



LSC TRANSPORTATION CONSULTANTS, INC.

1889 York Street
Denver, CO 80206
(303) 333-1105
FAX (303) 333-1107
E-mail: lsc@lscdenver.com

February 24, 2023

Mr. Scott Farkas
Crestone Peak Resources
1801 California Street, Suite 2500
Denver, CO 80202

Re: CPR - Lussing Trust
Traffic Impact Analysis
Aurora, CO
LSC #230030

Dear Mr. Farkas:

In response to your request, LSC Transportation Consultants, Inc. has prepared this Traffic Impact Analysis for the proposed CPR - Lussing Trust well site in Aurora, Colorado. The site is located east of Watkins Road and north of E. Jewell Avenue as shown in Figure 1.

REPORT CONTENTS

The report contains the following: the existing roadway and traffic conditions in the vicinity of the site including the lane geometries, traffic controls, etc.; the existing weekday peak-hour traffic volumes; the existing daily traffic volumes in the area; the typical weekday site-generated traffic volume projections for the site and the nearby Watkins site; the assignment of the projected traffic volumes to the area roadways for the highest trip generating month; the projected total traffic volumes on the area roadways; the site's projected traffic impacts; and any recommended roadway improvements to mitigate the traffic impacts from the site. The estimated timing of each phase is the best information available today but is subject to change over time.

LAND USE AND ACCESS

The site is proposed as oil and gas operations with seven well heads. Full movement access is proposed to Watkins Road via an existing private access road as shown in Figure 2. There is adequate sight distance along Watkins Road.

The site will be developed in 12 phases as follows:

- | | |
|---|---------|
| 1. Construction Phase 1 Set up | 1 day |
| 2. Construction Phase 1 (Earthwork of site and access road) | 48 days |
| 3. Construction Phase 1 Breakdown | 1 day |
| 4. Secondary Construction (Finishing work and access road construction) | 10 days |
| 5. Drilling Set Up | 1 day |
| 6. Drilling | 48 days |

7. Drilling Breakdown	1 day
8. Completion & Flow Back Set Up	3 days
9. Completion (3 days per well)	16 days
10. Flowback	16 days
11. Completion & Flow Back Breakdown	3 days
12. Production/Operations	ongoing

These phases are detailed in Table 1.

ROADWAY AND TRAFFIC CONDITIONS

Area Roadways

The major roadways in the site’s vicinity are shown on Figure 1 and are described below.

- **Watkins Road (CR 97)** is a two-lane paved arterial county road that generally runs north/south west of the proposed site. It connects E. Quincy Avenue (CR 30) north to Interstate 70 (I-70) and US 36. The posted speed limit is 55 mph south of E. 6th Avenue.
- **E. 6th Avenue** is a two-lane paved roadway north of the site. The intersection with Watkins Road is stop-sign controlled. The posted speed limit is 50 mph.
- **Jewell Avenue** is a two-lane, paved road that runs east-west south of the site. The intersection with Watkins Road is stop-sign controlled.
- **Existing or Proposed Private Access Roads** are gravel roadways that will provide access to the site. They will be maintained to accommodate construction traffic with a minimum width of 23 to 30 feet.

Existing Traffic Conditions

Figure 3 shows the existing weekday traffic volumes, lane geometry, traffic controls, and the posted speed limits in the vicinity of the site. The weekday peak-hour traffic volumes and average daily traffic volumes are from the attached traffic counts conducted by Counter Measures in September, 2022 and January, 2023.

2024 Background Traffic

Figure 4 shows the 2024 background traffic volumes which assume an annual growth rate of three percent or higher to maintain a conservative analysis.

Existing and 2024 Background Levels of Service

Level of service (LOS) is a quantitative measure of the level of congestion or delay at an intersection. Level of service is indicated on a scale from “A” to “F.” LOS A is indicative of little congestion or delay and LOS F is indicative of a high level of congestion or delay. Attached are specific level of service definitions for unsignalized intersections.

The intersections in the study area were analyzed to determine the existing and 2024 background levels of service using Synchro. Table 2 shows the level of service analysis results. The level of service reports are attached.

1. **Watkins Road/I-70 WB On/Off-Ramp:** All movements at this unsignalized intersection currently operate at LOS “B” or better during both morning and afternoon peak-hours and are expected to do so through 2024.
2. **Watkins Road/I-70 EB On/Off-Ramp:** All movements at this unsignalized intersection currently operate at LOS “B” or better during both morning and afternoon peak-hours and are expected to do so through 2024.
3. **Watkins Road/E. 6th Avenue:** All movements at this unsignalized intersection currently operate at LOS “A” during both morning and afternoon peak-hours and are expected to do so through 2024.
4. **Watkins Road/Jewell Avenue:** All movements at this unsignalized intersection currently operate at LOS “B” or better during both morning and afternoon peak-hours and are expected to do so through 2024.
5. **Watkins Road/Site Access:** This intersection was analyzed only for the total traffic scenario.

TRIP GENERATION

Table 3 shows the estimated highest daily passenger car equivalent trip generation potential for the combination of the site and the nearby Chico Watkins & Watkins North sites. This is expected to occur in May, 2024.

Table 4 shows the estimated daily and peak-hour traffic impact for the site and the nearby Chico Watkins & Watkins North sites in passenger car equivalents when the site is at peak generation. This is expected to occur in May, 2024.

TRIP ASSIGNMENT

Figure 6 shows the estimated May, 2024 assignment of site-generated traffic volumes in passenger car equivalents. May, 2024 is expected to have the highest trip generation potential for the combined Watkins and Lussing Trust sites as well as be the highest trip generation potential for the stand-alone Lussing Trust site.

2024 TOTAL TRAFFIC

Figure 7 shows the estimated March, 2024 total traffic, traffic control, and lane geometry which is the sum of March, 2024 background traffic volumes (from Figure 4) and the site-generated traffic volumes (from Figure 6). This figure shows the highest combined monthly impact of the Lussing Trust site and the nearby Watkins sites.

PROJECTED LEVELS OF SERVICE

The intersections in the study area were analyzed as appropriate to determine the 2024 total levels of service for the highest trip generating scenario. Table 2 shows the level of service analysis results. The level of service reports are attached.

1. **Watkins Road/I-70 WB On/Off-Ramp:** All movements at this unsignalized intersection are expected to operate at LOS “B” or better during both morning and afternoon peak-hours through 2024.
2. **Watkins Road/I-70 EB On/Off-Ramp:** All movements at this unsignalized intersection are expected to operate at LOS “B” or better during both morning and afternoon peak-hours through 2024.
3. **Watkins Road/E. 6th Avenue:** All movements at this unsignalized intersection are expected to operate at LOS “B” or better during both morning and afternoon peak-hours through 2024.
4. **Watkins Road/Jewell Avenue:** All movements at this unsignalized intersection are expected to operate at LOS “B” or better during both morning and afternoon peak-hours through 2024.
5. **Watkins Road/Site Access:** All movements at this unsignalized intersection are expected to operate at LOS “A” during both morning and afternoon peak-hours through 2025.

AUXILIARY TURN LANE EVALUATION

The City of Aurora generally follows the CDOT NR-B classification to determine if auxiliary turn lanes are warranted. The site access would typically require a southbound left-turn lane on Watkins Road because the peak-hour turning volume is expected to be above 10 passenger car equivalent vehicles. If constructed, this lane would be 378 feet long plus a 222-foot transition taper and 55:1 redirect taper based on the 55 mph posted speed limit. This threshold is only expected to be exceeded for about 45 days. This lane would no longer be needed in the productions/operations phase because the site access is not planned to be a future public street.

A southbound left-turn lane is not recommended because the turn lane volume threshold will only be met for about 45 days and then will no longer be warranted. A detailed traffic control plan is recommended in lieu of constructing the turn lane.

TRAFFIC CONTROL PLAN

The City of Aurora is restricting all non-essential site trips during the commuter hours of 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. which will greatly reduce impacts to commuter traffic. A traffic control plan should be developed to warn motorists of heavy truck traffic during construction of the site. Auxiliary turn lanes are not recommended per the above section because the impacts are temporary and the traffic control and construction of a turn lane would likely be more impactful than the temporary impact with implementation of a traffic

control plan. It is also worth noting the site access intersection is not intended as a future public street so the turning volumes will be very low once the productions/operations phase begins.

CONCLUSIONS AND RECOMMENDATIONS

Trip Generation

1. The daily impact for either site will be highest at about 422 passenger car equivalent trips per day during the Completion Phase (16 days). The highest combined impact of the two sites will be 702 passenger car equivalent trips in May, 2024.
2. The long-term impact will be minimal due to product being removed from the site via pipeline.

Projected Levels of Service

3. All movements at the unsignalized intersections analyzed are expected to operate at LOS "B" or better during both morning and afternoon peak-hours through 2024. Operations will likely be much better because the City is restricting all non-essential site trips during the commuter hours of 7:00 - 9:00 a.m. and 4:00 - 6:00 p.m.

Conclusions

4. The impact of the proposed CPR - Lussing Trust well site can be accommodated by the existing roadway network with the following recommendations.

Recommendations

5. The City of Aurora is restricting all non-essential site trips during the commuter hours of 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. which will greatly reduce impacts to commuter traffic. A traffic control plan should be developed to warn motorists of heavy truck traffic during construction of the site. Auxiliary turn lanes are not recommended because the impacts are temporary and the traffic control and construction of one or more turn lanes would be more impactful than the temporary impact with implementation of a traffic control plan. It is also worth noting the site access intersection is not intended as a future public street so the turning volumes will be very low once the productions/ operations phase begins.

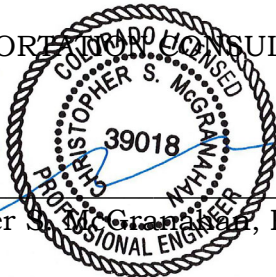
* * * * *

We trust our findings will assist you in gaining approval of the proposed CPR - Lussing Trust well site development. Please contact me if you have any questions or need further assistance.

Sincerely,

LSC TRANSPORTATION CONSULTANTS, INC.

By  _____
Christopher S. McGrath, PE, PTOE
Principal



2-24-23

CSM/wc

Enclosures: Tables 1 - 4
Figures 1 - 9
Traffic Count Reports
Level of Service Definitions
Level of Service Reports

Table 1
CPR Lussing Trust (7 well heads)
Trip Generation Estimate
LSC #230030; February, 2023

Phase of Development and Estimated Start Date	Gross Vehicle Weight ⁽¹⁾			ESAL Per Vehicle ⁽¹⁾	Number of Vehicles Estimated per Day ⁽¹⁾		Average Daily Trips	Average Daily ESALs
Construction Phase 1 (50 days +/-) - Earthwork of site and access road								
1.) <i>Setup (1 Day)</i>								
Passenger Vehicle ⁽²⁾	4,500	to	8,500 lbs	0.003	10	Vehicles	20	0.06
Multiple Unit Trucks ⁽²⁾	50,000	to	70,000 lbs	1.087	5	Vehicles	10	10.87
					Typical Vehicle Trips per Day =		30	10.93
					Typical Passenger Car Equivalent Trips per Day ⁽³⁾ =		50	
2.) <i>Construction (48 days)</i>								
Passenger Vehicle ⁽²⁾	4,500	to	8,500 lbs	0.003	10	Vehicles	20	0.06
					Typical Vehicle Trips per Day =		20	0.06
					Typical Passenger Car Equivalent Trips per Day ⁽³⁾ =		20	
3.) <i>Breakdown (1 Day)</i>								
Passenger Vehicle ⁽²⁾	4,500	to	8,500 lbs	0.003	10	Vehicles	20	0.06
Multiple Unit Trucks ⁽²⁾	50,000	to	70,000 lbs	1.087	5	Vehicles	10	10.87
					Typical Vehicle Trips per Day =		30	10.93
					Typical Passenger Car Equivalent Trips per Day ⁽³⁾ =		50	
4.) Secondary Construction (10 days +/-) - Finishing work and access road construction								
Passenger Vehicle ⁽²⁾	4,500	to	8,500 lbs	0.003	10	Vehicles	20	0.06
Multiple Unit Trucks ⁽²⁾	50,000	to	70,000 lbs	1.087	40	Vehicles	80	86.96
					Typical Vehicle Trips per Day =		100	87.02
					Typical Passenger Car Equivalent Trips per Day ⁽³⁾ =		260	
Drilling Phase 2 (50 days +/-)								
5.) <i>Setup (1 Day)</i>								
Passenger Vehicle ⁽²⁾	4,500	to	8,500 lbs	0.003	20	Vehicles	40	0.12
Multiple Unit Trucks ⁽²⁾	50,000	to	70,000 lbs	1.087	14	Vehicles	28	30.44
					Typical Vehicle Trips per Day =		68	30.56
					Typical Passenger Car Equivalent Trips per Day ⁽³⁾ =		124	
6.) <i>Drilling (48 days)</i>								
Passenger Vehicle ⁽²⁾	4,500	to	8,500 lbs	0.003	23	Vehicles	46	0.14
Multiple Unit Trucks ⁽²⁾	50,000	to	70,000 lbs	1.087	11	Vehicles	22	23.91
					Typical Vehicle Trips per Day =		68	24.05
					Typical Passenger Car Equivalent Trips per Day ⁽³⁾ =		112	
7.) <i>Breakdown (1 Day)</i>								
Passenger Vehicle ⁽²⁾	4,500	to	8,500 lbs	0.003	20	Vehicles	40	0.12
Multiple Unit Trucks ⁽²⁾	50,000	to	70,000 lbs	1.087	14	Vehicles	28	30.44
					Typical Vehicle Trips per Day =		68	30.56
					Typical Passenger Car Equivalent Trips per Day ⁽³⁾ =		124	
Completion & Flow Back Phase (38 days +/-)								
8.) <i>Setup (3 Days)</i>								
Passenger Vehicle ⁽²⁾	4,500	to	8,500 lbs	0.003	20	Vehicles	40	0.12
Multiple Unit Trucks ⁽²⁾	50,000	to	70,000 lbs	1.087	40	Vehicles	80	86.96
					Typical Vehicle Trips per Day =		120	87.08
					Typical Passenger Car Equivalent Trips per Day ⁽³⁾ =		280	
9.) <i>Completion (16 days)</i>								
Passenger Vehicle ⁽²⁾	4,500	to	8,500 lbs	0.003	61	Vehicles	122	0.37
Multiple Unit Trucks ⁽²⁾	50,000	to	70,000 lbs	1.087	50	Vehicles	100	108.70
					Typical Vehicle Trips per Day =		222	109.07
					Typical Passenger Car Equivalent Trips per Day ⁽³⁾ =		422	
10.) <i>Flow Back (16 Days)</i>								
Passenger Vehicle ⁽²⁾	4,500	to	8,500 lbs	0.003	5	Vehicles	10	0.03
Multiple Unit Trucks ⁽²⁾	50,000	to	70,000 lbs	1.087	28	Vehicles	56	60.87
					Typical Vehicle Trips per Day =		66	60.90
					Typical Passenger Car Equivalent Trips per Day ⁽³⁾ =		178	
11.) <i>Breakdown (3 days)</i>								
Passenger Vehicle ⁽²⁾	4,500	to	8,500 lbs	0.003	20	Vehicles	40	0.12
Multiple Unit Trucks ⁽²⁾	50,000	to	70,000 lbs	1.087	40	Vehicles	80	86.96
					Typical Vehicle Trips per Day =		120	87.08
					Typical Passenger Car Equivalent Trips per Day ⁽³⁾ =		280	
12.) Production/Operation Phase (ongoing with no distribution/collection system)								
Passenger Vehicle	4,500	to	8,500 lbs	0.003	2	Vehicles	4	0.01
					Typical Vehicle Trips per Day =		4	0.01
					Typical Passenger Car Equivalent Trips per Day =		4	

Notes:

(1) Source: Based on scheduling information provided by Crestone Peak Resources - subject to change

(2) CDOT *State Highway Access Code* (SHAC) assumes: passenger vehicle < 20', single unit truck from 20' to 40', multiple unit truck > 40'

(3) CDOT SHAC assumes single unit trucks = 2 passenger car equivalents and multiple unit trucks = 3 passenger car equivalents

Source: LSC Transportation Consultants, Inc. based on scheduling input from Crestone Peak Resources

Table 2
Intersection Levels of Service Analysis
CPR Lussing Trust
Aurora, CO
LSC #230030; February, 2023

Intersection No. & Location	Traffic Control	Existing Traffic		2024 Background Traffic		March 2024 Total Traffic	
		Level of Service AM	Level of Service PM	Level of Service AM	Level of Service PM	Level of Service AM	Level of Service PM
1) <u>Watkins Road/I-70 WB On/Off Ramp</u>	TWSC						
NB Left/Through		A	A	A	A	A	A
WB Approach		B	B	B	B	B	B
Critical Movement Delay (sec/veh)		11.3	12.6	11.6	12.9	12.4	14.3
2) <u>Watkins Road/I-70 EB On/Off Ramp</u>	TWSC						
EB Approach		B	B	B	B	B	B
SB Left/Through		A	A	A	A	A	A
Critical Movement Delay (sec/veh)		10.2	11.5	10.4	11.9	10.8	12.5
3) <u>Watkins Road/E. 6th Avenue</u>	TWSC						
WB Approach		A	A	A	A	A	B
SB Left/Through		A	A	A	A	A	A
Critical Movement Delay (sec/veh)		9.1	9.6	9.4	9.9	9.7	10.3
4) <u>Watkins Road/E. Jewell Avenue</u>	TWSC						
NB Left/Through		A	A	A	A	A	A
EB Approach		A	B	A	B	A	B
Critical Movement Delay (sec/veh)		9.1	10.0	9.6	10.1	9.8	10.3
5) <u>Watkins Road/Lussing Trust Site Access</u>	TWSC						
WB Approach		--	--	--	--	A	A
SB Left/Through		--	--	--	--	A	A
Critical Movement Delay (sec/veh)		--	--	--	--	9.4	9.7

Table 3
Cumulative Impact of Lussing Trust & Chico-Watkins/Watkins North Sites ^{(1) (2) (3)}
Aurora, CO
LSC #230030; February, 2023

PAD LOCATION		WELL #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Dec-23	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Chico Watkins & Watkins North		^1-11																																
Lussing Trust		^1-7	50	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
			50	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
PHASE	LUSSING	DURATION (days)	TRIPS/ DAY																															
Construction #1 Setup		1	50	Jan-24																														
Construction #1 Construction		48	20	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Construction #1 Breakdown		1	50																															
Construction #2		10	260																															
Drilling (Setup)		1	124	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	50	260	260	260	260	260	260	260	260	260	260	124	112
Drilling (Operations)		48	112	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	50	260	260	260	260	260	260	260	260	260	260	124	112
Drilling (Breakdown)		1	124																															
Completion (Setup)		3	280	Feb-24																														
Completion (Frac Ops)		21	422	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	23	24	25	26	27	28	29	
Completion (Flowback)		21	178																															
Completion (Breakdown))		3	280	50	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
Production / Operations		4	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	
			162	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	
PHASE	WATKINS	DURATION (days)	TRIPS/DAY																															
Construction #1		1	50	Mar-24																														
Construction #1 Construction		48	20	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Construction #1 Breakdown		1	50	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	50	260	260	260	260	260	260	260	260	260	
Construction #2		10	260	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	124	280	280	280	422	422	422	422	422	422	422	422	
Drilling (Setup)		2	124	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	144	300	330	540	682	682	682	682	682	682	682	682	682	
Drilling (Operations)		22	112																															
Drilling (Breakdown)		2	124																															
Completion (Setup)		3	280	Apr-24																														
Completion (Frac Ops)		30	422	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
Completion (Flowback)		15	178	124	124	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	124	124	280	280	280	422	
Completion (Breakdown))		3	280	422	422	422	422	422	422	422	422	422	422	422	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	
Production / Operations		4	546	546	534	534	534	534	534	534	534	534	534	534	290	290	290	290	290	290	290	290	290	290	290	290	290	302	302	458	458	458	600	
			May-24																															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
			422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	178	178	
			178	178	178	280	280	280	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
			600	600	600	702	702	702	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	182	182	
			Jun-24																															
			1	2	3	4	5	6	7	8	9	10	11	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
			178	178	178	178	178	178	178	178	178	178	178	178	178	280	280	280	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
			4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
			182	182	182	182	182	182	182	182	182	182	182	182	182	284	284	284	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	
			Jul-24																															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
			4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
			4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
			8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	

Notes:

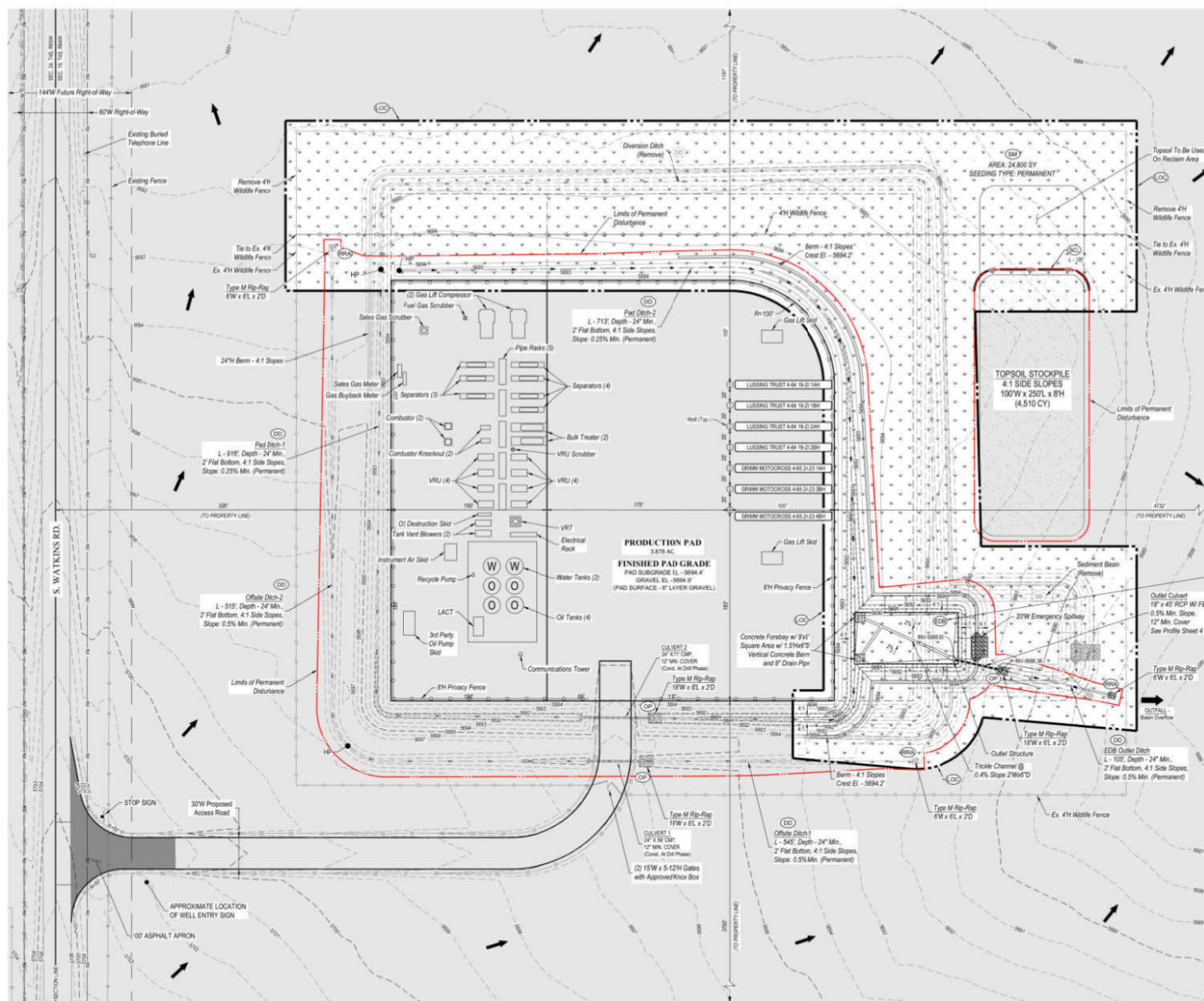
Table 4
ESTIMATED TRAFFIC GENERATION ⁽¹⁾
CPR Lussing Trust
Aurora, CO
LSC #230030; February, 2023

Month/Year	Vehicle-Trips Generated				
	Average Daily PCE ⁽¹⁾ ⁽²⁾ ⁽³⁾	AM Peak-Hour ⁽⁴⁾		PM Peak-Hour ⁽⁴⁾	
		In	Out	In	Out
March, 2024					
<u>Highest Combined Impact for the two sites</u>					
Chico Watkins & Watkins North	280	14	14	14	14
Lussing Trust	422	21	21	21	21
	702	35	35	35	35

Notes:

- (1) Based on data in Tables 1 and 2
- (2) CDOT *State Highway Access Code* (SHAC) assumes: passenger vehicle < 20', single unit truck from 20' to 40', multiple unit truck > 40'
- (3) CDOT SHAC assumes single unit trucks = 2 passenger car equivalents and multiple unit trucks = 3 passenger car equivalents
- (4) Assumes peak-hour trips are 10% of daily trips



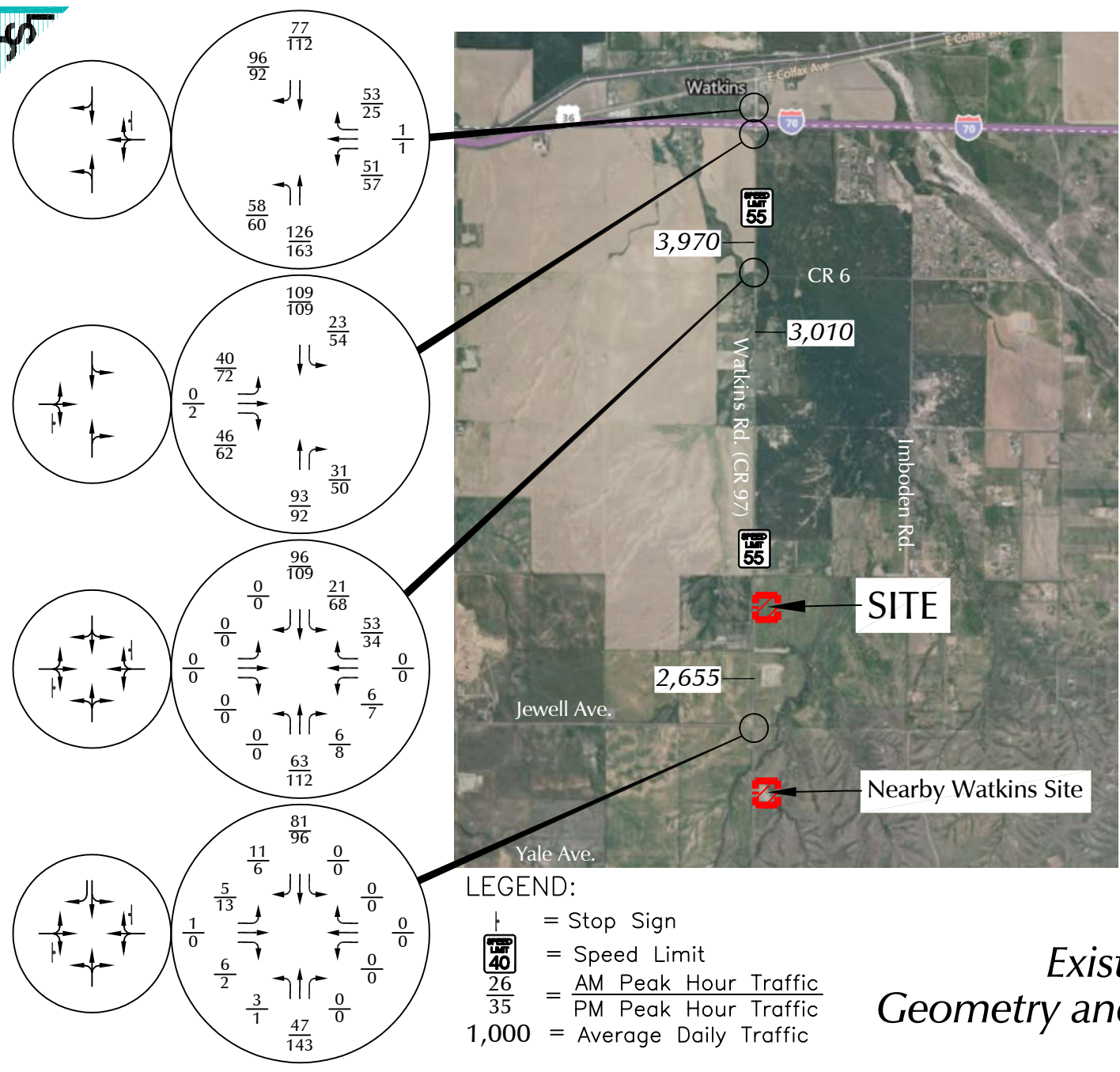


Approximate Scale
Scale: NTS

Figure 2

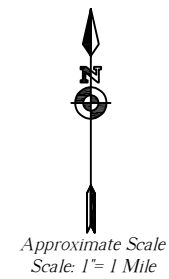
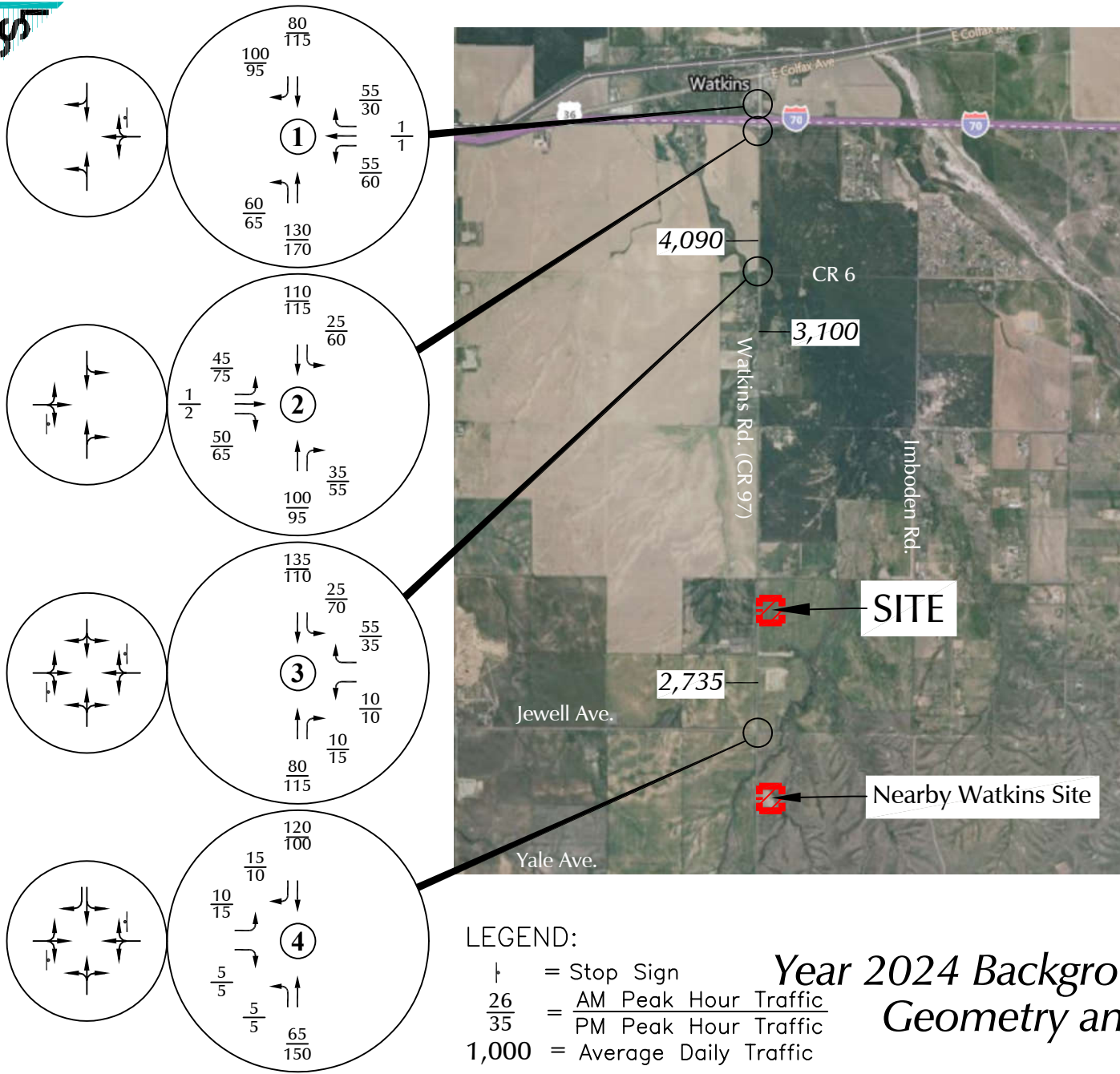
Site Plan

CPR - Lussing Trust (LSC #230030)



Approximate Scale
Scale: 1" = 1 Mile

Figure 3
**Existing Traffic, Lane
Geometry and Traffic Control**
CPR - Lussing Trust (LSC #230030)



Year 2024 Background Traffic, Lane Geometry and Traffic Control

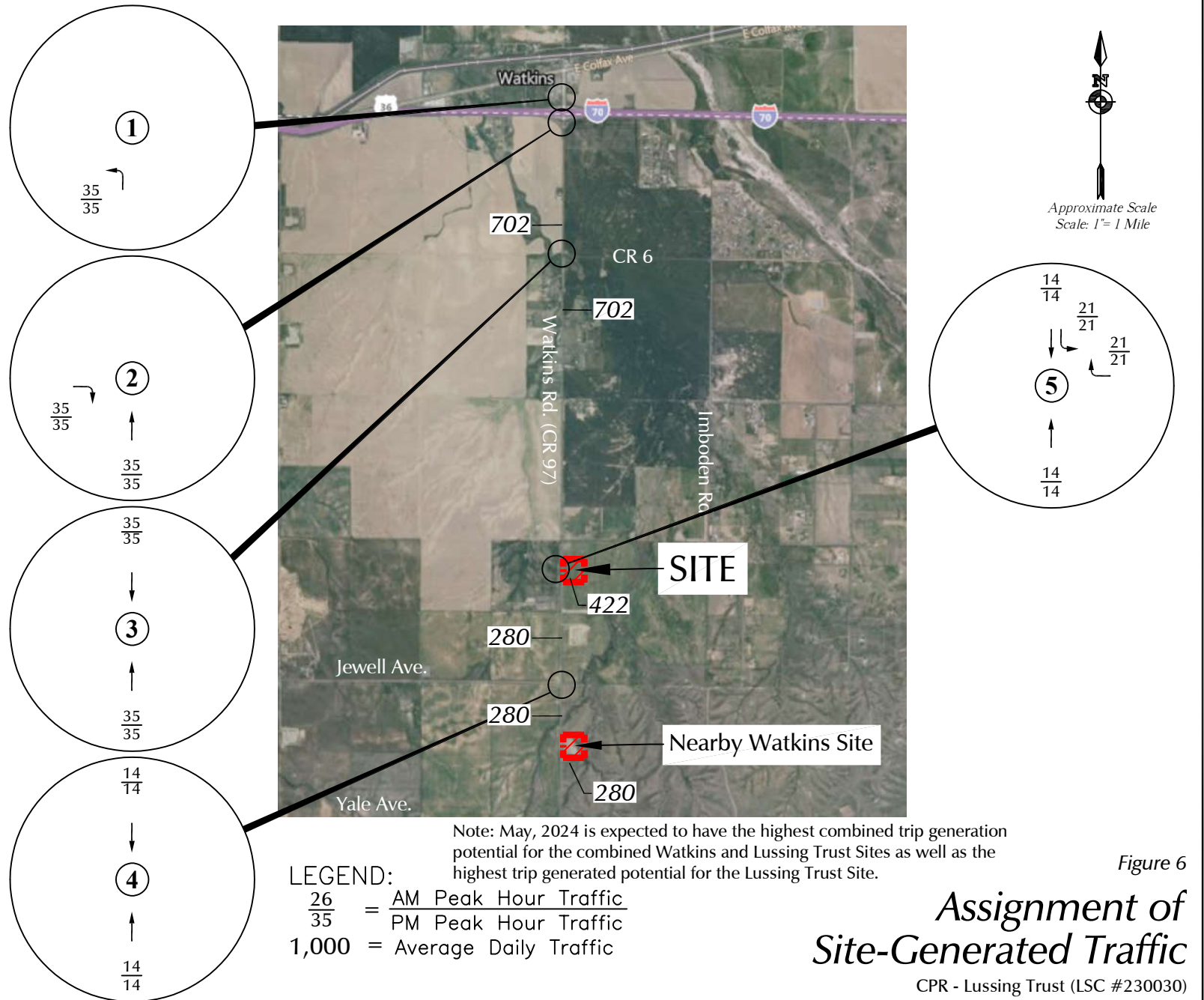


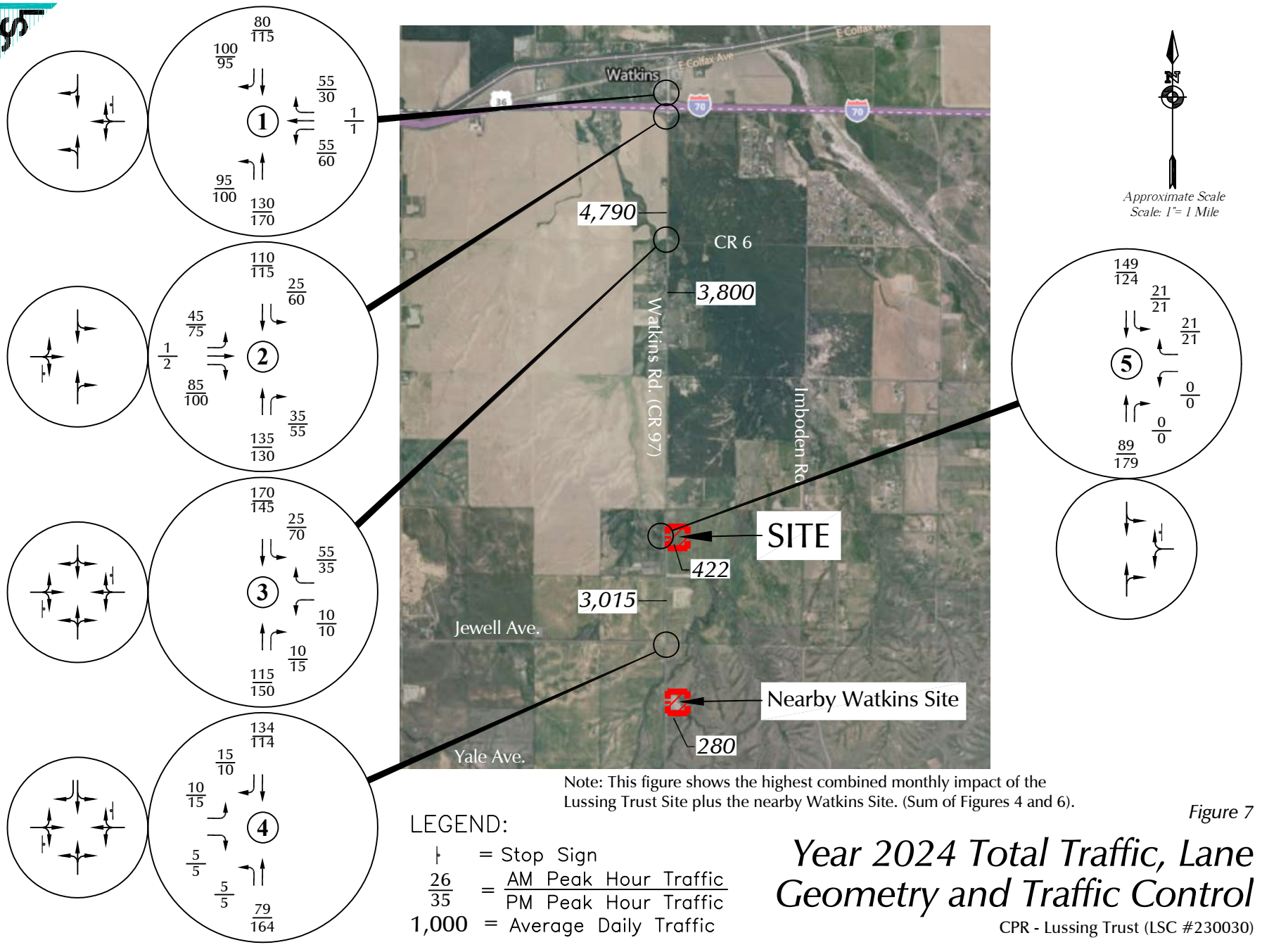
Approximate Scale
Scale: 1" = 1 Mile

LEGEND:
 = Percent Directional Distribution

Figure 5
*Directional Distribution
of Site-Generated Traffic*

CPR - Lussing Trust (LSC #230030)





COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: WATKINS RD
E/W STREET: I70 ON/OFF RAMP E/B
CITY: WATKINS
COUNTY: ARAPAHOE

File Name : 1-70ONOFFRAMPEB
Site Code : 00000013
Start Date : 1/5/2023
Page No : 1

Groups Printed- VEHICLES

	WATKINS RD Southbound			I70 E/B ON RAMP Westbound			WATKINS RD Northbound			I70 E/B OFF RAMP Eastbound			Int. Total
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	5	29	0	0	0	0	0	28	3	8	0	8	81
06:45 AM	5	28	0	0	0	0	0	25	8	9	0	13	88
Total	10	57	0	0	0	0	0	53	11	17	0	21	169
07:00 AM	2	18	0	0	0	0	0	20	9	11	0	11	71
07:15 AM	11	34	0	0	0	0	0	20	11	12	0	14	102
07:30 AM	9	23	0	0	0	0	0	18	15	11	0	59	135
07:45 AM	10	22	0	0	0	0	0	15	14	13	0	58	132
Total	32	97	0	0	0	0	0	73	49	47	0	142	440
08:00 AM	7	19	0	0	0	0	0	13	9	9	0	54	111
08:15 AM	7	11	0	0	0	0	0	10	9	8	0	30	75
Total	14	30	0	0	0	0	0	23	18	17	0	84	186
04:00 PM	7	13	0	0	0	0	0	8	11	9	0	7	55
04:15 PM	17	18	0	0	0	0	0	21	18	11	0	12	97
04:30 PM	12	13	0	0	0	0	0	14	9	14	0	19	81
04:45 PM	17	38	0	0	0	0	0	31	10	17	2	16	131
Total	53	82	0	0	0	0	0	74	48	51	2	54	364
05:00 PM	14	26	0	0	0	0	0	22	14	11	0	13	100
05:15 PM	11	32	0	0	0	0	0	25	17	30	0	14	129
05:30 PM	12	23	0	0	0	0	0	25	14	30	0	13	117
05:45 PM	12	19	0	0	0	0	0	12	19	23	0	11	96
Total	49	100	0	0	0	0	0	84	64	94	0	51	442
Grand Total	158	366	0	0	0	0	0	307	190	226	2	352	1601
Apprch %	30.2	69.8	0.0	0.0	0.0	0.0	0.0	61.8	38.2	39.0	0.3	60.7	
Total %	9.9	22.9	0.0	0.0	0.0	0.0	0.0	19.2	11.9	14.1	0.1	22.0	

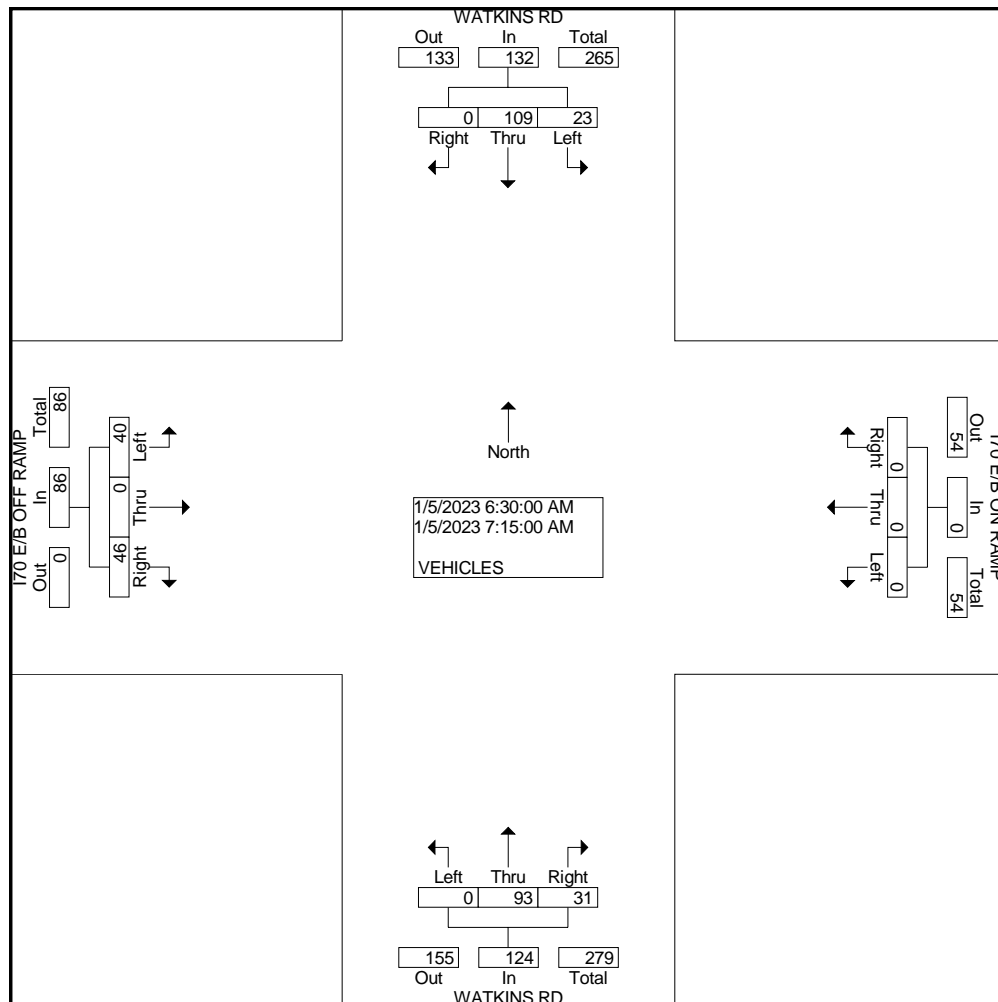
COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: WATKINS RD
E/W STREET: I70 ON/OFF RAMP E/B
CITY: WATKINS
COUNTY: ARAPAHOE

File Name : 1-70ONOFFRAMPEB
Site Code : 00000013
Start Date : 1/5/2023
Page No : 2

	WATKINS RD Southbound				I70 E/B ON RAMP Westbound				WATKINS RD Northbound				I70 E/B OFF RAMP Eastbound				Int. Total
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 06:30 AM to 07:15 AM - Peak 1 of 1																	
Intersection	06:30 AM																
Volume	23	109	0	132	0	0	0	0	0	93	31	124	40	0	46	86	342
Percent	17.4	82.6	0.0		0.0	0.0	0.0		0.0	75.0	25.0		46.5	0.0	53.5		
07:15	11	34	0	45	0	0	0	0	0	20	11	31	12	0	14	26	102
Volume																	
Peak Factor																	0.838
High Int.	07:15 AM				6:15:00 AM				06:45 AM				07:15 AM				
Volume	11	34	0	45	0	0	0	0	0	25	8	33	12	0	14	26	
Peak Factor				0.733								0.939				0.827	



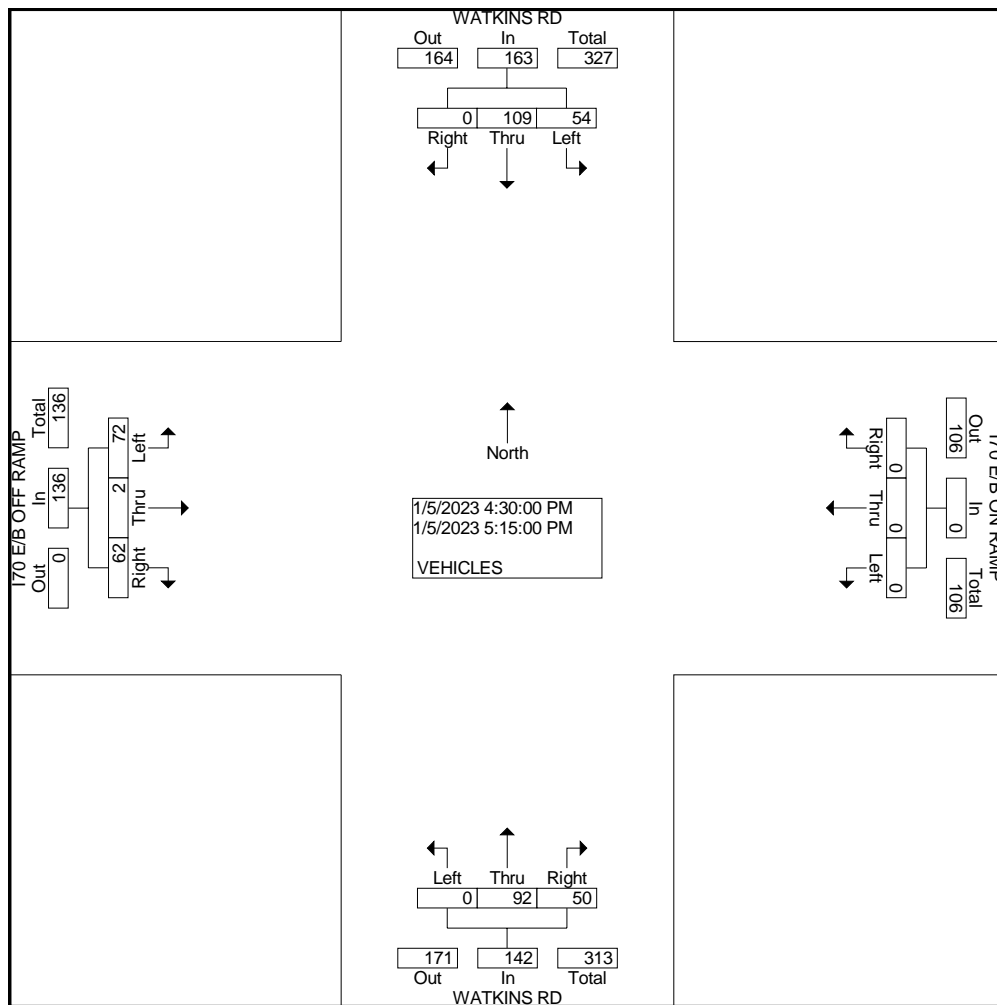
COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: WATKINS RD
E/W STREET: I70 ON/OFF RAMP E/B
CITY: WATKINS
COUNTY: ARAPAHOE

File Name : 1-70ONOFFRAMPEB
Site Code : 00000013
Start Date : 1/5/2023
Page No : 3

	WATKINS RD Southbound				I70 E/B ON RAMP Westbound				WATKINS RD Northbound				I70 E/B OFF RAMP Eastbound				Int. Total
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Intersection	04:30 PM																
Volume	54	109	0	163	0	0	0	0	0	92	50	142	72	2	62	136	441
Percent	33.1	66.9	0.0		0.0	0.0	0.0		0.0	64.8	35.2		52.9	1.5	45.6		
04:45																	
Volume	17	38	0	55	0	0	0	0	0	31	10	41	17	2	16	35	131
Peak Factor																	0.842
High Int.	04:45 PM								05:15 PM				05:15 PM				
Volume	17	38	0	55	0	0	0	0	0	25	17	42	30	0	14	44	
Peak Factor																	0.773



COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: WATKINS RD
E/W STREET: I70 ON/OFF RAMP W/B
CITY: WATKINS RD
COUNTY: ARAPAHOE

File Name : I70ONOFFRAMPWB
Site Code : 00000011
Start Date : 1/5/2023
Page No : 1

Groups Printed- VEHICLES

	WATKINS RD Southbound			I70 W/B OFF RAMP Westbound			WATKINS RD Northbound			I70 W/B ON RAMP Eastbound			Int. Total
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	0	22	17	11	1	23	19	51	0	0	0	0	144
06:45 AM	0	17	32	14	0	8	12	37	0	0	0	0	120
Total	0	39	49	25	1	31	31	88	0	0	0	0	264
07:00 AM	0	10	28	9	0	8	16	7	0	0	0	0	78
07:15 AM	0	28	19	17	0	14	11	31	0	0	0	0	120
07:30 AM	0	13	36	10	1	8	15	22	0	0	0	0	105
07:45 AM	0	12	18	10	3	8	8	19	0	0	0	0	78
Total	0	63	101	46	4	38	50	79	0	0	0	0	381
08:00 AM	0	16	11	5	0	7	13	21	0	0	0	0	73
08:15 AM	0	14	13	15	0	9	8	29	0	0	0	0	88
Total	0	30	24	20	0	16	21	50	0	0	0	0	161
04:00 PM	0	30	17	9	0	8	6	27	0	0	0	0	97
04:15 PM	0	20	18	8	1	10	15	35	0	0	0	0	107
04:30 PM	0	22	26	15	1	7	16	49	0	0	0	0	136
04:45 PM	0	38	27	16	0	3	9	29	0	0	0	0	122
Total	0	110	88	48	2	28	46	140	0	0	0	0	462
05:00 PM	0	25	19	15	0	5	21	40	0	0	0	0	125
05:15 PM	0	27	20	11	0	10	14	45	0	0	0	0	127
05:30 PM	0	17	19	6	1	9	12	39	0	0	0	0	103
05:45 PM	0	32	16	3	0	3	8	30	0	0	0	0	92
Total	0	101	74	35	1	27	55	154	0	0	0	0	447
Grand Total	0	343	336	174	8	140	203	511	0	0	0	0	1715
Apprch %	0.0	50.5	49.5	54.0	2.5	43.5	28.4	71.6	0.0	0.0	0.0	0.0	
Total %	0.0	20.0	19.6	10.1	0.5	8.2	11.8	29.8	0.0	0.0	0.0	0.0	

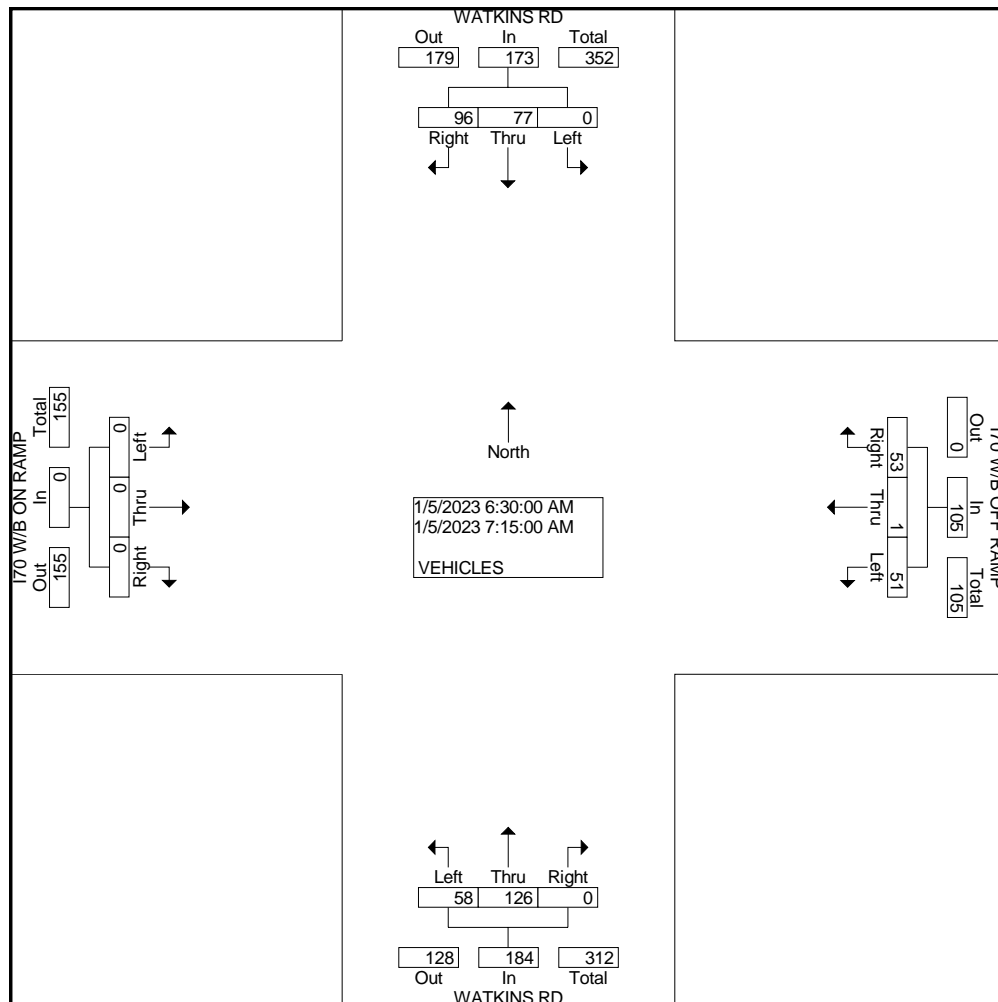
COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO
303-333-7409

N/S STREET: WATKINS RD
E/W STREET: I70 ON/OFF RAMP W/B
CITY: WATKINS RD
COUNTY: ARAPAHOE

File Name : I70ONOFFRAMPWB
Site Code : 00000011
Start Date : 1/5/2023
Page No : 2

	WATKINS RD Southbound				I70 W/B OFF RAMP Westbound				WATKINS RD Northbound				I70 W/B ON RAMP Eastbound				Int. Total
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 06:30 AM to 08:15 AM - Peak 1 of 1																	
Intersection	06:30 AM																
Volume	0	77	96	173	51	1	53	105	58	126	0	184	0	0	0	0	462
Percent	0.0	44.5	55.5		48.6	1.0	50.5		31.5	68.5	0.0		0.0	0.0	0.0		
06:30																	
Volume	0	22	17	39	11	1	23	35	19	51	0	70	0	0	0	0	144
Peak Factor																	0.802
High Int.	06:45 AM				06:30 AM				06:30 AM				6:15:00 AM				
Volume	0	17	32	49	11	1	23	35	19	51	0	70					
Peak Factor	0.883				0.750				0.657								



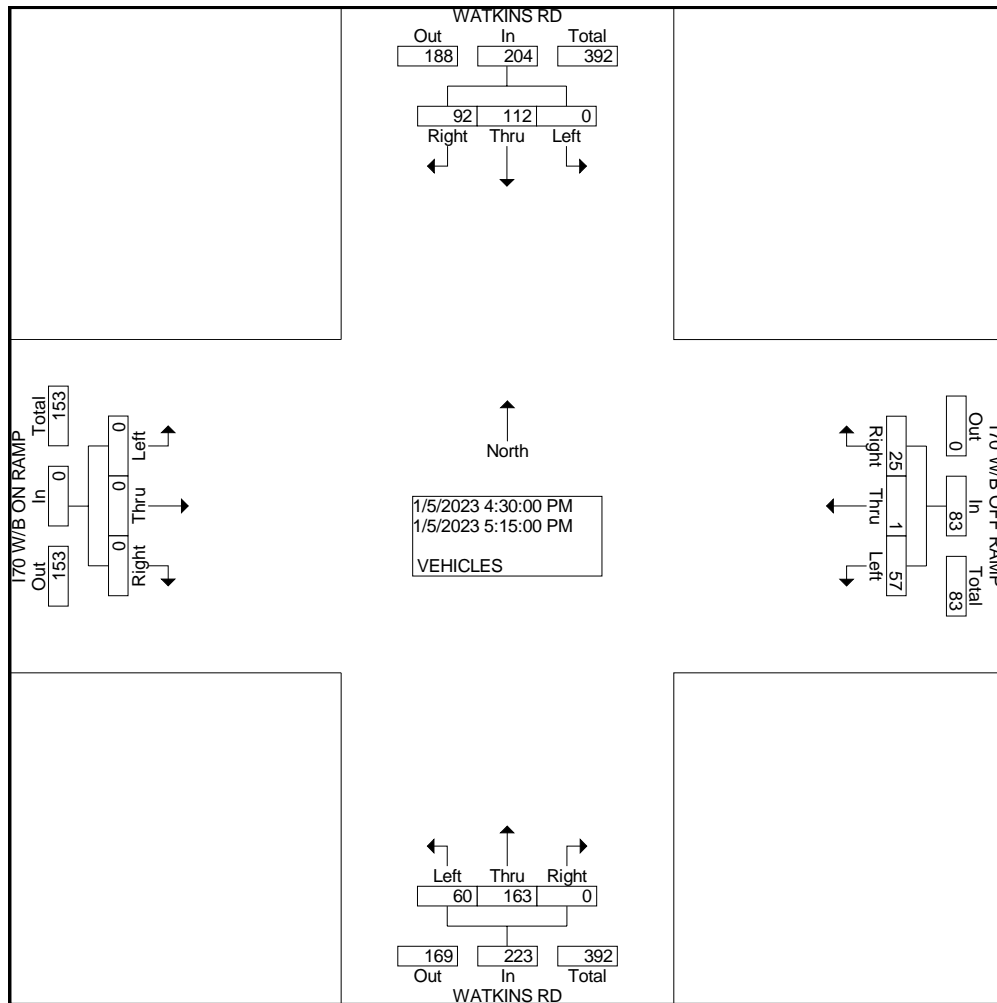
COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: WATKINS RD
E/W STREET: I70 ON/OFF RAMP W/B
CITY: WATKINS RD
COUNTY: ARAPAHOE

File Name : I70ONOFFRAMPWB
Site Code : 00000011
Start Date : 1/5/2023
Page No : 3

	WATKINS RD Southbound				I70 W/B OFF RAMP Westbound				WATKINS RD Northbound				I70 W/B ON RAMP Eastbound				Int. Total
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	04:30 PM																
Volume	0	112	92	204	57	1	25	83	60	163	0	223	0	0	0	0	510
Percent	0.0	54.9	45.1		68.7	1.2	30.1		26.9	73.1	0.0		0.0	0.0	0.0		
04:30																	
Volume	0	22	26	48	15	1	7	23	16	49	0	65	0	0	0	0	136
Peak Factor																	0.938
High Int.	04:45 PM				04:30 PM				04:30 PM								
Volume	0	38	27	65	15	1	7	23	16	49	0	65					
Peak Factor	0.785				0.902				0.858								



COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: WATKINS RD
E/W STREET: 6TH AVE
CITY: WATKINS
COUNTY: ARAPAHOE

File Name : WATK6TH23
Site Code : 00000011
Start Date : 1/10/2023
Page No : 1

Groups Printed- VEHICLES

	WATKINS RD Southbound			6TH AVE Westbound			WATKINS RD Northbound			NO ACCESS Eastbound			Int. Total
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	6	22	0	0	0	7	0	17	0	0	0	0	52
06:45 AM	10	23	0	2	0	11	0	20	4	0	0	0	70
Total	16	45	0	2	0	18	0	37	4	0	0	0	122
07:00 AM	2	21	0	3	0	17	0	10	1	0	0	0	54
07:15 AM	3	30	0	1	0	18	0	16	1	0	0	0	69
07:30 AM	3	22	0	7	0	17	0	23	1	0	0	0	73
07:45 AM	4	25	0	1	0	12	0	20	1	0	0	0	63
Total	12	98	0	12	0	64	0	69	4	0	0	0	259
08:00 AM	5	21	0	2	0	8	0	14	1	0	0	0	51
08:15 AM	6	24	0	1	0	6	0	14	0	0	0	0	51
Total	11	45	0	3	0	14	0	28	1	0	0	0	102
04:00 PM	16	26	0	0	0	5	0	34	1	0	0	0	82
04:15 PM	19	28	0	2	0	4	0	28	5	0	0	0	86
04:30 PM	18	28	0	2	0	7	0	27	1	0	0	0	83
04:45 PM	14	24	0	0	0	10	0	23	2	0	0	0	73
Total	67	106	0	4	0	26	0	112	9	0	0	0	324
05:00 PM	21	26	0	2	0	7	0	33	2	0	0	0	91
05:15 PM	15	31	0	3	0	10	0	29	3	0	0	0	91
05:30 PM	14	25	0	3	0	11	0	27	2	0	0	0	82
05:45 PM	14	23	0	3	0	8	0	21	1	0	0	0	70
Total	64	105	0	11	0	36	0	110	8	0	0	0	334
Grand Total	170	399	0	32	0	158	0	356	26	0	0	0	1141
Apprch %	29.9	70.1	0.0	16.8	0.0	83.2	0.0	93.2	6.8	0.0	0.0	0.0	
Total %	14.9	35.0	0.0	2.8	0.0	13.8	0.0	31.2	2.3	0.0	0.0	0.0	

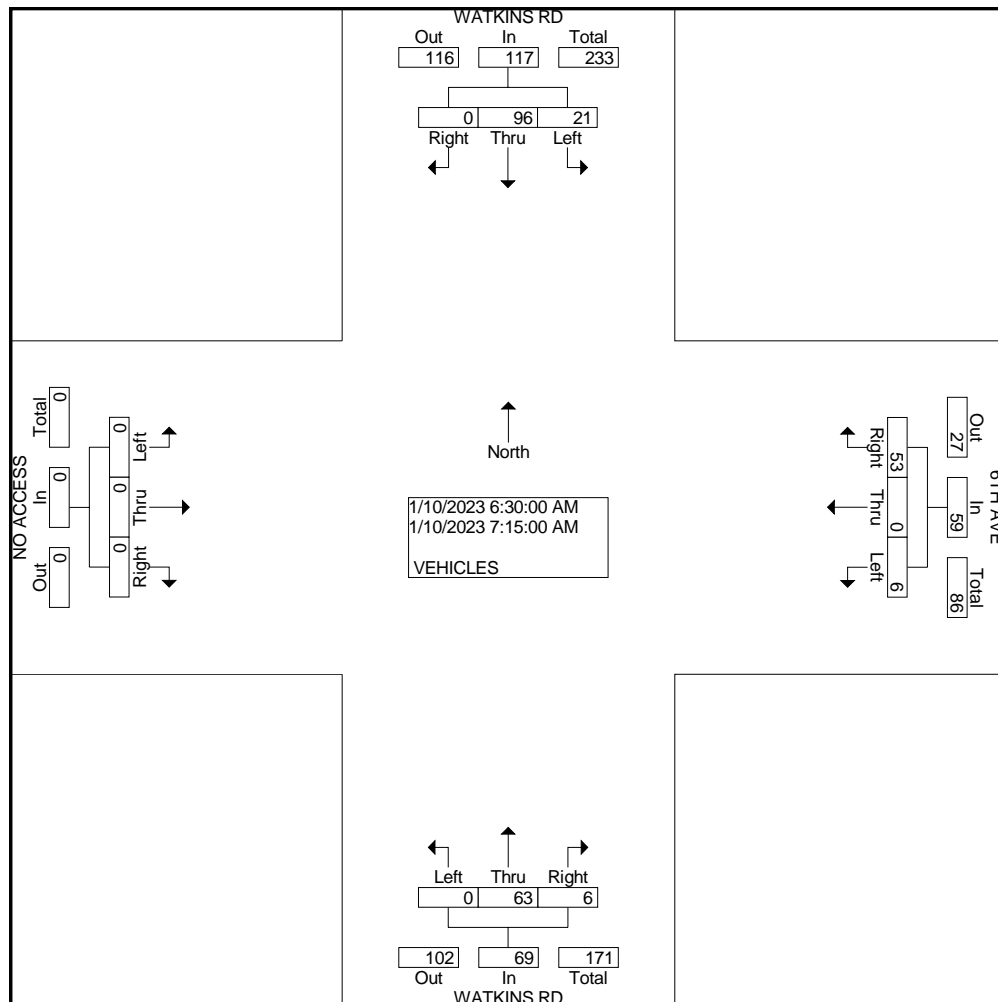
COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: WATKINS RD
E/W STREET: 6TH AVE
CITY: WATKINS
COUNTY: ARAPAHOE

File Name : WATK6TH23
Site Code : 00000011
Start Date : 1/10/2023
Page No : 2

	WATKINS RD Southbound				6TH AVE Westbound				WATKINS RD Northbound				NO ACCESS Eastbound				Int. Total
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 06:30 AM to 07:15 AM - Peak 1 of 1																	
Intersection	06:30 AM																
Volume	21	96	0	117	6	0	53	59	0	63	6	69	0	0	0	0	245
Percent	17.9	82.1	0.0		10.2	0.0	89.8		0.0	91.3	8.7		0.0	0.0	0.0		
06:45																	
Volume	10	23	0	33	2	0	11	13	0	20	4	24	0	0	0	0	70
Peak Factor																	0.875
High Int.	06:45 AM				07:00 AM				06:45 AM				6:15:00 AM				
Volume	10	23	0	33	3	0	17	20	0	20	4	24					
Peak Factor	0.886				0.738				0.719								



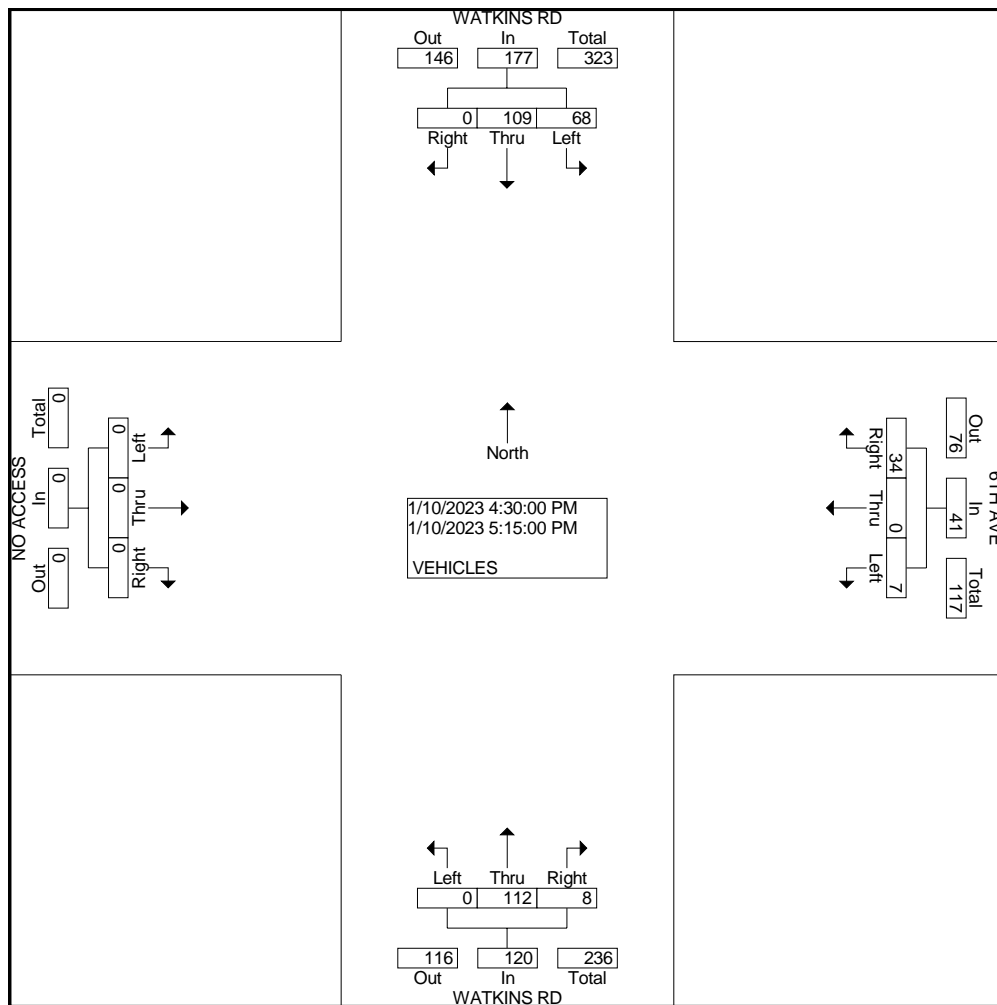
COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: WATKINS RD
E/W STREET: 6TH AVE
CITY: WATKINS
COUNTY: ARAPAHOE

File Name : WATK6TH23
Site Code : 00000011
Start Date : 1/10/2023
Page No : 3

	WATKINS RD Southbound				6TH AVE Westbound				WATKINS RD Northbound				NO ACCESS Eastbound				Int. Total
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Intersection	04:30 PM																
Volume	68	109	0	177	7	0	34	41	0	112	8	120	0	0	0	0	338
Percent	38.4	61.6	0.0		17.1	0.0	82.9		0.0	93.3	6.7		0.0	0.0	0.0		
05:15	15	31	0	46	3	0	10	13	0	29	3	32	0	0	0	0	91
Volume																	
Peak Factor																	0.929
High Int.	05:00 PM				05:15 PM				05:00 PM								
Volume	21	26	0	47	3	0	10	13	0	33	2	35					
Peak Factor				0.941				0.788				0.857					



COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: WATKINS RD
E/W STREET: E. JEWELL AVE
CITY: WATKINS
COUNTY: ARAPAHOE

File Name : WATKJEWELL
Site Code : 00000005
Start Date : 1/4/2023
Page No : 1

Groups Printed- VEHICLES

	WATKINS RD Southbound				NO ACCESS Westbound				WATKINS RD Northbound				JEWELL AVE Eastbound				Int. Total
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	0	11	2	0	0	0	0	0	1	23	0	0	3	1	1	0	42
06:45 AM	0	20	1	0	0	0	0	0	1	13	0	0	0	0	3	0	38
Total	0	31	3	0	0	0	0	0	2	36	0	0	3	1	4	0	80
07:00 AM	0	20	3	0	0	0	0	0	0	4	0	0	0	0	0	0	27
07:15 AM	0	30	5	0	0	0	0	0	1	7	0	0	2	0	0	0	45
07:30 AM	0	22	1	0	0	0	0	0	2	10	0	0	2	0	1	0	38
07:45 AM	0	14	4	0	0	0	0	0	1	13	0	0	3	0	0	0	35
Total	0	86	13	0	0	0	0	0	4	34	0	0	7	0	1	0	145
08:00 AM	0	23	0	0	0	0	0	0	0	9	0	0	2	0	0	0	34
08:15 AM	0	25	0	0	0	0	0	0	0	17	0	0	1	0	1	0	44
Total	0	48	0	0	0	0	0	0	0	26	0	0	3	0	1	0	78
04:00 PM	0	22	1	0	0	0	0	0	1	22	0	0	0	0	2	0	48
04:15 PM	0	23	2	0	0	0	0	0	0	19	0	0	1	0	0	0	45
04:30 PM	0	19	1	0	0	0	0	0	0	40	0	0	3	0	1	0	64
04:45 PM	0	22	3	0	0	0	0	0	0	36	0	0	4	0	1	0	66
Total	0	86	7	0	0	0	0	0	1	117	0	0	8	0	4	0	223
05:00 PM	0	25	2	0	0	0	0	0	1	37	0	0	5	0	0	0	70
05:15 PM	0	30	0	0	0	0	0	0	0	30	0	0	1	0	0	0	61
05:30 PM	0	16	1	0	0	0	0	0	0	18	0	0	0	0	2	0	37
05:45 PM	0	6	2	0	0	0	0	0	0	31	0	0	0	0	1	0	40
Total	0	77	5	0	0	0	0	0	1	116	0	0	6	0	3	0	208
Grand Total	0	328	28	0	0	0	0	0	8	329	0	0	27	1	13	0	734
Apprch %	0.0	92.1	7.9	0.0	0.0	0.0	0.0	0.0	2.4	97.6	0.0	0.0	65.9	2.4	31.7	0.0	
Total %	0.0	44.7	3.8	0.0	0.0	0.0	0.0	0.0	1.1	44.8	0.0	0.0	3.7	0.1	1.8	0.0	

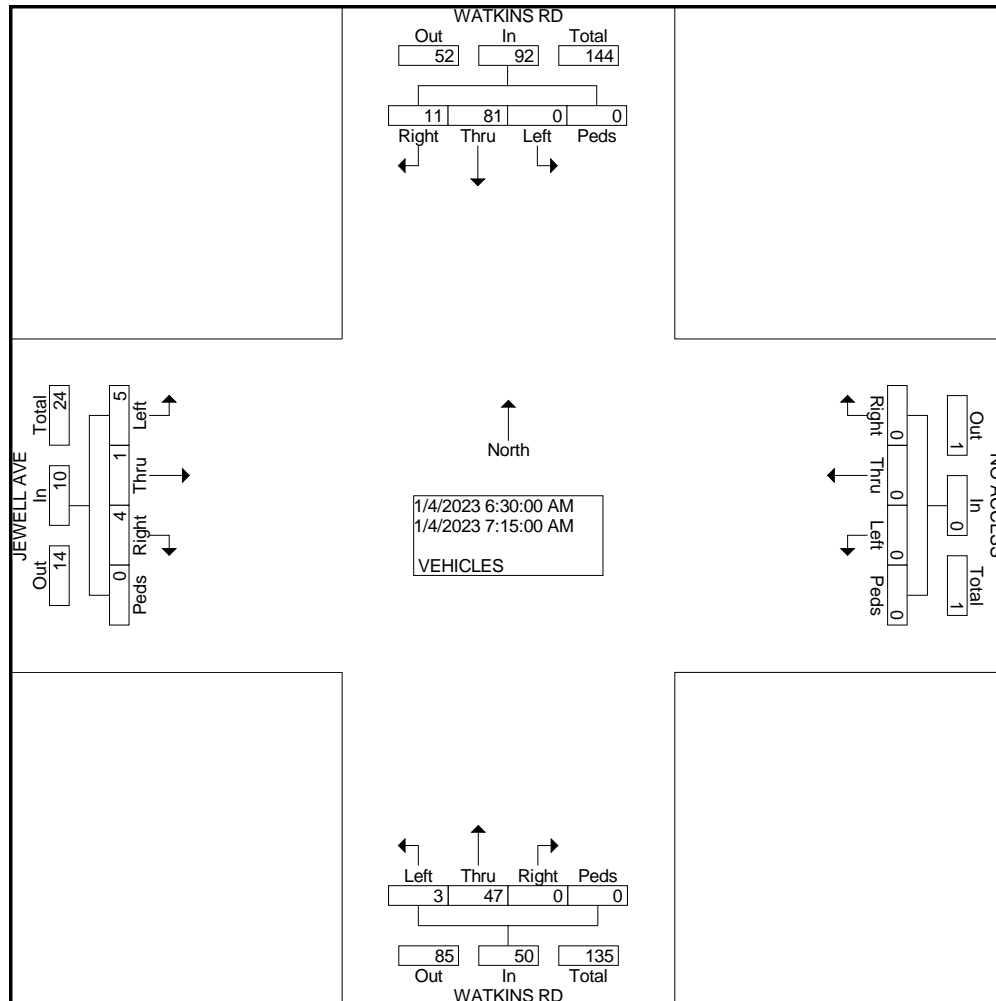
COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: WATKINS RD
E/W STREET: E. JEWELL AVE
CITY: WATKINS
COUNTY: ARAPAHOE

File Name : WATKJEWELL
Site Code : 00000005
Start Date : 1/4/2023
Page No : 2

	WATKINS RD Southbound					NO ACCESS Westbound					WATKINS RD Northbound					JEWELL AVE Eastbound					Int.
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour	From 06:30 AM to 08:15 AM - Peak 1 of 1																				
Intersection	06:30 AM																				
Volume	0	81	11	0	92	0	0	0	0	0	3	47	0	0	50	5	1	4	0	10	152
Percent	0.0	88.0	12.0	0.0		0.0	0.0	0.0	0.0		6.0	94.0	0.0	0.0		50.0	10.0	40.0	0.0		
07:15																					
Volume	0	30	5	0	35	0	0	0	0	0	1	7	0	0	8	2	0	0	0	2	45
Peak Factor																					0.844
High Int.	07:15 AM					6:15:00 AM					06:30 AM					06:30 AM					
Volume	0	30	5	0	35	0	0	0	0	0	1	23	0	0	24	3	1	1	0	5	
Peak Factor	0.657										0.521					0.500					



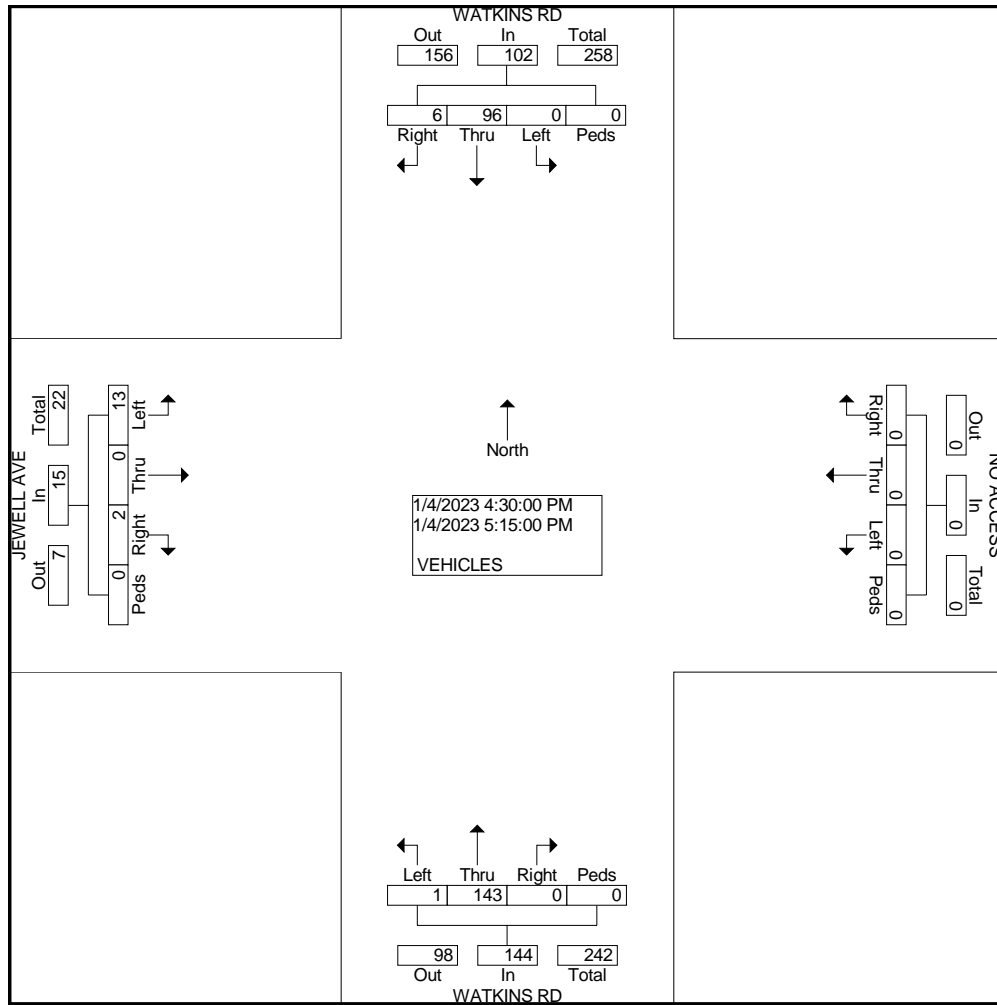
COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: WATKINS RD
E/W STREET: E. JEWELL AVE
CITY: WATKINS
COUNTY: ARAPAHOE

File Name : WATKJEWELL
Site Code : 00000005
Start Date : 1/4/2023
Page No : 3

	WATKINS RD Southbound					NO ACCESS Westbound					WATKINS RD Northbound					JEWELL AVE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Intersection	04:30 PM																				
Volume	0	96	6	0	102	0	0	0	0	0	1	143	0	0	144	13	0	2	0	15	261
Percent	0.0	94.1	5.9	0.0		0.0	0.0	0.0	0.0		0.7	99.3	0.0	0.0		86.7	0.0	13.3	0.0		
05:00 Volume	0	25	2	0	27	0	0	0	0	0	1	37	0	0	38	5	0	0	0	5	70
Peak Factor	0.932																				
High Int. Volume	05:15 PM										04:30 PM					04:45 PM					
Peak Factor	0	30	0	0	30	0	0	0	0	0	0	40	0	0	40	4	0	1	0	5	
	0.85										0.90					0.75					0
	0										0					0					



Location: WATKINS RD N-O E. 6TH AVE
City: WATKINS
County: ARAPAHOE
Direction: NORTH/SOUTH

COUNTER MEASURES INC.
1889 YORK STREET
DENVER, COLORADO 80206
303-333-7409

Site Code: 22060
Station ID: 22060

Start Time	07-Sep-22 Wed	NORTH	SOUTH							Total
12:00 AM		10	21							31
01:00		1	3							4
02:00		2	6							8
03:00		4	17							21
04:00		13	32							45
05:00		23	116							139
06:00		34	245							279
07:00		46	247							293
08:00		51	218							269
09:00		72	143							215
10:00		76	119							195
11:00		87	115							202
12:00 PM		62	167							229
01:00		77	145							222
02:00		83	158							241
03:00		117	210							327
04:00		103	259							362
05:00		121	192							313
06:00		64	160							224
07:00		40	88							128
08:00		25	80							105
09:00		22	39							61
10:00		16	20							36
11:00		7	16							23
Total		1156	2816							3972
Percent		29.1%	70.9%							
AM Peak	-	11:00	07:00	-	-	-	-	-	-	07:00
Vol.	-	87	247	-	-	-	-	-	-	293
PM Peak	-	17:00	16:00	-	-	-	-	-	-	16:00
Vol.	-	121	259	-	-	-	-	-	-	362
Grand Total		1156	2816							3972
Percent		29.1%	70.9%							
ADT		ADT 3,882	AADT 3,882							

Location: WATKINS RD S-O E. 6TH AVE
City: WATKINS
County: ARAPAHOE
Direction: NORTH/SOUTH

COUNTER MEASURES INC.
1889 YORK STREET
DENVER, COLORADO 80206
303-333-7409

Site Code: 220603
Station ID: 220603

Start Time	07-Sep-22 Wed	NORTH	SOUTH							Total
12:00 AM		8	7							15
01:00		1	3							4
02:00		2	3							5
03:00		10	10							20
04:00		20	13							33
05:00		52	68							120
06:00		71	149							220
07:00		89	164							253
08:00		88	126							214
09:00		93	67							160
10:00		66	84							150
11:00		78	78							156
12:00 PM		84	94							178
01:00		87	72							159
02:00		103	87							190
03:00		149	116							265
04:00		164	130							294
05:00		133	116							249
06:00		81	35							116
07:00		60	32							92
08:00		42	20							62
09:00		20	4							24
10:00		11	3							14
11:00		13	6							19
Total		1525	1487							3012
Percent		50.6%	49.4%							
AM Peak	-	09:00	07:00	-	-	-	-	-	-	07:00
Vol.	-	93	164	-	-	-	-	-	-	253
PM Peak	-	16:00	16:00	-	-	-	-	-	-	16:00
Vol.	-	164	130	-	-	-	-	-	-	294
Grand Total		1525	1487							3012
Percent		50.6%	49.4%							
ADT		ADT 2,966	AADT 2,966							

Location: WATKINS RD N-O JEWELL AVE
City: WATKINS
County: ARAPAHOE
Direction: NORTH/SOUTH

COUNTER MEASURES INC.
1889 YORK STREET
DENVER, COLORADO 80206
303-333-7409

Site Code: 220616
Station ID: 220616

Start Time	07-Sep-22 Wed	NORTH	SOUTH							Total
12:00 AM		9	5							14
01:00		2	4							6
02:00		1	5							6
03:00		7	13							20
04:00		25	29							54
05:00		57	55							112
06:00		74	98							172
07:00		91	111							202
08:00		104	90							194
09:00		72	64							136
10:00		68	34							102
11:00		82	44							126
12:00 PM		73	79							152
01:00		88	72							160
02:00		112	83							195
03:00		151	102							253
04:00		90	122							212
05:00		91	112							203
06:00		94	24							118
07:00		63	17							80
08:00		39	18							57
09:00		14	7							21
10:00		20	13							33
11:00		19	6							25
Total		1446	1207							2653
Percent		54.5%	45.5%							
AM Peak	-	08:00	07:00	-	-	-	-	-	-	07:00
Vol.	-	104	111	-	-	-	-	-	-	202
PM Peak	-	15:00	16:00	-	-	-	-	-	-	15:00
Vol.	-	151	122	-	-	-	-	-	-	253
Grand Total		1446	1207							2653
Percent		54.5%	45.5%							
ADT		ADT 2,479	AADT 2,479							

LEVEL OF SERVICE DEFINITIONS

From *Highway Capacity Manual*, Transportation Research Board, 2016, 6th Edition




UNSIGNALIZED INTERSECTION LEVEL OF SERVICE (LOS)

Applicable to Two-Way Stop Control, All-Way Stop Control, and Roundabouts

LOS	Average Vehicle Control Delay	Operational Characteristics
A	<10 seconds	Normally, vehicles on the stop-controlled approach only have to wait up to 10 seconds before being able to clear the intersection. Left-turning vehicles on the uncontrolled street do not have to wait to make their turn.
B	10 to 15 seconds	Vehicles on the stop-controlled approach will experience delays before being able to clear the intersection. <u>The delay could be up to 15 seconds.</u> Left-turning vehicles on the uncontrolled street may have to wait to make their turn.
C	15 to 25 seconds	Vehicles on the stop-controlled approach can expect delays in the range of 15 to 25 seconds before clearing the intersection. Motorists may begin to take chances due to the long delays, thereby posing a safety risk to through traffic. <u>Left-turning vehicles on the uncontrolled street will now be required to wait to make their turn causing a queue to be created in the turn lane.</u>
D	25 to 35 seconds	<u>This is the point at which a traffic signal may be warranted for this intersection.</u> The delays for the stop-controlled intersection are not considered to be excessive. The length of the queue may begin to block other public and private access points.
E	35 to 50 seconds	The delays for all critical traffic movements are considered to be unacceptable. The length of the queues for the stop-controlled approaches as well as the left-turn movements are extremely long. <u>There is a high probability that this intersection will meet traffic signal warrants.</u> The ability to install a traffic signal is affected by the location of other existing traffic signals. Consideration may be given to restricting the accesses by eliminating the left-turn movements from and to the stop-controlled approach.
F	>50 seconds	The delay for the critical traffic movements are probably in excess of 100 seconds. The length of the queues are extremely long. Motorists are selecting alternative routes due to the long delays. <u>The only remedy for these long delays is installing a traffic signal or restricting the accesses.</u> The potential for accidents at this intersection are extremely high due to motorist taking more risky chances. If the median permits, motorists begin making two-stage left-turns.

HCM 6th TWSC
1: Watkins Road & WB On Ramp/WB Off Ramp

Existing
AM Peak

Intersection												
Int Delay, s/veh	3.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	51	1	53	58	126	0	0	77	96
Future Vol, veh/h	0	0	0	51	1	53	58	126	0	0	77	96
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	0	0	58	1	60	66	143	0	0	88	109
Major/Minor				Minor1		Major1		Major2				
Conflicting Flow All				418	472	143	197	0	-	-	-	0
Stage 1				275	275	-	-	-	-	-	-	-
Stage 2				143	197	-	-	-	-	-	-	-
Critical Hdwy				6.45	6.55	6.25	4.15	-	-	-	-	-
Critical Hdwy Stg 1				5.45	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2				5.45	5.55	-	-	-	-	-	-	-
Follow-up Hdwy				3.545	4.045	3.345	2.245	-	-	-	-	-
Pot Cap-1 Maneuver				586	486	897	1358	-	0	0	-	-
Stage 1				764	677	-	-	-	0	0	-	-
Stage 2				877	732	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver				555	0	897	1358	-	-	-	-	-
Mov Cap-2 Maneuver				555	0	-	-	-	-	-	-	-
Stage 1				724	0	-	-	-	-	-	-	-
Stage 2				877	0	-	-	-	-	-	-	-
Approach				WB		NB		SB				
HCM Control Delay, s				11.3		2.5		0				
HCM LOS				B								
Minor Lane/Major Mvmt		NBL	NBTWBLn1	SBT	SBR							
Capacity (veh/h)		1358	-	689	-	-						
HCM Lane V/C Ratio		0.049	-	0.173	-	-						
HCM Control Delay (s)		7.8	0	11.3	-	-						
HCM Lane LOS		A	A	B	-	-						
HCM 95th %tile Q(veh)		0.2	-	0.6	-	-						

HCM 6th TWSC




2: Watkins Road & EB Off Ramp/WB On Ramp

Existing
AM Peak

Intersection												
Int Delay, s/veh	3.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	40	0	46	0	0	0	0	93	31	23	109	0
Future Vol, veh/h	40	0	46	0	0	0	0	93	31	23	109	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	45	0	52	0	0	0	0	106	35	26	124	0
Major/Minor	Minor2						Major1		Major2			
Conflicting Flow All	300	317	124				-	0	0	141	0	0
Stage 1	176	176	-				-	-	-	-	-	-
Stage 2	124	141	-				-	-	-	-	-	-
Critical Hdwy	6.45	6.55	6.25				-	-	-	4.15	-	-
Critical Hdwy Stg 1	5.45	5.55	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.45	5.55	-				-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345				-	-	-	2.245	-	-
Pot Cap-1 Maneuver	685	594	919				0	-	-	1424	-	0
Stage 1	847	748	-				0	-	-	-	-	0
Stage 2	894	774	-				0	-	-	-	-	0
Platoon blocked, %								-	-	-		
Mov Cap-1 Maneuver	671	0	919				-	-	-	1424	-	-
Mov Cap-2 Maneuver	671	0	-				-	-	-	-	-	-
Stage 1	847	0	-				-	-	-	-	-	-
Stage 2	876	0	-				-	-	-	-	-	-
Approach	EB						NB		SB			
HCM Control Delay, s	10.2						0		1.3			
HCM LOS	B											
Minor Lane/Major Mvmt		NBT	NBR	EBLn1	SBL	SBT						
Capacity (veh/h)		-	-	784	1424	-						
HCM Lane V/C Ratio		-	-	0.125	0.018	-						
HCM Control Delay (s)		-	-	10.2	7.6	0						
HCM Lane LOS		-	-	B	A	A						
HCM 95th %tile Q(veh)		-	-	0.4	0.1	-						

HCM 6th TWSC
3: Watkins Road & E. 6th Avenue

Existing
AM Peak

Intersection						
Int Delay, s/veh	2.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	53	63	6	21	96
Future Vol, veh/h	6	53	63	6	21	96
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	7	60	72	7	24	109





Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	233	76	0
Stage 1	76	-	-
Stage 2	157	-	-
Critical Hdwy	6.45	6.25	-
Critical Hdwy Stg 1	5.45	-	-
Critical Hdwy Stg 2	5.45	-	-
Follow-up Hdwy	3.545	3.345	-
Pot Cap-1 Maneuver	749	977	-
Stage 1	939	-	-
Stage 2	864	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	736	977	-
Mov Cap-2 Maneuver	736	-	-
Stage 1	939	-	-
Stage 2	849	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.1	0	1.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	946	1500
HCM Lane V/C Ratio	-	-	0.071	0.016
HCM Control Delay (s)	-	-	9.1	7.4
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0




HCM 6th TWSC
4: Watkins Road & E. Jewell Avenue

Existing
AM Peak

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	6	3	47	81	11
Future Vol, veh/h	5	6	3	47	81	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	6	7	3	53	92	13
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	151	92	105	0	-	0
Stage 1	92	-	-	-	-	-
Stage 2	59	-	-	-	-	-
Critical Hdwy	6.45	6.25	4.15	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	2.245	-	-	-
Pot Cap-1 Maneuver	834	957	1468	-	-	-
Stage 1	924	-	-	-	-	-
Stage 2	956	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	832	957	1468	-	-	-
Mov Cap-2 Maneuver	832	-	-	-	-	-
Stage 1	922	-	-	-	-	-
Stage 2	956	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	9.1	0.4		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1468	-	896	-	-	
HCM Lane V/C Ratio	0.002	-	0.014	-	-	
HCM Control Delay (s)	7.5	0	9.1	-	-	
HCM Lane LOS	A	A	A	-	-	
HCM 95th %tile Q(veh)	0	-	0	-	-	

HCM 6th TWSC
1: Watkins Road & WB On Ramp/WB Off Ramp

Existing
PM Peak

Intersection												
Int Delay, s/veh	3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	57	1	25	60	163	0	0	112	92
Future Vol, veh/h	0	0	0	57	1	25	60	163	0	0	112	92
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	0	0	65	1	28	68	185	0	0	127	105
Major/Minor				Minor1		Major1		Major2				
Conflicting Flow All				501	553	185	232	0	-	-	-	0
Stage 1				321	321	-	-	-	-	-	-	-
Stage 2				180	232	-	-	-	-	-	-	-
Critical Hdwy				6.45	6.55	6.25	4.15	-	-	-	-	-
Critical Hdwy Stg 1				5.45	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2				5.45	5.55	-	-	-	-	-	-	-
Follow-up Hdwy				3.545	4.045	3.345	2.245	-	-	-	-	-
Pot Cap-1 Maneuver				524	437	850	1318	-	0	0	-	-
Stage 1				729	646	-	-	-	0	0	-	-
Stage 2				844	707	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver				494	0	850	1318	-	-	-	-	-
Mov Cap-2 Maneuver				494	0	-	-	-	-	-	-	-
Stage 1				687	0	-	-	-	-	-	-	-
Stage 2				844	0	-	-	-	-	-	-	-
Approach				WB		NB		SB				
HCM Control Delay, s				12.6		2.1		0				
HCM LOS				B								
Minor Lane/Major Mvmt		NBL	NBTWBLn1	SBT	SBR							
Capacity (veh/h)		1318	-	566	-	-						
HCM Lane V/C Ratio		0.052	-	0.167	-	-						
HCM Control Delay (s)		7.9	0	12.6	-	-						
HCM Lane LOS		A	A	B	-	-						
HCM 95th %tile Q(veh)		0.2	-	0.6	-	-						

HCM 6th TWSC




2: Watkins Road & EB Off Ramp/WB On Ramp

Existing
PM Peak

Intersection												
Int Delay, s/veh	4.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	72	2	62	0	0	0	0	92	50	54	109	0
Future Vol, veh/h	72	2	62	0	0	0	0	92	50	54	109	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	82	2	70	0	0	0	0	105	57	61	124	0
Major/Minor	Minor2						Major1		Major2			
Conflicting Flow All	380	408	124				-	0	0	162	0	0
Stage 1	246	246	-				-	-	-	-	-	-
Stage 2	134	162	-				-	-	-	-	-	-
Critical Hdwy	6.45	6.55	6.25				-	-	-	4.15	-	-
Critical Hdwy Stg 1	5.45	5.55	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.45	5.55	-				-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345				-	-	-	2.245	-	-
Pot Cap-1 Maneuver	616	528	919				0	-	-	1399	-	0
Stage 1	788	697	-				0	-	-	-	-	0
Stage 2	885	758	-				0	-	-	-	-	0
Platoon blocked, %								-	-	-		
Mov Cap-1 Maneuver	587	0	919				-	-	-	1399	-	-
Mov Cap-2 Maneuver	587	0	-				-	-	-	-	-	-
Stage 1	788	0	-				-	-	-	-	-	-
Stage 2	843	0	-				-	-	-	-	-	-
Approach	EB						NB		SB			
HCM Control Delay, s	11.5						0		2.5			
HCM LOS	B											
Minor Lane/Major Mvmt		NBT	NBR	EBLn1	SBL	SBT						
Capacity (veh/h)		-	-	705	1399	-						
HCM Lane V/C Ratio		-	-	0.219	0.044	-						
HCM Control Delay (s)		-	-	11.5	7.7	0						
HCM Lane LOS		-	-	B	A	A						
HCM 95th %tile Q(veh)		-	-	0.8	0.1	-						





HCM 6th TWSC
3: Watkins Road & E. 6th Avenue

Existing
PM Peak

Intersection						
Int Delay, s/veh	2.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	34	112	8	68	109
Future Vol, veh/h	7	34	112	8	68	109
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	8	39	127	9	77	124
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	410	132	0	0	136	0
Stage 1	132	-	-	-	-	-
Stage 2	278	-	-	-	-	-
Critical Hdwy	6.45	6.25	-	-	4.15	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	-	-	2.245	-
Pot Cap-1 Maneuver	592	909	-	-	1430	-
Stage 1	887	-	-	-	-	-
Stage 2	762	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	558	909	-	-	1430	-
Mov Cap-2 Maneuver	558	-	-	-	-	-
Stage 1	887	-	-	-	-	-
Stage 2	718	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.6	0		2.9		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	821		1430	-	
HCM Lane V/C Ratio	-	0.057		0.054	-	
HCM Control Delay (s)	-	9.6		7.7	0	
HCM Lane LOS	-	A		A	A	
HCM 95th %tile Q(veh)	-	0.2		0.2	-	

HCM 6th TWSC
4: Watkins Road & E. Jewell Avenue

Existing
PM Peak

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	2	1	143	96	6
Future Vol, veh/h	13	2	1	143	96	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	15	2	1	163	109	7
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	274	109	116	0	-	0
Stage 1	109	-	-	-	-	-
Stage 2	165	-	-	-	-	-
Critical Hdwy	6.45	6.25	4.15	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	2.245	-	-	-
Pot Cap-1 Maneuver	709	937	1454	-	-	-
Stage 1	908	-	-	-	-	-
Stage 2	857	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	708	937	1454	-	-	-
Mov Cap-2 Maneuver	708	-	-	-	-	-
Stage 1	907	-	-	-	-	-
Stage 2	857	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	10	0.1		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1454	-	732	-	-	
HCM Lane V/C Ratio	0.001	-	0.023	-	-	
HCM Control Delay (s)	7.5	0	10	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.1	-	-	

HCM 6th TWSC
1: Watkins Road & WB On Ramp/WB Off Ramp

2024 Background
AM Peak

Intersection												
Int Delay, s/veh	3.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕			↕			↕	
Traffic Vol, veh/h	0	0	0	55	1	55	60	130	0	0	80	100
Future Vol, veh/h	0	0	0	55	1	55	60	130	0	0	80	100
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	0	0	63	1	63	68	148	0	0	91	114
Major/Minor				Minor1		Major1		Major2				
Conflicting Flow All				432	489	148	205	0	-	-	-	0
Stage 1				284	284	-	-	-	-	-	-	-
Stage 2				148	205	-	-	-	-	-	-	-
Critical Hdwy				6.45	6.55	6.25	4.15	-	-	-	-	-
Critical Hdwy Stg 1				5.45	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2				5.45	5.55	-	-	-	-	-	-	-
Follow-up Hdwy				3.545	4.045	3.345	2.245	-	-	-	-	-
Pot Cap-1 Maneuver				575	475	891	1349	-	0	0	-	-
Stage 1				757	671	-	-	-	0	0	-	-
Stage 2				872	726	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver				543	0	891	1349	-	-	-	-	-
Mov Cap-2 Maneuver				543	0	-	-	-	-	-	-	-
Stage 1				715	0	-	-	-	-	-	-	-
Stage 2				872	0	-	-	-	-	-	-	-
Approach				WB		NB		SB				
HCM Control Delay, s				11.6		2.5		0				
HCM LOS				B								
Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR							
Capacity (veh/h)	1349	-	675	-	-							
HCM Lane V/C Ratio	0.051	-	0.187	-	-							
HCM Control Delay (s)	7.8	0	11.6	-	-							
HCM Lane LOS	A	A	B	-	-							
HCM 95th %tile Q(veh)	0.2	-	0.7	-	-							

HCM 6th TWSC




2: Watkins Road & EB Off Ramp/WB On Ramp

2024 Background
AM Peak

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	45	1	50	0	0	0	0	100	35	25	110	0
Future Vol, veh/h	45	1	50	0	0	0	0	100	35	25	110	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	51	1	57	0	0	0	0	114	40	28	125	0
Major/Minor	Minor2						Major1			Major2		
Conflicting Flow All	315	335	125				-	0	0	154	0	0
Stage 1	181	181	-				-	-	-	-	-	-
Stage 2	134	154	-				-	-	-	-	-	-
Critical Hdwy	6.45	6.55	6.25				-	-	-	4.15	-	-
Critical Hdwy Stg 1	5.45	5.55	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.45	5.55	-				-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345				-	-	-	2.245	-	-
Pot Cap-1 Maneuver	672	581	918				0	-	-	1408	-	0
Stage 1	843	744	-				0	-	-	-	-	0
Stage 2	885	764	-				0	-	-	-	-	0
Platoon blocked, %							-	-				
Mov Cap-1 Maneuver	658	0	918				-	-	-	1408	-	-
Mov Cap-2 Maneuver	658	0	-				-	-	-	-	-	-
Stage 1	843	0	-				-	-	-	-	-	-
Stage 2	866	0	-				-	-	-	-	-	-
Approach	EB						NB			SB		
HCM Control Delay, s	10.4						0			1.4		
HCM LOS	B											
Minor Lane/Major Mvmt		NBT	NBR	EBLn1	SBL	SBT						
Capacity (veh/h)		-	-	773	1408	-						
HCM Lane V/C Ratio		-	-	0.141	0.02	-						
HCM Control Delay (s)		-	-	10.4	7.6	0						
HCM Lane LOS		-	-	B	A	A						
HCM 95th %tile Q(veh)		-	-	0.5	0.1	-						

HCM 6th TWSC
3: Watkins Road & E. 6th Avenue





2024 Background
AM Peak

Intersection						
Int Delay, s/veh	2.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	55	80	10	25	135
Future Vol, veh/h	10	55	80	10	25	135
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	11	63	91	11	28	153
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	306	97	0	0	102	0
Stage 1	97	-	-	-	-	-
Stage 2	209	-	-	-	-	-
Critical Hdwy	6.45	6.25	-	-	4.15	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	-	-	2.245	-
Pot Cap-1 Maneuver	680	951	-	-	1471	-
Stage 1	919	-	-	-	-	-
Stage 2	819	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	666	951	-	-	1471	-
Mov Cap-2 Maneuver	666	-	-	-	-	-
Stage 1	919	-	-	-	-	-
Stage 2	802	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	9.4		0		1.2	
HCM LOS	A					
Minor Lane/Major Mvmt			NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)			-	-	892	1471
HCM Lane V/C Ratio			-	-	0.083	0.019
HCM Control Delay (s)			-	-	9.4	7.5
HCM Lane LOS			-	-	A	A
HCM 95th %tile Q(veh)			-	-	0.3	0.1

HCM 6th TWSC

4: Watkins Road & E. Jewell Avenue

2024 Background
AM Peak

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	5	5	65	120	15
Future Vol, veh/h	10	5	5	65	120	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	11	6	6	74	136	17
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	222	136	153	0	-	0
Stage 1	136	-	-	-	-	-
Stage 2	86	-	-	-	-	-
Critical Hdwy	6.45	6.25	4.15	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	2.245	-	-	-
Pot Cap-1 Maneuver	760	905	1409	-	-	-
Stage 1	883	-	-	-	-	-
Stage 2	930	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	757	905	1409	-	-	-
Mov Cap-2 Maneuver	757	-	-	-	-	-
Stage 1	879	-	-	-	-	-
Stage 2	930	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	9.6	0.5		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1409	-	801	-	-	
HCM Lane V/C Ratio	0.004	-	0.021	-	-	
HCM Control Delay (s)	7.6	0	9.6	-	-	
HCM Lane LOS	A	A	A	-	-	
HCM 95th %tile Q(veh)	0	-	0.1	-	-	

HCM 6th TWSC
1: Watkins Road & WB On Ramp/WB Off Ramp

2024 Background
PM Peak

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↔			↔	
Traffic Vol, veh/h	0	0	0	60	1	30	65	170	0	0	115	95
Future Vol, veh/h	0	0	0	60	1	30	65	170	0	0	115	95
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	0	0	68	1	34	74	193	0	0	131	108

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	526	580	193	239	0	-
Stage 1	341	341	-	-	-	-
Stage 2	185	239	-	-	-	-
Critical Hdwy	6.45	6.55	6.25	4.15	-	-
Critical Hdwy Stg 1	5.45	5.55	-	-	-	-
Critical Hdwy Stg 2	5.45	5.55	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	2.245	-	-
Pot Cap-1 Maneuver	507	422	841	1310	-	0
Stage 1	713	633	-	-	-	0
Stage 2	839	702	-	-	-	0
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	475	0	841	1310	-	-
Mov Cap-2 Maneuver	475	0	-	-	-	-
Stage 1	668	0	-	-	-	-
Stage 2	839	0	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.9	2.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBTWBLn1	SBT	SBR
Capacity (veh/h)	1310	-	556	-
HCM Lane V/C Ratio	0.056	-	0.186	-
HCM Control Delay (s)	7.9	0	12.9	-
HCM Lane LOS	A	A	B	-
HCM 95th %tile Q(veh)	0.2	-	0.7	-

HCM 6th TWSC




2: Watkins Road & EB Off Ramp/WB On Ramp

2024 Background
PM Peak

Intersection												
Int Delay, s/veh	4.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↔						↔↕			↕↔	
Traffic Vol, veh/h	75	2	65	0	0	0	0	95	55	60	115	0
Future Vol, veh/h	75	2	65	0	0	0	0	95	55	60	115	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	85	2	74	0	0	0	0	108	63	68	131	0
Major/Minor	Minor2						Major1			Major2		
Conflicting Flow All	407	438	131				-	0	0	171	0	0
Stage 1	267	267	-				-	-	-	-	-	-
Stage 2	140	171	-				-	-	-	-	-	-
Critical Hdwy	6.45	6.55	6.25				-	-	-	4.15	-	-
Critical Hdwy Stg 1	5.45	5.55	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.45	5.55	-				-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345				-	-	-	2.245	-	-
Pot Cap-1 Maneuver	594	508	911				0	-	-	1388	-	0
Stage 1	771	683	-				0	-	-	-	-	0
Stage 2	879	752	-				0	-	-	-	-	0
Platoon blocked, %								-	-	-		
Mov Cap-1 Maneuver	563	0	911				-	-	-	1388	-	-
Mov Cap-2 Maneuver	563	0	-				-	-	-	-	-	-
Stage 1	771	0	-				-	-	-	-	-	-
Stage 2	832	0	-				-	-	-	-	-	-
Approach	EB						NB			SB		
HCM Control Delay, s	11.9						0			2.6		
HCM LOS	B											
Minor Lane/Major Mvmt		NBT	NBR	EBLn1	SBL	SBT						
Capacity (veh/h)		-	-	684	1388	-						
HCM Lane V/C Ratio		-	-	0.236	0.049	-						
HCM Control Delay (s)		-	-	11.9	7.7	0						
HCM Lane LOS		-	-	B	A	A						
HCM 95th %tile Q(veh)		-	-	0.9	0.2	-						

HCM 6th TWSC 3: Watkins Road & E. 6th Avenue

2024 Background
PM Peak

Intersection						
Int Delay, s/veh	2.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	35	115	15	70	110
Future Vol, veh/h	10	35	115	15	70	110
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	11	40	131	17	80	125





Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	425	140	0	0	148
Stage 1	140	-	-	-	-
Stage 2	285	-	-	-	-
Critical Hdwy	6.45	6.25	-	-	4.15
Critical Hdwy Stg 1	5.45	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-
Follow-up Hdwy	3.545	3.345	-	-	2.245
Pot Cap-1 Maneuver	580	900	-	-	1415
Stage 1	879	-	-	-	-
Stage 2	757	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	545	900	-	-	1415
Mov Cap-2 Maneuver	545	-	-	-	-
Stage 1	879	-	-	-	-
Stage 2	711	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.9	0	3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	786	1415
HCM Lane V/C Ratio	-	-	0.065	0.056
HCM Control Delay (s)	-	-	9.9	7.7
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.2

HCM 6th TWSC 4: Watkins Road & E. Jewell Avenue

2024 Background
PM Peak

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	5	5	150	100	10
Future Vol, veh/h	15	5	5	150	100	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	17	6	6	170	114	11

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	296	114	125	0	-	0
Stage 1	114	-	-	-	-	-
Stage 2	182	-	-	-	-	-
Critical Hdwy	6.45	6.25	4.15	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	2.245	-	-	-
Pot Cap-1 Maneuver	689	931	1443	-	-	-
Stage 1	903	-	-	-	-	-
Stage 2	842	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	686	931	1443	-	-	-
Mov Cap-2 Maneuver	686	-	-	-	-	-
Stage 1	898	-	-	-	-	-
Stage 2	842	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.1	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1443	-	734	-	-
HCM Lane V/C Ratio	0.004	-	0.031	-	-
HCM Control Delay (s)	7.5	0	10.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

HCM 6th TWSC
1: Watkins Road & WB On Ramp/WB Off Ramp

2024 Total
AM Peak

Intersection												
Int Delay, s/veh	4.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕			↕			↕	
Traffic Vol, veh/h	0	0	0	55	1	55	94	130	0	0	80	100
Future Vol, veh/h	0	0	0	55	1	55	94	130	0	0	80	100
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5	25	5	5	5	5	5
Mvmt Flow	0	0	0	63	1	63	107	148	0	0	91	114
Major/Minor				Minor1		Major1		Major2				
Conflicting Flow All				510	567	148	205	0	-	-	-	0
Stage 1				362	362	-	-	-	-	-	-	-
Stage 2				148	205	-	-	-	-	-	-	-
Critical Hdwy				6.45	6.55	6.25	4.35	-	-	-	-	-
Critical Hdwy Stg 1				5.45	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2				5.45	5.55	-	-	-	-	-	-	-
Follow-up Hdwy				3.545	4.045	3.345	2.425	-	-	-	-	-
Pot Cap-1 Maneuver				518	429	891	1241	-	0	0	-	-
Stage 1				698	620	-	-	-	0	0	-	-
Stage 2				872	726	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver				469	0	891	1241	-	-	-	-	-
Mov Cap-2 Maneuver				469	0	-	-	-	-	-	-	-
Stage 1				632	0	-	-	-	-	-	-	-
Stage 2				872	0	-	-	-	-	-	-	-
Approach				WB		NB		SB				
HCM Control Delay, s				12.4		3.4		0				
HCM LOS				B								
Minor Lane/Major Mvmt		NBL	NBTWBLn1	SBT	SBR							
Capacity (veh/h)		1241	-	615	-	-						
HCM Lane V/C Ratio		0.086	-	0.205	-	-						
HCM Control Delay (s)		8.2	0	12.4	-	-						
HCM Lane LOS		A	A	B	-	-						
HCM 95th %tile Q(veh)		0.3	-	0.8	-	-						




HCM 6th TWSC
2: Watkins Road & EB Off Ramp/WB On Ramp

2024 Total
AM Peak

Intersection												
Int Delay, s/veh	3.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↗			↖	
Traffic Vol, veh/h	45	1	84	0	0	0	0	134	35	25	110	0
Future Vol, veh/h	45	1	84	0	0	0	0	134	35	25	110	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	5	5	25	5	5	5	5	25	5	5	5	5
Mvmt Flow	51	1	95	0	0	0	0	152	40	28	125	0
Major/Minor	Minor2						Major1			Major2		
Conflicting Flow All	353	373	125				-	0	0	192	0	0
Stage 1	181	181	-				-	-	-	-	-	-
Stage 2	172	192	-				-	-	-	-	-	-
Critical Hdwy	6.45	6.55	6.45				-	-	-	4.15	-	-
Critical Hdwy Stg 1	5.45	5.55	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.45	5.55	-				-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.525				-	-	-	2.245	-	-
Pot Cap-1 Maneuver	639	553	867				0	-	-	1364	-	0
Stage 1	843	744	-				0	-	-	-	-	0
Stage 2	851	736	-				0	-	-	-	-	0
Platoon blocked, %								-	-	-		
Mov Cap-1 Maneuver	625	0	867				-	-	-	1364	-	-
Mov Cap-2 Maneuver	625	0	-				-	-	-	-	-	-
Stage 1	843	0	-				-	-	-	-	-	-
Stage 2	832	0	-				-	-	-	-	-	-
Approach	EB						NB			SB		
HCM Control Delay, s	10.8						0			1.4		
HCM LOS	B											
Minor Lane/Major Mvmt		NBT	NBR	EBLn1	SBL	SBT						
Capacity (veh/h)		-	-	764	1364	-						
HCM Lane V/C Ratio		-	-	0.193	0.021	-						
HCM Control Delay (s)		-	-	10.8	7.7	0						
HCM Lane LOS		-	-	B	A	A						
HCM 95th %tile Q(veh)		-	-	0.7	0.1	-						

HCM 6th TWSC
3: Watkins Road & E. 6th Avenue

2024 Total
AM Peak

Intersection						
Int Delay, s/veh	2.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	55	114	10	25	169
Future Vol, veh/h	10	55	114	10	25	169
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	5	5	25	5	5	25
Mvmt Flow	11	63	130	11	28	192





Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	384	136	0
Stage 1	136	-	-
Stage 2	248	-	-
Critical Hdwy	6.45	6.25	-
Critical Hdwy Stg 1	5.45	-	-
Critical Hdwy Stg 2	5.45	-	-
Follow-up Hdwy	3.545	3.345	-
Pot Cap-1 Maneuver	613	905	-
Stage 1	883	-	-
Stage 2	786	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	600	905	-
Mov Cap-2 Maneuver	600	-	-
Stage 1	883	-	-
Stage 2	769	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.7	0	1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	839	1424
HCM Lane V/C Ratio	-	-	0.088	0.02
HCM Control Delay (s)	-	-	9.7	7.6
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0.1




HCM 6th TWSC
4: Watkins Road & E. Jewell Avenue

2024 Total
AM Peak

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	5	5	78	133	15
Future Vol, veh/h	10	5	5	78	133	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	25	25	5
Mvmt Flow	11	6	6	89	151	17
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	252	151	168	0	-	0
Stage 1	151	-	-	-	-	-
Stage 2	101	-	-	-	-	-
Critical Hdwy	6.45	6.25	4.15	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	2.245	-	-	-
Pot Cap-1 Maneuver	730	887	1392	-	-	-
Stage 1	870	-	-	-	-	-
Stage 2	916	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	726	887	1392	-	-	-
Mov Cap-2 Maneuver	726	-	-	-	-	-
Stage 1	866	-	-	-	-	-
Stage 2	916	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	9.8	0.5		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1392	-	773	-	-	
HCM Lane V/C Ratio	0.004	-	0.022	-	-	
HCM Control Delay (s)	7.6	0	9.8	-	-	
HCM Lane LOS	A	A	A	-	-	
HCM 95th %tile Q(veh)	0	-	0.1	-	-	

HCM 6th TWSC
5: Watkins Road & Site Access

2024 Total
AM Peak

Intersection						
Int Delay, s/veh	1.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	21	83	0	21	148
Future Vol, veh/h	0	21	83	0	21	148
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	5	50	5	5	50	5
Mvmt Flow	0	24	94	0	24	168
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	310	94	0	0	94	0
Stage 1	94	-	-	-	-	-
Stage 2	216	-	-	-	-	-
Critical Hdwy	6.45	6.7	-	-	4.6	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.75	-	-	2.65	-
Pot Cap-1 Maneuver	676	846	-	-	1247	-
Stage 1	922	-	-	-	-	-
Stage 2	813	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	662	846	-	-	1247	-
Mov Cap-2 Maneuver	662	-	-	-	-	-
Stage 1	922	-	-	-	-	-
Stage 2	796	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.4	0		1		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	846		1247	-	
HCM Lane V/C Ratio	-	0.028		0.019	-	
HCM Control Delay (s)	-	9.4		7.9	0	
HCM Lane LOS	-	A		A	A	
HCM 95th %tile Q(veh)	-	0.1		0.1	-	

HCM 6th TWSC
1: Watkins Road & WB On Ramp/WB Off Ramp

2024 Total
PM Peak

Intersection												
Int Delay, s/veh	3.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕			↕			↕	
Traffic Vol, veh/h	0	0	0	60	1	30	99	170	0	0	115	95
Future Vol, veh/h	0	0	0	60	1	30	99	170	0	0	115	95
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5	25	5	5	5	5	5
Mvmt Flow	0	0	0	68	1	34	113	193	0	0	131	108
Major/Minor				Minor1		Major1		Major2				
Conflicting Flow All				604	658	193	239	0	-	-	-	0
Stage 1				419	419	-	-	-	-	-	-	-
Stage 2				185	239	-	-	-	-	-	-	-
Critical Hdwy				6.45	6.55	6.25	4.35	-	-	-	-	-
Critical Hdwy Stg 1				5.45	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2				5.45	5.55	-	-	-	-	-	-	-
Follow-up Hdwy				3.545	4.045	3.345	2.425	-	-	-	-	-
Pot Cap-1 Maneuver				457	380	841	1204	-	0	0	-	-
Stage 1				657	585	-	-	-	0	0	-	-
Stage 2				839	702	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver				409	0	841	1204	-	-	-	-	-
Mov Cap-2 Maneuver				409	0	-	-	-	-	-	-	-
Stage 1				588	0	-	-	-	-	-	-	-
Stage 2				839	0	-	-	-	-	-	-	-
Approach				WB		NB		SB				
HCM Control Delay, s				14.2		3.1		0				
HCM LOS				B								
Minor Lane/Major Mvmt		NBL	NBTWBLn1	SBT	SBR							
Capacity (veh/h)		1204	-	493	-	-						
HCM Lane V/C Ratio		0.093	-	0.21	-	-						
HCM Control Delay (s)		8.3	0	14.2	-	-						
HCM Lane LOS		A	A	B	-	-						
HCM 95th %tile Q(veh)		0.3	-	0.8	-	-						

HCM 6th TWSC
2: Watkins Road & EB Off Ramp/WB On Ramp

2024 Total
PM Peak

Intersection												
Int Delay, s/veh	5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	75	2	99	0	0	0	0	129	55	60	115	0
Future Vol, veh/h	75	2	99	0	0	0	0	129	55	60	115	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	5	5	25	5	5	5	5	25	5	5	5	5
Mvmt Flow	85	2	113	0	0	0	0	147	63	68	131	0




Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	446	477	131	-	0	0	210	0	0
Stage 1	267	267	-	-	-	-	-	-	-
Stage 2	179	210	-	-	-	-	-	-	-
Critical Hdwy	6.45	6.55	6.45	-	-	-	4.15	-	-
Critical Hdwy Stg 1	5.45	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.45	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.525	-	-	-	2.245	-	-
Pot Cap-1 Maneuver	564	483	861	0	-	-	1343	-	0
Stage 1	771	683	-	0	-	-	-	-	0
Stage 2	845	723	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	533	0	861	-	-	-	1343	-	-
Mov Cap-2 Maneuver	533	0	-	-	-	-	-	-	-
Stage 1	771	0	-	-	-	-	-	-	-
Stage 2	799	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.5	0	2.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	680	1343	-
HCM Lane V/C Ratio	-	-	0.294	0.051	-
HCM Control Delay (s)	-	-	12.5	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1.2	0.2	-

HCM 6th TWSC
3: Watkins Road & E. 6th Avenue

2024 Total
PM Peak

Intersection						
Int Delay, s/veh	2.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	35	149	15	70	144
Future Vol, veh/h	10	35	149	15	70	144
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	5	5	25	5	5	25
Mvmt Flow	11	40	169	17	80	164





Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	502	178	0
Stage 1	178	-	-
Stage 2	324	-	-
Critical Hdwy	6.45	6.25	-
Critical Hdwy Stg 1	5.45	-	-
Critical Hdwy Stg 2	5.45	-	-
Follow-up Hdwy	3.545	3.345	-
Pot Cap-1 Maneuver	524	857	-
Stage 1	846	-	-
Stage 2	726	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	490	857	-
Mov Cap-2 Maneuver	490	-	-
Stage 1	846	-	-
Stage 2	680	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	2.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	735	1371
HCM Lane V/C Ratio	-	-	0.07	0.058
HCM Control Delay (s)	-	-	10.3	7.8
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.2	0.2

HCM 6th TWSC
4: Watkins Road & E. Jewell Avenue

2024 Total
PM Peak

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	5	5	163	113	10
Future Vol, veh/h	15	5	5	163	113	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	25	25	5
Mvmt Flow	17	6	6	185	128	11




Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	325	128	139	0	-	0
Stage 1	128	-	-	-	-	-
Stage 2	197	-	-	-	-	-
Critical Hdwy	6.45	6.25	4.15	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	2.245	-	-	-
Pot Cap-1 Maneuver	663	914	1426	-	-	-
Stage 1	890	-	-	-	-	-
Stage 2	829	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	660	914	1426	-	-	-
Mov Cap-2 Maneuver	660	-	-	-	-	-
Stage 1	886	-	-	-	-	-
Stage 2	829	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.2	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1426	-	709	-	-
HCM Lane V/C Ratio	0.004	-	0.032	-	-
HCM Control Delay (s)	7.5	0	10.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

HCM 6th TWSC
5: Watkins Road & Site Access

2024 Total
PM Peak

Intersection						
Int Delay, s/veh	1.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	21	178	0	21	123
Future Vol, veh/h	0	21	178	0	21	123
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	5	25	5	5	25	5
Mvmt Flow	0	24	202	0	24	140
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	390	202	0	0	202	0
Stage 1	202	-	-	-	-	-
Stage 2	188	-	-	-	-	-
Critical Hdwy	6.45	6.45	-	-	4.35	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.525	-	-	2.425	-
Pot Cap-1 Maneuver	608	784	-	-	1244	-
Stage 1	825	-	-	-	-	-
Stage 2	837	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	595	784	-	-	1244	-
Mov Cap-2 Maneuver	595	-	-	-	-	-
Stage 1	825	-	-	-	-	-
Stage 2	819	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.7	0		1.2		
HCM LOS	A					
Minor Lane/Major Mvmt		NBT	NBRWBLn1	SBL	SBT	
Capacity (veh/h)		-	-	784	1244	-
HCM Lane V/C Ratio		-	-	0.03	0.019	-
HCM Control Delay (s)		-	-	9.7	8	0
HCM Lane LOS		-	-	A	A	A
HCM 95th %tile Q(veh)		-	-	0.1	0.1	-