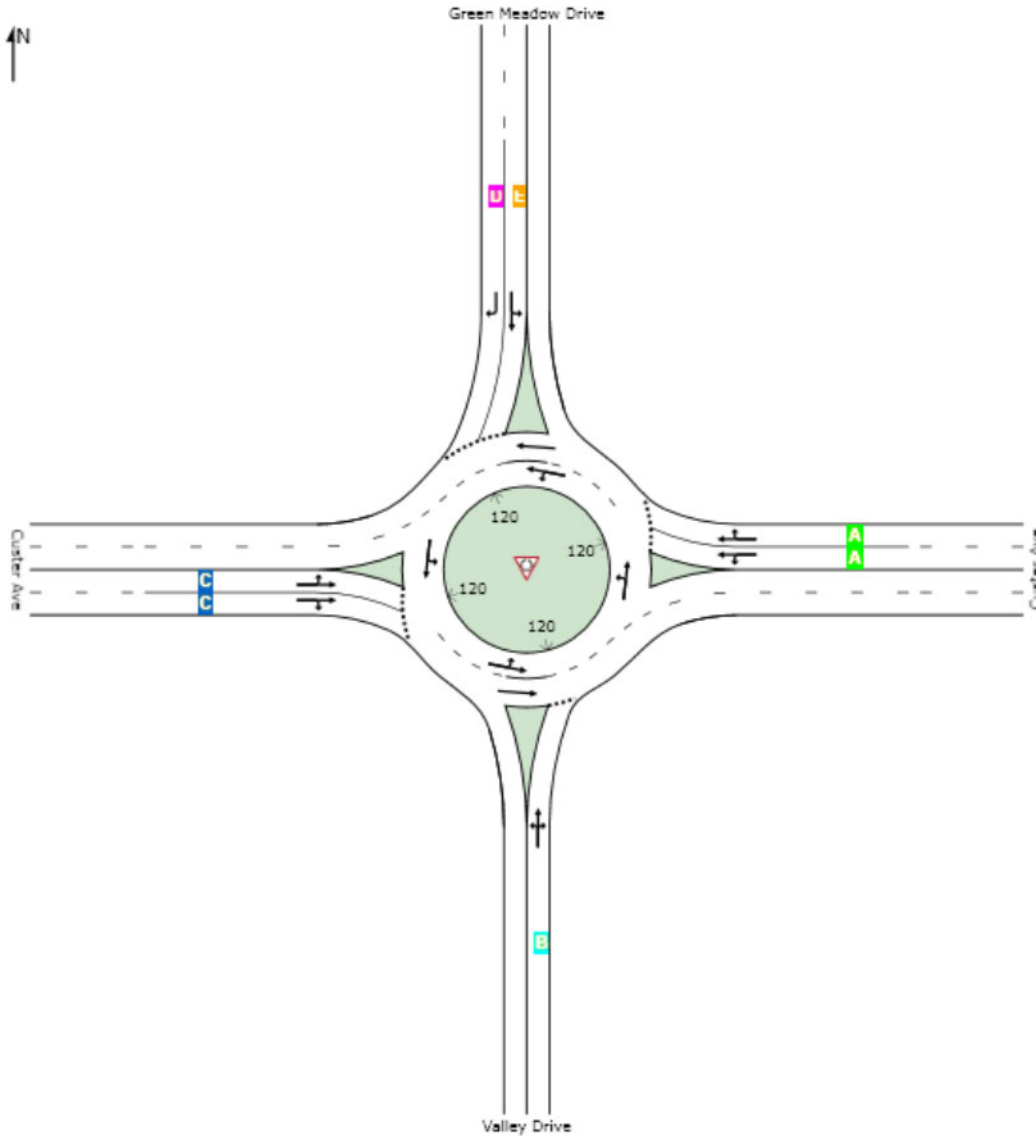
LEVEL OF SERVICE

 Site: Green Meadow 2042 AM Alternative 5

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | B | A | D | C | C |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Green Meadow 2042 AM Alternative 5

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Valley Drive | | | | | | | | | | | |
| 3 | L2 | 7 | 0.0 | 0.429 | 12.8 | LOS B | 1.9 | 47.7 | 0.71 | 0.76 | 32.0 |
| 8 | T1 | 48 | 0.0 | 0.429 | 12.8 | LOS B | 1.9 | 47.7 | 0.71 | 0.76 | 31.7 |
| 18 | R2 | 198 | 3.2 | 0.429 | 12.8 | LOS B | 1.9 | 47.7 | 0.71 | 0.76 | 30.7 |
| Approach | | 253 | 2.5 | 0.429 | 12.8 | LOS B | 1.9 | 47.7 | 0.71 | 0.76 | 31.0 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 320 | 0.5 | 0.518 | 9.4 | LOS A | 3.4 | 87.1 | 0.56 | 0.42 | 32.2 |
| 6 | T1 | 692 | 3.1 | 0.518 | 9.5 | LOS A | 3.4 | 87.1 | 0.56 | 0.42 | 32.9 |
| 16 | R2 | 110 | 1.5 | 0.518 | 9.5 | LOS A | 3.4 | 86.3 | 0.56 | 0.42 | 32.3 |
| Approach | | 1122 | 2.2 | 0.518 | 9.4 | LOS A | 3.4 | 87.1 | 0.56 | 0.42 | 32.6 |
| North: Green Meadow Drive | | | | | | | | | | | |
| 7 | L2 | 256 | 0.6 | 0.852 | 36.1 | LOS E | 7.6 | 189.9 | 0.90 | 1.22 | 23.6 |
| 4 | T1 | 241 | 0.0 | 0.852 | 36.1 | LOS E | 7.6 | 189.9 | 0.90 | 1.22 | 23.5 |
| 14 | R2 | 395 | 0.0 | 0.762 | 29.7 | LOS D | 5.3 | 133.2 | 0.87 | 1.08 | 24.9 |
| Approach | | 892 | 0.2 | 0.852 | 33.3 | LOS D | 7.6 | 189.9 | 0.89 | 1.16 | 24.1 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 166 | 0.0 | 0.637 | 19.0 | LOS C | 4.3 | 106.6 | 0.83 | 0.96 | 28.7 |
| 2 | T1 | 578 | 0.4 | 0.637 | 19.0 | LOS C | 4.3 | 106.6 | 0.83 | 0.96 | 29.0 |
| 12 | R2 | 26 | 6.7 | 0.637 | 19.1 | LOS C | 4.2 | 106.2 | 0.83 | 0.96 | 28.4 |
| Approach | | 770 | 0.5 | 0.637 | 19.0 | LOS C | 4.3 | 106.6 | 0.83 | 0.96 | 28.9 |
| All Vehicles | | 3037 | 1.2 | 0.852 | 19.1 | LOS C | 7.6 | 189.9 | 0.74 | 0.80 | 28.6 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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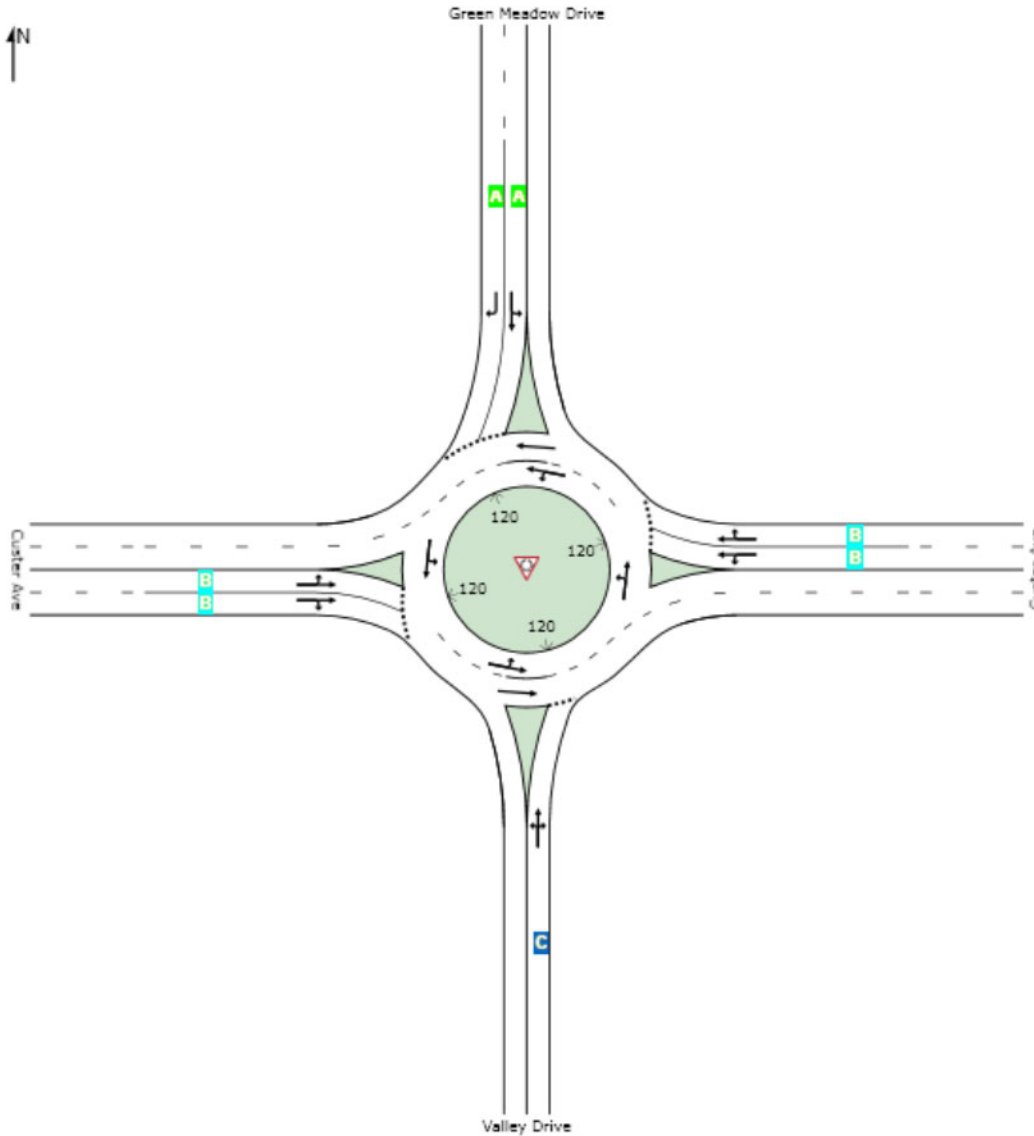
LEVEL OF SERVICE

 Site: Green Meadow 2042 School Alternative 5

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | C | B | A | B | B |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c > 1$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Green Meadow 2042 School Alternative 5

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Valley Drive | | | | | | | | | | | |
| 3 | L2 | 9 | 0.0 | 0.622 | 21.0 | LOS C | 3.3 | 82.3 | 0.82 | 0.95 | 28.6 |
| 8 | T1 | 83 | 0.0 | 0.622 | 21.0 | LOS C | 3.3 | 82.3 | 0.82 | 0.95 | 28.4 |
| 18 | R2 | 227 | 0.0 | 0.622 | 21.0 | LOS C | 3.3 | 82.3 | 0.82 | 0.95 | 27.7 |
| Approach | | 319 | 0.0 | 0.622 | 21.0 | LOS C | 3.3 | 82.3 | 0.82 | 0.95 | 27.9 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 149 | 0.0 | 0.561 | 12.0 | LOS B | 3.9 | 99.7 | 0.72 | 0.74 | 31.7 |
| 6 | T1 | 597 | 2.8 | 0.561 | 12.0 | LOS B | 4.0 | 100.0 | 0.72 | 0.74 | 31.8 |
| 16 | R2 | 244 | 0.0 | 0.561 | 12.0 | LOS B | 4.0 | 100.0 | 0.72 | 0.74 | 31.2 |
| Approach | | 990 | 1.7 | 0.561 | 12.0 | LOS B | 4.0 | 100.0 | 0.72 | 0.74 | 31.6 |
| North: Green Meadow Drive | | | | | | | | | | | |
| 7 | L2 | 162 | 2.8 | 0.283 | 8.4 | LOS A | 1.1 | 27.5 | 0.62 | 0.62 | 32.0 |
| 4 | T1 | 41 | 2.9 | 0.283 | 8.4 | LOS A | 1.1 | 27.5 | 0.62 | 0.62 | 31.8 |
| 14 | R2 | 136 | 1.4 | 0.207 | 8.0 | LOS A | 0.8 | 19.6 | 0.61 | 0.61 | 32.8 |
| Approach | | 338 | 2.3 | 0.283 | 8.2 | LOS A | 1.1 | 27.5 | 0.61 | 0.61 | 32.3 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 336 | 1.0 | 0.541 | 10.8 | LOS B | 3.8 | 95.1 | 0.68 | 0.64 | 31.4 |
| 2 | T1 | 689 | 0.6 | 0.541 | 10.8 | LOS B | 3.8 | 95.3 | 0.68 | 0.64 | 32.4 |
| 12 | R2 | 13 | 0.0 | 0.541 | 10.8 | LOS B | 3.8 | 95.3 | 0.68 | 0.64 | 31.8 |
| Approach | | 1038 | 0.7 | 0.541 | 10.8 | LOS B | 3.8 | 95.3 | 0.68 | 0.64 | 32.0 |
| All Vehicles | | 2685 | 1.2 | 0.622 | 12.1 | LOS B | 4.0 | 100.0 | 0.70 | 0.71 | 31.4 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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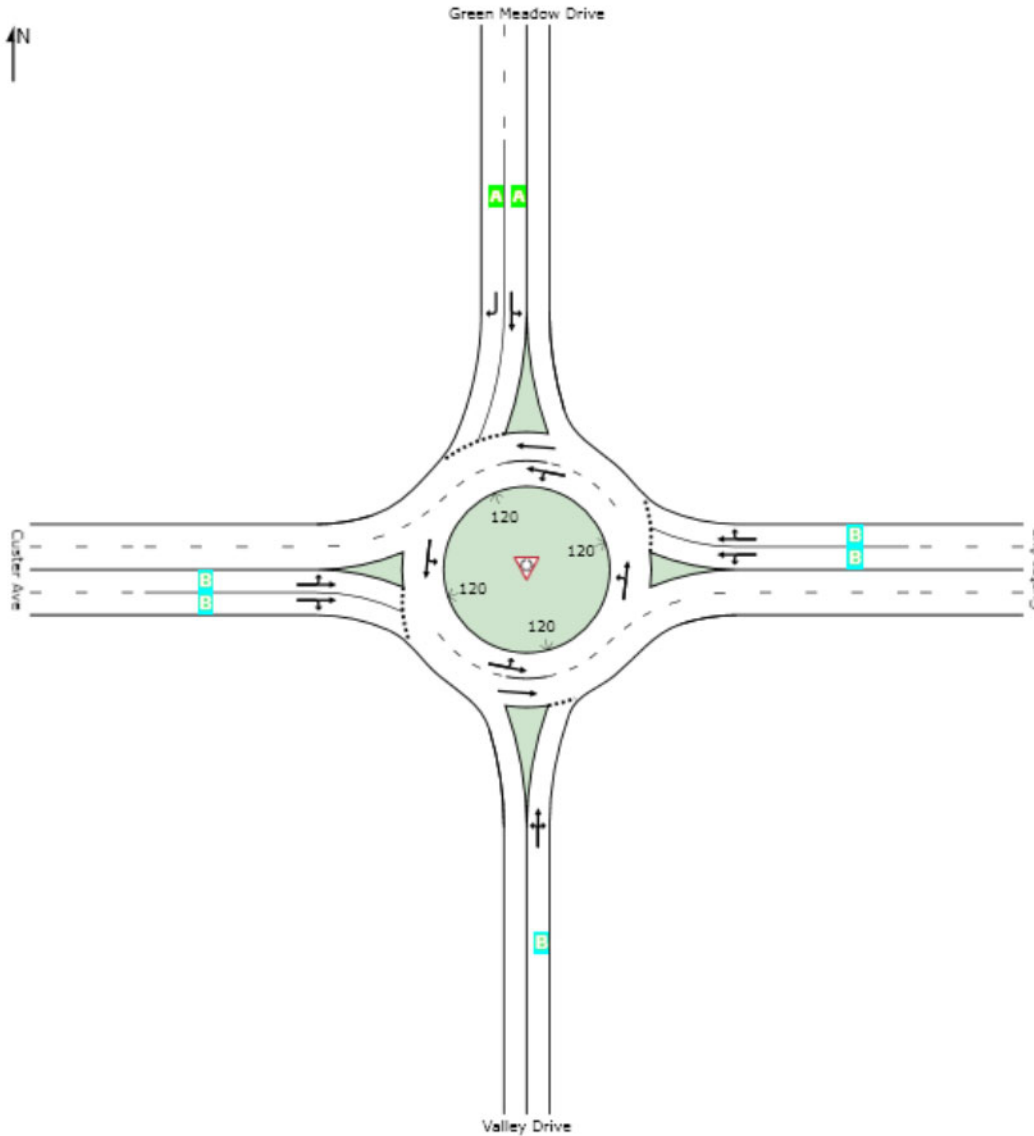
LEVEL OF SERVICE

 Site: Green Meadow 2042 PM Alternative 5

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | B | B | A | B | B |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Green Meadow 2042 PM Alternative 5

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Valley Drive | | | | | | | | | | | |
| 3 | L2 | 5 | 0.0 | 0.334 | 12.5 | LOS B | 1.3 | 32.1 | 0.74 | 0.78 | 23.4 |
| 8 | T1 | 37 | 0.0 | 0.334 | 12.5 | LOS B | 1.3 | 32.1 | 0.74 | 0.78 | 21.8 |
| 18 | R2 | 124 | 0.0 | 0.334 | 12.5 | LOS B | 1.3 | 32.1 | 0.74 | 0.78 | 22.2 |
| Approach | | 166 | 0.0 | 0.334 | 12.5 | LOS B | 1.3 | 32.1 | 0.74 | 0.78 | 22.1 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 113 | 0.0 | 0.590 | 12.1 | LOS B | 4.6 | 114.9 | 0.72 | 0.73 | 23.4 |
| 6 | T1 | 720 | 0.9 | 0.590 | 12.1 | LOS B | 4.6 | 115.2 | 0.72 | 0.73 | 21.9 |
| 16 | R2 | 288 | 0.0 | 0.590 | 12.0 | LOS B | 4.6 | 115.2 | 0.72 | 0.73 | 22.3 |
| Approach | | 1120 | 0.6 | 0.590 | 12.1 | LOS B | 4.6 | 115.2 | 0.72 | 0.73 | 22.2 |
| North: Green Meadow Drive | | | | | | | | | | | |
| 7 | L2 | 159 | 0.0 | 0.269 | 8.5 | LOS A | 1.0 | 25.8 | 0.63 | 0.63 | 23.5 |
| 4 | T1 | 27 | 4.0 | 0.269 | 8.5 | LOS A | 1.0 | 25.8 | 0.63 | 0.63 | 22.0 |
| 14 | R2 | 166 | 1.0 | 0.270 | 9.4 | LOS A | 1.0 | 26.0 | 0.65 | 0.65 | 22.8 |
| Approach | | 351 | 0.8 | 0.270 | 8.9 | LOS A | 1.0 | 26.0 | 0.64 | 0.64 | 23.1 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 323 | 1.1 | 0.531 | 10.1 | LOS B | 3.6 | 91.2 | 0.64 | 0.56 | 23.5 |
| 2 | T1 | 750 | 0.0 | 0.531 | 10.1 | LOS B | 3.7 | 91.7 | 0.64 | 0.56 | 22.3 |
| 12 | R2 | 10 | 0.0 | 0.531 | 10.1 | LOS B | 3.7 | 91.7 | 0.64 | 0.56 | 22.9 |
| Approach | | 1082 | 0.3 | 0.531 | 10.1 | LOS B | 3.7 | 91.7 | 0.64 | 0.56 | 22.7 |
| All Vehicles | | 2720 | 0.5 | 0.590 | 10.9 | LOS B | 4.6 | 115.2 | 0.68 | 0.65 | 22.5 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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HCM 6th Signalized Intersection Summary
3: Benton Ave & Custer Ave

Alternatives 1 2042 - AM
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|-------|------|-------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 7 | 712 | 168 | 262 | 852 | 66 | 66 | 38 | 260 | 171 | 87 | 50 |
| Future Volume (veh/h) | 7 | 712 | 168 | 262 | 852 | 66 | 66 | 38 | 260 | 171 | 87 | 50 |
| 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 | 1400 | 1389 | 1389 | 1477 | 1477 | 1477 | 1453 | 1371 | 1477 | 1465 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 8 | 818 | 193 | 301 | 979 | 76 | 76 | 44 | 299 | 197 | 100 | 57 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Percent Heavy Veh, % | 0 | 1 | 1 | 2 | 2 | 2 | 4 | 11 | 2 | 3 | 0 | 0 |
| Cap, veh/h | 78 | 710 | 645 | 251 | 1006 | 853 | 210 | 223 | 380 | 314 | 146 | 83 |
| Arrive On Green | 0.51 | 0.51 | 0.51 | 0.09 | 0.45 | 0.45 | 0.04 | 0.16 | 0.16 | 0.04 | 0.16 | 0.16 |
| Sat Flow, veh/h | 761 | 1389 | 1177 | 1406 | 1477 | 1251 | 1384 | 1371 | 1251 | 1395 | 897 | 511 |
| Grp Volume(v), veh/h | 8 | 818 | 193 | 301 | 979 | 76 | 76 | 44 | 299 | 197 | 0 | 157 |
| Grp Sat Flow(s),veh/h/ln | 761 | 1389 | 1177 | 1406 | 1477 | 1251 | 1384 | 1371 | 1251 | 1395 | 0 | 1408 |
| Q Serve(g_s), s | 1.4 | 69.0 | 12.0 | 19.0 | 87.6 | 4.7 | 5.0 | 3.7 | 22.0 | 5.0 | 0.0 | 14.2 |
| Cycle Q Clear(g_c), s | 66.0 | 69.0 | 12.0 | 19.0 | 87.6 | 4.7 | 5.0 | 3.7 | 22.0 | 5.0 | 0.0 | 14.2 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.36 |
| Lane Grp Cap(c), veh/h | 78 | 710 | 645 | 251 | 1006 | 853 | 210 | 223 | 380 | 314 | 0 | 229 |
| V/C Ratio(X) | 0.10 | 1.15 | 0.30 | 1.20 | 0.97 | 0.09 | 0.36 | 0.20 | 0.79 | 0.63 | 0.00 | 0.68 |
| Avail Cap(c_a), veh/h | 78 | 710 | 645 | 251 | 1006 | 853 | 210 | 223 | 380 | 314 | 0 | 229 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.09 | 0.09 | 0.09 | 0.78 | 0.78 | 0.78 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 63.8 | 33.0 | 16.5 | 49.7 | 35.9 | 13.1 | 48.9 | 48.9 | 43.0 | 52.4 | 0.0 | 53.2 |
| Incr Delay (d2), s/veh | 0.2 | 70.2 | 0.1 | 115.2 | 19.4 | 0.2 | 1.1 | 0.4 | 10.5 | 3.9 | 0.0 | 8.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.3 | 35.9 | 3.2 | 16.6 | 37.7 | 1.3 | 0.6 | 1.3 | 10.1 | 4.8 | 0.0 | 5.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 64.0 | 103.2 | 16.6 | 164.9 | 55.3 | 13.3 | 49.9 | 49.3 | 53.5 | 56.4 | 0.0 | 61.3 |
| LnGrp LOS | E | F | B | F | E | B | D | D | D | E | A | E |
| Approach Vol, veh/h | | 1019 | | | 1356 | | | 419 | | | 354 | |
| Approach Delay, s/veh | | 86.5 | | | 77.3 | | | 52.4 | | | 58.6 | |
| Approach LOS | | F | | | E | | | D | | | E | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 23.0 | 75.0 | 10.0 | 27.0 | | 98.0 | 10.0 | 27.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 5.0 | 5.0 | | 6.0 | 5.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 19.0 | 69.0 | 5.0 | 22.0 | | 92.0 | 5.0 | 22.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 21.0 | 71.0 | 7.0 | 16.2 | | 89.6 | 7.0 | 24.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.0 | 0.4 | | 1.6 | 0.0 | 0.0 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 74.8 |
| HCM 6th LOS | E |

Notes

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

HCM 6th Signalized Intersection Summary
3: Benton Ave & Custer Ave

Alternatives 1 2042 School
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|-------|------|-------|------|-------|------|-------|-------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 24 | 833 | 108 | 360 | 718 | 88 | 122 | 68 | 426 | 68 | 39 | 19 |
| Future Volume (veh/h) | 24 | 833 | 108 | 360 | 718 | 88 | 122 | 68 | 426 | 68 | 39 | 19 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1350 | 1339 | 1350 | 1500 | 1477 | 1500 | 1500 | 1477 | 1488 | 1500 | 1465 | 1465 |
| Adj Flow Rate, veh/h | 28 | 957 | 124 | 414 | 825 | 101 | 140 | 78 | 490 | 78 | 45 | 22 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Percent Heavy Veh, % | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 2 | 1 | 0 | 3 | 3 |
| Cap, veh/h | 164 | 653 | 615 | 358 | 1080 | 930 | 195 | 203 | 449 | 150 | 110 | 54 |
| Arrive On Green | 0.49 | 0.49 | 0.49 | 0.14 | 0.48 | 0.48 | 0.05 | 0.14 | 0.14 | 0.03 | 0.12 | 0.12 |
| Sat Flow, veh/h | 436 | 1339 | 1144 | 1429 | 1477 | 1271 | 1429 | 1477 | 1261 | 1429 | 929 | 454 |
| Grp Volume(v), veh/h | 28 | 957 | 124 | 414 | 825 | 101 | 140 | 78 | 490 | 78 | 0 | 67 |
| Grp Sat Flow(s),veh/h/ln | 436 | 1339 | 1144 | 1429 | 1477 | 1271 | 1429 | 1477 | 1261 | 1429 | 0 | 1383 |
| Q Serve(g_s), s | 8.0 | 78.0 | 9.0 | 35.0 | 73.3 | 6.9 | 8.0 | 7.7 | 22.0 | 5.0 | 0.0 | 7.2 |
| Cycle Q Clear(g_c), s | 42.2 | 78.0 | 9.0 | 35.0 | 73.3 | 6.9 | 8.0 | 7.7 | 22.0 | 5.0 | 0.0 | 7.2 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.33 |
| Lane Grp Cap(c), veh/h | 164 | 653 | 615 | 358 | 1080 | 930 | 195 | 203 | 449 | 150 | 0 | 164 |
| V/C Ratio(X) | 0.17 | 1.47 | 0.20 | 1.16 | 0.76 | 0.11 | 0.72 | 0.38 | 1.09 | 0.52 | 0.00 | 0.41 |
| Avail Cap(c_a), veh/h | 164 | 653 | 615 | 358 | 1080 | 930 | 195 | 203 | 449 | 150 | 0 | 164 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.27 | 0.27 | 0.27 | 0.80 | 0.80 | 0.80 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 45.1 | 41.0 | 19.2 | 60.6 | 30.1 | 12.9 | 65.0 | 62.8 | 51.5 | 63.4 | 0.0 | 65.3 |
| Incr Delay (d2), s/veh | 0.6 | 211.8 | 0.2 | 93.6 | 4.2 | 0.2 | 11.8 | 1.2 | 69.2 | 3.2 | 0.0 | 1.6 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.9 | 63.5 | 2.5 | 23.9 | 28.6 | 2.1 | 3.1 | 3.0 | 26.4 | 1.2 | 0.0 | 2.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 45.8 | 252.8 | 19.4 | 154.1 | 34.2 | 13.1 | 76.8 | 64.0 | 120.7 | 66.6 | 0.0 | 66.9 |
| LnGrp LOS | D | F | B | F | C | B | E | E | F | E | A | E |
| Approach Vol, veh/h | | 1109 | | | 1340 | | | 708 | | | 145 | |
| Approach Delay, s/veh | | 221.5 | | | 69.7 | | | 105.7 | | | 66.7 | |
| Approach LOS | | F | | | E | | | F | | | E | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 39.0 | 84.0 | 13.0 | 24.0 | | 123.0 | 10.0 | 27.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 5.0 | 5.0 | | 6.0 | 5.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 35.0 | 78.0 | 8.0 | 19.0 | | 117.0 | 5.0 | 22.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 37.0 | 80.0 | 10.0 | 9.2 | | 75.3 | 7.0 | 24.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.0 | 0.2 | | 7.7 | 0.0 | 0.0 | | | | |

Intersection Summary

| | |
|--------------------|-------|
| HCM 6th Ctrl Delay | 128.3 |
| HCM 6th LOS | F |

HCM 6th Signalized Intersection Summary
3: Benton Ave & Custer Ave

Alternatives 1 2042 PM
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|-------|------|------|------|-------|------|-------|-------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 11 | 888 | 88 | 318 | 874 | 153 | 182 | 98 | 594 | 84 | 47 | 12 |
| Future Volume (veh/h) | 11 | 888 | 88 | 318 | 874 | 153 | 182 | 98 | 594 | 84 | 47 | 12 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1400 | 1400 | 1400 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 11 | 915 | 91 | 328 | 901 | 158 | 188 | 101 | 612 | 87 | 48 | 12 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 122 | 669 | 630 | 347 | 1070 | 907 | 220 | 220 | 452 | 146 | 147 | 37 |
| Arrive On Green | 0.48 | 0.48 | 0.48 | 0.14 | 0.47 | 0.47 | 0.05 | 0.15 | 0.15 | 0.03 | 0.13 | 0.13 |
| Sat Flow, veh/h | 399 | 1400 | 1186 | 1429 | 1500 | 1271 | 1429 | 1500 | 1271 | 1429 | 1158 | 290 |
| Grp Volume(v), veh/h | 11 | 915 | 91 | 328 | 901 | 158 | 188 | 101 | 612 | 87 | 0 | 60 |
| Grp Sat Flow(s),veh/h/ln | 399 | 1400 | 1186 | 1429 | 1500 | 1271 | 1429 | 1500 | 1271 | 1429 | 0 | 1448 |
| Q Serve(g_s), s | 3.5 | 71.6 | 5.8 | 29.1 | 79.0 | 10.7 | 8.0 | 9.2 | 22.0 | 5.0 | 0.0 | 5.7 |
| Cycle Q Clear(g_c), s | 47.1 | 71.6 | 5.8 | 29.1 | 79.0 | 10.7 | 8.0 | 9.2 | 22.0 | 5.0 | 0.0 | 5.7 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.20 |
| Lane Grp Cap(c), veh/h | 122 | 669 | 630 | 347 | 1070 | 907 | 220 | 220 | 452 | 146 | 0 | 183 |
| V/C Ratio(X) | 0.09 | 1.37 | 0.14 | 0.95 | 0.84 | 0.17 | 0.85 | 0.46 | 1.35 | 0.60 | 0.00 | 0.33 |
| Avail Cap(c_a), veh/h | 122 | 669 | 630 | 372 | 1070 | 907 | 220 | 220 | 452 | 146 | 0 | 183 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.41 | 0.41 | 0.41 | 0.74 | 0.74 | 0.74 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 51.0 | 39.2 | 17.9 | 54.9 | 32.3 | 14.2 | 62.3 | 58.6 | 48.3 | 59.7 | 0.0 | 59.7 |
| Incr Delay (d2), s/veh | 0.6 | 169.8 | 0.2 | 26.4 | 6.1 | 0.3 | 26.5 | 1.5 | 173.1 | 6.5 | 0.0 | 1.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.4 | 55.4 | 1.7 | 15.3 | 31.7 | 3.4 | 5.7 | 3.6 | 38.4 | 1.6 | 0.0 | 2.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 51.6 | 209.0 | 18.1 | 81.3 | 38.4 | 14.5 | 88.8 | 60.0 | 221.4 | 66.2 | 0.0 | 60.7 |
| LnGrp LOS | D | F | B | F | D | B | F | E | F | E | A | E |
| Approach Vol, veh/h | | 1017 | | | 1387 | | | 901 | | | | 147 |
| Approach Delay, s/veh | | 190.2 | | | 45.8 | | | 175.6 | | | | 64.0 |
| Approach LOS | | F | | | D | | | F | | | | E |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 35.4 | 77.6 | 13.0 | 24.0 | | 113.0 | 10.0 | 27.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 5.0 | 5.0 | | 6.0 | 5.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 34.0 | 69.0 | 8.0 | 19.0 | | 107.0 | 5.0 | 22.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 31.1 | 73.6 | 10.0 | 7.7 | | 81.0 | 7.0 | 24.0 | | | | |
| Green Ext Time (p_c), s | 0.3 | 0.0 | 0.0 | 0.2 | | 8.2 | 0.0 | 0.0 | | | | |

Intersection Summary

| | |
|--------------------|-------|
| HCM 6th Ctrl Delay | 123.0 |
| HCM 6th LOS | F |

HCM 6th Signalized Intersection Summary
3: Benton Ave & Custer Ave

Alternatives 2 2042 AM
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | ↖ | ↗ | | ↖ | ↗ | | ↖ | ↗ | ↗ | ↖ | ↗ | ↗ |
| Traffic Volume (veh/h) | 7 | 712 | 168 | 262 | 852 | 66 | 66 | 38 | 260 | 171 | 87 | 50 |
| Future Volume (veh/h) | 7 | 712 | 168 | 262 | 852 | 66 | 66 | 38 | 260 | 171 | 87 | 50 |
| 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 | 1400 | 1389 | 1389 | 1477 | 1477 | 1477 | 1453 | 1371 | 1477 | 1465 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 8 | 818 | 193 | 301 | 979 | 76 | 76 | 44 | 299 | 197 | 100 | 57 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Percent Heavy Veh, % | 0 | 1 | 1 | 2 | 2 | 2 | 4 | 11 | 2 | 3 | 0 | 0 |
| Cap, veh/h | 370 | 1165 | 275 | 425 | 1807 | 140 | 164 | 223 | 336 | 260 | 115 | 65 |
| Arrive On Green | 0.55 | 0.55 | 0.55 | 0.07 | 0.45 | 0.45 | 0.07 | 0.16 | 0.16 | 0.04 | 0.13 | 0.13 |
| Sat Flow, veh/h | 761 | 2119 | 500 | 1406 | 2638 | 205 | 1384 | 1371 | 1251 | 1395 | 897 | 511 |
| Grp Volume(v), veh/h | 8 | 509 | 502 | 301 | 521 | 534 | 76 | 44 | 299 | 197 | 0 | 157 |
| Grp Sat Flow(s),veh/h/ln | 761 | 1320 | 1299 | 1406 | 1403 | 1440 | 1384 | 1371 | 1251 | 1395 | 0 | 1408 |
| Q Serve(g_s), s | 0.8 | 38.2 | 38.2 | 11.5 | 36.3 | 36.4 | 0.6 | 3.7 | 22.0 | 0.0 | 0.0 | 14.8 |
| Cycle Q Clear(g_c), s | 18.9 | 38.2 | 38.2 | 11.5 | 36.3 | 36.4 | 0.6 | 3.7 | 22.0 | 0.0 | 0.0 | 14.8 |
| Prop In Lane | 1.00 | | 0.38 | 1.00 | | 0.14 | 1.00 | | 1.00 | 1.00 | | 0.36 |
| Lane Grp Cap(c), veh/h | 370 | 726 | 714 | 425 | 961 | 987 | 164 | 223 | 336 | 260 | 0 | 180 |
| V/C Ratio(X) | 0.02 | 0.70 | 0.70 | 0.71 | 0.54 | 0.54 | 0.46 | 0.20 | 0.89 | 0.76 | 0.00 | 0.87 |
| Avail Cap(c_a), veh/h | 370 | 726 | 714 | 547 | 961 | 987 | 164 | 223 | 336 | 313 | 0 | 265 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.66 | 0.66 | 0.66 | 0.78 | 0.78 | 0.78 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 23.3 | 22.3 | 22.3 | 19.6 | 21.6 | 21.6 | 58.1 | 48.9 | 32.7 | 57.3 | 0.0 | 57.8 |
| Incr Delay (d2), s/veh | 0.1 | 3.8 | 3.8 | 2.3 | 1.7 | 1.7 | 2.0 | 0.4 | 23.9 | 8.4 | 0.0 | 18.4 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.2 | 12.2 | 12.0 | 4.3 | 13.2 | 13.5 | 2.5 | 1.3 | 9.8 | 7.2 | 0.0 | 6.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 23.3 | 26.0 | 26.1 | 21.9 | 23.3 | 23.3 | 60.2 | 49.3 | 56.6 | 65.7 | 0.0 | 76.2 |
| LnGrp LOS | C | C | C | C | C | C | E | D | E | E | A | E |
| Approach Vol, veh/h | | 1019 | | | 1356 | | | 419 | | | 354 | |
| Approach Delay, s/veh | | 26.0 | | | 23.0 | | | 56.5 | | | 70.3 | |
| Approach LOS | | C | | | C | | | E | | | E | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 18.3 | 80.2 | 14.2 | 22.3 | | 98.5 | 9.5 | 27.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.5 | 5.0 | | 6.0 | 4.5 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 26.0 | 57.4 | 6.7 | 25.4 | | 87.4 | 10.1 | 22.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 13.5 | 40.2 | 2.6 | 16.8 | | 38.4 | 2.0 | 24.0 | | | | |
| Green Ext Time (p_c), s | 0.7 | 6.3 | 0.0 | 0.5 | | 8.6 | 0.4 | 0.0 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 33.8 |
| HCM 6th LOS | C |

Notes

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

HCM 6th Signalized Intersection Summary
3: Benton Ave & Custer Ave

Alternatives 2 2042 School
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|-------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 24 | 833 | 108 | 360 | 718 | 88 | 122 | 68 | 426 | 68 | 39 | 19 |
| Future Volume (veh/h) | 24 | 833 | 108 | 360 | 718 | 88 | 122 | 68 | 426 | 68 | 39 | 19 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1350 | 1339 | 1339 | 1500 | 1477 | 1477 | 1500 | 1477 | 1488 | 1500 | 1465 | 1465 |
| Adj Flow Rate, veh/h | 28 | 957 | 124 | 414 | 825 | 101 | 140 | 78 | 490 | 78 | 45 | 22 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Percent Heavy Veh, % | 0 | 1 | 1 | 0 | 2 | 2 | 0 | 2 | 1 | 0 | 3 | 3 |
| Cap, veh/h | 240 | 997 | 129 | 413 | 1795 | 220 | 217 | 217 | 496 | 167 | 119 | 58 |
| Arrive On Green | 0.44 | 0.44 | 0.44 | 0.16 | 0.47 | 0.47 | 0.06 | 0.15 | 0.15 | 0.04 | 0.13 | 0.13 |
| Sat Flow, veh/h | 436 | 2266 | 293 | 1429 | 2516 | 308 | 1429 | 1477 | 1261 | 1429 | 929 | 454 |
| Grp Volume(v), veh/h | 28 | 537 | 544 | 414 | 460 | 466 | 140 | 78 | 490 | 78 | 0 | 67 |
| Grp Sat Flow(s),veh/h/ln | 436 | 1272 | 1287 | 1429 | 1403 | 1421 | 1429 | 1477 | 1261 | 1429 | 0 | 1383 |
| Q Serve(g_s), s | 5.8 | 61.4 | 61.5 | 37.0 | 33.2 | 33.2 | 8.3 | 7.1 | 22.0 | 5.5 | 0.0 | 6.7 |
| Cycle Q Clear(g_c), s | 5.8 | 61.4 | 61.5 | 37.0 | 33.2 | 33.2 | 8.3 | 7.1 | 22.0 | 5.5 | 0.0 | 6.7 |
| Prop In Lane | 1.00 | | 0.23 | 1.00 | | 0.22 | 1.00 | | 1.00 | 1.00 | | 0.33 |
| Lane Grp Cap(c), veh/h | 240 | 560 | 566 | 413 | 1001 | 1014 | 217 | 217 | 496 | 167 | 0 | 177 |
| V/C Ratio(X) | 0.12 | 0.96 | 0.96 | 1.00 | 0.46 | 0.46 | 0.65 | 0.36 | 0.99 | 0.47 | 0.00 | 0.38 |
| Avail Cap(c_a), veh/h | 240 | 560 | 566 | 413 | 1001 | 1014 | 217 | 217 | 496 | 167 | 0 | 177 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.78 | 0.78 | 0.78 | 0.80 | 0.80 | 0.80 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 25.1 | 40.7 | 40.7 | 53.4 | 20.2 | 20.2 | 58.1 | 57.7 | 45.1 | 56.6 | 0.0 | 59.9 |
| Incr Delay (d2), s/veh | 0.8 | 25.1 | 25.0 | 40.2 | 1.2 | 1.2 | 6.5 | 1.0 | 37.1 | 2.0 | 0.0 | 1.3 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.7 | 22.7 | 23.0 | 20.3 | 12.1 | 12.2 | 2.3 | 2.7 | 22.9 | 0.7 | 0.0 | 2.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 25.9 | 65.8 | 65.7 | 93.6 | 21.4 | 21.4 | 64.6 | 58.7 | 82.2 | 58.6 | 0.0 | 61.3 |
| LnGrp LOS | C | E | E | F | C | C | E | E | F | E | A | E |
| Approach Vol, veh/h | | 1109 | | | 1340 | | | 708 | | | 145 | |
| Approach Delay, s/veh | | 64.8 | | | 43.7 | | | 76.2 | | | 59.9 | |
| Approach LOS | | E | | | D | | | E | | | E | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 6 | 7 | 8 | | | | | |
| Phs Duration (G+Y+Rc), s | 41.0 | 72.0 | 12.8 | 24.2 | 113.0 | 10.0 | 27.0 | | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.5 | 5.0 | 6.0 | 4.5 | 5.0 | | | | | |
| Max Green Setting (Gmax), s | 37.0 | 66.0 | 8.3 | 19.2 | 107.0 | 5.5 | 22.0 | | | | | |
| Max Q Clear Time (g_c+I1), s | 39.0 | 63.5 | 10.3 | 8.7 | 35.2 | 7.5 | 24.0 | | | | | |
| Green Ext Time (p_c), s | 0.0 | 1.6 | 0.0 | 0.2 | 7.1 | 0.0 | 0.0 | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 58.4 | | | | | | | | | |
| HCM 6th LOS | | | E | | | | | | | | | |

HCM 6th Signalized Intersection Summary
3: Benton Ave & Custer Ave

Alternatives 2 2042 PM
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|-------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 11 | 888 | 88 | 318 | 874 | 153 | 182 | 98 | 594 | 84 | 47 | 12 |
| Future Volume (veh/h) | 11 | 888 | 88 | 318 | 874 | 153 | 182 | 98 | 594 | 84 | 47 | 12 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1400 | 1400 | 1400 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 11 | 915 | 91 | 328 | 901 | 158 | 188 | 101 | 612 | 87 | 48 | 12 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 179 | 951 | 95 | 350 | 1503 | 263 | 336 | 350 | 556 | 215 | 232 | 58 |
| Arrive On Green | 0.39 | 0.39 | 0.39 | 0.13 | 0.41 | 0.41 | 0.08 | 0.23 | 0.23 | 0.04 | 0.20 | 0.20 |
| Sat Flow, veh/h | 399 | 2443 | 243 | 1429 | 2424 | 425 | 1429 | 1500 | 1271 | 1429 | 1158 | 290 |
| Grp Volume(v), veh/h | 11 | 498 | 508 | 328 | 530 | 529 | 188 | 101 | 612 | 87 | 0 | 60 |
| Grp Sat Flow(s),veh/h/ln | 399 | 1330 | 1356 | 1429 | 1425 | 1424 | 1429 | 1500 | 1271 | 1429 | 0 | 1448 |
| Q Serve(g_s), s | 2.9 | 54.9 | 54.9 | 27.9 | 43.6 | 43.7 | 11.5 | 8.3 | 35.0 | 6.5 | 0.0 | 5.2 |
| Cycle Q Clear(g_c), s | 11.9 | 54.9 | 54.9 | 27.9 | 43.6 | 43.7 | 11.5 | 8.3 | 35.0 | 6.5 | 0.0 | 5.2 |
| Prop In Lane | 1.00 | | 0.18 | 1.00 | | 0.30 | 1.00 | | 1.00 | 1.00 | | 0.20 |
| Lane Grp Cap(c), veh/h | 179 | 518 | 528 | 350 | 884 | 883 | 336 | 350 | 556 | 215 | 0 | 290 |
| V/C Ratio(X) | 0.06 | 0.96 | 0.96 | 0.94 | 0.60 | 0.60 | 0.56 | 0.29 | 1.10 | 0.40 | 0.00 | 0.21 |
| Avail Cap(c_a), veh/h | 179 | 518 | 528 | 449 | 884 | 883 | 336 | 350 | 556 | 215 | 0 | 290 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.82 | 0.82 | 0.82 | 0.74 | 0.74 | 0.74 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 34.7 | 44.7 | 44.7 | 50.6 | 29.7 | 29.7 | 45.7 | 47.3 | 42.2 | 46.2 | 0.0 | 50.1 |
| Incr Delay (d2), s/veh | 0.5 | 27.7 | 27.3 | 19.3 | 2.2 | 2.2 | 2.1 | 0.5 | 68.6 | 1.2 | 0.0 | 0.4 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.3 | 21.8 | 22.2 | 14.6 | 16.4 | 16.4 | 1.9 | 3.2 | 30.7 | 2.8 | 0.0 | 1.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 35.3 | 72.4 | 72.1 | 70.0 | 32.0 | 32.0 | 47.8 | 47.7 | 110.7 | 47.4 | 0.0 | 50.4 |
| LnGrp LOS | D | E | E | E | C | C | D | D | F | D | A | D |
| Approach Vol, veh/h | | 1017 | | | 1387 | | | 901 | | | | 147 |
| Approach Delay, s/veh | | 71.8 | | | 41.0 | | | 90.5 | | | | 48.6 |
| Approach LOS | | E | | | D | | | F | | | | D |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 6 | 7 | 8 | | | | | |
| Phs Duration (G+Y+Rc), s | 34.6 | 64.4 | 16.0 | 35.0 | 99.0 | 11.0 | 40.0 | | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.5 | 5.0 | 6.0 | 4.5 | 5.0 | | | | | |
| Max Green Setting (Gmax), s | 41.0 | 48.0 | 11.5 | 30.0 | 93.0 | 6.5 | 35.0 | | | | | |
| Max Q Clear Time (g_c+I1), s | 29.9 | 56.9 | 13.5 | 7.2 | 45.7 | 8.5 | 37.0 | | | | | |
| Green Ext Time (p_c), s | 0.7 | 0.0 | 0.0 | 0.2 | 8.6 | 0.0 | 0.0 | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 63.3 | | | | | | | | |
| HCM 6th LOS | | | | E | | | | | | | | |

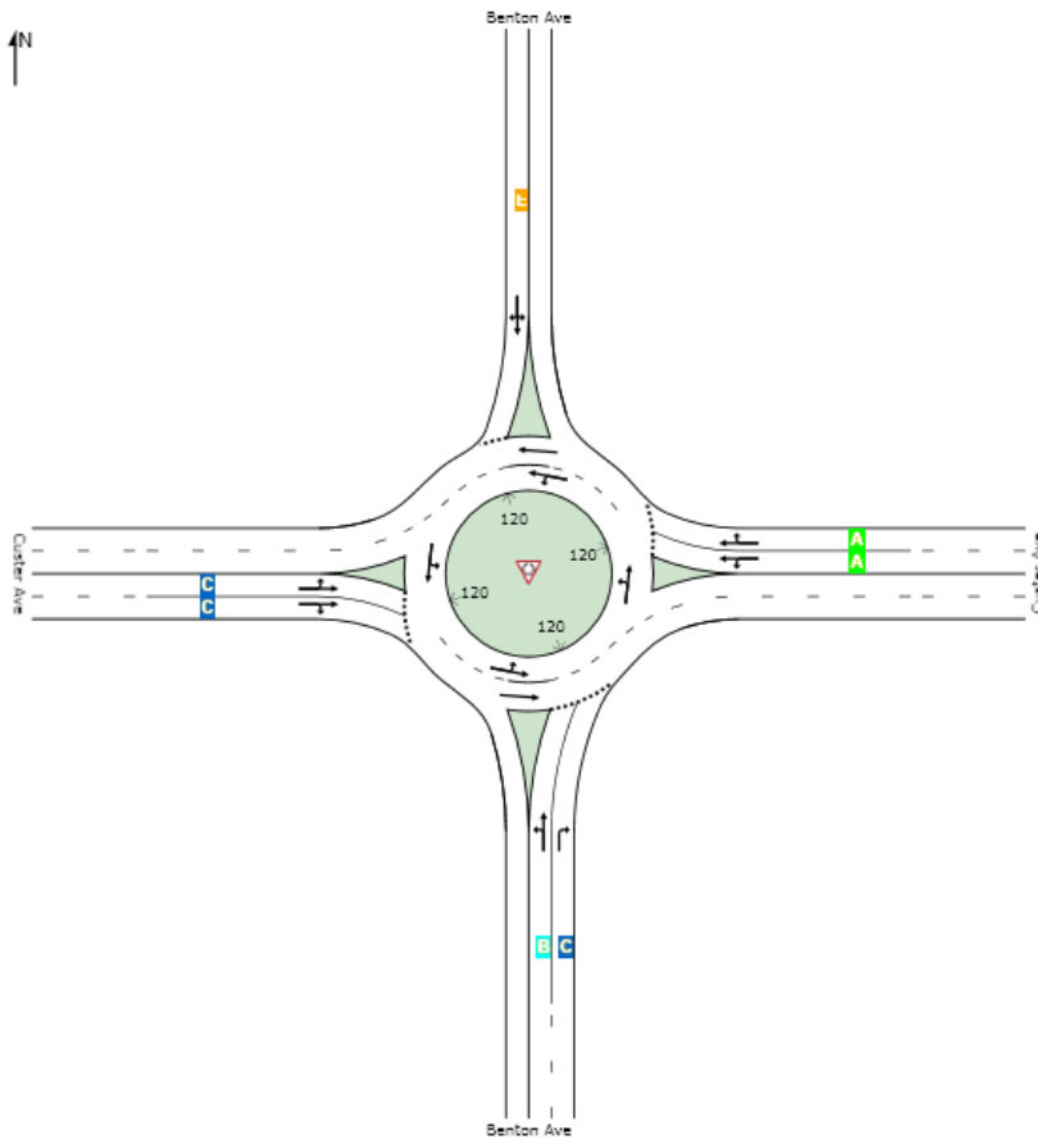
LEVEL OF SERVICE

 Site: Benton 2042 AM Alternative 3

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | B | A | E | C | C |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Benton 2042 AM Alternative 3

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Benton Ave | | | | | | | | | | | |
| 3 | L2 | 76 | 3.8 | 0.246 | 11.0 | LOS B | 0.8 | 22.0 | 0.68 | 0.68 | 31.2 |
| 8 | T1 | 44 | 10.8 | 0.246 | 11.0 | LOS B | 0.8 | 22.0 | 0.68 | 0.68 | 31.0 |
| 18 | R2 | 300 | 2.2 | 0.523 | 15.5 | LOS C | 2.5 | 64.1 | 0.74 | 0.82 | 29.5 |
| Approach | | 420 | 3.4 | 0.523 | 14.2 | LOS B | 2.5 | 64.1 | 0.73 | 0.78 | 30.0 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 302 | 1.7 | 0.575 | 9.9 | LOS A | 4.5 | 114.1 | 0.50 | 0.32 | 32.2 |
| 6 | T1 | 983 | 1.7 | 0.575 | 9.9 | LOS A | 4.5 | 114.1 | 0.50 | 0.32 | 32.8 |
| 16 | R2 | 76 | 2.3 | 0.575 | 9.9 | LOS A | 4.5 | 114.0 | 0.50 | 0.32 | 32.1 |
| Approach | | 1361 | 1.7 | 0.575 | 9.9 | LOS A | 4.5 | 114.1 | 0.50 | 0.32 | 32.6 |
| North: Benton Ave | | | | | | | | | | | |
| 7 | L2 | 197 | 2.8 | 0.825 | 41.3 | LOS E | 5.6 | 140.8 | 0.92 | 1.21 | 22.3 |
| 4 | T1 | 100 | 0.0 | 0.825 | 41.3 | LOS E | 5.6 | 140.8 | 0.92 | 1.21 | 22.2 |
| 14 | R2 | 58 | 0.0 | 0.825 | 41.3 | LOS E | 5.6 | 140.8 | 0.92 | 1.21 | 21.8 |
| Approach | | 355 | 1.6 | 0.825 | 41.3 | LOS E | 5.6 | 140.8 | 0.92 | 1.21 | 22.2 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 8 | 0.0 | 0.690 | 18.4 | LOS C | 5.7 | 143.0 | 0.85 | 0.99 | 29.8 |
| 2 | T1 | 821 | 1.0 | 0.690 | 18.4 | LOS C | 5.7 | 143.0 | 0.85 | 0.99 | 29.6 |
| 12 | R2 | 194 | 1.4 | 0.690 | 18.4 | LOS C | 5.7 | 142.8 | 0.85 | 0.99 | 28.7 |
| Approach | | 1023 | 1.1 | 0.690 | 18.4 | LOS C | 5.7 | 143.0 | 0.85 | 0.99 | 29.4 |
| All Vehicles | | 3159 | 1.7 | 0.825 | 16.8 | LOS C | 5.7 | 143.0 | 0.69 | 0.70 | 29.6 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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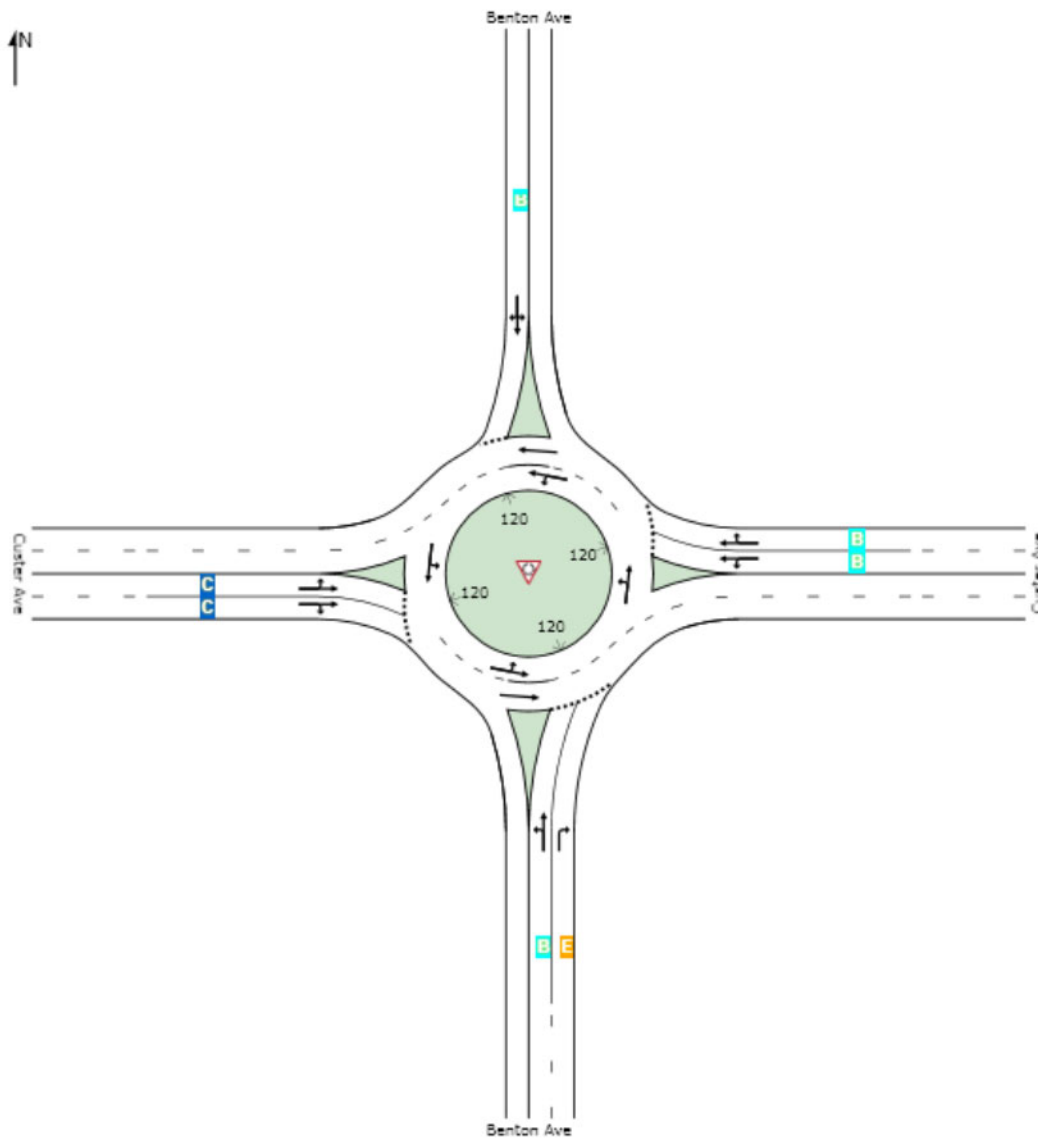
LEVEL OF SERVICE

 Site: Benton 2042 School Alternative 3

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | D | B | B | C | C |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Benton 2042 School Alternative 3

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Benton Ave | | | | | | | | | | | |
| 3 | L2 | 140 | 0.0 | 0.435 | 14.8 | LOS B | 1.9 | 48.1 | 0.75 | 0.81 | 29.8 |
| 8 | T1 | 78 | 1.5 | 0.435 | 14.8 | LOS B | 1.9 | 48.1 | 0.75 | 0.81 | 29.6 |
| 18 | R2 | 489 | 1.0 | 0.865 | 38.6 | LOS E | 7.8 | 196.2 | 0.91 | 1.25 | 22.6 |
| Approach | | 707 | 0.9 | 0.865 | 31.3 | LOS D | 7.8 | 196.2 | 0.86 | 1.11 | 24.5 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 413 | 0.4 | 0.630 | 12.1 | LOS B | 5.4 | 137.1 | 0.68 | 0.57 | 30.9 |
| 6 | T1 | 824 | 2.1 | 0.630 | 12.1 | LOS B | 5.4 | 137.1 | 0.68 | 0.57 | 31.7 |
| 16 | R2 | 101 | 0.0 | 0.630 | 12.1 | LOS B | 5.4 | 136.1 | 0.68 | 0.57 | 31.2 |
| Approach | | 1339 | 1.4 | 0.630 | 12.1 | LOS B | 5.4 | 137.1 | 0.68 | 0.57 | 31.4 |
| North: Benton Ave | | | | | | | | | | | |
| 7 | L2 | 78 | 0.0 | 0.337 | 14.3 | LOS B | 1.2 | 31.4 | 0.77 | 0.81 | 30.2 |
| 4 | T1 | 45 | 2.9 | 0.337 | 14.3 | LOS B | 1.2 | 31.4 | 0.77 | 0.81 | 30.0 |
| 14 | R2 | 22 | 0.0 | 0.337 | 14.3 | LOS B | 1.2 | 31.4 | 0.77 | 0.81 | 29.2 |
| Approach | | 145 | 0.9 | 0.337 | 14.3 | LOS B | 1.2 | 31.4 | 0.77 | 0.81 | 30.0 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 28 | 0.0 | 0.694 | 17.6 | LOS C | 6.0 | 152.4 | 0.85 | 0.98 | 30.1 |
| 2 | T1 | 956 | 1.0 | 0.694 | 17.6 | LOS C | 6.1 | 152.6 | 0.85 | 0.98 | 29.9 |
| 12 | R2 | 124 | 0.0 | 0.694 | 17.5 | LOS C | 6.1 | 152.6 | 0.85 | 0.98 | 29.0 |
| Approach | | 1108 | 0.9 | 0.694 | 17.6 | LOS C | 6.1 | 152.6 | 0.85 | 0.98 | 29.8 |
| All Vehicles | | 3299 | 1.1 | 0.865 | 18.1 | LOS C | 7.8 | 196.2 | 0.78 | 0.83 | 29.1 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

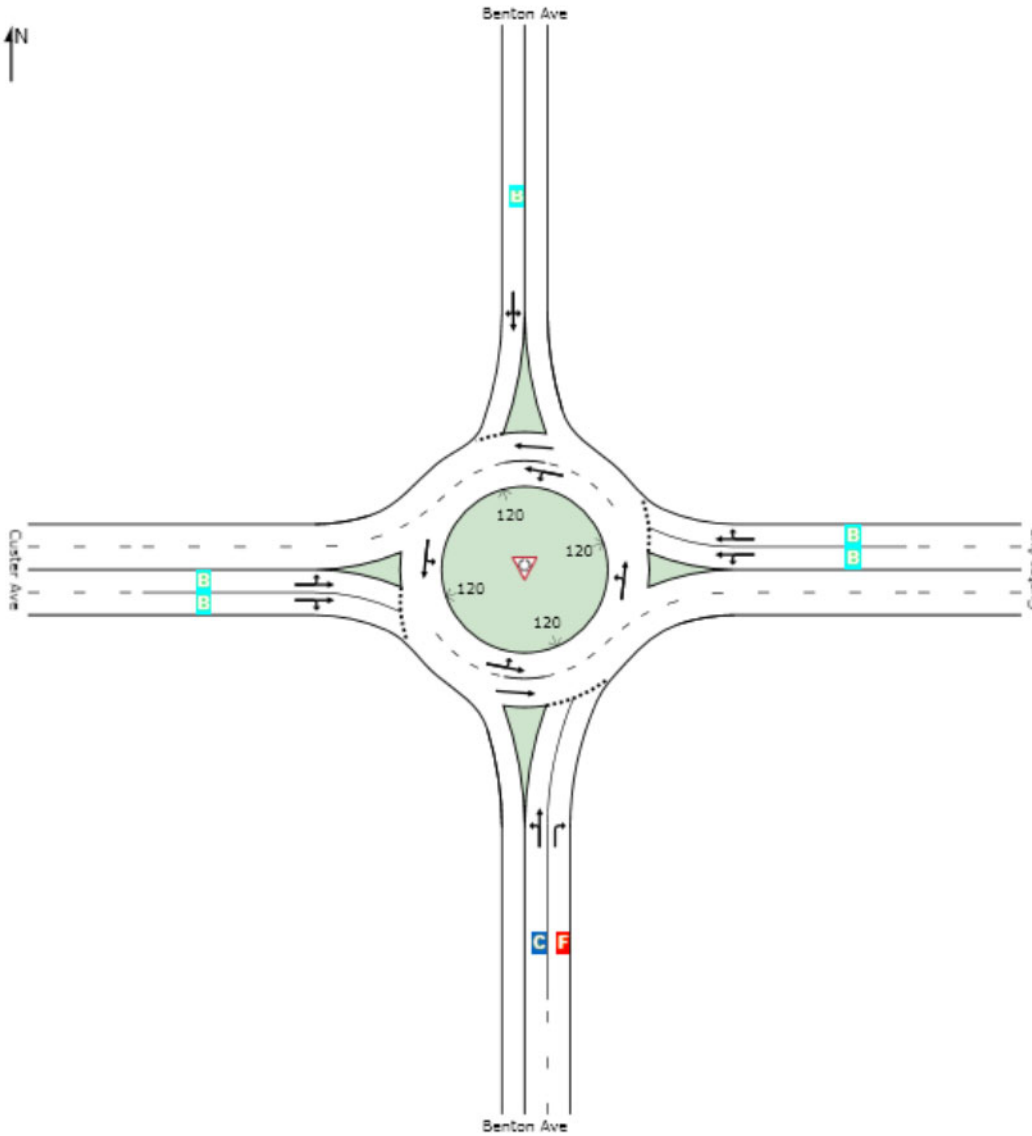
LEVEL OF SERVICE

 Site: Benton 2042 PM Alternative 3

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | F | B | B | B | C |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Benton 2042 PM Alternative 3

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Benton Ave | | | | | | | | | | | |
| 3 | L2 | 187 | 0.0 | 0.539 | 17.1 | LOS C | 2.7 | 68.5 | 0.77 | 0.90 | 21.9 |
| 8 | T1 | 101 | 0.0 | 0.539 | 17.1 | LOS C | 2.7 | 68.5 | 0.77 | 0.90 | 20.5 |
| 18 | R2 | 610 | 0.5 | 1.018 | 67.6 | LOS F | 19.5 | 489.3 | 1.00 | 2.33 | 14.3 |
| Approach | | 897 | 0.3 | 1.018 | 51.4 | LOS F | 19.5 | 489.3 | 0.93 | 1.87 | 16.1 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 326 | 0.5 | 0.677 | 14.0 | LOS B | 6.6 | 166.7 | 0.77 | 0.76 | 22.7 |
| 6 | T1 | 897 | 0.4 | 0.677 | 14.0 | LOS B | 6.7 | 167.0 | 0.77 | 0.76 | 21.5 |
| 16 | R2 | 157 | 0.0 | 0.677 | 14.0 | LOS B | 6.7 | 167.0 | 0.78 | 0.76 | 22.0 |
| Approach | | 1381 | 0.4 | 0.677 | 14.0 | LOS B | 6.7 | 167.0 | 0.77 | 0.76 | 21.8 |
| North: Benton Ave | | | | | | | | | | | |
| 7 | L2 | 86 | 0.0 | 0.348 | 14.7 | LOS B | 1.3 | 32.6 | 0.78 | 0.84 | 22.4 |
| 4 | T1 | 48 | 0.0 | 0.348 | 14.7 | LOS B | 1.3 | 32.6 | 0.78 | 0.84 | 21.0 |
| 14 | R2 | 12 | 11.1 | 0.348 | 14.7 | LOS B | 1.3 | 32.6 | 0.78 | 0.84 | 21.3 |
| Approach | | 147 | 0.9 | 0.348 | 14.7 | LOS B | 1.3 | 32.6 | 0.78 | 0.84 | 21.8 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 11 | 0.0 | 0.583 | 12.7 | LOS B | 4.3 | 108.0 | 0.75 | 0.84 | 23.5 |
| 2 | T1 | 912 | 0.0 | 0.583 | 12.7 | LOS B | 4.3 | 108.0 | 0.75 | 0.84 | 21.9 |
| 12 | R2 | 90 | 0.0 | 0.583 | 12.7 | LOS B | 4.3 | 108.0 | 0.75 | 0.84 | 22.3 |
| Approach | | 1013 | 0.0 | 0.583 | 12.7 | LOS B | 4.3 | 108.0 | 0.75 | 0.84 | 22.0 |
| All Vehicles | | 3438 | 0.3 | 1.018 | 23.4 | LOS C | 19.5 | 489.3 | 0.81 | 1.08 | 20.0 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

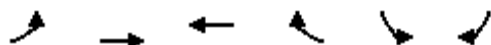
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HCM 6th Signalized Intersection Summary
4: Custer Ave & Cooney Dr

Alternatives 1 2042 - AM
10/12/2018



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|----------------------------------------------------------------------|------|-------|------|------|------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 12 | 1131 | 1166 | 55 | 94 | 6 |
| Future Volume (veh/h) | 12 | 1131 | 1166 | 55 | 94 | 6 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | | 1.00 | 1.00 | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | No | | No | |
| Adj Sat Flow, veh/h/ln | 1400 | 1378 | 1477 | 1477 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 13 | 1216 | 1254 | 59 | 101 | 6 |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Percent Heavy Veh, % | 0 | 2 | 2 | 2 | 0 | 0 |
| Cap, veh/h | 460 | 2170 | 2261 | 106 | 119 | 7 |
| Arrive On Green | 0.83 | 0.83 | 0.83 | 0.83 | 0.09 | 0.09 |
| Sat Flow, veh/h | 595 | 2687 | 2802 | 128 | 1327 | 79 |
| Grp Volume(v), veh/h | 13 | 1216 | 644 | 669 | 108 | 0 |
| Grp Sat Flow(s),veh/h/ln | 595 | 1309 | 1403 | 1454 | 1419 | 0 |
| Q Serve(g_s), s | 1.0 | 20.1 | 19.6 | 19.7 | 10.1 | 0.0 |
| Cycle Q Clear(g_c), s | 20.7 | 20.1 | 19.6 | 19.7 | 10.1 | 0.0 |
| Prop In Lane | 1.00 | | | 0.09 | 0.94 | 0.06 |
| Lane Grp Cap(c), veh/h | 460 | 2170 | 1162 | 1204 | 128 | 0 |
| V/C Ratio(X) | 0.03 | 0.56 | 0.55 | 0.56 | 0.85 | 0.00 |
| Avail Cap(c_a), veh/h | 460 | 2170 | 1162 | 1204 | 284 | 0 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.09 | 0.09 | 0.41 | 0.41 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 6.9 | 3.7 | 3.7 | 3.7 | 60.5 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 0.1 | 0.8 | 0.8 | 14.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.1 | 3.8 | 4.2 | 4.4 | 4.2 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 7.0 | 3.8 | 4.4 | 4.4 | 74.5 | 0.0 |
| LnGrp LOS | A | A | A | A | E | A |
| Approach Vol, veh/h | | 1229 | 1313 | | 108 | |
| Approach Delay, s/veh | | 3.8 | 4.4 | | 74.5 | |
| Approach LOS | | A | A | | E | |
| Timer - Assigned Phs | | 2 | | 4 | | 6 |
| Phs Duration (G+Y+Rc), s | | 117.9 | | 17.1 | | 117.9 |
| Change Period (Y+Rc), s | | 6.0 | | 5.0 | | 6.0 |
| Max Green Setting (Gmax), s | | 97.0 | | 27.0 | | 97.0 |
| Max Q Clear Time (g_c+I1), s | | 22.7 | | 12.1 | | 21.7 |
| Green Ext Time (p_c), s | | 12.8 | | 0.2 | | 12.8 |
| Intersection Summary | | | | | | |
| HCM 6th Ctrl Delay | | | 7.0 | | | |
| HCM 6th LOS | | | A | | | |
| Notes | | | | | | |
| User approved volume balancing among the lanes for turning movement. | | | | | | |

HCM 6th Signalized Intersection Summary
4: Custer Ave & Cooney Dr

Alternatives 1 2042 School
10/12/2018



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|----------------------------------------------------------------------|------|-------|------|------|------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 11 | 1311 | 1129 | 55 | 87 | 18 |
| Future Volume (veh/h) | 11 | 1311 | 1129 | 55 | 87 | 18 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | | 1.00 | 1.00 | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | No | | No | |
| Adj Sat Flow, veh/h/ln | 1350 | 1339 | 1488 | 1488 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 12 | 1441 | 1241 | 60 | 96 | 20 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 0 | 1 | 1 | 1 | 0 | 0 |
| Cap, veh/h | 259 | 2113 | 2280 | 110 | 111 | 23 |
| Arrive On Green | 0.83 | 0.83 | 0.83 | 0.83 | 0.10 | 0.10 |
| Sat Flow, veh/h | 306 | 2612 | 2820 | 133 | 1148 | 239 |
| Grp Volume(v), veh/h | 12 | 1441 | 638 | 663 | 117 | 0 |
| Grp Sat Flow(s),veh/h/ln | 306 | 1272 | 1414 | 1464 | 1400 | 0 |
| Q Serve(g_s), s | 1.9 | 33.2 | 21.0 | 21.0 | 12.4 | 0.0 |
| Cycle Q Clear(g_c), s | 22.9 | 33.2 | 21.0 | 21.0 | 12.4 | 0.0 |
| Prop In Lane | 1.00 | | | 0.09 | 0.82 | 0.17 |
| Lane Grp Cap(c), veh/h | 259 | 2113 | 1174 | 1216 | 135 | 0 |
| V/C Ratio(X) | 0.05 | 0.68 | 0.54 | 0.54 | 0.87 | 0.00 |
| Avail Cap(c_a), veh/h | 259 | 2113 | 1174 | 1216 | 233 | 0 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.09 | 0.09 | 0.46 | 0.46 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 7.5 | 5.0 | 3.9 | 3.9 | 66.8 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 0.2 | 0.8 | 0.8 | 15.2 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.1 | 6.6 | 5.4 | 5.6 | 5.0 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 7.5 | 5.1 | 4.8 | 4.8 | 82.1 | 0.0 |
| LnGrp LOS | A | A | A | A | F | A |
| Approach Vol, veh/h | | 1453 | 1301 | | 117 | |
| Approach Delay, s/veh | | 5.2 | 4.8 | | 82.1 | |
| Approach LOS | | A | A | | F | |
| Timer - Assigned Phs | | 2 | | 4 | | 6 |
| Phs Duration (G+Y+Rc), s | | 130.5 | | 19.5 | | 130.5 |
| Change Period (Y+Rc), s | | 6.0 | | 5.0 | | 6.0 |
| Max Green Setting (Gmax), s | | 114.0 | | 25.0 | | 114.0 |
| Max Q Clear Time (g_c+I1), s | | 35.2 | | 14.4 | | 23.0 |
| Green Ext Time (p_c), s | | 17.8 | | 0.2 | | 14.5 |
| Intersection Summary | | | | | | |
| HCM 6th Ctrl Delay | | | 8.1 | | | |
| HCM 6th LOS | | | A | | | |
| Notes | | | | | | |
| User approved volume balancing among the lanes for turning movement. | | | | | | |

HCM 6th Signalized Intersection Summary
4: Custer Ave & Cooney Dr

Alternatives 1 2042 PM
10/12/2018



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------------|------|-------|------|------|------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 7 | 1545 | 1346 | 73 | 96 | 23 |
| Future Volume (veh/h) | 7 | 1545 | 1346 | 73 | 96 | 23 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | | 1.00 | 1.00 | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | No | | No | |
| Adj Sat Flow, veh/h/ln | 1400 | 1400 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 7 | 1561 | 1360 | 74 | 97 | 23 |
| Peak Hour Factor | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 231 | 2201 | 2274 | 123 | 111 | 26 |
| Arrive On Green | 0.83 | 0.83 | 0.83 | 0.83 | 0.10 | 0.10 |
| Sat Flow, veh/h | 279 | 2730 | 2824 | 149 | 1119 | 265 |
| Grp Volume(v), veh/h | 7 | 1561 | 704 | 730 | 121 | 0 |
| Grp Sat Flow(s),veh/h/ln | 279 | 1330 | 1425 | 1473 | 1396 | 0 |
| Q Serve(g_s), s | 1.3 | 36.8 | 25.3 | 25.5 | 12.8 | 0.0 |
| Cycle Q Clear(g_c), s | 26.8 | 36.8 | 25.3 | 25.5 | 12.8 | 0.0 |
| Prop In Lane | 1.00 | | | 0.10 | 0.80 | 0.19 |
| Lane Grp Cap(c), veh/h | 231 | 2201 | 1179 | 1219 | 139 | 0 |
| V/C Ratio(X) | 0.03 | 0.71 | 0.60 | 0.60 | 0.87 | 0.00 |
| Avail Cap(c_a), veh/h | 231 | 2201 | 1179 | 1219 | 223 | 0 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.09 | 0.09 | 0.09 | 0.09 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 9.0 | 5.4 | 4.4 | 4.4 | 66.6 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 0.2 | 0.2 | 0.2 | 18.7 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.1 | 7.8 | 5.8 | 6.0 | 5.3 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 9.0 | 5.6 | 4.6 | 4.6 | 85.3 | 0.0 |
| LnGrp LOS | A | A | A | A | F | A |
| Approach Vol, veh/h | | 1568 | 1434 | | 121 | |
| Approach Delay, s/veh | | 5.6 | 4.6 | | 85.3 | |
| Approach LOS | | A | A | | F | |
| Timer - Assigned Phs | | 2 | | 4 | | 6 |
| Phs Duration (G+Y+Rc), s | | 130.1 | | 19.9 | | 130.1 |
| Change Period (Y+Rc), s | | 6.0 | | 5.0 | | 6.0 |
| Max Green Setting (Gmax), s | | 115.0 | | 24.0 | | 115.0 |
| Max Q Clear Time (g_c+I1), s | | 38.8 | | 14.8 | | 27.5 |
| Green Ext Time (p_c), s | | 20.5 | | 0.2 | | 15.2 |

Intersection Summary

| | |
|--------------------|-----|
| HCM 6th Ctrl Delay | 8.2 |
| HCM 6th LOS | A |

Notes

User approved volume balancing among the lanes for turning movement.

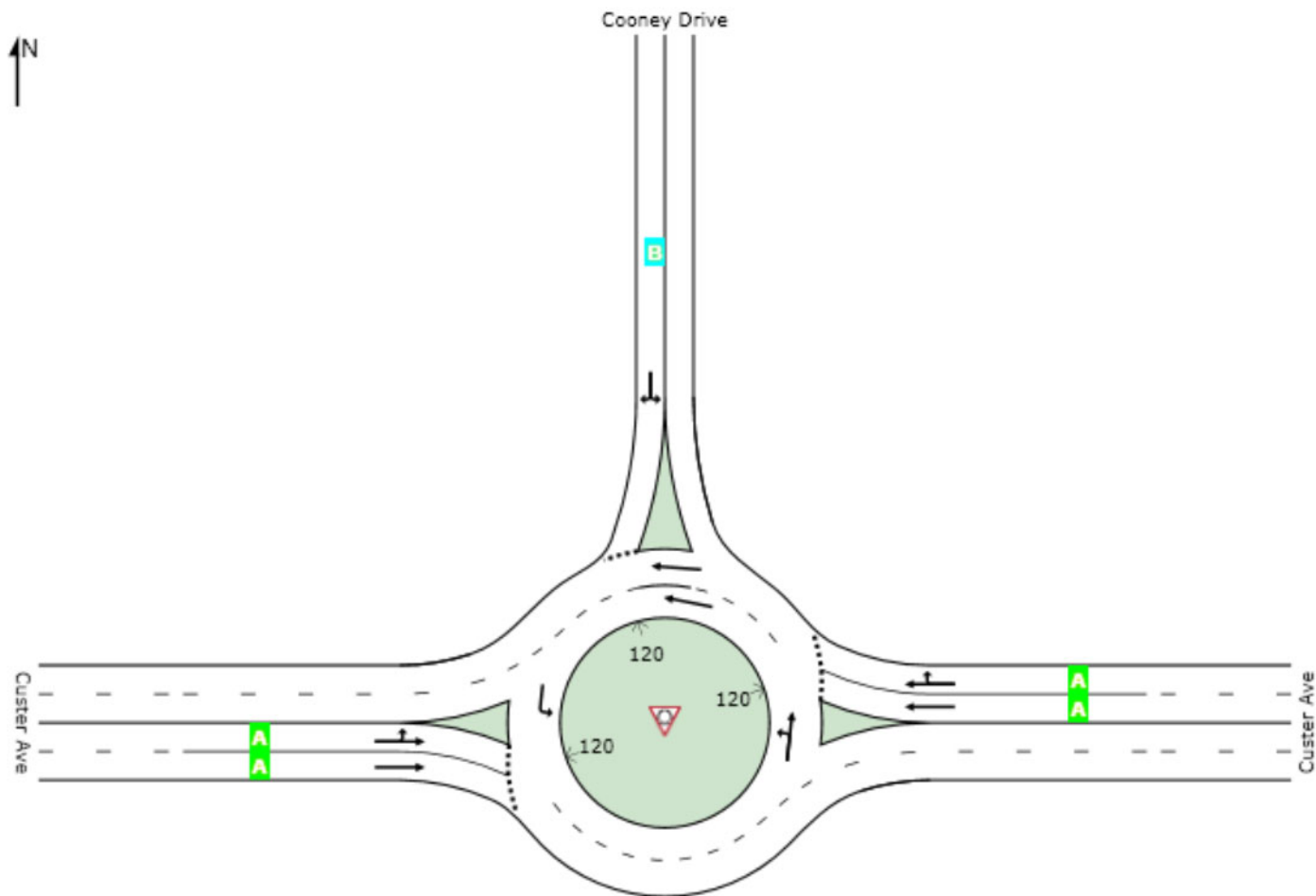
LEVEL OF SERVICE

 Site: Cooney 2042 AM Alternative 2

Roundabout

All Movement Classes

| | East | North | West | Intersection |
|-----|------|-------|------|--------------|
| LOS | A | B | A | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

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MOVEMENT SUMMARY

 Site: Cooney 2042 AM Alternative 2

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| East: Custer Ave | | | | | | | | | | | |
| 6 | T1 | 1259 | 2.1 | 0.495 | 7.8 | LOS A | 3.8 | 96.9 | 0.12 | 0.03 | 34.3 |
| 16 | R2 | 59 | 3.8 | 0.495 | 7.8 | LOS A | 3.8 | 96.8 | 0.12 | 0.03 | 33.1 |
| Approach | | 1319 | 2.2 | 0.495 | 7.8 | LOS A | 3.8 | 96.9 | 0.12 | 0.03 | 34.3 |
| North: Cooney Drive | | | | | | | | | | | |
| 7 | L2 | 102 | 0.0 | 0.227 | 10.9 | LOS B | 0.8 | 19.5 | 0.72 | 0.72 | 30.6 |
| 14 | R2 | 6 | 0.0 | 0.227 | 10.9 | LOS B | 0.8 | 19.5 | 0.72 | 0.72 | 29.6 |
| Approach | | 108 | 0.0 | 0.227 | 10.9 | LOS B | 0.8 | 19.5 | 0.72 | 0.72 | 30.6 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 13 | 0.0 | 0.503 | 8.4 | LOS A | 3.6 | 92.0 | 0.39 | 0.22 | 34.3 |
| 2 | T1 | 1221 | 1.6 | 0.503 | 8.4 | LOS A | 3.6 | 92.0 | 0.39 | 0.22 | 34.0 |
| Approach | | 1234 | 1.6 | 0.503 | 8.4 | LOS A | 3.6 | 92.0 | 0.39 | 0.22 | 34.0 |
| All Vehicles | | 2661 | 1.8 | 0.503 | 8.2 | LOS A | 3.8 | 96.9 | 0.27 | 0.15 | 34.0 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

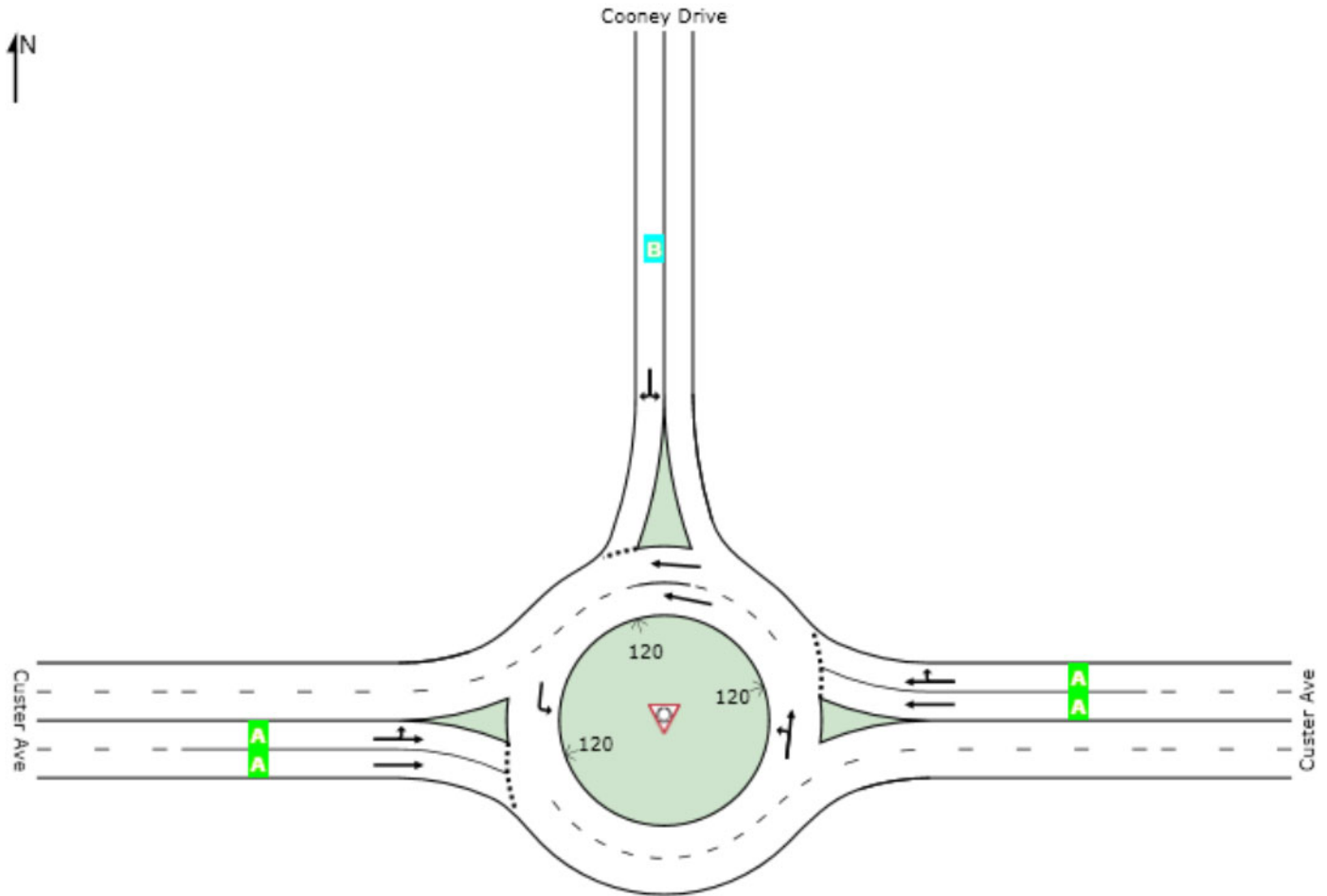
LEVEL OF SERVICE

 Site: Cooney 2042 School Alternative 2

Roundabout

All Movement Classes

| | East | North | West | Intersection |
|-----|------|-------|------|--------------|
| LOS | A | B | A | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

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MOVEMENT SUMMARY

 Site: Cooney 2042 School Alternative 2

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| East: Custer Ave | | | | | | | | | | | |
| 6 | T1 | 1248 | 1.0 | 0.485 | 7.6 | LOS A | 3.8 | 94.5 | 0.12 | 0.03 | 34.5 |
| 16 | R2 | 61 | 1.9 | 0.485 | 7.6 | LOS A | 3.7 | 94.4 | 0.12 | 0.03 | 33.3 |
| Approach | | 1308 | 1.0 | 0.485 | 7.6 | LOS A | 3.8 | 94.5 | 0.12 | 0.03 | 34.4 |
| North: Cooney Drive | | | | | | | | | | | |
| 7 | L2 | 96 | 0.0 | 0.241 | 11.1 | LOS B | 0.8 | 20.9 | 0.72 | 0.72 | 30.8 |
| 14 | R2 | 20 | 6.7 | 0.241 | 11.1 | LOS B | 0.8 | 20.9 | 0.72 | 0.72 | 29.6 |
| Approach | | 116 | 1.1 | 0.241 | 11.1 | LOS B | 0.8 | 20.9 | 0.72 | 0.72 | 30.6 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 12 | 0.0 | 0.588 | 9.9 | LOS A | 5.0 | 126.7 | 0.45 | 0.25 | 33.5 |
| 2 | T1 | 1449 | 1.0 | 0.588 | 9.9 | LOS A | 5.0 | 126.7 | 0.45 | 0.25 | 33.3 |
| Approach | | 1461 | 1.0 | 0.588 | 9.9 | LOS A | 5.0 | 126.7 | 0.45 | 0.25 | 33.3 |
| All Vehicles | | 2885 | 1.0 | 0.588 | 8.9 | LOS A | 5.0 | 126.7 | 0.31 | 0.17 | 33.6 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

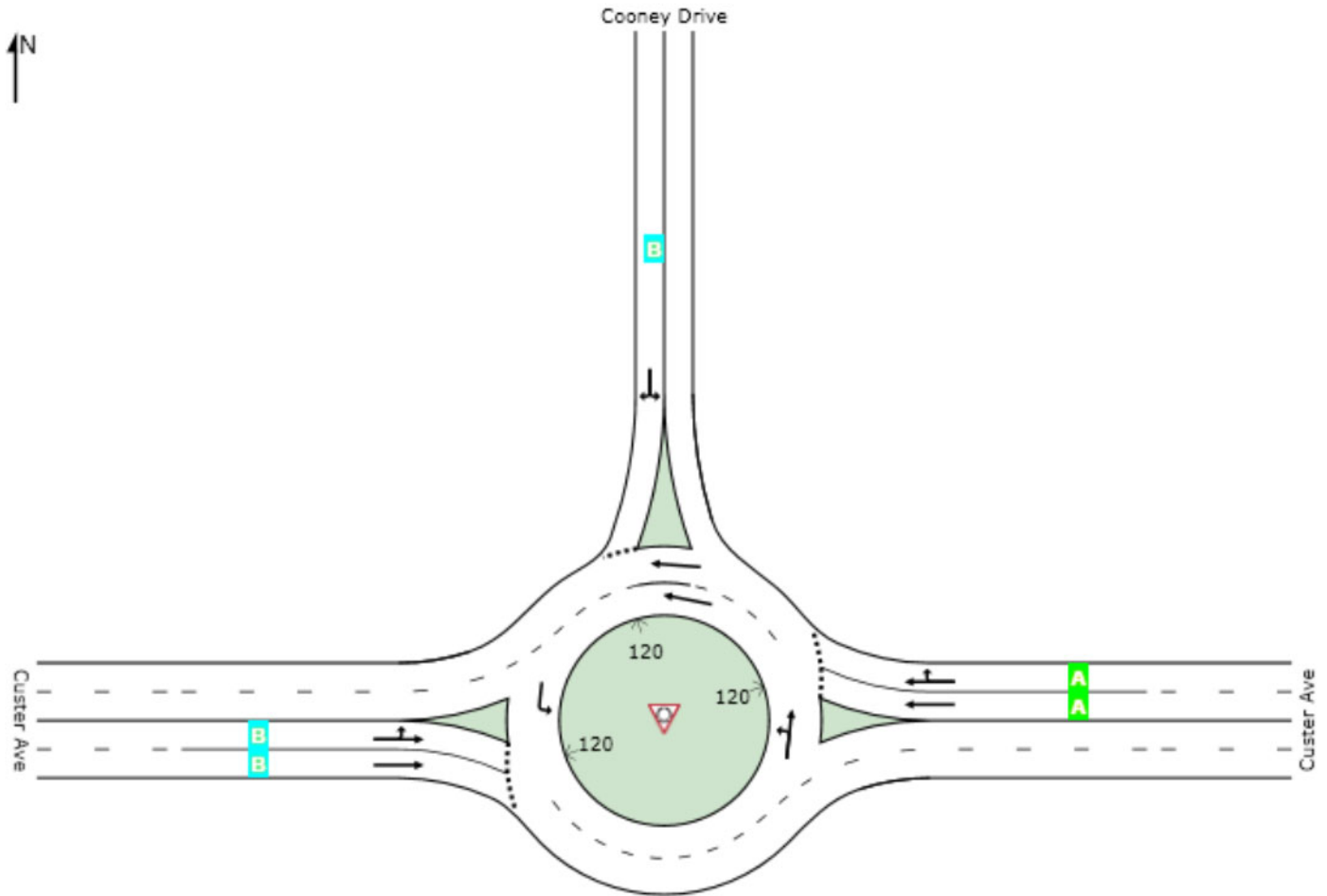
LEVEL OF SERVICE

 Site: Cooney 2042 PM Alternative 2

Roundabout

All Movement Classes

| | East | North | West | Intersection |
|-----|------|-------|------|--------------|
| LOS | A | B | B | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

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MOVEMENT SUMMARY

 Site: Cooney 2042 PM Alternative 2

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| East: Custer Ave | | | | | | | | | | | |
| 6 | T1 | 1364 | 0.4 | 0.527 | 8.2 | LOS A | 4.5 | 113.0 | 0.09 | 0.02 | 22.9 |
| 16 | R2 | 74 | 1.4 | 0.527 | 8.2 | LOS A | 4.5 | 112.9 | 0.09 | 0.02 | 23.3 |
| Approach | | 1438 | 0.5 | 0.527 | 8.2 | LOS A | 4.5 | 113.0 | 0.09 | 0.02 | 23.0 |
| North: Cooney Drive | | | | | | | | | | | |
| 7 | L2 | 97 | 0.0 | 0.272 | 12.5 | LOS B | 1.0 | 24.0 | 0.75 | 0.77 | 22.7 |
| 14 | R2 | 23 | 0.0 | 0.272 | 12.5 | LOS B | 1.0 | 24.0 | 0.75 | 0.77 | 21.6 |
| Approach | | 121 | 0.0 | 0.272 | 12.5 | LOS B | 1.0 | 24.0 | 0.75 | 0.77 | 22.4 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 7 | 0.0 | 0.629 | 10.8 | LOS B | 5.9 | 148.4 | 0.49 | 0.28 | 24.0 |
| 2 | T1 | 1565 | 0.2 | 0.629 | 10.8 | LOS B | 5.9 | 148.4 | 0.49 | 0.28 | 22.4 |
| Approach | | 1572 | 0.2 | 0.629 | 10.8 | LOS B | 5.9 | 148.4 | 0.49 | 0.28 | 22.4 |
| All Vehicles | | 3131 | 0.3 | 0.629 | 9.6 | LOS A | 5.9 | 148.4 | 0.32 | 0.18 | 22.6 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.






















Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

HCM 6th Signalized Intersection Summary
5: McHugh Dr & Custer Ave






















Alternatives 1 2042 - AM

10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | |  |  |  |  |  | |  |  | |
| Traffic Volume (veh/h) | 159 | 959 | 38 | 83 | 829 | 98 | 90 | 65 | 111 | 287 | 129 | 287 |
| Future Volume (veh/h) | 159 | 959 | 38 | 83 | 829 | 98 | 90 | 65 | 111 | 287 | 129 | 287 |
| 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 | 1400 | 1378 | 1378 | 1500 | 1453 | 1500 | 1500 | 1500 | 1500 | 1488 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 171 | 1031 | 41 | 89 | 891 | 105 | 97 | 70 | 119 | 309 | 139 | 309 |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Percent Heavy Veh, % | 0 | 2 | 2 | 0 | 4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Cap, veh/h | 122 | 1388 | 55 | 269 | 775 | 810 | 106 | 85 | 145 | 264 | 98 | 218 |
| Arrive On Green | 0.03 | 0.36 | 0.36 | 0.04 | 0.53 | 0.53 | 0.04 | 0.17 | 0.17 | 0.10 | 0.24 | 0.24 |
| Sat Flow, veh/h | 1333 | 2567 | 102 | 1429 | 1453 | 1271 | 1429 | 499 | 848 | 1417 | 414 | 920 |
| Grp Volume(v), veh/h | 171 | 526 | 546 | 89 | 891 | 105 | 97 | 0 | 189 | 309 | 0 | 448 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 1309 | 1360 | 1429 | 1453 | 1271 | 1429 | 0 | 1347 | 1417 | 0 | 1334 |
| Q Serve(g_s), s | 7.0 | 47.4 | 47.5 | 3.8 | 72.0 | 4.4 | 5.0 | 0.0 | 18.3 | 14.0 | 0.0 | 32.0 |
| Cycle Q Clear(g_c), s | 7.0 | 47.4 | 47.5 | 3.8 | 72.0 | 4.4 | 5.0 | 0.0 | 18.3 | 14.0 | 0.0 | 32.0 |
| Prop In Lane | 1.00 | | 0.08 | 1.00 | | 1.00 | 1.00 | | 0.63 | 1.00 | | 0.69 |
| Lane Grp Cap(c), veh/h | 122 | 708 | 735 | 269 | 775 | 810 | 106 | 0 | 230 | 264 | 0 | 316 |
| V/C Ratio(X) | 1.40 | 0.74 | 0.74 | 0.33 | 1.15 | 0.13 | 0.91 | 0.00 | 0.82 | 1.17 | 0.00 | 1.42 |
| Avail Cap(c_a), veh/h | 122 | 708 | 735 | 269 | 775 | 810 | 106 | 0 | 230 | 264 | 0 | 316 |
| HCM Platoon Ratio | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.09 | 0.09 | 0.09 | 0.87 | 0.87 | 0.87 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 39.3 | 35.2 | 35.2 | 21.8 | 31.5 | 9.7 | 53.6 | 0.0 | 54.0 | 49.1 | 0.0 | 51.5 |
| Incr Delay (d2), s/veh | 182.9 | 0.7 | 0.6 | 2.9 | 80.3 | 0.3 | 60.4 | 0.0 | 20.5 | 110.3 | 0.0 | 205.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 8.4 | 16.0 | 16.6 | 1.4 | 41.6 | 1.3 | 3.2 | 0.0 | 7.6 | 11.7 | 0.0 | 28.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 222.1 | 35.8 | 35.8 | 24.7 | 111.8 | 10.0 | 114.0 | 0.0 | 74.5 | 159.4 | 0.0 | 256.6 |
| LnGrp LOS | F | D | D | C | F | A | F | A | E | F | A | F |
| Approach Vol, veh/h | | 1243 | | | 1085 | | | 286 | | | 757 | |
| Approach Delay, s/veh | | 61.5 | | | 94.8 | | | 87.9 | | | 216.9 | |
| Approach LOS | | E | | | F | | | F | | | F | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 10.0 | 79.0 | 9.0 | 37.0 | 11.0 | 78.0 | 18.0 | 28.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 6.0 | 73.0 | 5.0 | 32.0 | 7.0 | 72.0 | 14.0 | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 5.8 | 49.5 | 7.0 | 34.0 | 9.0 | 74.0 | 16.0 | 20.3 | | | | |
| Green Ext Time (p_c), s | 0.0 | 7.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | 109.4 | | | | | | | | | | | |
| HCM 6th LOS | F | | | | | | | | | | | |

HCM 6th Signalized Intersection Summary
5: McHugh Dr & Custer Ave

Alternatives 1 2042 School
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | |  |  |  |  |  | |  |  | |
| Traffic Volume (veh/h) | 203 | 1134 | 62 | 36 | 900 | 120 | 109 | 61 | 92 | 202 | 43 | 175 |
| Future Volume (veh/h) | 203 | 1134 | 62 | 36 | 900 | 120 | 109 | 61 | 92 | 202 | 43 | 175 |
| 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 | 1350 | 1329 | 1329 | 1500 | 1477 | 1488 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 228 | 1274 | 70 | 40 | 1011 | 135 | 122 | 69 | 103 | 227 | 48 | 197 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Percent Heavy Veh, % | 0 | 2 | 2 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 177 | 1541 | 85 | 141 | 827 | 782 | 124 | 83 | 124 | 163 | 41 | 169 |
| Arrive On Green | 0.07 | 0.42 | 0.42 | 0.03 | 0.56 | 0.56 | 0.05 | 0.15 | 0.15 | 0.06 | 0.16 | 0.16 |
| Sat Flow, veh/h | 1286 | 2434 | 134 | 1429 | 1477 | 1261 | 1429 | 543 | 811 | 1429 | 257 | 1054 |
| Grp Volume(v), veh/h | 228 | 660 | 684 | 40 | 1011 | 135 | 122 | 0 | 172 | 227 | 0 | 245 |
| Grp Sat Flow(s),veh/h/ln | 1286 | 1262 | 1305 | 1429 | 1477 | 1261 | 1429 | 0 | 1354 | 1429 | 0 | 1310 |
| Q Serve(g_s), s | 15.0 | 69.7 | 70.0 | 1.8 | 84.0 | 6.8 | 8.0 | 0.0 | 18.5 | 9.0 | 0.0 | 24.0 |
| Cycle Q Clear(g_c), s | 15.0 | 69.7 | 70.0 | 1.8 | 84.0 | 6.8 | 8.0 | 0.0 | 18.5 | 9.0 | 0.0 | 24.0 |
| Prop In Lane | 1.00 | | 0.10 | 1.00 | | 1.00 | 1.00 | | 0.60 | 1.00 | | 0.80 |
| Lane Grp Cap(c), veh/h | 177 | 799 | 826 | 141 | 827 | 782 | 124 | 0 | 208 | 163 | 0 | 210 |
| V/C Ratio(X) | 1.29 | 0.83 | 0.83 | 0.28 | 1.22 | 0.17 | 0.98 | 0.00 | 0.83 | 1.39 | 0.00 | 1.17 |
| Avail Cap(c_a), veh/h | 177 | 799 | 826 | 150 | 827 | 782 | 124 | 0 | 208 | 163 | 0 | 210 |
| HCM Platoon Ratio | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.09 | 0.09 | 0.09 | 0.82 | 0.82 | 0.82 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 54.7 | 36.3 | 36.4 | 26.4 | 33.0 | 12.1 | 58.1 | 0.0 | 61.6 | 60.1 | 0.0 | 63.0 |
| Incr Delay (d2), s/veh | 135.0 | 1.0 | 0.9 | 0.9 | 109.2 | 0.4 | 75.1 | 0.0 | 23.0 | 209.6 | 0.0 | 115.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 10.5 | 22.9 | 23.8 | 0.7 | 54.1 | 2.1 | 4.2 | 0.0 | 7.7 | 12.3 | 0.0 | 14.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 189.7 | 37.3 | 37.3 | 27.3 | 142.2 | 12.5 | 133.2 | 0.0 | 84.6 | 269.7 | 0.0 | 178.1 |
| LnGrp LOS | F | D | D | C | F | B | F | A | F | F | A | F |
| Approach Vol, veh/h | | 1572 | | | 1186 | | | 294 | | | | 472 |
| Approach Delay, s/veh | | 59.4 | | | 123.6 | | | 104.7 | | | | 222.2 |
| Approach LOS | | E | | | F | | | F | | | | F |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 8.1 | 100.9 | 12.0 | 29.0 | 19.0 | 90.0 | 13.0 | 28.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 94.0 | 8.0 | 24.0 | 15.0 | 84.0 | 9.0 | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 3.8 | 72.0 | 10.0 | 26.0 | 17.0 | 86.0 | 11.0 | 20.5 | | | | |
| Green Ext Time (p_c), s | 0.0 | 10.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 106.6 | | | | | | | | |
| HCM 6th LOS | | | | F | | | | | | | | |

HCM 6th Signalized Intersection Summary
5: McHugh Dr & Custer Ave

Alternatives 1 2042 PM
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|-------|------|------|-------|-------|------|------|------|------|-------|-------|-------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 257 | 1313 | 27 | 20 | 1072 | 152 | 100 | 96 | 41 | 314 | 28 | 254 |
| Future Volume (veh/h) | 257 | 1313 | 27 | 20 | 1072 | 152 | 100 | 96 | 41 | 314 | 28 | 254 |
| 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 | 1400 | 1400 | 1400 | 1500 | 1488 | 1488 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 265 | 1354 | 28 | 21 | 1105 | 157 | 103 | 99 | 42 | 324 | 29 | 262 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 181 | 1654 | 34 | 129 | 804 | 782 | 134 | 153 | 65 | 223 | 22 | 201 |
| Arrive On Green | 0.07 | 0.41 | 0.41 | 0.02 | 0.54 | 0.54 | 0.06 | 0.15 | 0.15 | 0.08 | 0.17 | 0.17 |
| Sat Flow, veh/h | 1333 | 2665 | 55 | 1429 | 1488 | 1261 | 1429 | 1000 | 424 | 1429 | 129 | 1162 |
| Grp Volume(v), veh/h | 265 | 675 | 707 | 21 | 1105 | 157 | 103 | 0 | 141 | 324 | 0 | 291 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 1330 | 1390 | 1429 | 1488 | 1261 | 1429 | 0 | 1424 | 1429 | 0 | 1291 |
| Q Serve(g_s), s | 15.0 | 67.6 | 67.8 | 1.0 | 81.0 | 8.1 | 9.0 | 0.0 | 14.0 | 12.0 | 0.0 | 26.0 |
| Cycle Q Clear(g_c), s | 15.0 | 67.6 | 67.8 | 1.0 | 81.0 | 8.1 | 9.0 | 0.0 | 14.0 | 12.0 | 0.0 | 26.0 |
| Prop In Lane | 1.00 | | 0.04 | 1.00 | | 1.00 | 1.00 | | 0.30 | 1.00 | | 0.90 |
| Lane Grp Cap(c), veh/h | 181 | 825 | 863 | 129 | 804 | 782 | 134 | 0 | 218 | 223 | 0 | 224 |
| V/C Ratio(X) | 1.46 | 0.82 | 0.82 | 0.16 | 1.37 | 0.20 | 0.77 | 0.00 | 0.65 | 1.46 | 0.00 | 1.30 |
| Avail Cap(c_a), veh/h | 181 | 825 | 863 | 149 | 804 | 782 | 134 | 0 | 218 | 223 | 0 | 224 |
| HCM Platoon Ratio | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.09 | 0.09 | 0.09 | 0.80 | 0.80 | 0.80 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 54.3 | 36.8 | 36.8 | 25.8 | 34.5 | 12.4 | 52.1 | 0.0 | 59.7 | 58.4 | 0.0 | 62.0 |
| Incr Delay (d2), s/veh | 210.4 | 0.9 | 0.8 | 0.5 | 175.0 | 0.5 | 23.5 | 0.0 | 5.9 | 228.2 | 0.0 | 164.0 |
| 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 | 14.4 | 23.3 | 24.4 | 0.3 | 67.5 | 2.5 | 4.2 | 0.0 | 5.5 | 18.0 | 0.0 | 18.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 264.7 | 37.6 | 37.6 | 26.3 | 209.5 | 12.8 | 75.6 | 0.0 | 65.6 | 286.6 | 0.0 | 226.0 |
| LnGrp LOS | F | D | D | C | F | B | E | A | E | F | A | F |
| Approach Vol, veh/h | | 1647 | | | 1283 | | | 244 | | | 615 | |
| Approach Delay, s/veh | | 74.2 | | | 182.5 | | | 69.8 | | | 257.9 | |
| Approach LOS | | E | | | F | | | E | | | F | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 6.9 | 99.1 | 13.0 | 31.0 | 19.0 | 87.0 | 16.0 | 28.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 91.0 | 9.0 | 26.0 | 15.0 | 81.0 | 12.0 | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 3.0 | 69.8 | 11.0 | 28.0 | 17.0 | 83.0 | 14.0 | 16.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 10.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 140.4 | | | | | | | | |
| HCM 6th LOS | | | | F | | | | | | | | |

HCM 6th Signalized Intersection Summary
5: McHugh Dr & Custer Ave

Alternatives 2 2042 - AM
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|-------|------|------|------|------|-------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 159 | 959 | 38 | 83 | 829 | 98 | 90 | 65 | 111 | 287 | 129 | 287 |
| Future Volume (veh/h) | 159 | 959 | 38 | 83 | 829 | 98 | 90 | 65 | 111 | 287 | 129 | 287 |
| 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 | 1400 | 1378 | 1378 | 1500 | 1453 | 1453 | 1500 | 1500 | 1500 | 1488 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 171 | 1031 | 41 | 89 | 891 | 105 | 97 | 70 | 119 | 309 | 139 | 309 |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Percent Heavy Veh, % | 0 | 2 | 2 | 0 | 4 | 4 | 0 | 0 | 0 | 1 | 0 | 0 |
| Cap, veh/h | 243 | 1198 | 48 | 177 | 1041 | 123 | 106 | 85 | 145 | 379 | 132 | 293 |
| Arrive On Green | 0.06 | 0.31 | 0.31 | 0.04 | 0.42 | 0.42 | 0.04 | 0.17 | 0.17 | 0.19 | 0.32 | 0.32 |
| Sat Flow, veh/h | 1333 | 2567 | 102 | 1429 | 2488 | 293 | 1429 | 499 | 848 | 1417 | 414 | 920 |
| Grp Volume(v), veh/h | 171 | 526 | 546 | 89 | 494 | 502 | 97 | 0 | 189 | 309 | 0 | 448 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 1309 | 1360 | 1429 | 1381 | 1400 | 1429 | 0 | 1347 | 1417 | 0 | 1334 |
| Q Serve(g_s), s | 9.4 | 51.1 | 51.1 | 4.9 | 43.8 | 43.8 | 5.0 | 0.0 | 18.3 | 23.7 | 0.0 | 43.0 |
| Cycle Q Clear(g_c), s | 9.4 | 51.1 | 51.1 | 4.9 | 43.8 | 43.8 | 5.0 | 0.0 | 18.3 | 23.7 | 0.0 | 43.0 |
| Prop In Lane | 1.00 | | 0.08 | 1.00 | | 0.21 | 1.00 | | 0.63 | 1.00 | | 0.69 |
| Lane Grp Cap(c), veh/h | 243 | 611 | 635 | 177 | 578 | 586 | 106 | 0 | 230 | 379 | 0 | 425 |
| V/C Ratio(X) | 0.71 | 0.86 | 0.86 | 0.50 | 0.86 | 0.86 | 0.91 | 0.00 | 0.82 | 0.82 | 0.00 | 1.05 |
| Avail Cap(c_a), veh/h | 267 | 611 | 635 | 177 | 578 | 586 | 106 | 0 | 230 | 379 | 0 | 425 |
| HCM Platoon Ratio | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.78 | 0.78 | 0.78 | 0.87 | 0.87 | 0.87 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 28.7 | 42.6 | 42.6 | 29.6 | 35.5 | 35.5 | 53.6 | 0.0 | 54.0 | 36.1 | 0.0 | 46.0 |
| Incr Delay (d2), s/veh | 5.8 | 11.9 | 11.5 | 8.6 | 13.3 | 13.2 | 60.4 | 0.0 | 20.5 | 12.9 | 0.0 | 58.6 |
| 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 | 3.5 | 19.2 | 19.9 | 2.1 | 16.7 | 16.9 | 3.2 | 0.0 | 7.6 | 9.6 | 0.0 | 21.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 34.5 | 54.5 | 54.1 | 38.2 | 48.9 | 48.7 | 114.0 | 0.0 | 74.5 | 48.9 | 0.0 | 104.6 |
| LnGrp LOS | C | D | D | D | D | D | F | A | E | D | A | F |
| Approach Vol, veh/h | | 1243 | | | 1085 | | | 286 | | | 757 | |
| Approach Delay, s/veh | | 51.6 | | | 47.9 | | | 87.9 | | | 81.9 | |
| Approach LOS | | D | | | D | | | F | | | F | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 9.0 | 69.0 | 9.0 | 48.0 | 15.5 | 62.5 | 29.0 | 28.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 63.0 | 5.0 | 43.0 | 14.0 | 54.0 | 25.0 | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 6.9 | 53.1 | 7.0 | 45.0 | 11.4 | 45.8 | 25.7 | 20.3 | | | | |
| Green Ext Time (p_c), s | 0.0 | 4.9 | 0.0 | 0.0 | 0.1 | 4.0 | 0.0 | 0.2 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 60.3 | | | | | | | | | |
| HCM 6th LOS | | | E | | | | | | | | | |

HCM 6th Signalized Intersection Summary
5: McHugh Dr & Custer Ave

Alternatives 2 2042 School
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|------|------|------|------|------|-------|------|-------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 203 | 1134 | 62 | 36 | 900 | 120 | 109 | 61 | 92 | 202 | 43 | 175 |
| Future Volume (veh/h) | 203 | 1134 | 62 | 36 | 900 | 120 | 109 | 61 | 92 | 202 | 43 | 175 |
| 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 | 1350 | 1329 | 1329 | 1500 | 1477 | 1477 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 228 | 1274 | 70 | 40 | 1011 | 135 | 122 | 69 | 103 | 227 | 48 | 197 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Percent Heavy Veh, % | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 246 | 1430 | 78 | 118 | 1261 | 168 | 147 | 79 | 118 | 230 | 51 | 209 |
| Arrive On Green | 0.07 | 0.39 | 0.39 | 0.03 | 0.51 | 0.51 | 0.06 | 0.15 | 0.15 | 0.11 | 0.20 | 0.20 |
| Sat Flow, veh/h | 1286 | 2434 | 134 | 1429 | 2488 | 332 | 1429 | 543 | 811 | 1429 | 257 | 1054 |
| Grp Volume(v), veh/h | 228 | 660 | 684 | 40 | 570 | 576 | 122 | 0 | 172 | 227 | 0 | 245 |
| Grp Sat Flow(s),veh/h/ln | 1286 | 1262 | 1305 | 1429 | 1403 | 1417 | 1429 | 0 | 1354 | 1429 | 0 | 1310 |
| Q Serve(g_s), s | 13.7 | 73.3 | 73.6 | 2.0 | 50.6 | 50.7 | 9.0 | 0.0 | 18.7 | 17.0 | 0.0 | 27.6 |
| Cycle Q Clear(g_c), s | 13.7 | 73.3 | 73.6 | 2.0 | 50.6 | 50.7 | 9.0 | 0.0 | 18.7 | 17.0 | 0.0 | 27.6 |
| Prop In Lane | 1.00 | | 0.10 | 1.00 | | 0.23 | 1.00 | | 0.60 | 1.00 | | 0.80 |
| Lane Grp Cap(c), veh/h | 246 | 742 | 767 | 118 | 711 | 718 | 147 | 0 | 197 | 230 | 0 | 260 |
| V/C Ratio(X) | 0.93 | 0.89 | 0.89 | 0.34 | 0.80 | 0.80 | 0.83 | 0.00 | 0.87 | 0.99 | 0.00 | 0.94 |
| Avail Cap(c_a), veh/h | 314 | 742 | 767 | 127 | 711 | 718 | 147 | 0 | 208 | 230 | 0 | 271 |
| HCM Platoon Ratio | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.65 | 0.65 | 0.65 | 0.82 | 0.82 | 0.82 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 35.6 | 41.4 | 41.5 | 31.1 | 30.7 | 30.7 | 56.4 | 0.0 | 62.7 | 51.8 | 0.0 | 59.2 |
| Incr Delay (d2), s/veh | 20.9 | 10.5 | 10.4 | 1.4 | 7.7 | 7.7 | 31.3 | 0.0 | 29.6 | 55.0 | 0.0 | 38.0 |
| 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 | 10.4 | 26.1 | 27.1 | 0.7 | 18.5 | 18.7 | 2.5 | 0.0 | 8.1 | 5.6 | 0.0 | 12.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 56.5 | 51.9 | 51.9 | 32.5 | 38.4 | 38.4 | 87.7 | 0.0 | 92.3 | 106.8 | 0.0 | 97.2 |
| LnGrp LOS | E | D | D | C | D | D | F | A | F | F | A | F |
| Approach Vol, veh/h | | 1572 | | | 1186 | | | 294 | | | | 472 |
| Approach Delay, s/veh | | 52.5 | | | 38.2 | | | 90.4 | | | | 101.8 |
| Approach LOS | | D | | | D | | | F | | | | F |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 8.1 | 94.1 | 13.0 | 34.8 | 20.2 | 82.0 | 21.0 | 26.8 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 86.0 | 9.0 | 31.0 | 24.0 | 67.0 | 17.0 | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 4.0 | 75.6 | 11.0 | 29.6 | 15.7 | 52.7 | 19.0 | 20.7 | | | | |
| Green Ext Time (p_c), s | 0.0 | 6.5 | 0.0 | 0.2 | 0.4 | 6.7 | 0.0 | 0.2 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 57.5 | | | | | | | | |
| HCM 6th LOS | | | | E | | | | | | | | |

HCM 6th Signalized Intersection Summary
5: McHugh Dr & Custer Ave

Alternatives 2 2042 PM
10/12/2018

























| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|-------|------|------|------|------|------|------|------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 257 | 1313 | 27 | 20 | 1072 | 152 | 100 | 96 | 41 | 314 | 28 | 254 |
| Future Volume (veh/h) | 257 | 1313 | 27 | 20 | 1072 | 152 | 100 | 96 | 41 | 314 | 28 | 254 |
| 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 | 1400 | 1400 | 1400 | 1500 | 1488 | 1488 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 265 | 1354 | 28 | 21 | 1105 | 157 | 103 | 99 | 42 | 324 | 29 | 262 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 252 | 1512 | 31 | 104 | 1077 | 153 | 133 | 153 | 65 | 299 | 30 | 271 |
| Arrive On Green | 0.10 | 0.37 | 0.37 | 0.02 | 0.43 | 0.43 | 0.05 | 0.15 | 0.15 | 0.13 | 0.23 | 0.23 |
| Sat Flow, veh/h | 1333 | 2665 | 55 | 1429 | 2486 | 352 | 1429 | 1000 | 424 | 1429 | 129 | 1162 |
| Grp Volume(v), veh/h | 265 | 675 | 707 | 21 | 627 | 635 | 103 | 0 | 141 | 324 | 0 | 291 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 1330 | 1390 | 1429 | 1414 | 1425 | 1429 | 0 | 1424 | 1429 | 0 | 1291 |
| Q Serve(g_s), s | 23.0 | 71.7 | 71.8 | 1.2 | 65.0 | 65.0 | 8.0 | 0.0 | 14.0 | 20.0 | 0.0 | 33.5 |
| Cycle Q Clear(g_c), s | 23.0 | 71.7 | 71.8 | 1.2 | 65.0 | 65.0 | 8.0 | 0.0 | 14.0 | 20.0 | 0.0 | 33.5 |
| Prop In Lane | 1.00 | | 0.04 | 1.00 | | 0.25 | 1.00 | | 0.30 | 1.00 | | 0.90 |
| Lane Grp Cap(c), veh/h | 252 | 754 | 788 | 104 | 613 | 617 | 133 | 0 | 218 | 299 | 0 | 301 |
| V/C Ratio(X) | 1.05 | 0.90 | 0.90 | 0.20 | 1.02 | 1.03 | 0.77 | 0.00 | 0.65 | 1.08 | 0.00 | 0.97 |
| Avail Cap(c_a), veh/h | 252 | 754 | 788 | 123 | 613 | 617 | 133 | 0 | 218 | 299 | 0 | 301 |
| HCM Platoon Ratio | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.62 | 0.62 | 0.62 | 0.80 | 0.80 | 0.80 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 53.8 | 42.7 | 42.8 | 32.3 | 42.5 | 42.5 | 55.0 | 0.0 | 59.7 | 51.8 | 0.0 | 56.9 |
| Incr Delay (d2), s/veh | 58.2 | 10.4 | 10.1 | 0.8 | 38.7 | 39.7 | 24.2 | 0.0 | 5.9 | 76.5 | 0.0 | 42.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 13.8 | 26.7 | 27.9 | 0.4 | 29.0 | 29.4 | 1.7 | 0.0 | 5.5 | 10.1 | 0.0 | 14.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 112.1 | 53.1 | 52.8 | 33.1 | 81.2 | 82.2 | 79.1 | 0.0 | 65.6 | 128.2 | 0.0 | 99.4 |
| LnGrp LOS | F | D | D | C | F | F | E | A | E | F | A | F |
| Approach Vol, veh/h | | 1647 | | | 1283 | | | 244 | | | 615 | |
| Approach Delay, s/veh | | 62.5 | | | 80.9 | | | 71.3 | | | 114.6 | |
| Approach LOS | | E | | | F | | | E | | | F | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 6.9 | 91.1 | 12.0 | 40.0 | 27.0 | 71.0 | 24.0 | 28.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 83.0 | 8.0 | 35.0 | 23.0 | 65.0 | 20.0 | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 3.2 | 73.8 | 10.0 | 35.5 | 25.0 | 67.0 | 22.0 | 16.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 5.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | | | | |

Intersection Summary

| | |
|--------------------|------|
| HCM 6th Ctrl Delay | 77.7 |
| HCM 6th LOS | E |























HCM 6th Signalized Intersection Summary
5: McHugh Dr & Custer Ave

Alternatives 3 2042 AM
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | |  |  |  |  |  | |  |  |  |
| Traffic Volume (veh/h) | 159 | 959 | 38 | 83 | 829 | 98 | 90 | 65 | 111 | 287 | 129 | 287 |
| Future Volume (veh/h) | 159 | 959 | 38 | 83 | 829 | 98 | 90 | 65 | 111 | 287 | 129 | 287 |
| 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 | 1400 | 1378 | 1378 | 1500 | 1453 | 1500 | 1500 | 1500 | 1500 | 1488 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 171 | 1031 | 41 | 89 | 891 | 105 | 97 | 70 | 119 | 309 | 139 | 309 |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Percent Heavy Veh, % | 0 | 2 | 2 | 0 | 4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Cap, veh/h | 299 | 1239 | 49 | 195 | 1206 | 790 | 360 | 77 | 131 | 345 | 420 | 462 |
| Arrive On Green | 0.05 | 0.32 | 0.32 | 0.04 | 0.44 | 0.44 | 0.06 | 0.15 | 0.15 | 0.19 | 0.28 | 0.28 |
| Sat Flow, veh/h | 1333 | 2567 | 102 | 1429 | 2761 | 1271 | 1429 | 499 | 848 | 1417 | 1500 | 1271 |
| Grp Volume(v), veh/h | 171 | 526 | 546 | 89 | 891 | 105 | 97 | 0 | 189 | 309 | 139 | 309 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 1309 | 1360 | 1429 | 1381 | 1271 | 1429 | 0 | 1347 | 1417 | 1500 | 1271 |
| Q Serve(g_s), s | 9.1 | 50.3 | 50.3 | 4.7 | 36.2 | 4.6 | 7.7 | 0.0 | 18.6 | 24.3 | 9.9 | 27.6 |
| Cycle Q Clear(g_c), s | 9.1 | 50.3 | 50.3 | 4.7 | 36.2 | 4.6 | 7.7 | 0.0 | 18.6 | 24.3 | 9.9 | 27.6 |
| Prop In Lane | 1.00 | | 0.08 | 1.00 | | 1.00 | 1.00 | | 0.63 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 299 | 632 | 656 | 195 | 1206 | 790 | 360 | 0 | 208 | 345 | 420 | 462 |
| V/C Ratio(X) | 0.57 | 0.83 | 0.83 | 0.46 | 0.74 | 0.13 | 0.27 | 0.00 | 0.91 | 0.89 | 0.33 | 0.67 |
| Avail Cap(c_a), veh/h | 337 | 632 | 656 | 195 | 1206 | 790 | 360 | 0 | 230 | 345 | 444 | 482 |
| HCM Platoon Ratio | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.78 | 0.78 | 0.78 | 0.87 | 0.87 | 0.87 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 24.4 | 40.9 | 40.9 | 28.0 | 31.6 | 10.5 | 44.8 | 0.0 | 56.1 | 37.8 | 38.5 | 36.1 |
| Incr Delay (d2), s/veh | 1.4 | 9.7 | 9.4 | 6.6 | 3.6 | 0.3 | 0.4 | 0.0 | 33.4 | 24.4 | 0.3 | 3.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 3.1 | 18.6 | 19.3 | 2.0 | 12.6 | 1.4 | 2.8 | 0.0 | 8.3 | 10.8 | 3.8 | 9.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 25.8 | 50.7 | 50.4 | 34.6 | 35.2 | 10.8 | 45.2 | 0.0 | 89.6 | 62.2 | 38.9 | 39.2 |
| LnGrp LOS | C | D | D | C | D | B | D | A | F | E | D | D |
| Approach Vol, veh/h | | 1243 | | | 1085 | | | 286 | | | 757 | |
| Approach Delay, s/veh | | 47.1 | | | 32.8 | | | 74.5 | | | 48.5 | |
| Approach LOS | | D | | | C | | | E | | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 9.0 | 71.2 | 12.0 | 42.8 | 15.2 | 64.9 | 29.0 | 25.8 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 63.0 | 8.0 | 40.0 | 15.0 | 53.0 | 25.0 | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 6.7 | 52.3 | 9.7 | 29.6 | 11.1 | 38.2 | 26.3 | 20.6 | | | | |
| Green Ext Time (p_c), s | 0.0 | 5.2 | 0.0 | 1.3 | 0.2 | 5.9 | 0.0 | 0.2 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 45.2 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |























HCM 6th Signalized Intersection Summary
5: McHugh Dr & Custer Ave

Alternatives 3 2042 School
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | |  |  |  |  |  | |  |  |  |
| Traffic Volume (veh/h) | 203 | 1134 | 62 | 36 | 900 | 120 | 109 | 61 | 92 | 202 | 43 | 175 |
| Future Volume (veh/h) | 203 | 1134 | 62 | 36 | 900 | 120 | 109 | 61 | 92 | 202 | 43 | 175 |
| 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 | 1350 | 1329 | 1329 | 1500 | 1477 | 1488 | 1500 | 1500 | 1500 | 1500 | 1500 | 1488 |
| Adj Flow Rate, veh/h | 228 | 1274 | 70 | 40 | 1011 | 135 | 122 | 69 | 103 | 227 | 48 | 197 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Percent Heavy Veh, % | 0 | 2 | 2 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Cap, veh/h | 260 | 1444 | 79 | 121 | 1482 | 809 | 280 | 76 | 113 | 224 | 269 | 343 |
| Arrive On Green | 0.06 | 0.39 | 0.39 | 0.03 | 0.53 | 0.53 | 0.07 | 0.14 | 0.14 | 0.11 | 0.18 | 0.18 |
| Sat Flow, veh/h | 1286 | 2434 | 134 | 1429 | 2806 | 1261 | 1429 | 543 | 811 | 1429 | 1500 | 1261 |
| Grp Volume(v), veh/h | 228 | 660 | 684 | 40 | 1011 | 135 | 122 | 0 | 172 | 227 | 48 | 197 |
| Grp Sat Flow(s),veh/h/ln | 1286 | 1262 | 1305 | 1429 | 1403 | 1261 | 1429 | 0 | 1354 | 1429 | 1500 | 1261 |
| Q Serve(g_s), s | 11.4 | 72.8 | 73.1 | 1.9 | 39.9 | 6.4 | 11.0 | 0.0 | 18.8 | 17.0 | 4.1 | 20.2 |
| Cycle Q Clear(g_c), s | 11.4 | 72.8 | 73.1 | 1.9 | 39.9 | 6.4 | 11.0 | 0.0 | 18.8 | 17.0 | 4.1 | 20.2 |
| Prop In Lane | 1.00 | | 0.10 | 1.00 | | 1.00 | 1.00 | | 0.60 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 260 | 749 | 774 | 121 | 1482 | 809 | 280 | 0 | 189 | 224 | 269 | 343 |
| V/C Ratio(X) | 0.88 | 0.88 | 0.88 | 0.33 | 0.68 | 0.17 | 0.44 | 0.00 | 0.91 | 1.01 | 0.18 | 0.57 |
| Avail Cap(c_a), veh/h | 329 | 749 | 774 | 130 | 1482 | 809 | 280 | 0 | 208 | 224 | 290 | 360 |
| HCM Platoon Ratio | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.65 | 0.65 | 0.65 | 0.82 | 0.82 | 0.82 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 27.3 | 40.7 | 40.8 | 30.5 | 26.1 | 10.8 | 50.8 | 0.0 | 63.6 | 52.2 | 52.1 | 47.1 |
| Incr Delay (d2), s/veh | 13.5 | 9.8 | 9.7 | 1.3 | 2.1 | 0.4 | 1.1 | 0.0 | 36.2 | 63.7 | 0.2 | 1.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 5.7 | 25.8 | 26.7 | 0.7 | 13.7 | 1.9 | 4.1 | 0.0 | 8.4 | 6.0 | 1.6 | 6.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 40.8 | 50.5 | 50.5 | 31.8 | 28.2 | 11.2 | 51.9 | 0.0 | 99.8 | 115.9 | 52.4 | 48.8 |
| LnGrp LOS | D | D | D | C | C | B | D | A | F | F | D | D |
| Approach Vol, veh/h | | 1572 | | | 1186 | | | 294 | | | 472 | |
| Approach Delay, s/veh | | 49.1 | | | 26.4 | | | 79.9 | | | 81.5 | |
| Approach LOS | | D | | | C | | | E | | | F | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 8.1 | 95.0 | 15.0 | 31.9 | 17.8 | 85.2 | 21.0 | 25.9 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 86.0 | 11.0 | 29.0 | 22.0 | 69.0 | 17.0 | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 3.9 | 75.1 | 13.0 | 22.2 | 13.4 | 41.9 | 19.0 | 20.8 | | | | |
| Green Ext Time (p_c), s | 0.0 | 6.7 | 0.0 | 0.4 | 0.4 | 8.9 | 0.0 | 0.2 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 48.4 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |

HCM 6th Signalized Intersection Summary
5: McHugh Dr & Custer Ave

Alternatives 3 2042 PM
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | |  |  |  |  |  | |  |  |  |
| Traffic Volume (veh/h) | 257 | 1313 | 27 | 20 | 1072 | 152 | 100 | 96 | 41 | 314 | 28 | 254 |
| Future Volume (veh/h) | 257 | 1313 | 27 | 20 | 1072 | 152 | 100 | 96 | 41 | 314 | 28 | 254 |
| 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 | 1400 | 1400 | 1400 | 1500 | 1488 | 1488 | 1500 | 1500 | 1500 | 1500 | 1500 | 1488 |
| Adj Flow Rate, veh/h | 265 | 1354 | 28 | 21 | 1105 | 157 | 103 | 99 | 42 | 324 | 29 | 262 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Cap, veh/h | 281 | 1602 | 33 | 120 | 1367 | 786 | 223 | 113 | 48 | 263 | 299 | 424 |
| Arrive On Green | 0.09 | 0.40 | 0.40 | 0.02 | 0.48 | 0.48 | 0.05 | 0.11 | 0.11 | 0.14 | 0.20 | 0.20 |
| Sat Flow, veh/h | 1333 | 2665 | 55 | 1429 | 2828 | 1261 | 1429 | 1000 | 424 | 1429 | 1500 | 1261 |
| Grp Volume(v), veh/h | 265 | 675 | 707 | 21 | 1105 | 157 | 103 | 0 | 141 | 324 | 29 | 262 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 1330 | 1390 | 1429 | 1414 | 1261 | 1429 | 0 | 1424 | 1429 | 1500 | 1261 |
| Q Serve(g_s), s | 18.5 | 69.1 | 69.2 | 1.1 | 49.7 | 8.0 | 8.0 | 0.0 | 14.6 | 21.0 | 2.4 | 26.1 |
| Cycle Q Clear(g_c), s | 18.5 | 69.1 | 69.2 | 1.1 | 49.7 | 8.0 | 8.0 | 0.0 | 14.6 | 21.0 | 2.4 | 26.1 |
| Prop In Lane | 1.00 | | 0.04 | 1.00 | | 1.00 | 1.00 | | 0.30 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 281 | 799 | 836 | 120 | 1367 | 786 | 223 | 0 | 161 | 263 | 299 | 424 |
| V/C Ratio(X) | 0.94 | 0.84 | 0.85 | 0.18 | 0.81 | 0.20 | 0.46 | 0.00 | 0.88 | 1.23 | 0.10 | 0.62 |
| Avail Cap(c_a), veh/h | 285 | 799 | 836 | 139 | 1367 | 786 | 223 | 0 | 218 | 263 | 360 | 476 |
| HCM Platoon Ratio | 0.66 | 0.66 | 0.66 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.62 | 0.62 | 0.62 | 0.80 | 0.80 | 0.80 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 41.4 | 38.9 | 38.9 | 28.3 | 32.8 | 12.1 | 56.3 | 0.0 | 65.5 | 52.6 | 49.0 | 41.7 |
| Incr Delay (d2), s/veh | 28.1 | 6.9 | 6.7 | 0.6 | 4.2 | 0.5 | 1.5 | 0.0 | 23.1 | 132.4 | 0.1 | 1.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 12.6 | 25.2 | 26.3 | 0.4 | 17.7 | 2.4 | 3.7 | 0.0 | 6.4 | 11.6 | 0.9 | 8.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 69.5 | 45.8 | 45.6 | 28.9 | 37.1 | 12.6 | 57.8 | 0.0 | 88.6 | 185.0 | 49.1 | 43.3 |
| LnGrp LOS | E | D | D | C | D | B | E | A | F | F | D | D |
| Approach Vol, veh/h | | 1647 | | | 1283 | | | 244 | | | 615 | |
| Approach Delay, s/veh | | 49.5 | | | 33.9 | | | 75.6 | | | 118.3 | |
| Approach LOS | | D | | | C | | | E | | | F | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 6.9 | 96.2 | 12.0 | 34.9 | 24.6 | 78.5 | 25.0 | 21.9 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.0 | 4.0 | 5.0 | 4.0 | 6.0 | 4.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 82.0 | 8.0 | 36.0 | 21.0 | 66.0 | 21.0 | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 3.1 | 71.2 | 10.0 | 28.1 | 20.5 | 51.7 | 23.0 | 16.6 | | | | |
| Green Ext Time (p_c), s | 0.0 | 6.6 | 0.0 | 0.5 | 0.0 | 7.3 | 0.0 | 0.3 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 57.1 | | | | | | | | |
| HCM 6th LOS | | | | E | | | | | | | | |

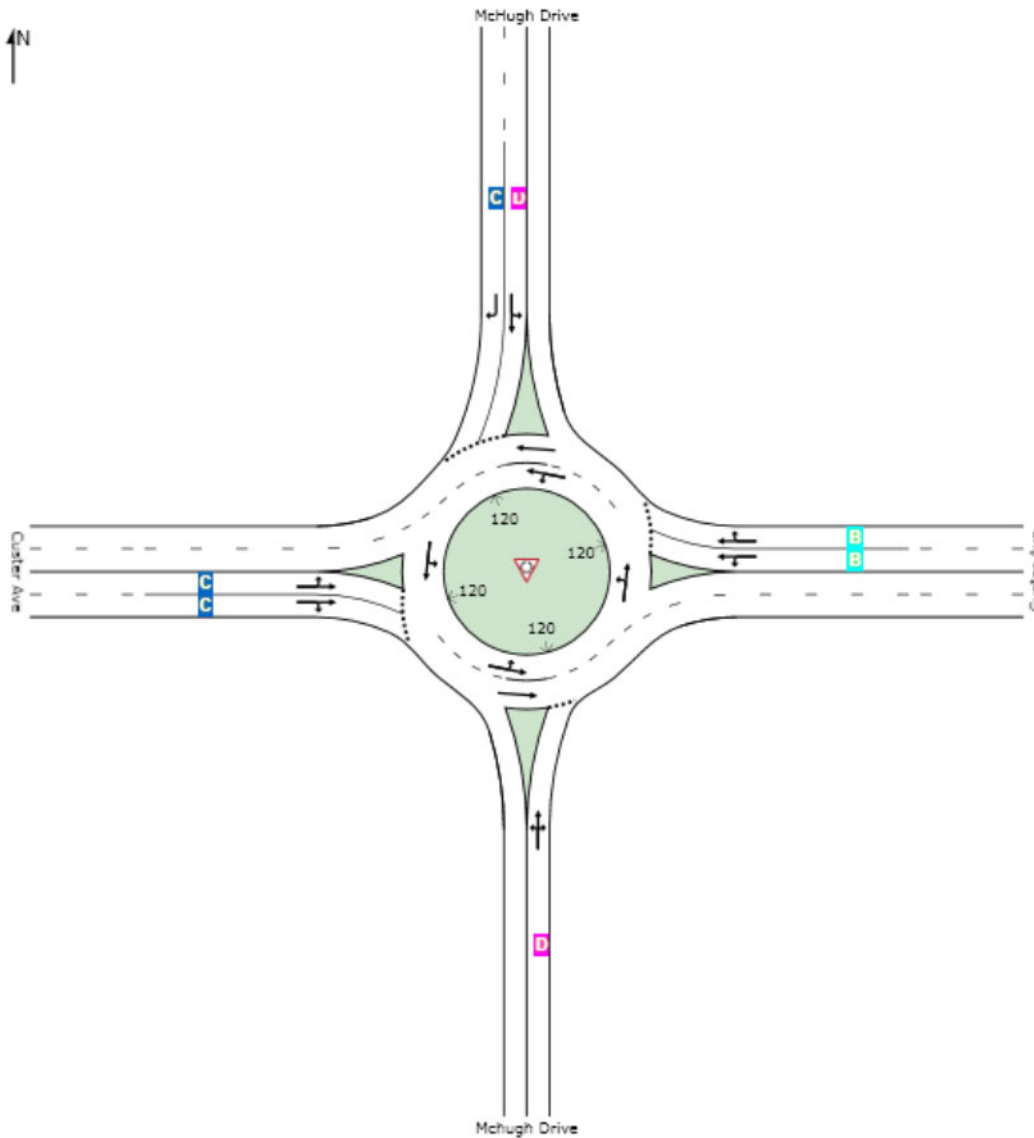
LEVEL OF SERVICE

Site: McHugh 2042 AM Alternative 4

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | D | B | D | C | C |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: McHugh 2042 AM Alternative 4

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Mchugh Drive | | | | | | | | | | | |
| 3 | L2 | 97 | 0.0 | 0.737 | 35.0 | LOS D | 4.0 | 100.4 | 0.91 | 1.11 | 24.0 |
| 8 | T1 | 70 | 0.0 | 0.737 | 35.0 | LOS D | 4.0 | 100.4 | 0.91 | 1.11 | 23.8 |
| 18 | R2 | 119 | 0.0 | 0.737 | 35.0 | LOS D | 4.0 | 100.4 | 0.91 | 1.11 | 23.3 |
| Approach | | 285 | 0.0 | 0.737 | 35.0 | LOS D | 4.0 | 100.4 | 0.91 | 1.11 | 23.7 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 89 | 0.0 | 0.566 | 11.4 | LOS B | 4.0 | 103.5 | 0.68 | 0.63 | 32.4 |
| 6 | T1 | 889 | 3.6 | 0.566 | 11.4 | LOS B | 4.0 | 103.6 | 0.68 | 0.63 | 32.3 |
| 16 | R2 | 105 | 0.0 | 0.566 | 11.4 | LOS B | 4.0 | 103.6 | 0.68 | 0.63 | 31.5 |
| Approach | | 1084 | 3.0 | 0.566 | 11.4 | LOS B | 4.0 | 103.6 | 0.68 | 0.63 | 32.2 |
| North: McHugh Drive | | | | | | | | | | | |
| 7 | L2 | 308 | 0.6 | 0.809 | 32.6 | LOS D | 6.1 | 154.1 | 0.89 | 1.14 | 24.2 |
| 4 | T1 | 138 | 0.0 | 0.809 | 32.6 | LOS D | 6.1 | 154.1 | 0.89 | 1.14 | 24.1 |
| 14 | R2 | 308 | 0.0 | 0.632 | 22.4 | LOS C | 3.5 | 86.6 | 0.83 | 0.96 | 27.1 |
| Approach | | 754 | 0.2 | 0.809 | 28.4 | LOS D | 6.1 | 154.1 | 0.86 | 1.07 | 25.3 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 171 | 0.0 | 0.781 | 22.6 | LOS C | 8.3 | 210.1 | 0.92 | 1.12 | 27.8 |
| 2 | T1 | 1029 | 1.9 | 0.781 | 22.6 | LOS C | 8.3 | 210.1 | 0.92 | 1.11 | 27.9 |
| 12 | R2 | 41 | 0.0 | 0.781 | 22.6 | LOS C | 8.3 | 209.4 | 0.92 | 1.11 | 27.3 |
| Approach | | 1240 | 1.6 | 0.781 | 22.6 | LOS C | 8.3 | 210.1 | 0.92 | 1.11 | 27.8 |
| All Vehicles | | 3364 | 1.6 | 0.809 | 21.3 | LOS C | 8.3 | 210.1 | 0.83 | 0.95 | 28.0 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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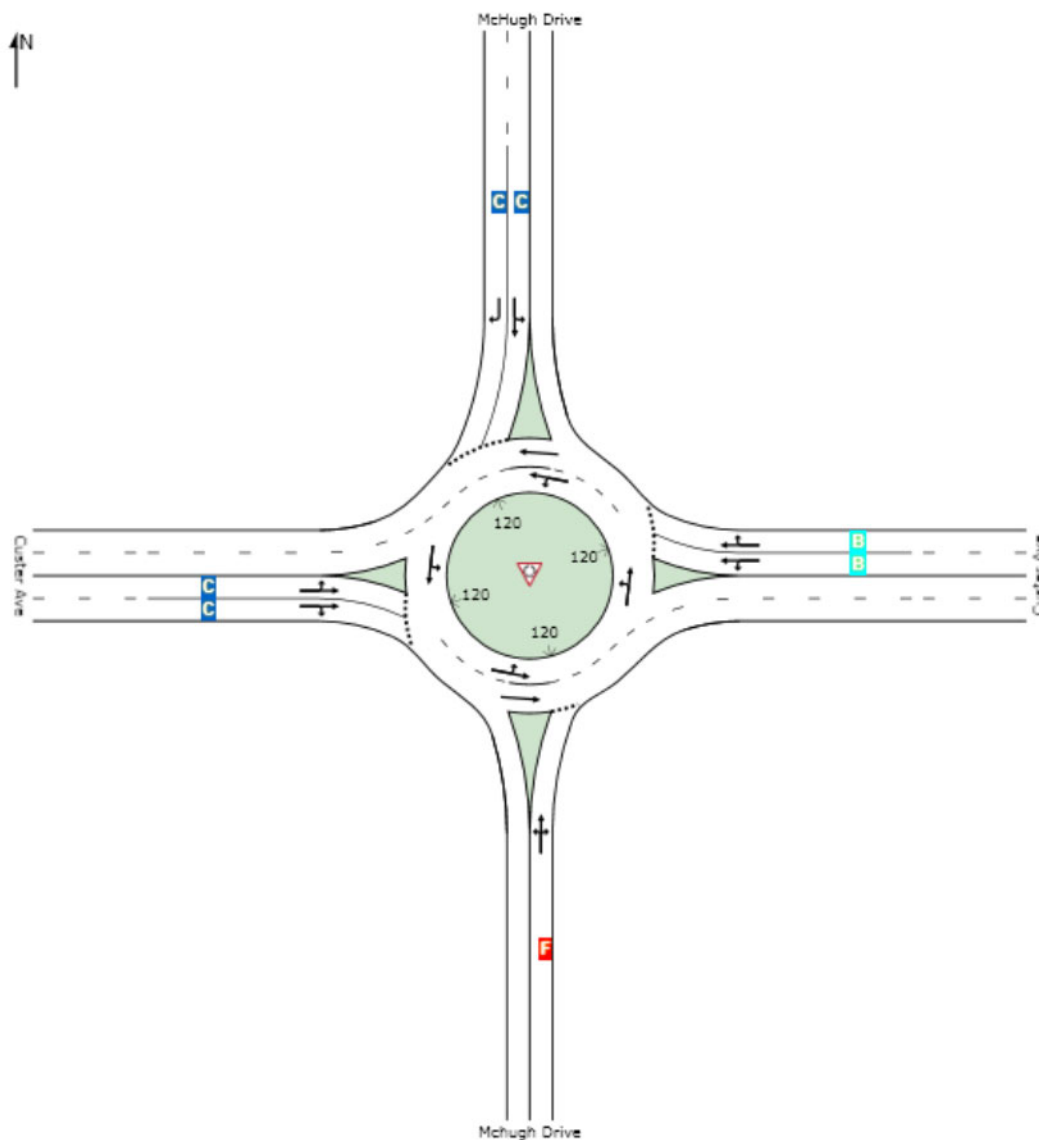
LEVEL OF SERVICE

Site: McHugh 2042 School Alternative 4

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | F | B | C | C | C |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: McHugh 2042 School Alternative 4

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Mchugh Drive | | | | | | | | | | | |
| 3 | L2 | 123 | 0.0 | 0.926 | 69.8 | LOS F | 7.2 | 180.3 | 0.98 | 1.44 | 17.5 |
| 8 | T1 | 69 | 0.0 | 0.926 | 69.8 | LOS F | 7.2 | 180.3 | 0.98 | 1.44 | 17.5 |
| 18 | R2 | 103 | 1.5 | 0.926 | 69.8 | LOS F | 7.2 | 180.3 | 0.98 | 1.44 | 17.2 |
| Approach | | 295 | 0.5 | 0.926 | 69.8 | LOS F | 7.2 | 180.3 | 0.98 | 1.44 | 17.4 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 40 | 0.0 | 0.664 | 14.9 | LOS B | 5.8 | 147.1 | 0.80 | 0.86 | 31.1 |
| 6 | T1 | 1012 | 1.5 | 0.664 | 14.9 | LOS B | 5.8 | 147.1 | 0.80 | 0.86 | 30.9 |
| 16 | R2 | 135 | 1.2 | 0.664 | 14.9 | LOS B | 5.8 | 147.1 | 0.80 | 0.86 | 30.0 |
| Approach | | 1188 | 1.4 | 0.664 | 14.9 | LOS B | 5.8 | 147.1 | 0.80 | 0.86 | 30.8 |
| North: McHugh Drive | | | | | | | | | | | |
| 7 | L2 | 227 | 0.0 | 0.534 | 17.4 | LOS C | 2.6 | 63.8 | 0.79 | 0.88 | 28.5 |
| 4 | T1 | 48 | 0.0 | 0.534 | 17.4 | LOS C | 2.6 | 63.8 | 0.79 | 0.88 | 28.3 |
| 14 | R2 | 197 | 1.0 | 0.440 | 16.4 | LOS C | 1.9 | 47.2 | 0.78 | 0.84 | 29.2 |
| Approach | | 472 | 0.4 | 0.534 | 17.0 | LOS C | 2.6 | 63.8 | 0.79 | 0.86 | 28.8 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 228 | 0.0 | 0.794 | 19.9 | LOS C | 10.6 | 267.4 | 0.93 | 0.96 | 28.7 |
| 2 | T1 | 1276 | 1.7 | 0.794 | 19.9 | LOS C | 10.6 | 267.4 | 0.93 | 0.96 | 28.8 |
| 12 | R2 | 70 | 1.8 | 0.794 | 20.0 | LOS C | 10.5 | 265.8 | 0.92 | 0.96 | 28.2 |
| Approach | | 1574 | 1.5 | 0.794 | 19.9 | LOS C | 10.6 | 267.4 | 0.93 | 0.96 | 28.7 |
| All Vehicles | | 3529 | 1.2 | 0.926 | 22.0 | LOS C | 10.6 | 267.4 | 0.87 | 0.96 | 27.8 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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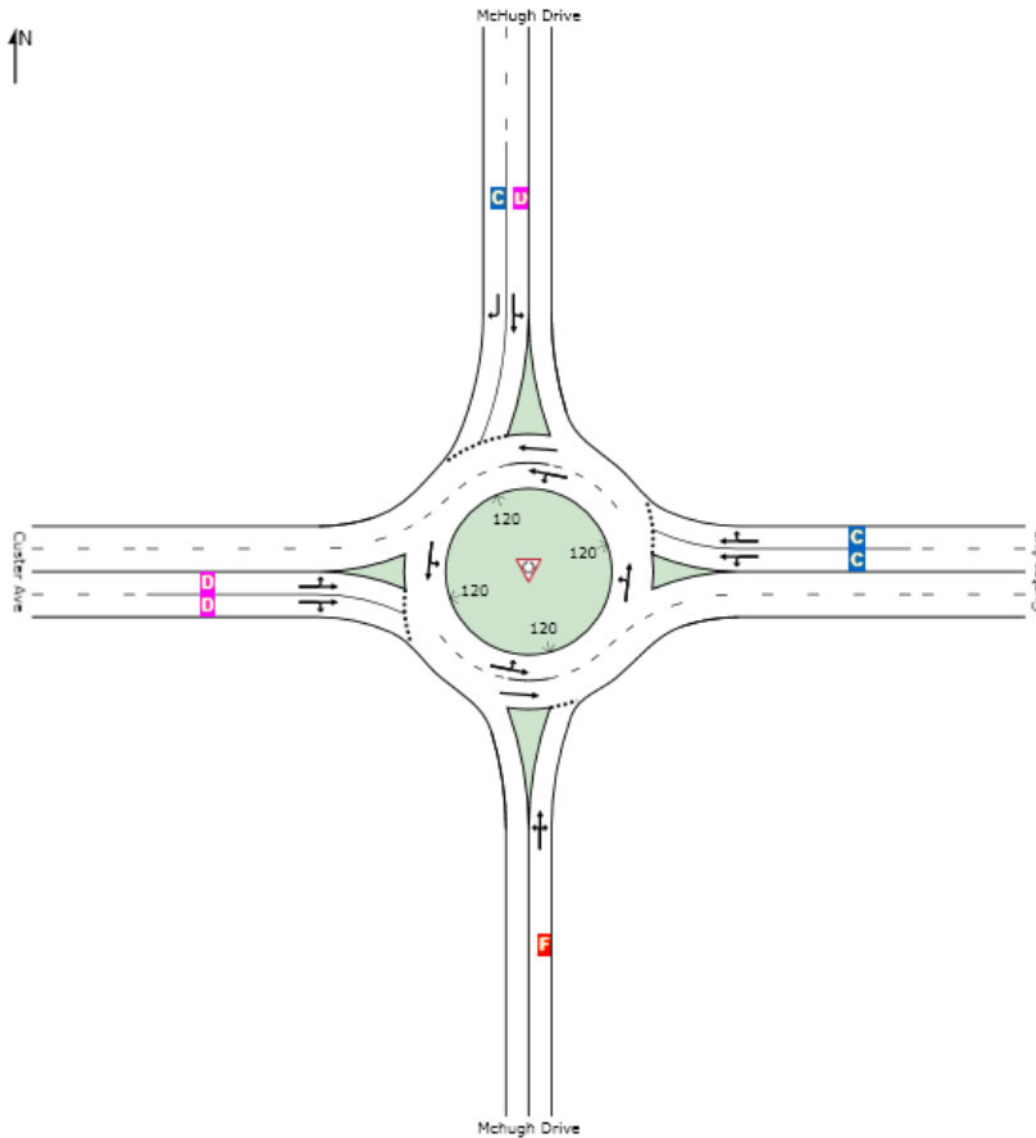
LEVEL OF SERVICE

Site: McHugh 2042 PM Alternative 4

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | F | C | D | D | D |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: McHugh 2042 PM Alternative 4

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Mchugh Drive | | | | | | | | | | | |
| 3 | L2 | 103 | 0.0 | 0.902 | 72.5 | LOS F | 5.9 | 148.3 | 0.98 | 1.55 | 14.4 |
| 8 | T1 | 99 | 0.0 | 0.902 | 72.5 | LOS F | 5.9 | 148.3 | 0.98 | 1.55 | 13.8 |
| 18 | R2 | 42 | 0.0 | 0.902 | 72.5 | LOS F | 5.9 | 148.3 | 0.98 | 1.55 | 14.0 |
| Approach | | 245 | 0.0 | 0.902 | 72.5 | LOS F | 5.9 | 148.3 | 0.98 | 1.55 | 14.1 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 21 | 0.0 | 0.748 | 19.3 | LOS C | 7.8 | 196.5 | 0.89 | 1.11 | 22.0 |
| 6 | T1 | 1106 | 0.8 | 0.748 | 19.3 | LOS C | 7.8 | 196.5 | 0.89 | 1.11 | 20.6 |
| 16 | R2 | 157 | 0.9 | 0.748 | 19.3 | LOS C | 7.8 | 196.4 | 0.89 | 1.11 | 20.9 |
| Approach | | 1284 | 0.8 | 0.748 | 19.3 | LOS C | 7.8 | 196.5 | 0.89 | 1.11 | 20.7 |
| North: McHugh Drive | | | | | | | | | | | |
| 7 | L2 | 324 | 0.0 | 0.713 | 26.9 | LOS D | 4.2 | 105.4 | 0.87 | 1.12 | 19.8 |
| 4 | T1 | 29 | 0.0 | 0.713 | 26.9 | LOS D | 4.2 | 105.4 | 0.87 | 1.12 | 18.7 |
| 14 | R2 | 262 | 0.6 | 0.611 | 23.7 | LOS C | 3.1 | 77.0 | 0.84 | 1.02 | 19.9 |
| Approach | | 615 | 0.3 | 0.713 | 25.5 | LOS D | 4.2 | 105.4 | 0.86 | 1.08 | 19.8 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 265 | 0.0 | 0.870 | 27.3 | LOS D | 14.7 | 368.1 | 1.00 | 1.32 | 20.2 |
| 2 | T1 | 1355 | 0.3 | 0.870 | 27.3 | LOS D | 14.7 | 368.1 | 1.00 | 1.32 | 19.2 |
| 12 | R2 | 28 | 0.0 | 0.870 | 27.3 | LOS D | 14.7 | 367.7 | 1.00 | 1.32 | 19.5 |
| Approach | | 1648 | 0.2 | 0.870 | 27.3 | LOS D | 14.7 | 368.1 | 1.00 | 1.32 | 19.3 |
| All Vehicles | | 3792 | 0.4 | 0.902 | 27.2 | LOS D | 14.7 | 368.1 | 0.94 | 1.23 | 19.4 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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HCM 6th Signalized Intersection Summary
6: Villard Ave/Private Approach & Custer Ave

Alternatives 1 2042 - AM

10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|-------|------|------|------|-------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 10 | 1229 | 93 | 60 | 1039 | 15 | 24 | 5 | 83 | 5 | 15 | 10 |
| Future Volume (veh/h) | 10 | 1229 | 93 | 60 | 1039 | 15 | 24 | 5 | 83 | 5 | 15 | 10 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1400 | 1389 | 1389 | 1383 | 1477 | 1477 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 11 | 1366 | 103 | 67 | 1154 | 17 | 27 | 6 | 92 | 6 | 17 | 11 |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Percent Heavy Veh, % | 0 | 1 | 1 | 10 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 535 | 2056 | 154 | 472 | 2338 | 34 | 135 | 7 | 111 | 36 | 59 | 30 |
| Arrive On Green | 1.00 | 1.00 | 1.00 | 0.83 | 0.83 | 0.83 | 0.09 | 0.09 | 0.09 | 0.09 | 0.09 | 0.09 |
| Sat Flow, veh/h | 682 | 2488 | 187 | 506 | 2830 | 42 | 2106 | 79 | 1205 | 47 | 636 | 327 |
| Grp Volume(v), veh/h | 11 | 722 | 747 | 67 | 572 | 599 | 27 | 0 | 98 | 34 | 0 | 0 |
| Grp Sat Flow(s),veh/h/ln | 682 | 1320 | 1355 | 506 | 1403 | 1469 | 2106 | 0 | 1283 | 1009 | 0 | 0 |
| Q Serve(g_s), s | 0.3 | 0.0 | 0.0 | 3.6 | 16.1 | 16.2 | 0.0 | 0.0 | 10.1 | 0.1 | 0.0 | 0.0 |
| Cycle Q Clear(g_c), s | 16.5 | 0.0 | 0.0 | 3.6 | 16.1 | 16.2 | 5.5 | 0.0 | 10.1 | 10.2 | 0.0 | 0.0 |
| Prop In Lane | 1.00 | | 0.14 | 1.00 | | 0.03 | 1.00 | | 0.94 | 0.18 | | 0.32 |
| Lane Grp Cap(c), veh/h | 535 | 1090 | 1120 | 472 | 1159 | 1214 | 135 | 0 | 118 | 125 | 0 | 0 |
| V/C Ratio(X) | 0.02 | 0.66 | 0.67 | 0.14 | 0.49 | 0.49 | 0.20 | 0.00 | 0.83 | 0.27 | 0.00 | 0.00 |
| Avail Cap(c_a), veh/h | 535 | 1090 | 1120 | 472 | 1159 | 1214 | 245 | 0 | 185 | 198 | 0 | 0 |
| HCM Platoon Ratio | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.38 | 0.38 | 0.38 | 0.56 | 0.56 | 0.56 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |
| Uniform Delay (d), s/veh | 1.2 | 0.0 | 0.0 | 2.3 | 3.4 | 3.4 | 58.1 | 0.0 | 60.2 | 57.0 | 0.0 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 1.2 | 1.2 | 0.4 | 0.8 | 0.8 | 0.7 | 0.0 | 15.8 | 1.2 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 0.4 | 0.4 | 0.3 | 3.6 | 3.7 | 0.9 | 0.0 | 3.9 | 1.1 | 0.0 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 1.2 | 1.2 | 1.2 | 2.7 | 4.3 | 4.2 | 58.8 | 0.0 | 76.1 | 58.2 | 0.0 | 0.0 |
| LnGrp LOS | A | A | A | A | A | A | E | A | E | E | A | A |
| Approach Vol, veh/h | | 1480 | | | 1238 | | | 125 | | | | 34 |
| Approach Delay, s/veh | | 1.2 | | | 4.2 | | | 72.3 | | | | 58.2 |
| Approach LOS | | A | | | A | | | E | | | | E |
| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 117.0 | | 18.0 | | 117.0 | | 18.0 | | | | |
| Change Period (Y+Rc), s | | 5.5 | | 5.5 | | 5.5 | | 5.5 | | | | |
| Max Green Setting (Gmax), s | | 104.5 | | 19.5 | | 104.5 | | 19.5 | | | | |
| Max Q Clear Time (g_c+I1), s | | 18.5 | | 12.2 | | 18.2 | | 12.1 | | | | |
| Green Ext Time (p_c), s | | 17.8 | | 0.0 | | 12.0 | | 0.3 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 6.3 | | | | | | | | |
| HCM 6th LOS | | | | A | | | | | | | | |

HCM 6th Signalized Intersection Summary
6: Villard Ave/Private Approach & Custer Ave

Alternatives 1 2042 School
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|-------|------|------|------|-------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 10 | 1413 | 49 | 47 | 1061 | 15 | 28 | 5 | 112 | 5 | 15 | 10 |
| Future Volume (veh/h) | 10 | 1413 | 49 | 47 | 1061 | 15 | 28 | 5 | 112 | 5 | 15 | 10 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1350 | 1339 | 1339 | 1500 | 1477 | 1477 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 11 | 1606 | 56 | 53 | 1206 | 17 | 32 | 6 | 127 | 6 | 17 | 11 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Percent Heavy Veh, % | 0 | 1 | 1 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 305 | 1962 | 68 | 236 | 2215 | 31 | 145 | 8 | 177 | 39 | 82 | 44 |
| Arrive On Green | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.14 | 0.14 | 0.14 | 0.14 | 0.14 | 0.14 |
| Sat Flow, veh/h | 329 | 2509 | 87 | 240 | 2832 | 40 | 1108 | 58 | 1222 | 73 | 568 | 307 |
| Grp Volume(v), veh/h | 11 | 812 | 850 | 53 | 597 | 626 | 32 | 0 | 133 | 34 | 0 | 0 |
| Grp Sat Flow(s),veh/h/ln | 329 | 1272 | 1324 | 240 | 1403 | 1469 | 1108 | 0 | 1280 | 948 | 0 | 0 |
| Q Serve(g_s), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 14.9 | 0.2 | 0.0 | 0.0 |
| Cycle Q Clear(g_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 9.2 | 0.0 | 14.9 | 15.1 | 0.0 | 0.0 |
| Prop In Lane | 1.00 | | 0.07 | 1.00 | | 0.03 | 1.00 | | 0.95 | 0.18 | | 0.32 |
| Lane Grp Cap(c), veh/h | 305 | 995 | 1035 | 236 | 1097 | 1149 | 145 | 0 | 185 | 165 | 0 | 0 |
| V/C Ratio(X) | 0.04 | 0.82 | 0.82 | 0.22 | 0.54 | 0.54 | 0.22 | 0.00 | 0.72 | 0.21 | 0.00 | 0.00 |
| Avail Cap(c_a), veh/h | 305 | 995 | 1035 | 236 | 1097 | 1149 | 145 | 0 | 185 | 165 | 0 | 0 |
| HCM Platoon Ratio | 2.00 | 2.00 | 2.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l) | 0.30 | 0.30 | 0.30 | 0.47 | 0.47 | 0.47 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |
| Uniform Delay (d), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 58.8 | 0.0 | 61.2 | 56.4 | 0.0 | 0.0 |
| Incr Delay (d2), s/veh | 0.1 | 2.3 | 2.3 | 1.0 | 0.9 | 0.9 | 3.5 | 0.0 | 21.2 | 2.8 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 0.6 | 0.7 | 0.1 | 0.3 | 0.3 | 1.3 | 0.0 | 6.0 | 1.3 | 0.0 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.1 | 2.3 | 2.3 | 1.0 | 0.9 | 0.9 | 62.3 | 0.0 | 82.5 | 59.2 | 0.0 | 0.0 |
| LnGrp LOS | A | A | A | A | A | A | E | A | F | E | A | A |
| Approach Vol, veh/h | | 1673 | | | 1276 | | | 165 | | | | 34 |
| Approach Delay, s/veh | | 2.3 | | | 0.9 | | | 78.6 | | | | 59.2 |
| Approach LOS | | A | | | A | | | E | | | | E |
| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 122.8 | | 27.2 | | 122.8 | | 27.2 | | | | |
| Change Period (Y+Rc), s | | 5.5 | | 5.5 | | 5.5 | | 5.5 | | | | |
| Max Green Setting (Gmax), s | | 117.3 | | 21.7 | | 117.3 | | 21.7 | | | | |
| Max Q Clear Time (g_c+I1), s | | 2.0 | | 17.1 | | 2.0 | | 16.9 | | | | |
| Green Ext Time (p_c), s | | 24.5 | | 0.0 | | 14.6 | | 0.3 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 6.4 | | | | | | | | |
| HCM 6th LOS | | | | A | | | | | | | | |

HCM 6th Signalized Intersection Summary
6: Villard Ave/Private Approach & Custer Ave

Alternatives 1 2042 PM
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|-------|------|------|------|-------|------|-------|-------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 10 | 1611 | 59 | 85 | 1237 | 15 | 18 | 5 | 146 | 5 | 15 | 10 |
| Future Volume (veh/h) | 10 | 1611 | 59 | 85 | 1237 | 15 | 18 | 5 | 146 | 5 | 15 | 10 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1400 | 1400 | 1400 | 1500 | 1488 | 1488 | 1406 | 1500 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 10 | 1661 | 61 | 88 | 1275 | 15 | 19 | 5 | 151 | 5 | 15 | 10 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 1 | 1 | 8 | 0 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 303 | 2085 | 76 | 228 | 2280 | 27 | 103 | 5 | 161 | 30 | 58 | 30 |
| Arrive On Green | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 |
| Sat Flow, veh/h | 320 | 2617 | 96 | 226 | 2862 | 34 | 1042 | 41 | 1236 | 15 | 447 | 231 |
| Grp Volume(v), veh/h | 10 | 841 | 881 | 88 | 630 | 660 | 19 | 0 | 156 | 30 | 0 | 0 |
| Grp Sat Flow(s),veh/h/ln | 320 | 1330 | 1383 | 226 | 1414 | 1482 | 1042 | 0 | 1277 | 693 | 0 | 0 |
| Q Serve(g_s), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 18.2 | 0.2 | 0.0 | 0.0 |
| Cycle Q Clear(g_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.7 | 0.0 | 18.2 | 18.4 | 0.0 | 0.0 |
| Prop In Lane | 1.00 | | 0.07 | 1.00 | | 0.02 | 1.00 | | 0.97 | 0.17 | | 0.33 |
| Lane Grp Cap(c), veh/h | 303 | 1060 | 1102 | 228 | 1126 | 1181 | 103 | 0 | 166 | 118 | 0 | 0 |
| V/C Ratio(X) | 0.03 | 0.79 | 0.80 | 0.39 | 0.56 | 0.56 | 0.18 | 0.00 | 0.94 | 0.25 | 0.00 | 0.00 |
| Avail Cap(c_a), veh/h | 303 | 1060 | 1102 | 228 | 1126 | 1181 | 103 | 0 | 166 | 118 | 0 | 0 |
| HCM Platoon Ratio | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.20 | 0.20 | 0.20 | 0.37 | 0.37 | 0.37 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |
| Uniform Delay (d), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 59.7 | 0.0 | 64.7 | 58.3 | 0.0 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 1.3 | 1.3 | 1.8 | 0.7 | 0.7 | 3.9 | 0.0 | 55.4 | 5.1 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 0.4 | 0.4 | 0.1 | 0.2 | 0.2 | 0.8 | 0.0 | 8.5 | 1.2 | 0.0 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 1.3 | 1.3 | 1.8 | 0.7 | 0.7 | 63.6 | 0.0 | 120.1 | 63.4 | 0.0 | 0.0 |
| LnGrp LOS | A | A | A | A | A | A | E | A | F | E | A | A |
| Approach Vol, veh/h | | 1732 | | | 1378 | | | 175 | | | | 30 |
| Approach Delay, s/veh | | 1.3 | | | 0.8 | | | 113.9 | | | | 63.4 |
| Approach LOS | | A | | | A | | | F | | | | E |
| Timer - Assigned Phs | | 2 | | 4 | | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 125.0 | | 25.0 | | 125.0 | | 25.0 | | | | |
| Change Period (Y+Rc), s | | 5.5 | | 5.5 | | 5.5 | | 5.5 | | | | |
| Max Green Setting (Gmax), s | | 119.5 | | 19.5 | | 119.5 | | 19.5 | | | | |
| Max Q Clear Time (g_c+I1), s | | 2.0 | | 20.4 | | 2.0 | | 20.2 | | | | |
| Green Ext Time (p_c), s | | 26.9 | | 0.0 | | 19.4 | | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 7.6 | | | | | | | | |
| HCM 6th LOS | | | | A | | | | | | | | |

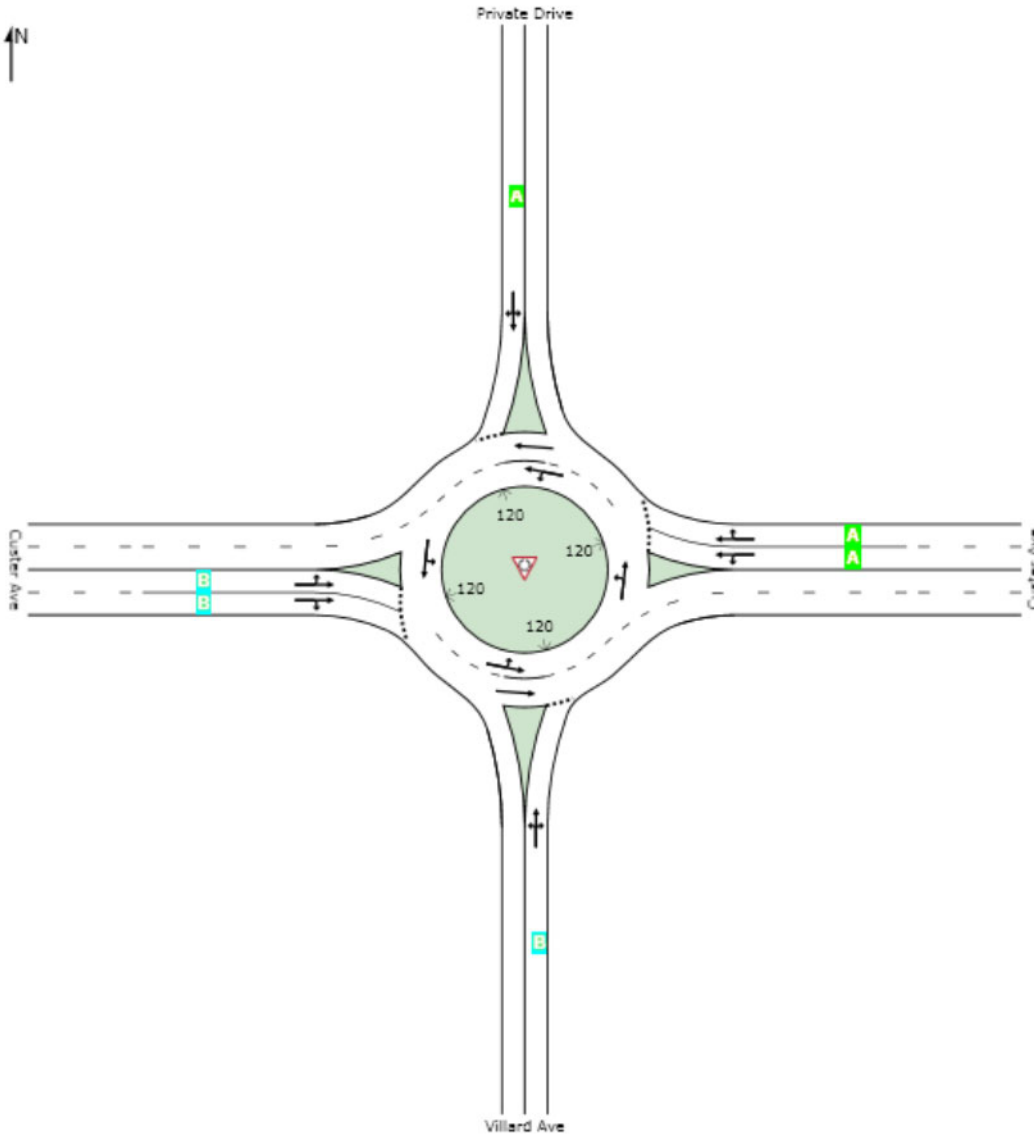
LEVEL OF SERVICE

 Site: Villard 2042 AM Alternative 2

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | B | A | A | B | A |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Villard 2042 AM Alternative 2

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Villard Ave | | | | | | | | | | | |
| 3 | L2 | 27 | 0.0 | 0.286 | 13.0 | LOS B | 1.0 | 25.5 | 0.76 | 0.78 | 31.4 |
| 8 | T1 | 6 | 0.0 | 0.286 | 13.0 | LOS B | 1.0 | 25.5 | 0.76 | 0.78 | 31.1 |
| 18 | R2 | 92 | 0.0 | 0.286 | 13.0 | LOS B | 1.0 | 25.5 | 0.76 | 0.78 | 30.2 |
| Approach | | 124 | 0.0 | 0.286 | 13.0 | LOS B | 1.0 | 25.5 | 0.76 | 0.78 | 30.5 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 66 | 9.8 | 0.480 | 7.8 | LOS A | 3.4 | 87.9 | 0.24 | 0.09 | 34.0 |
| 6 | T1 | 1151 | 2.4 | 0.480 | 7.7 | LOS A | 3.5 | 88.6 | 0.24 | 0.10 | 34.2 |
| 16 | R2 | 17 | 0.0 | 0.480 | 7.7 | LOS A | 3.5 | 88.6 | 0.24 | 0.10 | 33.3 |
| Approach | | 1234 | 2.8 | 0.480 | 7.7 | LOS A | 3.5 | 88.6 | 0.24 | 0.10 | 34.2 |
| North: Private Drive | | | | | | | | | | | |
| 7 | L2 | 6 | 0.0 | 0.069 | 8.4 | LOS A | 0.2 | 5.6 | 0.68 | 0.68 | 33.7 |
| 4 | T1 | 17 | 0.0 | 0.069 | 8.4 | LOS A | 0.2 | 5.6 | 0.68 | 0.68 | 33.5 |
| 14 | R2 | 11 | 0.0 | 0.069 | 8.4 | LOS A | 0.2 | 5.6 | 0.68 | 0.68 | 32.4 |
| Approach | | 33 | 0.0 | 0.069 | 8.4 | LOS A | 0.2 | 5.6 | 0.68 | 0.68 | 33.2 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 11 | 0.0 | 0.595 | 10.1 | LOS B | 5.1 | 129.4 | 0.45 | 0.25 | 33.4 |
| 2 | T1 | 1361 | 1.4 | 0.595 | 10.1 | LOS B | 5.1 | 129.7 | 0.45 | 0.25 | 33.2 |
| 12 | R2 | 103 | 0.0 | 0.595 | 10.1 | LOS B | 5.1 | 129.7 | 0.45 | 0.25 | 32.1 |
| Approach | | 1475 | 1.3 | 0.595 | 10.1 | LOS B | 5.1 | 129.7 | 0.45 | 0.25 | 33.1 |
| All Vehicles | | 2866 | 1.9 | 0.595 | 9.2 | LOS A | 5.1 | 129.7 | 0.38 | 0.21 | 33.4 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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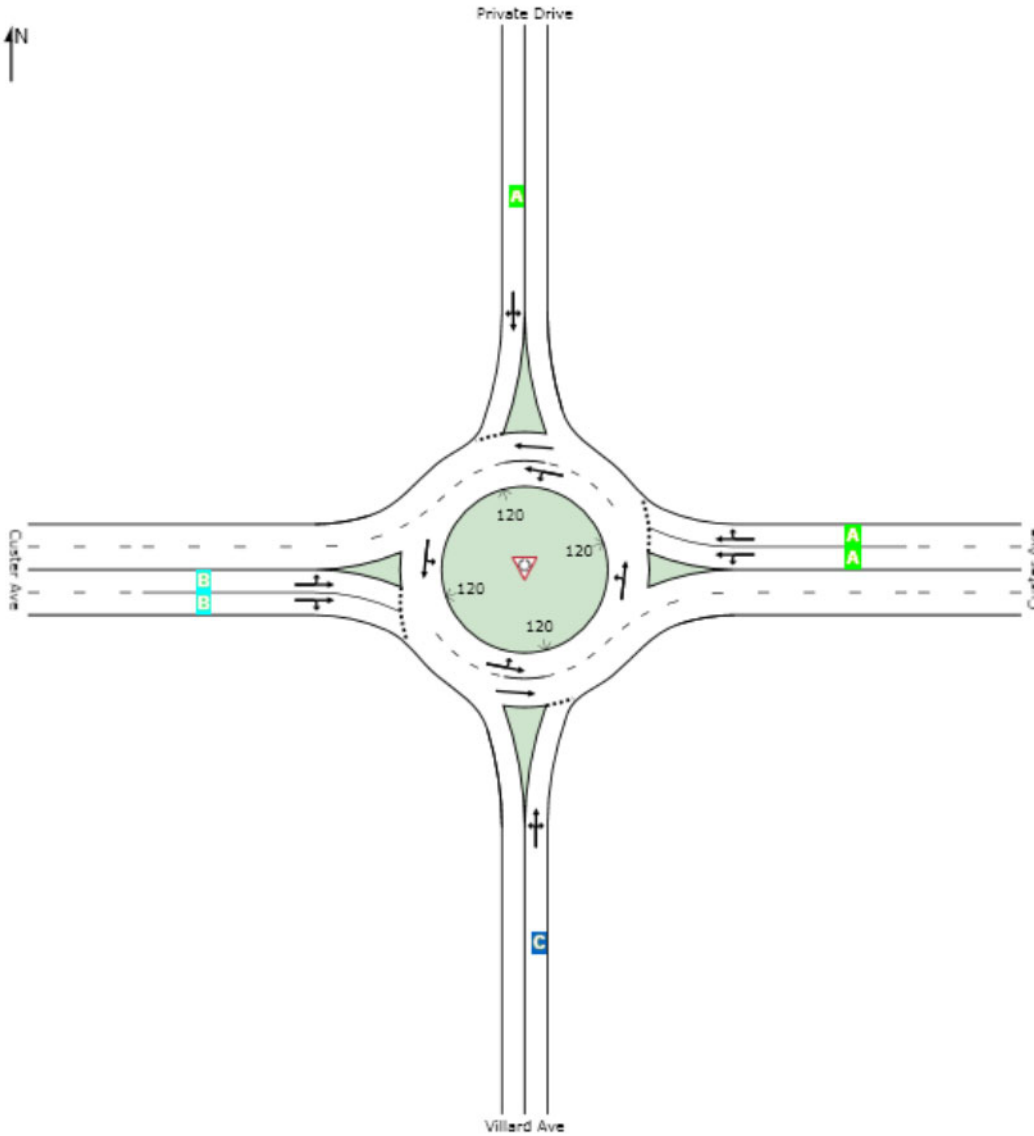
LEVEL OF SERVICE

 Site: Villard 2042 School Alternative 2

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | C | A | A | B | B |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c > 1$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Villard 2042 School Alternative 2

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|-----------------------------|------------|------------------|----------------------|------------------|--------------------------------------|-------------------------|--------------|--------------------------------|----------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Villard Ave | | | | | | | | | | | |
| 3 | L2 | 32 | 0.0 | 0.471 | 21.5 | LOS C | 1.8 | 46.4 | 0.85 | 0.93 | 28.1 |
| 8 | T1 | 6 | 0.0 | 0.471 | 21.5 | LOS C | 1.8 | 46.4 | 0.85 | 0.93 | 27.9 |
| 18 | R2 | 127 | 1.2 | 0.471 | 21.5 | LOS C | 1.8 | 46.4 | 0.85 | 0.93 | 27.2 |
| Approach | | 165 | 0.9 | 0.471 | 21.5 | LOS C | 1.8 | 46.4 | 0.85 | 0.93 | 27.4 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 53 | 0.0 | 0.496 | 8.0 | LOS A | 3.7 | 93.9 | 0.27 | 0.11 | 34.3 |
| 6 | T1 | 1206 | 2.2 | 0.496 | 8.0 | LOS A | 3.7 | 93.9 | 0.27 | 0.11 | 34.1 |
| 16 | R2 | 17 | 0.0 | 0.496 | 8.0 | LOS A | 3.7 | 93.8 | 0.26 | 0.11 | 33.1 |
| Approach | | 1276 | 2.1 | 0.496 | 8.0 | LOS A | 3.7 | 93.9 | 0.27 | 0.11 | 34.1 |
| North: Private Drive | | | | | | | | | | | |
| 7 | L2 | 6 | 0.0 | 0.074 | 8.8 | LOS A | 0.2 | 6.0 | 0.69 | 0.69 | 33.6 |
| 4 | T1 | 17 | 0.0 | 0.074 | 8.8 | LOS A | 0.2 | 6.0 | 0.69 | 0.69 | 33.3 |
| 14 | R2 | 11 | 0.0 | 0.074 | 8.8 | LOS A | 0.2 | 6.0 | 0.69 | 0.69 | 32.3 |
| Approach | | 34 | 0.0 | 0.074 | 8.8 | LOS A | 0.2 | 6.0 | 0.69 | 0.69 | 33.0 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 11 | 0.0 | 0.660 | 11.5 | LOS B | 6.8 | 170.1 | 0.47 | 0.24 | 32.8 |
| 2 | T1 | 1606 | 0.9 | 0.660 | 11.5 | LOS B | 6.8 | 170.3 | 0.47 | 0.24 | 32.5 |
| 12 | R2 | 56 | 0.0 | 0.660 | 11.5 | LOS B | 6.8 | 170.3 | 0.47 | 0.24 | 31.5 |
| Approach | | 1673 | 0.9 | 0.660 | 11.5 | LOS B | 6.8 | 170.3 | 0.47 | 0.24 | 32.5 |
| All Vehicles | | 3148 | 1.4 | 0.660 | 10.5 | LOS B | 6.8 | 170.3 | 0.41 | 0.23 | 32.8 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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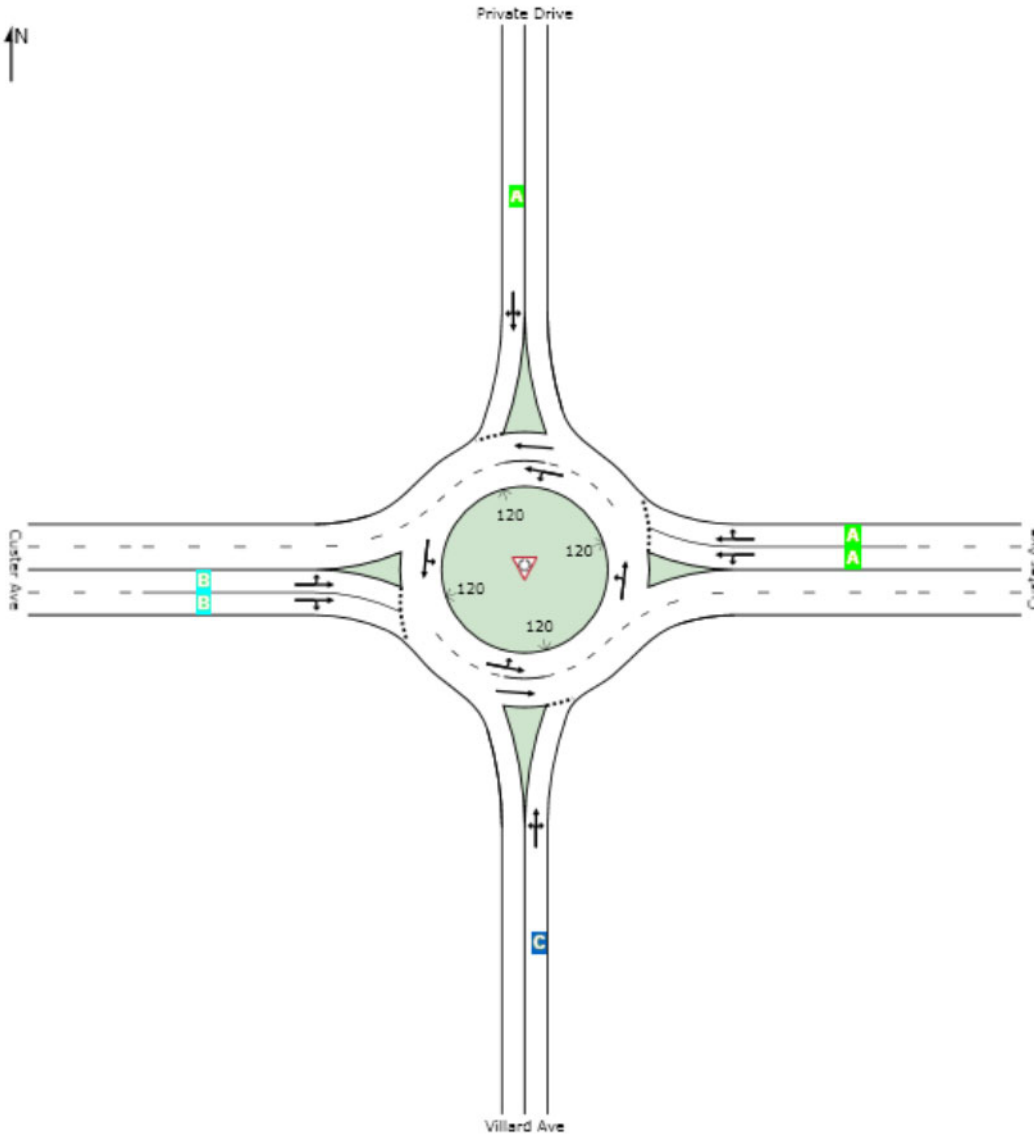
LEVEL OF SERVICE

 Site: Villard 2042 PM Alternative 2

Roundabout

All Movement Classes

| | South | East | North | West | Intersection |
|-----|-------|------|-------|------|--------------|
| LOS | C | A | A | B | B |



Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if $v/c >$ irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: Villard 2042 PM Alternative 2

Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|-------------------|--------------|-----------------------------|-------------------|
| Mov ID | OD Mov | Demand Flows Total veh/h | Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Queue Distance ft | Prop. Queued | Effective Stop Rate per veh | Average Speed mph |
| South: Villard Ave | | | | | | | | | | | |
| 3 | L2 | 18 | 7.7 | 0.520 | 24.5 | LOS C | 2.1 | 52.5 | 0.86 | 1.00 | 20.7 |
| 8 | T1 | 5 | 0.0 | 0.520 | 24.5 | LOS C | 2.1 | 52.5 | 0.86 | 1.00 | 19.5 |
| 18 | R2 | 150 | 1.8 | 0.520 | 24.5 | LOS C | 2.1 | 52.5 | 0.86 | 1.00 | 19.8 |
| Approach | | 174 | 2.4 | 0.520 | 24.5 | LOS C | 2.1 | 52.5 | 0.86 | 1.00 | 19.8 |
| East: Custer Ave | | | | | | | | | | | |
| 1 | L2 | 87 | 0.0 | 0.519 | 8.2 | LOS A | 4.2 | 105.7 | 0.23 | 0.09 | 24.5 |
| 6 | T1 | 1271 | 0.6 | 0.519 | 8.2 | LOS A | 4.2 | 105.7 | 0.23 | 0.09 | 22.9 |
| 16 | R2 | 15 | 0.0 | 0.519 | 8.2 | LOS A | 4.2 | 105.6 | 0.23 | 0.09 | 23.3 |
| Approach | | 1374 | 0.6 | 0.519 | 8.2 | LOS A | 4.2 | 105.7 | 0.23 | 0.09 | 23.0 |
| North: Private Drive | | | | | | | | | | | |
| 7 | L2 | 5 | 0.0 | 0.071 | 9.2 | LOS A | 0.2 | 5.7 | 0.71 | 0.71 | 24.1 |
| 4 | T1 | 15 | 0.0 | 0.071 | 9.2 | LOS A | 0.2 | 5.7 | 0.71 | 0.71 | 22.5 |
| 14 | R2 | 10 | 0.0 | 0.071 | 9.2 | LOS A | 0.2 | 5.7 | 0.71 | 0.71 | 22.9 |
| Approach | | 31 | 0.0 | 0.071 | 9.2 | LOS A | 0.2 | 5.7 | 0.71 | 0.71 | 22.9 |
| West: Custer Ave | | | | | | | | | | | |
| 5 | L2 | 10 | 0.0 | 0.698 | 12.8 | LOS B | 7.5 | 188.9 | 0.60 | 0.35 | 23.5 |
| 2 | T1 | 1656 | 0.2 | 0.698 | 12.8 | LOS B | 7.5 | 188.9 | 0.60 | 0.35 | 21.9 |
| 12 | R2 | 61 | 0.0 | 0.698 | 12.8 | LOS B | 7.5 | 188.9 | 0.60 | 0.35 | 22.3 |
| Approach | | 1727 | 0.2 | 0.698 | 12.8 | LOS B | 7.5 | 188.9 | 0.60 | 0.35 | 21.9 |
| All Vehicles | | 3305 | 0.5 | 0.698 | 11.5 | LOS B | 7.5 | 188.9 | 0.46 | 0.28 | 22.2 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

























HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

























HCM 6th Signalized Intersection Summary
7: Montana Ave & Custer Ave

Alternatives 1 2042 - AM
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h) | 118 | 834 | 243 | 270 | 825 | 267 | 144 | 194 | 75 | 432 | 647 | 138 |
| Future Volume (veh/h) | 118 | 834 | 243 | 270 | 825 | 267 | 144 | 194 | 75 | 432 | 647 | 138 |
| 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 | 1389 | 1367 | 1378 | 1477 | 1453 | 1477 | 1465 | 1477 | 1442 | 1477 | 1488 | 1442 |
| Adj Flow Rate, veh/h | 136 | 959 | 279 | 310 | 948 | 307 | 166 | 223 | 86 | 497 | 744 | 159 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Percent Heavy Veh, % | 1 | 3 | 2 | 2 | 4 | 2 | 3 | 2 | 5 | 2 | 1 | 5 |
| Cap, veh/h | 214 | 875 | 479 | 236 | 1114 | 688 | 209 | 664 | 452 | 528 | 877 | 468 |
| Arrive On Green | 0.07 | 0.34 | 0.34 | 0.18 | 0.54 | 0.54 | 0.07 | 0.24 | 0.24 | 0.15 | 0.31 | 0.31 |
| Sat Flow, veh/h | 1323 | 2598 | 1168 | 1406 | 2761 | 1251 | 1395 | 2806 | 1222 | 1406 | 2828 | 1222 |
| Grp Volume(v), veh/h | 136 | 959 | 279 | 310 | 948 | 307 | 166 | 223 | 86 | 497 | 744 | 159 |
| Grp Sat Flow(s),veh/h/ln | 1323 | 1299 | 1168 | 1406 | 1381 | 1251 | 1395 | 1403 | 1222 | 1406 | 1414 | 1222 |
| Q Serve(g_s), s | 10.1 | 50.5 | 27.8 | 20.0 | 43.9 | 19.1 | 11.0 | 9.9 | 7.2 | 22.0 | 37.0 | 13.8 |
| Cycle Q Clear(g_c), s | 10.1 | 50.5 | 27.8 | 20.0 | 43.9 | 19.1 | 11.0 | 9.9 | 7.2 | 22.0 | 37.0 | 13.8 |
| 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 | 214 | 875 | 479 | 236 | 1114 | 688 | 209 | 664 | 452 | 528 | 877 | 468 |
| V/C Ratio(X) | 0.64 | 1.10 | 0.58 | 1.32 | 0.85 | 0.45 | 0.80 | 0.34 | 0.19 | 0.94 | 0.85 | 0.34 |
| Avail Cap(c_a), veh/h | 214 | 875 | 479 | 236 | 1114 | 688 | 209 | 664 | 452 | 528 | 877 | 468 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.70 | 0.70 | 0.70 | 0.09 | 0.09 | 0.09 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 34.0 | 49.8 | 34.3 | 43.9 | 30.9 | 15.1 | 48.1 | 47.5 | 32.0 | 47.8 | 48.5 | 32.8 |
| Incr Delay (d2), s/veh | 3.9 | 56.1 | 1.1 | 145.2 | 0.6 | 0.0 | 18.3 | 1.4 | 0.9 | 25.0 | 10.0 | 2.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 3.5 | 23.0 | 7.9 | 14.3 | 13.1 | 4.6 | 3.1 | 3.6 | 2.2 | 13.7 | 14.0 | 4.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 37.9 | 105.9 | 35.4 | 189.0 | 31.5 | 15.2 | 66.4 | 48.8 | 33.0 | 72.9 | 58.5 | 34.8 |
| LnGrp LOS | D | F | D | F | C | B | E | D | C | E | E | C |
| Approach Vol, veh/h | | 1374 | | | 1565 | | | 475 | | | 1400 | |
| Approach Delay, s/veh | | 84.8 | | | 59.5 | | | 52.1 | | | 60.9 | |
| Approach LOS | | F | | | E | | | D | | | E | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 26.0 | 42.0 | 25.0 | 57.0 | 15.0 | 53.0 | 15.0 | 67.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.5 | 5.0 | 6.5 | 4.0 | 6.5 | 4.0 | 6.5 | | | | |
| Max Green Setting (Gmax), s | 22.0 | 35.5 | 20.0 | 50.5 | 11.0 | 46.5 | 11.0 | 60.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 24.0 | 11.9 | 22.0 | 52.5 | 13.0 | 39.0 | 12.1 | 45.9 | | | | |
| Green Ext Time (p_c), s | 0.0 | 1.0 | 0.0 | 0.0 | 0.0 | 2.1 | 0.0 | 4.4 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 66.4 | | | | | | | | |
| HCM 6th LOS | | | | E | | | | | | | | |

























HCM 6th Signalized Intersection Summary
7: Montana Ave & Custer Ave

Alternatives 1 2042 School
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h) | 276 | 970 | 179 | 256 | 719 | 403 | 221 | 556 | 236 | 392 | 476 | 130 |
| Future Volume (veh/h) | 276 | 970 | 179 | 256 | 719 | 403 | 221 | 556 | 236 | 392 | 476 | 130 |
| 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 | 1350 | 1329 | 1350 | 1488 | 1477 | 1477 | 1488 | 1500 | 1500 | 1477 | 1488 | 1500 |
| Adj Flow Rate, veh/h | 294 | 1032 | 190 | 272 | 765 | 429 | 235 | 591 | 251 | 417 | 506 | 138 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 0 | 2 | 0 | 1 | 2 | 2 | 1 | 0 | 0 | 2 | 1 | 0 |
| Cap, veh/h | 271 | 884 | 530 | 190 | 814 | 571 | 293 | 674 | 428 | 301 | 820 | 581 |
| Arrive On Green | 0.17 | 0.35 | 0.35 | 0.13 | 0.39 | 0.39 | 0.11 | 0.24 | 0.24 | 0.17 | 0.29 | 0.29 |
| Sat Flow, veh/h | 1286 | 2525 | 1144 | 1417 | 2806 | 1251 | 1417 | 2850 | 1271 | 1406 | 2828 | 1271 |
| Grp Volume(v), veh/h | 294 | 1032 | 190 | 272 | 765 | 429 | 235 | 591 | 251 | 417 | 506 | 138 |
| Grp Sat Flow(s),veh/h/ln | 1286 | 1262 | 1144 | 1417 | 1403 | 1251 | 1417 | 1425 | 1271 | 1406 | 1414 | 1271 |
| Q Serve(g_s), s | 25.0 | 52.5 | 16.0 | 15.0 | 39.4 | 43.5 | 17.0 | 30.0 | 24.5 | 25.0 | 23.2 | 9.9 |
| Cycle Q Clear(g_c), s | 25.0 | 52.5 | 16.0 | 15.0 | 39.4 | 43.5 | 17.0 | 30.0 | 24.5 | 25.0 | 23.2 | 9.9 |
| 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 | 271 | 884 | 530 | 190 | 814 | 571 | 293 | 674 | 428 | 301 | 820 | 581 |
| V/C Ratio(X) | 1.08 | 1.17 | 0.36 | 1.43 | 0.94 | 0.75 | 0.80 | 0.88 | 0.59 | 1.38 | 0.62 | 0.24 |
| Avail Cap(c_a), veh/h | 271 | 884 | 530 | 190 | 814 | 571 | 293 | 675 | 428 | 301 | 820 | 581 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.43 | 0.43 | 0.43 | 0.09 | 0.09 | 0.09 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 43.0 | 48.8 | 25.9 | 40.0 | 44.8 | 29.6 | 41.4 | 55.1 | 41.1 | 40.1 | 46.0 | 24.8 |
| Incr Delay (d2), s/veh | 60.3 | 81.2 | 0.1 | 197.9 | 2.6 | 0.5 | 14.2 | 14.9 | 5.8 | 191.9 | 3.5 | 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 | 11.1 | 26.2 | 4.4 | 15.0 | 13.0 | 12.0 | 7.8 | 12.0 | 8.3 | 24.6 | 8.5 | 3.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 103.4 | 129.9 | 26.0 | 237.8 | 47.4 | 30.1 | 55.6 | 70.0 | 46.9 | 231.9 | 49.5 | 25.8 |
| LnGrp LOS | F | F | C | F | D | C | E | E | D | F | D | C |
| Approach Vol, veh/h | | 1516 | | | 1466 | | | 1077 | | | 1061 | |
| Approach Delay, s/veh | | 111.7 | | | 77.7 | | | 61.5 | | | 118.1 | |
| Approach LOS | | F | | | E | | | E | | | F | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 29.0 | 42.0 | 20.0 | 59.0 | 21.0 | 50.0 | 29.0 | 50.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.5 | 5.0 | 6.5 | 4.0 | 6.5 | 4.0 | 6.5 | | | | |
| Max Green Setting (Gmax), s | 25.0 | 35.5 | 15.0 | 52.5 | 17.0 | 43.5 | 25.0 | 43.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 27.0 | 32.0 | 17.0 | 54.5 | 19.0 | 25.2 | 27.0 | 45.5 | | | | |
| Green Ext Time (p_c), s | 0.0 | 1.4 | 0.0 | 0.0 | 0.0 | 2.8 | 0.0 | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 92.7 | | | | | | | | |
| HCM 6th LOS | | | | F | | | | | | | | |































HCM 6th Signalized Intersection Summary
7: Montana Ave & Custer Ave

Alternatives 1 2042 PM
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h) | 300 | 1192 | 198 | 308 | 860 | 526 | 231 | 689 | 310 | 363 | 507 | 140 |
| Future Volume (veh/h) | 300 | 1192 | 198 | 308 | 860 | 526 | 231 | 689 | 310 | 363 | 507 | 140 |
| 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 | 1400 | 1389 | 1400 | 1500 | 1488 | 1500 | 1500 | 1488 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 309 | 1229 | 204 | 318 | 887 | 542 | 238 | 710 | 320 | 374 | 523 | 144 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, % | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 263 | 941 | 558 | 210 | 895 | 581 | 275 | 688 | 453 | 248 | 770 | 547 |
| Arrive On Green | 0.16 | 0.36 | 0.36 | 0.15 | 0.42 | 0.42 | 0.11 | 0.24 | 0.24 | 0.14 | 0.27 | 0.27 |
| Sat Flow, veh/h | 1333 | 2639 | 1186 | 1429 | 2828 | 1271 | 1429 | 2828 | 1271 | 1429 | 2850 | 1271 |
| Grp Volume(v), veh/h | 309 | 1229 | 204 | 318 | 887 | 542 | 238 | 710 | 320 | 374 | 523 | 144 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 1320 | 1186 | 1429 | 1414 | 1271 | 1429 | 1414 | 1271 | 1429 | 1425 | 1271 |
| Q Serve(g_s), s | 24.0 | 53.5 | 16.5 | 17.0 | 46.7 | 47.5 | 17.0 | 36.5 | 32.5 | 21.0 | 24.6 | 10.9 |
| Cycle Q Clear(g_c), s | 24.0 | 53.5 | 16.5 | 17.0 | 46.7 | 47.5 | 17.0 | 36.5 | 32.5 | 21.0 | 24.6 | 10.9 |
| 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 | 263 | 941 | 558 | 210 | 895 | 581 | 275 | 688 | 453 | 248 | 770 | 547 |
| V/C Ratio(X) | 1.18 | 1.31 | 0.37 | 1.51 | 0.99 | 0.93 | 0.86 | 1.03 | 0.71 | 1.51 | 0.68 | 0.26 |
| Avail Cap(c_a), veh/h | 263 | 941 | 558 | 210 | 895 | 581 | 275 | 688 | 453 | 248 | 770 | 547 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.47 | 0.47 | 0.47 | 0.09 | 0.09 | 0.09 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 46.3 | 48.2 | 25.4 | 42.2 | 43.2 | 33.9 | 42.2 | 56.7 | 41.5 | 45.0 | 49.0 | 27.5 |
| Incr Delay (d2), s/veh | 96.8 | 141.3 | 0.1 | 234.0 | 7.0 | 3.2 | 23.3 | 42.7 | 8.9 | 248.5 | 4.8 | 1.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 13.0 | 35.8 | 4.6 | 18.4 | 15.8 | 19.0 | 8.5 | 16.9 | 11.2 | 23.6 | 9.2 | 3.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 143.1 | 189.5 | 25.6 | 276.2 | 50.2 | 37.1 | 65.5 | 99.5 | 50.4 | 293.4 | 53.8 | 28.7 |
| LnGrp LOS | F | F | C | F | D | D | E | F | D | F | D | C |
| Approach Vol, veh/h | | 1742 | | | 1747 | | | 1268 | | | 1041 | |
| Approach Delay, s/veh | | 162.1 | | | 87.3 | | | 80.7 | | | 136.4 | |
| Approach LOS | | F | | | F | | | F | | | F | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 25.0 | 43.0 | 22.0 | 60.0 | 21.0 | 47.0 | 28.0 | 54.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.5 | 5.0 | 6.5 | 4.0 | 6.5 | 4.0 | 6.5 | | | | |
| Max Green Setting (Gmax), s | 21.0 | 36.5 | 17.0 | 53.5 | 17.0 | 40.5 | 24.0 | 47.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 23.0 | 38.5 | 19.0 | 55.5 | 19.0 | 26.6 | 26.0 | 49.5 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.6 | 0.0 | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 117.1 | | | | | | | | |
| HCM 6th LOS | | | | F | | | | | | | | |































HCM 6th Signalized Intersection Summary
7: Montana Ave & Custer Ave

Alternatives 2 2042 - AM
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |   |   |  |   |   |  |  |   |  |  |   |  |
| Traffic Volume (veh/h) | 118 | 834 | 243 | 270 | 825 | 267 | 144 | 194 | 75 | 432 | 647 | 138 |
| Future Volume (veh/h) | 118 | 834 | 243 | 270 | 825 | 267 | 144 | 194 | 75 | 432 | 647 | 138 |
| 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 | 1389 | 1367 | 1378 | 1477 | 1453 | 1477 | 1465 | 1477 | 1442 | 1477 | 1488 | 1442 |
| Adj Flow Rate, veh/h | 136 | 959 | 279 | 310 | 948 | 307 | 166 | 223 | 86 | 497 | 744 | 159 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Percent Heavy Veh, % | 1 | 3 | 2 | 2 | 4 | 2 | 3 | 2 | 5 | 2 | 1 | 5 |
| Cap, veh/h | 152 | 883 | 484 | 283 | 1113 | 680 | 213 | 677 | 422 | 534 | 871 | 449 |
| Arrive On Green | 0.06 | 0.34 | 0.34 | 0.14 | 0.54 | 0.54 | 0.07 | 0.24 | 0.24 | 0.14 | 0.31 | 0.31 |
| Sat Flow, veh/h | 2566 | 2598 | 1168 | 2728 | 2761 | 1251 | 1395 | 2806 | 1222 | 1406 | 2828 | 1222 |
| Grp Volume(v), veh/h | 136 | 959 | 279 | 310 | 948 | 307 | 166 | 223 | 86 | 497 | 744 | 159 |
| Grp Sat Flow(s),veh/h/ln | 1283 | 1299 | 1168 | 1364 | 1381 | 1251 | 1395 | 1403 | 1222 | 1406 | 1414 | 1222 |
| Q Serve(g_s), s | 7.1 | 45.9 | 15.1 | 14.0 | 39.6 | 17.4 | 10.0 | 8.8 | 1.7 | 19.0 | 33.3 | 12.8 |
| Cycle Q Clear(g_c), s | 7.1 | 45.9 | 15.1 | 14.0 | 39.6 | 17.4 | 10.0 | 8.8 | 1.7 | 19.0 | 33.3 | 12.8 |
| 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 | 152 | 883 | 484 | 283 | 1113 | 680 | 213 | 677 | 422 | 534 | 871 | 449 |
| V/C Ratio(X) | 0.89 | 1.09 | 0.58 | 1.10 | 0.85 | 0.45 | 0.78 | 0.33 | 0.20 | 0.93 | 0.85 | 0.35 |
| Avail Cap(c_a), veh/h | 152 | 883 | 484 | 283 | 1113 | 680 | 213 | 709 | 435 | 534 | 903 | 462 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.70 | 0.70 | 0.70 | 0.09 | 0.09 | 0.09 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 63.1 | 44.5 | 13.3 | 58.2 | 27.9 | 14.0 | 42.7 | 42.2 | 13.0 | 43.2 | 43.8 | 31.1 |
| Incr Delay (d2), s/veh | 33.7 | 52.0 | 1.0 | 48.8 | 0.6 | 0.0 | 16.2 | 1.3 | 1.1 | 23.1 | 10.4 | 2.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 3.0 | 20.9 | 3.8 | 6.5 | 11.4 | 4.1 | 2.7 | 3.2 | 1.2 | 12.5 | 12.7 | 4.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 96.8 | 96.6 | 14.3 | 107.0 | 28.5 | 14.0 | 58.9 | 43.5 | 14.1 | 66.3 | 54.3 | 33.2 |
| LnGrp LOS | F | F | B | F | C | B | E | D | B | E | D | C |
| Approach Vol, veh/h | | 1374 | | | 1565 | | | 475 | | | 1400 | |
| Approach Delay, s/veh | | 79.9 | | | 41.2 | | | 43.6 | | | 56.1 | |
| Approach LOS | | E | | | D | | | D | | | E | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 23.0 | 39.1 | 20.5 | 52.4 | 14.0 | 48.1 | 12.0 | 60.9 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.5 | 6.5 | * 6.5 | 4.0 | 6.5 | 4.0 | 6.5 | | | | |
| Max Green Setting (Gmax), s | 19.0 | 34.1 | 14.0 | * 46 | 10.0 | 43.1 | 8.0 | 52.9 | | | | |
| Max Q Clear Time (g_c+I1), s | 21.0 | 10.8 | 16.0 | 47.9 | 12.0 | 35.3 | 9.1 | 41.6 | | | | |
| Green Ext Time (p_c), s | 0.0 | 1.0 | 0.0 | 0.0 | 0.0 | 2.1 | 0.0 | 3.9 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 56.8 | | | | | | | | | |
| HCM 6th LOS | | | E | | | | | | | | | |
| Notes | | | | | | | | | | | | |
| * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier. | | | | | | | | | | | | |































HCM 6th Signalized Intersection Summary
7: Montana Ave & Custer Ave

Alternatives 2 2042 School
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |   |   |  |   |   |  |  |   |  |  |   |  |
| Traffic Volume (veh/h) | 276 | 970 | 179 | 256 | 719 | 403 | 221 | 556 | 236 | 392 | 476 | 130 |
| Future Volume (veh/h) | 276 | 970 | 179 | 256 | 719 | 403 | 221 | 556 | 236 | 392 | 476 | 130 |
| 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 | 1350 | 1329 | 1350 | 1488 | 1477 | 1477 | 1488 | 1500 | 1500 | 1477 | 1488 | 1500 |
| Adj Flow Rate, veh/h | 294 | 1032 | 190 | 272 | 765 | 429 | 235 | 591 | 251 | 417 | 506 | 138 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 0 | 2 | 0 | 1 | 2 | 2 | 1 | 0 | 0 | 2 | 1 | 0 |
| Cap, veh/h | 316 | 901 | 538 | 220 | 916 | 634 | 296 | 646 | 390 | 314 | 829 | 534 |
| Arrive On Green | 0.13 | 0.36 | 0.36 | 0.11 | 0.43 | 0.43 | 0.11 | 0.23 | 0.23 | 0.18 | 0.29 | 0.29 |
| Sat Flow, veh/h | 2494 | 2525 | 1144 | 2750 | 2806 | 1251 | 1417 | 2850 | 1271 | 1406 | 2828 | 1271 |
| Grp Volume(v), veh/h | 294 | 1032 | 190 | 272 | 765 | 429 | 235 | 591 | 251 | 417 | 506 | 138 |
| Grp Sat Flow(s),veh/h/ln | 1247 | 1262 | 1144 | 1375 | 1403 | 1251 | 1417 | 1425 | 1271 | 1406 | 1414 | 1271 |
| Q Serve(g_s), s | 17.5 | 53.5 | 10.1 | 12.0 | 36.3 | 39.2 | 17.0 | 30.3 | 10.4 | 27.0 | 23.1 | 10.6 |
| Cycle Q Clear(g_c), s | 17.5 | 53.5 | 10.1 | 12.0 | 36.3 | 39.2 | 17.0 | 30.3 | 10.4 | 27.0 | 23.1 | 10.6 |
| 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 | 316 | 901 | 538 | 220 | 916 | 634 | 296 | 646 | 390 | 314 | 829 | 534 |
| V/C Ratio(X) | 0.93 | 1.15 | 0.35 | 1.24 | 0.83 | 0.68 | 0.79 | 0.91 | 0.64 | 1.33 | 0.61 | 0.26 |
| Avail Cap(c_a), veh/h | 316 | 901 | 538 | 220 | 916 | 634 | 296 | 675 | 403 | 314 | 858 | 547 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.44 | 0.44 | 0.44 | 0.09 | 0.09 | 0.09 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 64.8 | 48.3 | 11.6 | 67.0 | 38.8 | 23.4 | 42.2 | 56.6 | 21.8 | 42.0 | 45.6 | 28.3 |
| Incr Delay (d2), s/veh | 18.6 | 72.0 | 0.1 | 110.1 | 0.6 | 0.2 | 13.5 | 19.8 | 8.0 | 168.6 | 3.3 | 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 | 6.4 | 25.6 | 2.5 | 7.4 | 11.6 | 10.2 | 2.6 | 12.5 | 5.0 | 23.1 | 8.4 | 3.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 83.4 | 120.2 | 11.7 | 177.1 | 39.5 | 23.7 | 55.7 | 76.3 | 29.8 | 210.6 | 48.9 | 29.5 |
| LnGrp LOS | F | F | B | F | D | C | E | E | C | F | D | C |
| Approach Vol, veh/h | | 1516 | | | 1466 | | | 1077 | | | 1061 | |
| Approach Delay, s/veh | | 99.5 | | | 60.4 | | | 61.0 | | | 109.9 | |
| Approach LOS | | F | | | E | | | E | | | F | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 31.0 | 40.5 | 18.5 | 60.0 | 21.0 | 50.5 | 23.0 | 55.5 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.5 | 6.5 | * 6.5 | 4.0 | 6.5 | 4.0 | 6.5 | | | | |
| Max Green Setting (Gmax), s | 27.0 | 35.5 | 12.0 | * 54 | 17.0 | 45.5 | 19.0 | 47.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 29.0 | 32.3 | 14.0 | 55.5 | 19.0 | 25.1 | 19.5 | 41.2 | | | | |
| Green Ext Time (p_c), s | 0.0 | 1.2 | 0.0 | 0.0 | 0.0 | 2.8 | 0.0 | 2.9 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 82.4 | | | | | | | | | |
| HCM 6th LOS | | | F | | | | | | | | | |
| Notes | | | | | | | | | | | | |
| * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier. | | | | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 7: Montana Ave & Custer Ave

Alternatives 2 2042 PM
 10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |   |   |  |   |   |  |  |   |  |  |   |  |
| Traffic Volume (veh/h) | 300 | 1192 | 198 | 308 | 860 | 526 | 231 | 689 | 310 | 363 | 507 | 140 |
| Future Volume (veh/h) | 300 | 1192 | 198 | 308 | 860 | 526 | 231 | 689 | 310 | 363 | 507 | 140 |
| 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 | 1400 | 1389 | 1400 | 1500 | 1488 | 1500 | 1500 | 1488 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 309 | 1229 | 204 | 318 | 887 | 542 | 238 | 710 | 320 | 374 | 523 | 144 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, % | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 337 | 1029 | 597 | 262 | 1056 | 678 | 387 | 1050 | 548 | 347 | 1191 | 650 |
| Arrive On Green | 0.19 | 0.78 | 0.78 | 0.08 | 0.50 | 0.50 | 0.11 | 0.37 | 0.37 | 0.16 | 0.42 | 0.42 |
| Sat Flow, veh/h | 2587 | 2639 | 1186 | 2771 | 2828 | 1271 | 1429 | 2828 | 1271 | 1429 | 2850 | 1271 |
| Grp Volume(v), veh/h | 309 | 1229 | 204 | 318 | 887 | 542 | 238 | 710 | 320 | 374 | 523 | 144 |
| Grp Sat Flow(s),veh/h/ln | 1293 | 1320 | 1186 | 1386 | 1414 | 1271 | 1429 | 1414 | 1271 | 1429 | 1425 | 1271 |
| Q Serve(g_s), s | 13.2 | 58.5 | 6.5 | 9.0 | 40.6 | 55.4 | 15.5 | 31.6 | 22.3 | 24.0 | 19.6 | 9.4 |
| Cycle Q Clear(g_c), s | 13.2 | 58.5 | 6.5 | 9.0 | 40.6 | 55.4 | 15.5 | 31.6 | 22.3 | 24.0 | 19.6 | 9.4 |
| 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 | 337 | 1029 | 597 | 262 | 1056 | 678 | 387 | 1050 | 548 | 347 | 1191 | 650 |
| V/C Ratio(X) | 0.92 | 1.19 | 0.34 | 1.21 | 0.84 | 0.80 | 0.62 | 0.68 | 0.58 | 1.08 | 0.44 | 0.22 |
| Avail Cap(c_a), veh/h | 337 | 1029 | 597 | 262 | 1056 | 678 | 387 | 1050 | 548 | 347 | 1191 | 650 |
| HCM Platoon Ratio | 2.00 | 2.00 | 2.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.47 | 0.47 | 0.47 | 0.09 | 0.09 | 0.09 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 35.2 | 16.5 | 6.6 | 67.4 | 33.9 | 23.5 | 24.8 | 39.6 | 31.9 | 33.2 | 31.1 | 20.2 |
| Incr Delay (d2), s/veh | 16.3 | 92.1 | 0.1 | 99.0 | 0.6 | 0.6 | 2.6 | 3.5 | 4.5 | 70.6 | 1.2 | 0.8 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 4.3 | 20.0 | 1.1 | 8.5 | 12.7 | 14.1 | 5.4 | 11.3 | 7.1 | 14.8 | 6.9 | 2.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 51.6 | 108.6 | 6.7 | 166.4 | 34.5 | 24.1 | 27.4 | 43.1 | 36.4 | 103.8 | 32.3 | 21.0 |
| LnGrp LOS | D | F | A | F | C | C | C | D | D | F | C | C |
| Approach Vol, veh/h | | 1742 | | | 1747 | | | 1268 | | | 1041 | |
| Approach Delay, s/veh | | 86.6 | | | 55.3 | | | 38.4 | | | 56.4 | |
| Approach LOS | | F | | | E | | | D | | | E | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 28.0 | 62.2 | 15.5 | 65.0 | 21.0 | 69.2 | 18.0 | 62.5 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.5 | 6.5 | * 6.5 | 4.0 | 6.5 | 4.0 | 6.5 | | | | |
| Max Green Setting (Gmax), s | 24.0 | 36.5 | 9.0 | * 59 | 17.0 | 43.5 | 14.0 | 54.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 26.0 | 33.6 | 11.0 | 60.5 | 17.5 | 21.6 | 15.2 | 57.4 | | | | |
| Green Ext Time (p_c), s | 0.0 | 1.4 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 61.2 | | | | | | | | |
| HCM 6th LOS | | | | E | | | | | | | | |
| Notes | | | | | | | | | | | | |
| * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier. | | | | | | | | | | | | |

HCM 6th Signalized Intersection Summary
7: Montana Ave & Custer Ave

























Alternatives 3 2042 AM
10/12/2018



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|-------|------|-------|------|------|------|------|------|-------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 118 | 834 | 243 | 270 | 825 | 267 | 144 | 194 | 75 | 432 | 647 | 138 |
| Future Volume (veh/h) | 118 | 834 | 243 | 270 | 825 | 267 | 144 | 194 | 75 | 432 | 647 | 138 |
| 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 | 1389 | 1367 | 1378 | 1477 | 1453 | 1477 | 1465 | 1477 | 1442 | 1477 | 1488 | 1442 |
| Adj Flow Rate, veh/h | 136 | 959 | 279 | 310 | 948 | 307 | 166 | 223 | 86 | 497 | 744 | 159 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Percent Heavy Veh, % | 1 | 3 | 2 | 2 | 4 | 2 | 3 | 2 | 5 | 2 | 1 | 5 |
| Cap, veh/h | 213 | 857 | 471 | 245 | 1132 | 705 | 209 | 645 | 452 | 418 | 877 | 460 |
| Arrive On Green | 0.07 | 0.33 | 0.33 | 0.19 | 0.55 | 0.55 | 0.07 | 0.23 | 0.23 | 0.15 | 0.31 | 0.31 |
| Sat Flow, veh/h | 1323 | 2598 | 1168 | 1406 | 2761 | 1251 | 1395 | 2806 | 1222 | 2728 | 2828 | 1222 |
| Grp Volume(v), veh/h | 136 | 959 | 279 | 310 | 948 | 307 | 166 | 223 | 86 | 497 | 744 | 159 |
| Grp Sat Flow(s),veh/h/ln | 1323 | 1299 | 1168 | 1406 | 1381 | 1251 | 1395 | 1403 | 1222 | 1364 | 1414 | 1222 |
| Q Serve(g_s), s | 10.0 | 49.5 | 28.1 | 21.0 | 43.1 | 18.4 | 11.0 | 10.0 | 7.2 | 23.0 | 37.0 | 14.0 |
| Cycle Q Clear(g_c), s | 10.0 | 49.5 | 28.1 | 21.0 | 43.1 | 18.4 | 11.0 | 10.0 | 7.2 | 23.0 | 37.0 | 14.0 |
| 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 | 213 | 857 | 471 | 245 | 1132 | 705 | 209 | 645 | 452 | 418 | 877 | 460 |
| V/C Ratio(X) | 0.64 | 1.12 | 0.59 | 1.27 | 0.84 | 0.44 | 0.80 | 0.35 | 0.19 | 1.19 | 0.85 | 0.35 |
| Avail Cap(c_a), veh/h | 213 | 857 | 471 | 245 | 1132 | 705 | 209 | 645 | 452 | 418 | 877 | 460 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.70 | 0.70 | 0.70 | 0.09 | 0.09 | 0.09 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 35.4 | 50.3 | 35.1 | 43.8 | 29.9 | 14.1 | 48.7 | 48.3 | 32.0 | 63.5 | 48.5 | 33.5 |
| Incr Delay (d2), s/veh | 4.0 | 64.8 | 1.2 | 122.7 | 0.5 | 0.0 | 18.3 | 1.5 | 0.9 | 106.3 | 10.0 | 2.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 3.6 | 23.6 | 8.0 | 13.4 | 12.7 | 4.4 | 3.1 | 3.6 | 2.2 | 14.1 | 14.0 | 4.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 39.4 | 115.1 | 36.3 | 166.5 | 30.5 | 14.1 | 67.0 | 49.8 | 33.0 | 169.8 | 58.5 | 35.6 |
| LnGrp LOS | D | F | D | F | C | B | E | D | C | F | E | D |
| Approach Vol, veh/h | | 1374 | | | 1565 | | | 475 | | | 1400 | |
| Approach Delay, s/veh | | 91.6 | | | 54.2 | | | 52.7 | | | 95.4 | |
| Approach LOS | | F | | | D | | | D | | | F | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 27.0 | 41.0 | 26.0 | 56.0 | 15.0 | 53.0 | 14.0 | 68.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 6.5 | 5.0 | 6.5 | 4.0 | 6.5 | 4.0 | 6.5 | | | | |
| Max Green Setting (Gmax), s | 23.0 | 34.5 | 21.0 | 49.5 | 11.0 | 46.5 | 10.0 | 61.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 25.0 | 12.0 | 23.0 | 51.5 | 13.0 | 39.0 | 12.0 | 45.1 | | | | |
| Green Ext Time (p_c), s | 0.0 | 1.0 | 0.0 | 0.0 | 0.0 | 2.1 | 0.0 | 4.6 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 76.7 | | | | | | | | |
| HCM 6th LOS | | | | E | | | | | | | | |

























HCM 6th Signalized Intersection Summary
7: Montana Ave & Custer Ave

Alternatives 3 2042 School
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h) | 276 | 970 | 179 | 256 | 719 | 403 | 221 | 556 | 236 | 392 | 476 | 130 |
| Future Volume (veh/h) | 276 | 970 | 179 | 256 | 719 | 403 | 221 | 556 | 236 | 392 | 476 | 130 |
| 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 | 1350 | 1329 | 1350 | 1488 | 1477 | 1477 | 1488 | 1500 | 1500 | 1477 | 1488 | 1500 |
| Adj Flow Rate, veh/h | 294 | 1032 | 190 | 272 | 765 | 429 | 235 | 591 | 251 | 417 | 506 | 138 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 0 | 2 | 0 | 1 | 2 | 2 | 1 | 0 | 0 | 2 | 1 | 0 |
| Cap, veh/h | 307 | 943 | 564 | 218 | 887 | 571 | 260 | 608 | 424 | 382 | 660 | 530 |
| Arrive On Green | 0.18 | 0.37 | 0.37 | 0.16 | 0.42 | 0.42 | 0.12 | 0.21 | 0.21 | 0.14 | 0.23 | 0.23 |
| Sat Flow, veh/h | 1286 | 2525 | 1144 | 1417 | 2806 | 1251 | 1417 | 2850 | 1271 | 2728 | 2828 | 1271 |
| Grp Volume(v), veh/h | 294 | 1032 | 190 | 272 | 765 | 429 | 235 | 591 | 251 | 417 | 506 | 138 |
| Grp Sat Flow(s),veh/h/ln | 1286 | 1262 | 1144 | 1417 | 1403 | 1251 | 1417 | 1425 | 1271 | 1364 | 1414 | 1271 |
| Q Serve(g_s), s | 25.5 | 56.0 | 15.1 | 18.0 | 37.2 | 43.6 | 18.0 | 30.9 | 24.6 | 21.0 | 25.1 | 10.6 |
| Cycle Q Clear(g_c), s | 25.5 | 56.0 | 15.1 | 18.0 | 37.2 | 43.6 | 18.0 | 30.9 | 24.6 | 21.0 | 25.1 | 10.6 |
| 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 | 307 | 943 | 564 | 218 | 887 | 571 | 260 | 608 | 424 | 382 | 660 | 530 |
| V/C Ratio(X) | 0.96 | 1.09 | 0.34 | 1.25 | 0.86 | 0.75 | 0.91 | 0.97 | 0.59 | 1.09 | 0.77 | 0.26 |
| Avail Cap(c_a), veh/h | 311 | 943 | 564 | 218 | 887 | 571 | 260 | 608 | 424 | 382 | 660 | 530 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.44 | 0.44 | 0.44 | 0.09 | 0.09 | 0.09 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 39.2 | 47.0 | 23.1 | 42.4 | 40.5 | 28.8 | 44.4 | 58.6 | 41.5 | 64.5 | 53.7 | 28.6 |
| Incr Delay (d2), s/veh | 23.4 | 50.8 | 0.1 | 114.9 | 0.9 | 0.5 | 31.9 | 30.2 | 6.0 | 73.0 | 8.3 | 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 | 12.9 | 23.9 | 4.1 | 14.8 | 11.9 | 11.7 | 9.2 | 13.5 | 8.3 | 11.1 | 9.6 | 3.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 62.6 | 97.8 | 23.2 | 157.3 | 41.4 | 29.3 | 76.4 | 88.8 | 47.5 | 137.5 | 62.0 | 29.8 |
| LnGrp LOS | E | F | C | F | D | C | E | F | D | F | E | C |
| Approach Vol, veh/h | | 1516 | | | 1466 | | | 1077 | | | 1061 | |
| Approach Delay, s/veh | | 81.6 | | | 59.4 | | | 76.5 | | | 87.5 | |
| Approach LOS | | F | | | E | | | E | | | F | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 25.0 | 39.0 | 23.0 | 63.0 | 22.0 | 42.0 | 31.6 | 54.4 | | | | |
| Change Period (Y+Rc), s | 4.0 | 7.0 | 5.0 | 7.0 | 4.0 | 7.0 | 4.0 | 7.0 | | | | |
| Max Green Setting (Gmax), s | 21.0 | 32.0 | 18.0 | 56.0 | 18.0 | 35.0 | 28.0 | 47.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 23.0 | 32.9 | 20.0 | 58.0 | 20.0 | 27.1 | 27.5 | 45.6 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.9 | 0.0 | 0.8 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 75.4 | | | | | | | | |
| HCM 6th LOS | | | | E | | | | | | | | |

























HCM 6th Signalized Intersection Summary
7: Montana Ave & Custer Ave

Alternatives 3 2042 PM
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h) | 300 | 1192 | 198 | 308 | 860 | 526 | 231 | 689 | 310 | 363 | 507 | 140 |
| Future Volume (veh/h) | 300 | 1192 | 198 | 308 | 860 | 526 | 231 | 689 | 310 | 363 | 507 | 140 |
| 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 | 1400 | 1389 | 1400 | 1500 | 1488 | 1500 | 1500 | 1488 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 309 | 1229 | 204 | 318 | 887 | 542 | 238 | 710 | 320 | 374 | 523 | 144 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, % | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 283 | 985 | 554 | 229 | 961 | 559 | 293 | 916 | 573 | 277 | 943 | 632 |
| Arrive On Green | 0.33 | 0.75 | 0.75 | 0.17 | 0.45 | 0.45 | 0.09 | 0.32 | 0.32 | 0.10 | 0.33 | 0.33 |
| Sat Flow, veh/h | 1333 | 2639 | 1186 | 1429 | 2828 | 1271 | 1429 | 2828 | 1271 | 2771 | 2850 | 1271 |
| Grp Volume(v), veh/h | 309 | 1229 | 204 | 318 | 887 | 542 | 238 | 710 | 320 | 374 | 523 | 144 |
| Grp Sat Flow(s),veh/h/ln | 1333 | 1320 | 1186 | 1429 | 1414 | 1271 | 1429 | 1414 | 1271 | 1386 | 1425 | 1271 |
| Q Serve(g_s), s | 25.0 | 56.0 | 8.5 | 19.0 | 44.2 | 51.0 | 14.0 | 34.0 | 27.7 | 15.0 | 22.6 | 9.6 |
| Cycle Q Clear(g_c), s | 25.0 | 56.0 | 8.5 | 19.0 | 44.2 | 51.0 | 14.0 | 34.0 | 27.7 | 15.0 | 22.6 | 9.6 |
| 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 | 283 | 985 | 554 | 229 | 961 | 559 | 293 | 916 | 573 | 277 | 943 | 632 |
| V/C Ratio(X) | 1.09 | 1.25 | 0.37 | 1.39 | 0.92 | 0.97 | 0.81 | 0.77 | 0.56 | 1.35 | 0.55 | 0.23 |
| Avail Cap(c_a), veh/h | 283 | 985 | 554 | 229 | 961 | 559 | 293 | 916 | 573 | 277 | 943 | 632 |
| HCM Platoon Ratio | 2.00 | 2.00 | 2.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.47 | 0.47 | 0.47 | 0.09 | 0.09 | 0.09 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 31.7 | 19.0 | 9.5 | 43.6 | 39.2 | 35.1 | 37.6 | 45.8 | 30.2 | 67.5 | 41.1 | 21.4 |
| Incr Delay (d2), s/veh | 64.4 | 115.5 | 0.1 | 177.5 | 1.7 | 6.0 | 15.6 | 6.4 | 3.9 | 179.3 | 2.4 | 0.8 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 9.8 | 24.2 | 1.7 | 16.1 | 14.2 | 19.6 | 4.2 | 12.6 | 9.0 | 12.2 | 8.2 | 3.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 96.1 | 134.5 | 9.7 | 221.1 | 40.9 | 41.1 | 53.1 | 52.1 | 34.1 | 246.8 | 43.5 | 22.2 |
| LnGrp LOS | F | F | A | F | D | D | D | D | C | F | D | C |
| Approach Vol, veh/h | | 1742 | | | 1747 | | | 1268 | | | 1041 | |
| Approach Delay, s/veh | | 113.0 | | | 73.8 | | | 47.8 | | | 113.6 | |
| Approach LOS | | F | | | E | | | D | | | F | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 19.0 | 55.6 | 24.0 | 63.0 | 18.0 | 56.6 | 29.0 | 58.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | * 7 | 5.0 | 7.0 | 4.0 | 7.0 | 4.0 | 7.0 | | | | |
| Max Green Setting (Gmax), s | 15.0 | * 38 | 19.0 | 56.0 | 14.0 | 38.0 | 25.0 | 51.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 17.0 | 36.0 | 21.0 | 58.0 | 16.0 | 24.6 | 27.0 | 53.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 1.0 | 0.0 | 0.0 | 0.0 | 2.6 | 0.0 | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 87.0 | | | | | | | | | |
| HCM 6th LOS | | | F | | | | | | | | | |
| Notes | | | | | | | | | | | | |
| * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier. | | | | | | | | | | | | |

























HCM 6th Signalized Intersection Summary
7: Montana Ave & Custer Ave

Alternatives 4 2042 AM
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h) | 118 | 834 | 243 | 270 | 825 | 267 | 144 | 194 | 75 | 432 | 647 | 138 |
| Future Volume (veh/h) | 118 | 834 | 243 | 270 | 825 | 267 | 144 | 194 | 75 | 432 | 647 | 138 |
| 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 | 1389 | 1367 | 1378 | 1477 | 1453 | 1477 | 1465 | 1477 | 1442 | 1477 | 1488 | 1442 |
| Adj Flow Rate, veh/h | 136 | 959 | 279 | 310 | 948 | 307 | 166 | 223 | 86 | 497 | 744 | 159 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Percent Heavy Veh, % | 1 | 3 | 2 | 2 | 4 | 2 | 3 | 2 | 5 | 2 | 1 | 5 |
| Cap, veh/h | 168 | 892 | 510 | 291 | 1108 | 851 | 178 | 275 | 250 | 761 | 848 | 446 |
| Arrive On Green | 0.07 | 0.34 | 0.34 | 0.14 | 0.53 | 0.53 | 0.09 | 0.10 | 0.10 | 0.28 | 0.30 | 0.30 |
| Sat Flow, veh/h | 2566 | 2598 | 1168 | 2728 | 2761 | 1251 | 1395 | 2806 | 1222 | 2728 | 2828 | 1222 |
| Grp Volume(v), veh/h | 136 | 959 | 279 | 310 | 948 | 307 | 166 | 223 | 86 | 497 | 744 | 159 |
| Grp Sat Flow(s),veh/h/ln | 1283 | 1299 | 1168 | 1364 | 1381 | 1251 | 1395 | 1403 | 1222 | 1364 | 1414 | 1222 |
| Q Serve(g_s), s | 7.8 | 51.5 | 16.2 | 16.0 | 44.2 | 3.9 | 14.0 | 11.7 | 0.0 | 24.1 | 37.5 | 14.2 |
| Cycle Q Clear(g_c), s | 7.8 | 51.5 | 16.2 | 16.0 | 44.2 | 3.9 | 14.0 | 11.7 | 0.0 | 24.1 | 37.5 | 14.2 |
| 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 | 168 | 892 | 510 | 291 | 1108 | 851 | 178 | 275 | 250 | 761 | 848 | 446 |
| V/C Ratio(X) | 0.81 | 1.08 | 0.55 | 1.07 | 0.86 | 0.36 | 0.93 | 0.81 | 0.34 | 0.65 | 0.88 | 0.36 |
| Avail Cap(c_a), veh/h | 171 | 892 | 510 | 291 | 1108 | 851 | 178 | 664 | 419 | 761 | 877 | 459 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.70 | 0.70 | 0.70 | 0.09 | 0.09 | 0.09 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 69.2 | 49.3 | 13.8 | 64.4 | 31.3 | 2.1 | 69.4 | 66.3 | 51.1 | 47.7 | 49.9 | 34.7 |
| Incr Delay (d2), s/veh | 17.4 | 48.1 | 0.7 | 36.7 | 0.7 | 0.0 | 47.7 | 22.4 | 3.7 | 1.8 | 12.4 | 2.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 3.0 | 22.4 | 4.1 | 6.8 | 13.2 | 1.0 | 8.7 | 5.0 | 3.0 | 8.3 | 14.5 | 4.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 86.6 | 97.3 | 14.5 | 101.0 | 31.9 | 2.1 | 117.1 | 88.7 | 54.8 | 49.5 | 62.2 | 36.9 |
| LnGrp LOS | F | F | B | F | C | A | F | F | D | D | E | D |
| Approach Vol, veh/h | | 1374 | | | 1565 | | | 475 | | | 1400 | |
| Approach Delay, s/veh | | 79.5 | | | 39.7 | | | 92.5 | | | 54.9 | |
| Approach LOS | | E | | | D | | | F | | | D | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 48.3 | 21.2 | 22.5 | 58.0 | 18.0 | 51.5 | 13.8 | 66.7 | | | | |
| Change Period (Y+Rc), s | 6.5 | * 6.5 | 6.5 | * 6.5 | 4.0 | 6.5 | 4.0 | 6.5 | | | | |
| Max Green Setting (Gmax), s | 25.0 | * 36 | 16.0 | * 52 | 14.0 | 46.5 | 10.0 | 58.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 26.1 | 13.7 | 18.0 | 53.5 | 16.0 | 39.5 | 9.8 | 46.2 | | | | |
| Green Ext Time (p_c), s | 0.0 | 1.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 4.1 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 60.7 | | | | | | | | | |
| HCM 6th LOS | | | E | | | | | | | | | |
| Notes | | | | | | | | | | | | |
| * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier. | | | | | | | | | | | | |
































HCM 6th Signalized Intersection Summary
7: Montana Ave & Custer Ave

Alternatives 4 2042 School
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h) | 276 | 970 | 179 | 256 | 719 | 403 | 221 | 556 | 236 | 392 | 476 | 130 |
| Future Volume (veh/h) | 276 | 970 | 179 | 256 | 719 | 403 | 221 | 556 | 236 | 392 | 476 | 130 |
| 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 | 1350 | 1329 | 1350 | 1488 | 1477 | 1477 | 1488 | 1500 | 1500 | 1477 | 1488 | 1500 |
| Adj Flow Rate, veh/h | 294 | 1032 | 190 | 272 | 765 | 429 | 235 | 591 | 251 | 417 | 506 | 138 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 0 | 2 | 0 | 1 | 2 | 2 | 1 | 0 | 0 | 2 | 1 | 0 |
| Cap, veh/h | 325 | 943 | 572 | 238 | 981 | 915 | 228 | 646 | 399 | 1041 | 1419 | 804 |
| Arrive On Green | 0.13 | 0.37 | 0.37 | 0.12 | 0.46 | 0.46 | 0.13 | 0.23 | 0.23 | 0.38 | 0.50 | 0.50 |
| Sat Flow, veh/h | 2494 | 2525 | 1144 | 2750 | 2806 | 1251 | 1417 | 2850 | 1271 | 2728 | 2828 | 1271 |
| Grp Volume(v), veh/h | 294 | 1032 | 190 | 272 | 765 | 429 | 235 | 591 | 251 | 417 | 506 | 138 |
| Grp Sat Flow(s),veh/h/ln | 1247 | 1262 | 1144 | 1375 | 1403 | 1251 | 1417 | 1425 | 1271 | 1364 | 1414 | 1271 |
| Q Serve(g_s), s | 17.4 | 56.0 | 16.4 | 13.0 | 34.3 | 12.2 | 19.0 | 30.3 | 12.3 | 16.7 | 16.3 | 6.7 |
| Cycle Q Clear(g_c), s | 17.4 | 56.0 | 16.4 | 13.0 | 34.3 | 12.2 | 19.0 | 30.3 | 12.3 | 16.7 | 16.3 | 6.7 |
| 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 | 325 | 943 | 572 | 238 | 981 | 915 | 228 | 646 | 399 | 1041 | 1419 | 804 |
| V/C Ratio(X) | 0.90 | 1.09 | 0.33 | 1.14 | 0.78 | 0.47 | 1.03 | 0.91 | 0.63 | 0.40 | 0.36 | 0.17 |
| Avail Cap(c_a), veh/h | 349 | 943 | 572 | 238 | 981 | 915 | 228 | 703 | 424 | 1041 | 1419 | 804 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.44 | 0.44 | 0.44 | 0.09 | 0.09 | 0.09 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 64.3 | 47.0 | 28.6 | 66.4 | 35.3 | 8.7 | 57.2 | 56.6 | 44.0 | 33.9 | 22.7 | 11.4 |
| Incr Delay (d2), s/veh | 12.9 | 50.8 | 0.1 | 68.7 | 0.4 | 0.0 | 68.5 | 19.7 | 7.4 | 0.2 | 0.7 | 0.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 6.1 | 23.9 | 4.5 | 6.6 | 10.8 | 4.0 | 5.6 | 12.5 | 4.1 | 5.5 | 5.5 | 2.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 77.2 | 97.8 | 28.8 | 135.0 | 35.7 | 8.8 | 125.7 | 76.2 | 51.4 | 34.0 | 23.4 | 11.8 |
| LnGrp LOS | E | F | C | F | D | A | F | E | D | C | C | B |
| Approach Vol, veh/h | | 1516 | | | 1466 | | | 1077 | | | 1061 | |
| Approach Delay, s/veh | | 85.2 | | | 46.2 | | | 81.2 | | | 26.1 | |
| Approach LOS | | F | | | D | | | F | | | C | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 64.3 | 41.0 | 20.0 | 63.0 | 23.0 | 82.3 | 23.6 | 59.4 | | | | |
| Change Period (Y+Rc), s | 7.0 | * 7 | 7.0 | * 7 | 4.0 | 7.0 | 4.0 | 7.0 | | | | |
| Max Green Setting (Gmax), s | 21.0 | * 37 | 13.0 | * 56 | 19.0 | 39.0 | 21.0 | 49.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 18.7 | 32.3 | 15.0 | 58.0 | 21.0 | 18.3 | 19.4 | 36.3 | | | | |
| Green Ext Time (p_c), s | 0.3 | 1.7 | 0.0 | 0.0 | 0.0 | 2.8 | 0.1 | 4.4 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 60.9 | | | | | | | | |
| HCM 6th LOS | | | | E | | | | | | | | |
| Notes | | | | | | | | | | | | |
| * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier. | | | | | | | | | | | | |

HCM 6th Signalized Intersection Summary
7: Montana Ave & Custer Ave

Alternatives 4 2042 PM
10/12/2018

| |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |   |   |  |   |   |  |  |   |  |   |   |  |
| Traffic Volume (veh/h) | 300 | 1192 | 198 | 308 | 860 | 526 | 231 | 689 | 310 | 363 | 507 | 140 |
| Future Volume (veh/h) | 300 | 1192 | 198 | 308 | 860 | 526 | 231 | 689 | 310 | 363 | 507 | 140 |
| 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 | 1400 | 1389 | 1400 | 1500 | 1488 | 1500 | 1500 | 1488 | 1500 | 1500 | 1500 | 1500 |
| Adj Flow Rate, veh/h | 309 | 1229 | 204 | 318 | 887 | 542 | 238 | 710 | 320 | 374 | 523 | 144 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, % | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Cap, veh/h | 371 | 1108 | 649 | 281 | 1166 | 1168 | 229 | 660 | 381 | 1403 | 1804 | 925 |
| Arrive On Green | 0.09 | 0.42 | 0.42 | 0.09 | 0.55 | 0.55 | 0.13 | 0.23 | 0.23 | 0.51 | 0.63 | 0.63 |
| Sat Flow, veh/h | 2587 | 2639 | 1186 | 2771 | 2828 | 1271 | 1429 | 2828 | 1271 | 2771 | 2850 | 1271 |
| Grp Volume(v), veh/h | 309 | 1229 | 204 | 318 | 887 | 542 | 238 | 710 | 320 | 374 | 523 | 144 |
| Grp Sat Flow(s),veh/h/ln | 1293 | 1320 | 1186 | 1386 | 1414 | 1271 | 1429 | 1414 | 1271 | 1386 | 1425 | 1271 |
| Q Serve(g_s), s | 12.1 | 63.0 | 21.2 | 10.0 | 36.5 | 13.7 | 19.0 | 35.0 | 25.3 | 11.6 | 12.4 | 5.2 |
| Cycle Q Clear(g_c), s | 12.1 | 63.0 | 21.2 | 10.0 | 36.5 | 13.7 | 19.0 | 35.0 | 25.3 | 11.6 | 12.4 | 5.2 |
| 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 | 371 | 1108 | 649 | 281 | 1166 | 1168 | 229 | 660 | 381 | 1403 | 1804 | 925 |
| V/C Ratio(X) | 0.83 | 1.11 | 0.31 | 1.13 | 0.76 | 0.46 | 1.04 | 1.08 | 0.84 | 0.27 | 0.29 | 0.16 |
| Avail Cap(c_a), veh/h | 385 | 1108 | 649 | 281 | 1166 | 1168 | 229 | 660 | 381 | 1403 | 1804 | 925 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.47 | 0.47 | 0.47 | 0.09 | 0.09 | 0.09 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 36.9 | 43.5 | 43.0 | 66.6 | 28.1 | 8.2 | 56.4 | 57.5 | 49.1 | 21.1 | 12.4 | 6.3 |
| Incr Delay (d2), s/veh | 7.0 | 55.8 | 0.1 | 64.3 | 0.3 | 0.0 | 70.2 | 57.3 | 19.4 | 0.1 | 0.4 | 0.4 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 4.1 | 28.7 | 6.2 | 7.7 | 11.0 | 5.2 | 5.7 | 17.5 | 9.6 | 3.7 | 3.9 | 1.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 43.9 | 99.3 | 43.1 | 130.9 | 28.4 | 8.2 | 126.6 | 114.8 | 68.5 | 21.2 | 12.8 | 6.6 |
| LnGrp LOS | D | F | D | F | C | A | F | F | E | C | B | A |
| Approach Vol, veh/h | | 1742 | | | 1747 | | | 1268 | | | 1041 | |
| Approach Delay, s/veh | | 82.9 | | | 40.8 | | | 105.3 | | | 15.0 | |
| Approach LOS | | F | | | D | | | F | | | B | |
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 83.0 | 42.0 | 17.0 | 70.0 | 23.0 | 102.0 | 18.2 | 68.8 | | | | |
| Change Period (Y+Rc), s | 7.0 | * 7 | 7.0 | * 7 | 4.0 | 7.0 | 4.0 | 7.0 | | | | |
| Max Green Setting (Gmax), s | 19.0 | * 35 | 10.0 | * 63 | 19.0 | 35.0 | 15.0 | 59.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 13.6 | 37.0 | 12.0 | 65.0 | 21.0 | 14.4 | 14.1 | 38.5 | | | | |
| Green Ext Time (p_c), s | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.1 | 6.6 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 62.9 | | | | | | | | |
| HCM 6th LOS | | | | E | | | | | | | | |
| Notes | | | | | | | | | | | | |
| * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier. | | | | | | | | | | | | |