



Complete Streets Redesign of Washington Street

Technical Memorandum

Traffic Count Results and

Traffic Analysis Summary

Submitted March 31, 2014



Washington Street Complete Streets Redesign

Traffic Count Results & Traffic Analysis Summary

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Washington Street Complete Streets Redesign

Traffic Count Results & Traffic Analysis Summary

Overview

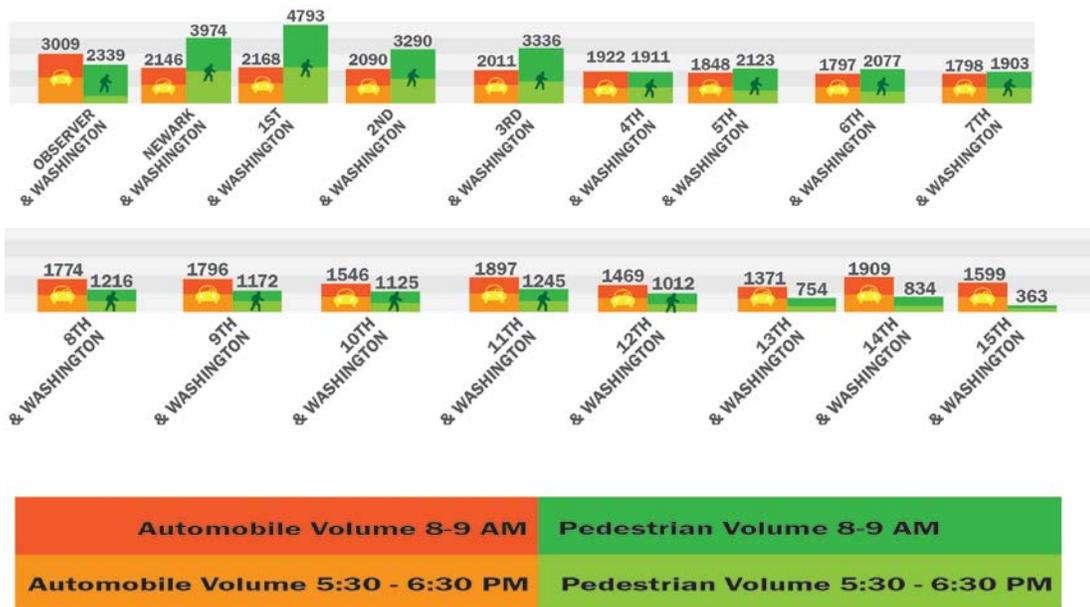
This Technical Memorandum summarizes the findings and supporting documentation and data described in Chapter 4, “Transportation,” of the Existing Conditions Report, March 19, 2014.

Methodology

Video technology was deployed at all signalized intersections on Washington Street to measure traffic volumes. These video traffic counters were set up between 7 a.m. and 7 p.m. on Tuesday, October 15, 2013 to understand traffic volumes on a typical weekday.

Traffic Volumes

- The collected data show that roughly 10,000 vehicles make a trip on Washington Street on a typical weekday, at a rate of 450-900 vehicles per hour, about equal per direction.
- Traffic volumes do not increase substantially during peak periods typically associated with the morning and evening commute, versus the rest of the day.
- Of the vehicles accessing Washington Street, 4-5% are trucks (of which most are single unit box trucks) and 4-5% are buses.
- Based on a review of the turning movements at each intersection, most of the motor vehicle traffic along Washington Street is local, not cut-through or continuous along the entire roadway.
- There are between 500-1500 pedestrians per hour south of 8th Street, 300-500 pedestrians per hour north of 8th Street.
- Up to 1,300 pedestrians cross Washington Street in peak hours at the south end, and hundreds of pedestrians per hour cross every street
- Pedestrian and vehicular travel data are compared for the peak hours at each intersection in the following graphic.





Washington Street Complete Streets Redesign

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Traffic Operations

Intersections

- There are 17 closely spaced intersections, 16 signalized, one all-way stop
- 2 signals are County (Observer and 14th)
- All remaining signals have only one undersized traffic signal head suspended over the roadway, no pedestrian heads, and long (120 second) fixed time cycles, with over 70 seconds of green to Washington Street. Pedestrians cannot see signal heads when crossing.
- Signals can most likely be removed at the following side streets, with stop signs on side streets at these five cross streets: 5th, 8th, 10th, 12th, 13th
- All-way stops may be feasible at these cross-streets, or signals replaced: 4th, 6th, 7th, 9th
- Signals would have to be replaced at these cross-streets: Newark, 1st, 2nd, 3rd, 11th
- No changes to Washington & 15th and Washington & 14th
- Signal timing changes only at Washington & Observer

Level of Service (LOS)

- Through an evaluation of the Level of Service (LOS) provided at each intersection, it was found that most intersections along Washington Street operate with an acceptable-to-good flow of vehicular traffic, expressed as LOS "C" or better on a scale of "A" to "F", with "A" being the best and "F" being the worst.
- Intersections between Washington Street and Newark Street, 1st Street, 2nd Street, and 3rd Street, respectively, are each operating at LOS "D" or better.
- The intersection between Washington Street and Observer Highway is operating at LOS "E" or "F" for eastbound left turns and LOS "E" for the southbound approach from Washington Street.
- In terms of overall delay at peak hours (the time that vehicles are stopped for signals or congestion), it was found that the morning peak (8-9 a.m.) produced 73.6 vehicle-hours of delay, while the evening peak (5:30-6:30 p.m.) produced 57.1 vehicle-hours of delay.

Potential Traffic Operations

- Signal changes mentioned above.
- We do not need additional lanes.
- With changes, no movement will be worse than a LOS D for a signal
- Overall delay will be 64.9 vehicle-hours for morning peak hour, and 48.3 vehicle-hours for the evening peak hour (i.e. 12-15% reduction from existing).



Washington Street Complete Streets Redesign Traffic Count Results & Traffic Analysis Summary

Crash History

Crash history for 2010-2012 was studied and compared to typical traffic crash frequency predicted by the Highway Safety Manual.

Washington St from 8th St to 15th St (residential portion with angle parking)

- 77 total crashes, including 7 vehicle-pedestrian and 3 bicycle-pedestrian crashes.
- Expected would be 65 crashes, including 7 vehicle-pedestrian and 1 bicycle-pedestrian crash.
- Traffic safety in this area can be considered typical.

Washington St from Observer Highway to 8th St (commercial portion with parallel parking)

- 220 total crashes, including 17 vehicle-pedestrian and 5 bicycle-pedestrian crashes.
- Expected would be 68 crashes, including 8 vehicle-pedestrian crashes and 1 bicycle-pedestrian crash.
- This area has more **than triple a typical crash rate** for similar roadways.
- Nearly half of all crashes involve parked vehicles or backing vehicles, and therefore can be related to parallel parking and/or double parking.
- Sideswipe crashes are also high at more than 20% of crashes, and this may be related to double parking, or the physical width of Washington Street (since there is only one lane per direction).
- Washington and 3rd has the highest crash rate, Washington and Newark has the second highest crash rate.
- The block between 4th and 5th also stands out with high crash rate.

Washington St and Observer Highway Intersection

- 23 total crashes, including 3 vehicle-pedestrian crashes.
- Expected would be 11 crashes, with no vehicle-pedestrian or bicycle-pedestrian crashes.
- Consequently, this area has more **than double a typical crash rate** for similar intersections.

Vehicle-Pedestrian Crash Trends (2011 to October 28, 2013)

- 27 total, 25 resulting in injuries. No Fatalities.
- 18, or 67% occurred in darkness. Lighting may help these.
- 12, or nearly half, involved left or right turning vehicles.

Vehicle-Bicycle Crash Trends (2011 to October 28, 2013)

- 8 total, 6 resulting in injuries. No Fatalities.
- 4 or 50%, involved left or right turning vehicles.
- 2 involved double parked vehicles.



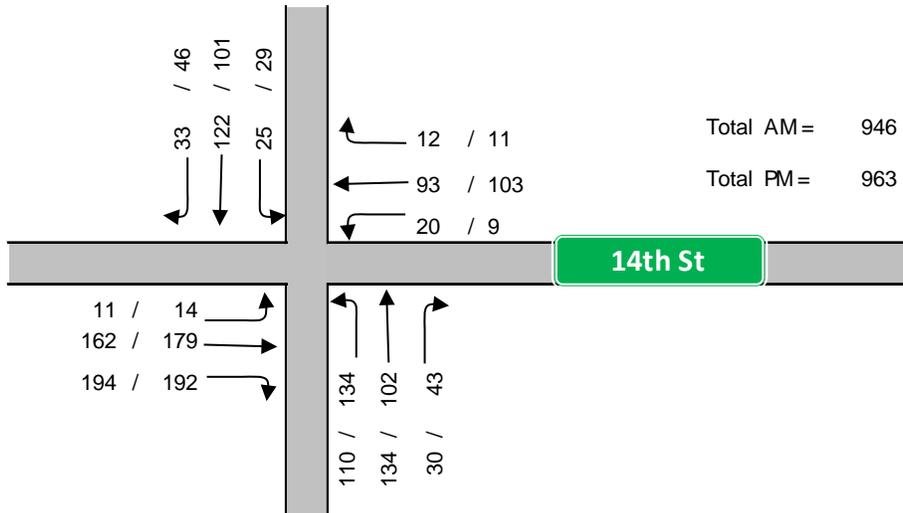
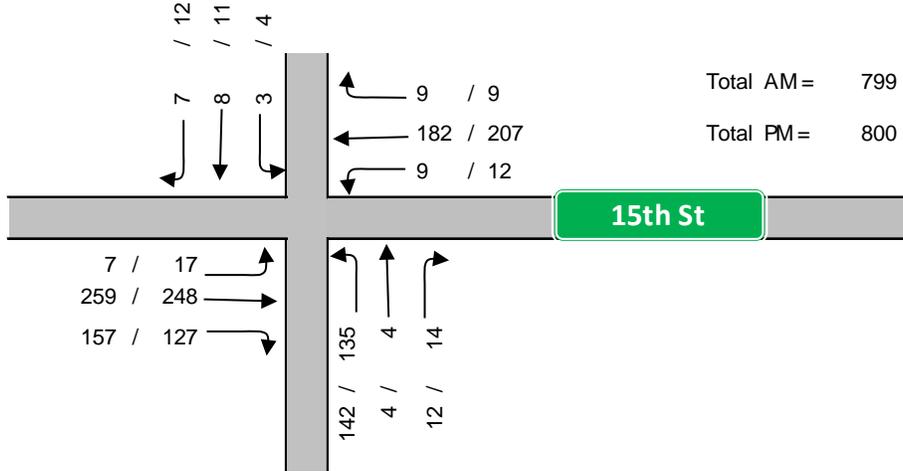
Washington Street Complete Streets Redesign

Traffic Count Results & Traffic Analysis Summary

Data

Washington Street Traffic Volumes and Turning Movements

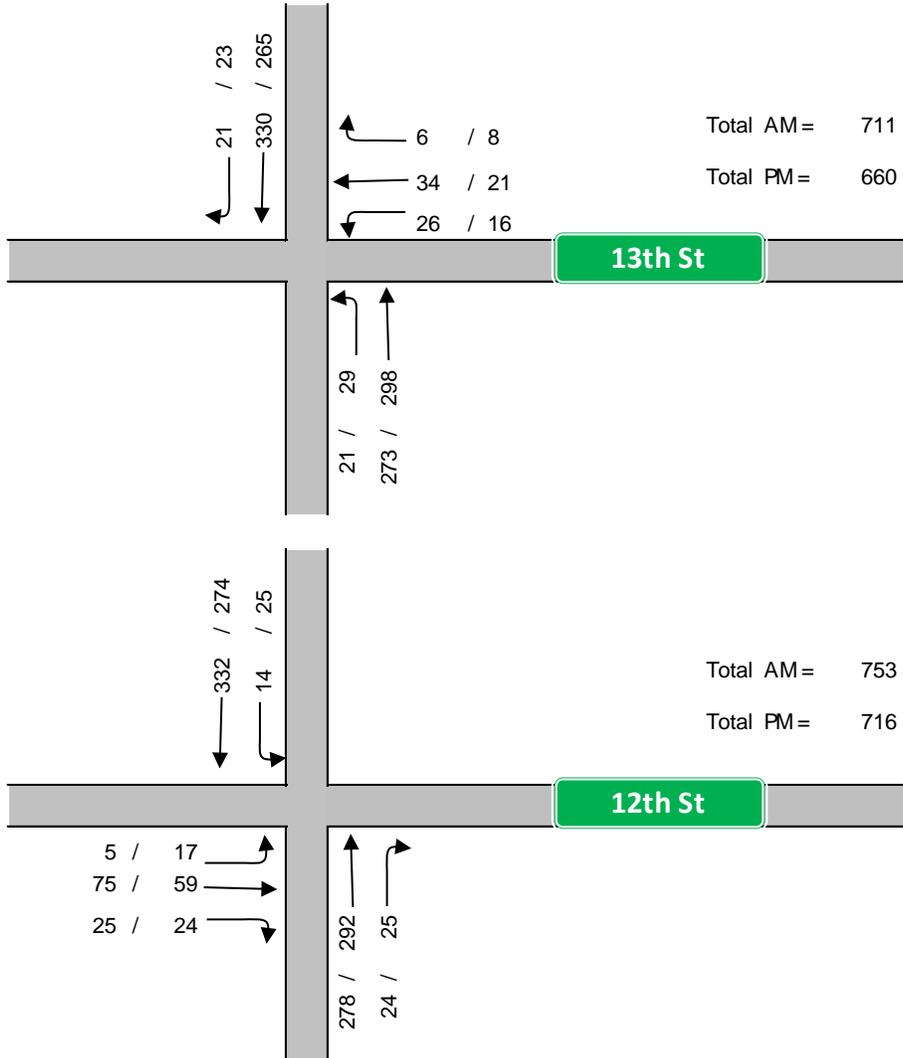
PEAK HOUR TRAFFIC VOLUMES: MORNING (8:00-9:00 AM) / AFTERNOON (5:30-6:30 PM)





Washington Street Complete Streets Redesign Traffic Count Results & Traffic Analysis Summary

Washington Street Traffic Volumes and Turning Movements

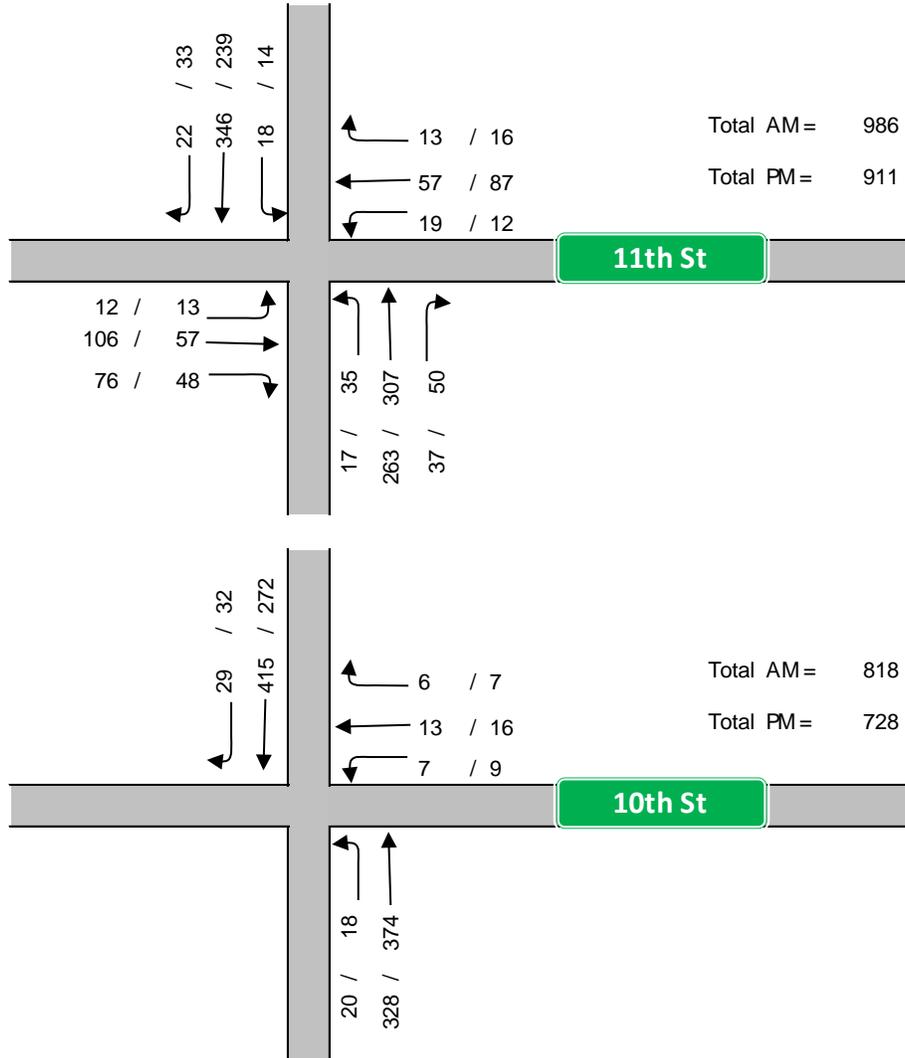




Washington Street Complete Streets Redesign

Traffic Count Results & Traffic Analysis Summary

Washington Street Traffic Volumes and Turning Movements

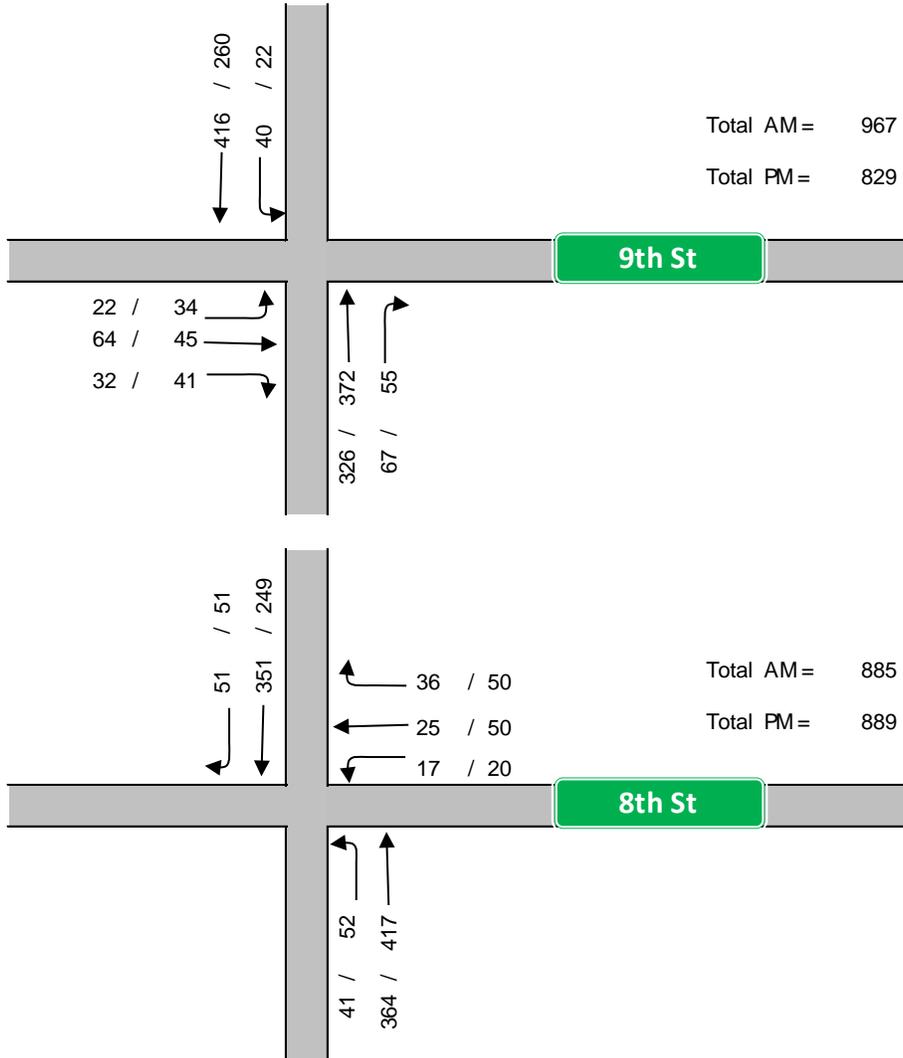




Washington Street Complete Streets Redesign

Traffic Count Results & Traffic Analysis Summary

Washington Street Traffic Volumes and Turning Movements

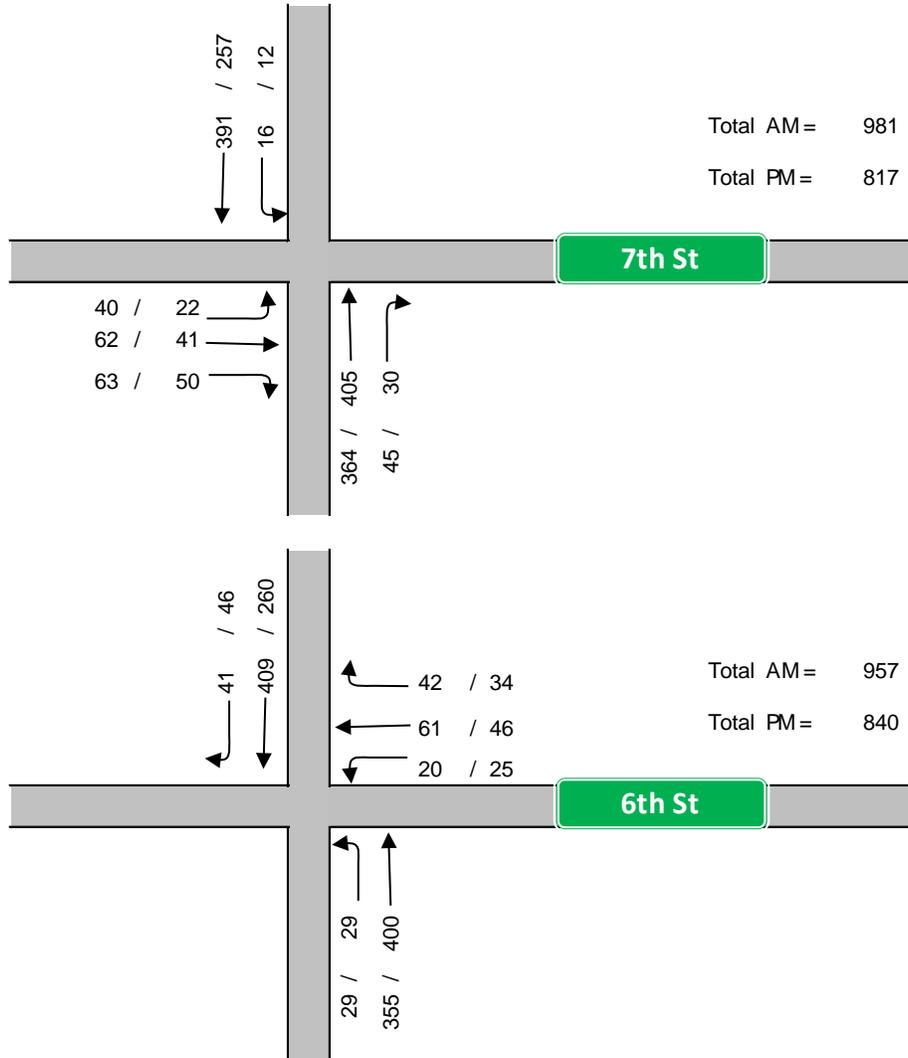




Washington Street Complete Streets Redesign

Traffic Count Results & Traffic Analysis Summary

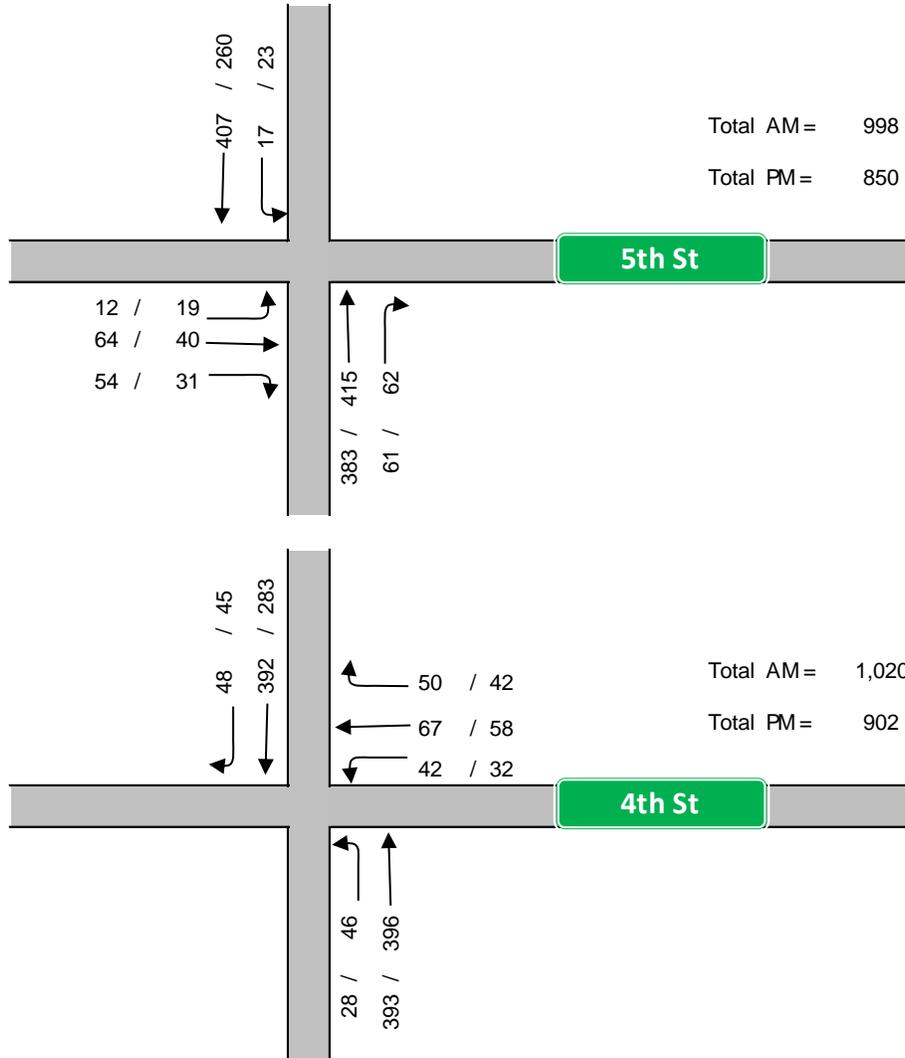
Washington Street Traffic Volumes and Turning Movements





Washington Street Complete Streets Redesign Traffic Count Results & Traffic Analysis Summary

Washington Street Traffic Volumes and Turning Movements

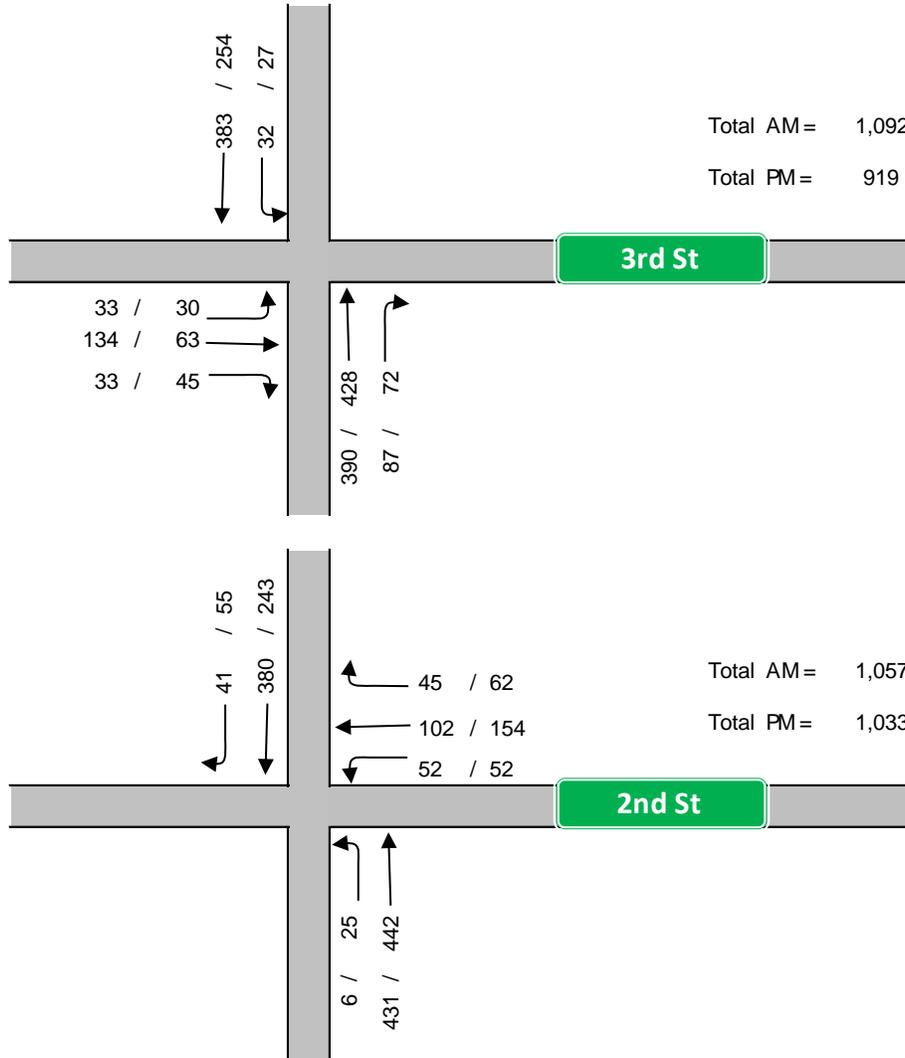




Washington Street Complete Streets Redesign

Traffic Count Results & Traffic Analysis Summary

Washington Street Traffic Volumes and Turning Movements

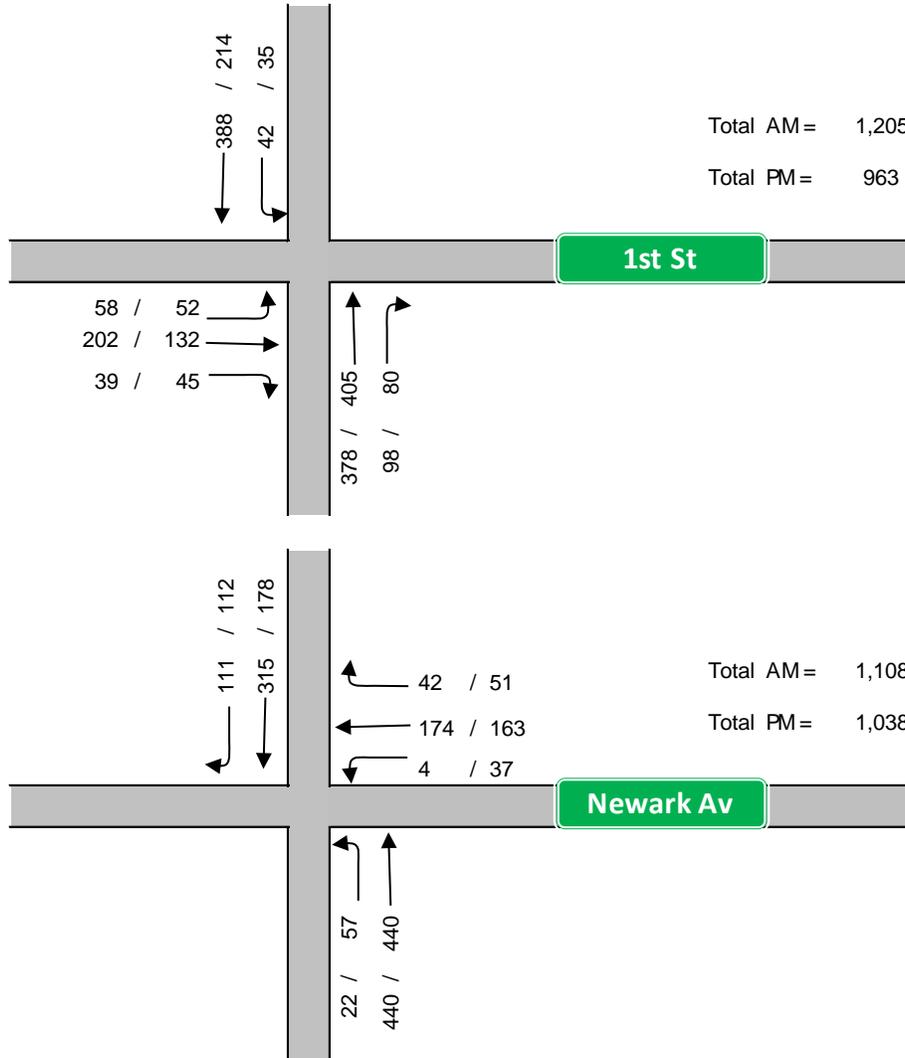




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Traffic Count Results & Traffic Analysis Summary

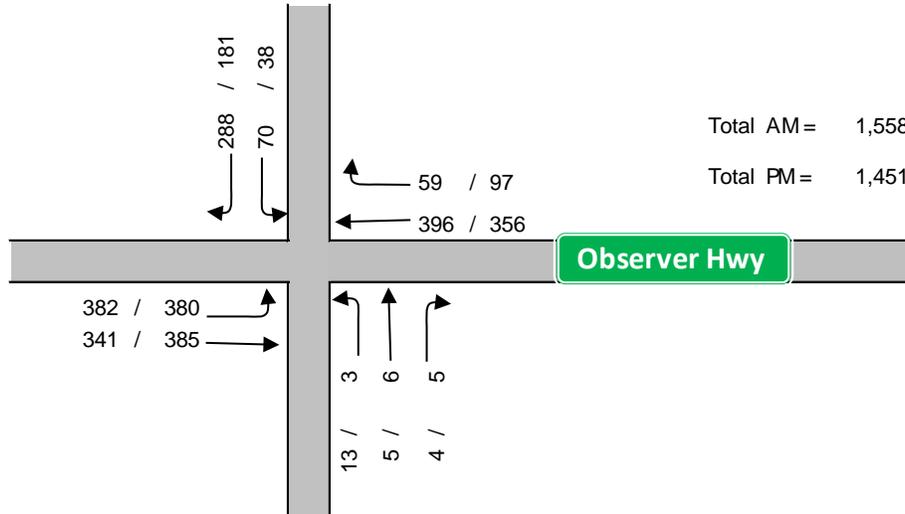
Washington Street Traffic Volumes and Turning Movements





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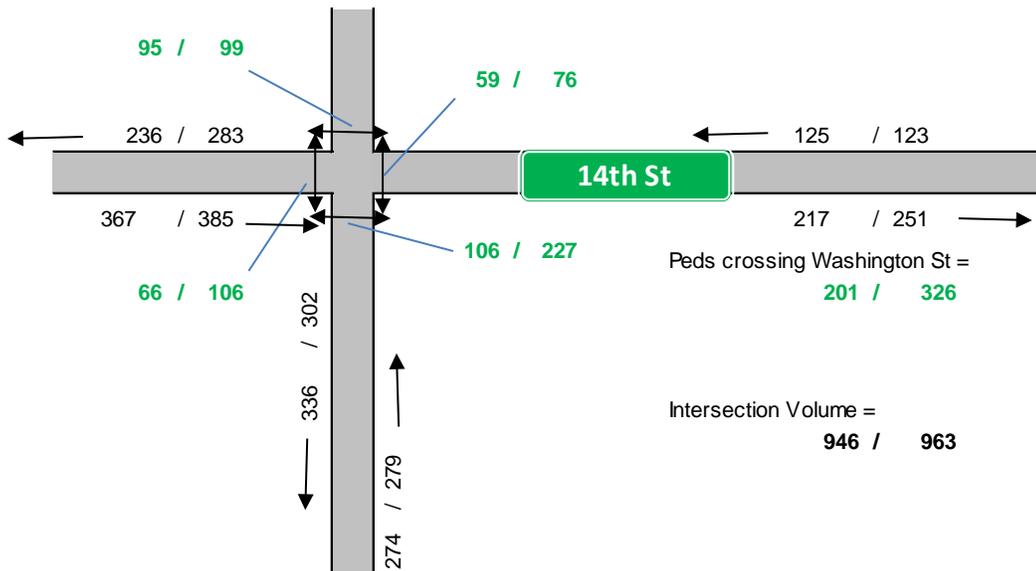
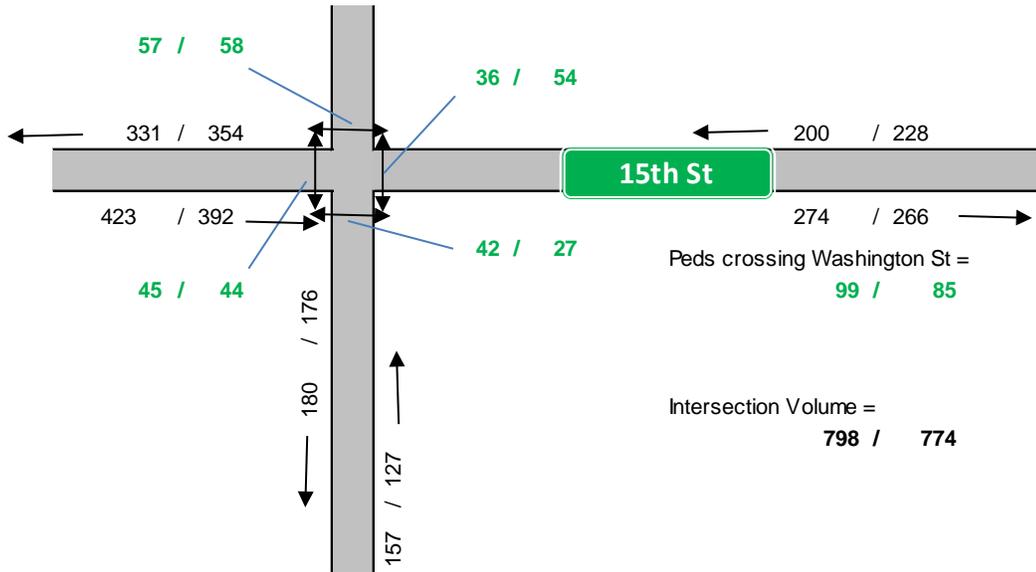
Washington Street Traffic Volumes and Turning Movements





Washington Street Complete Streets Redesign Traffic Count Results & Traffic Analysis Summary

Washington Street Pedestrian Volumes

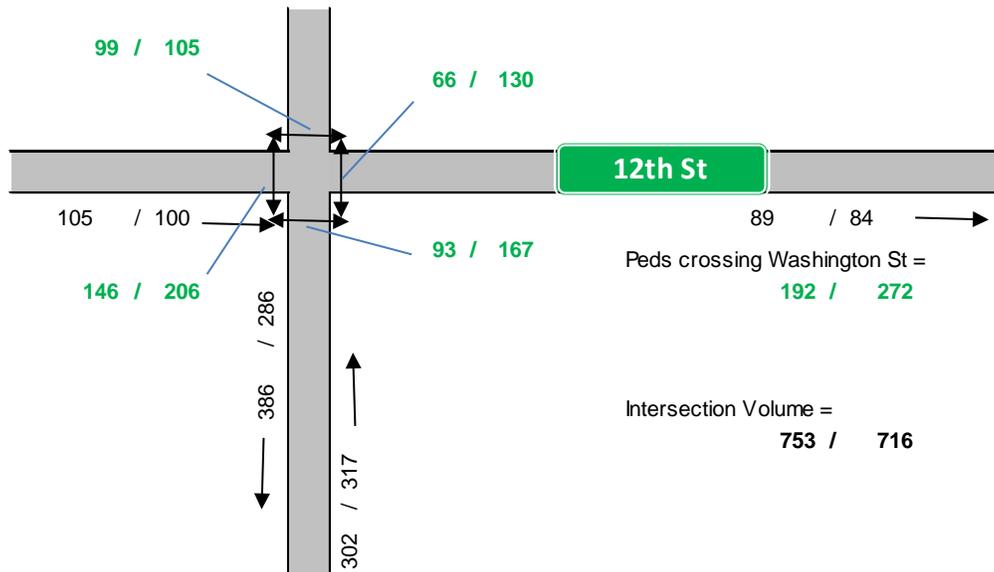
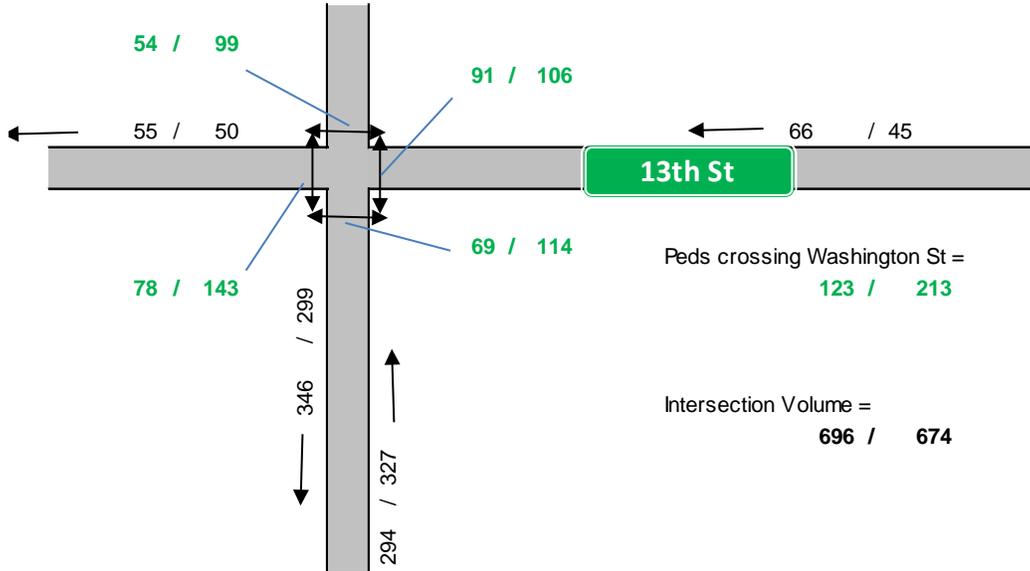




Washington Street Complete Streets Redesign

Traffic Count Results & Traffic Analysis Summary

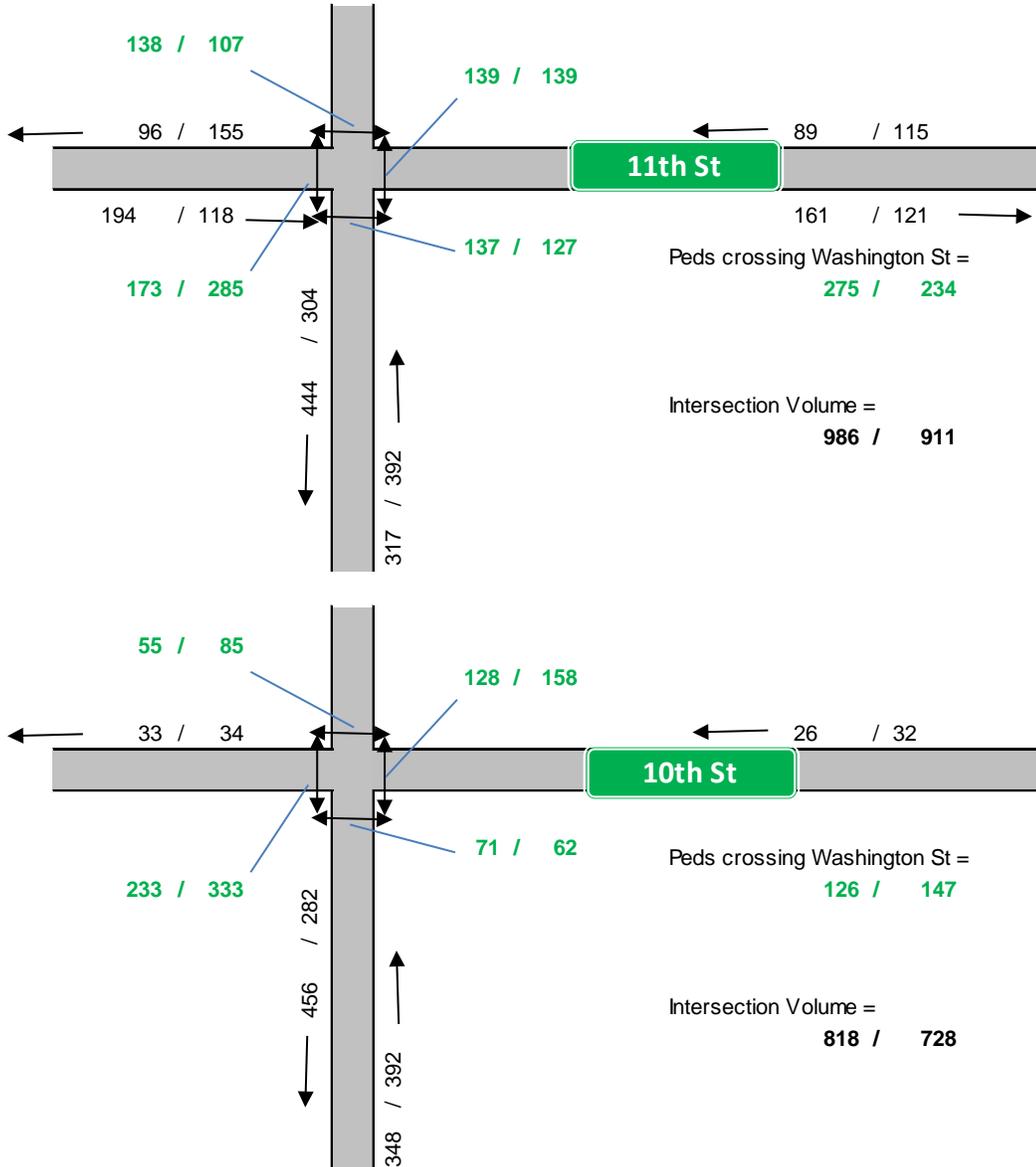
Washington Street Pedestrian Volumes





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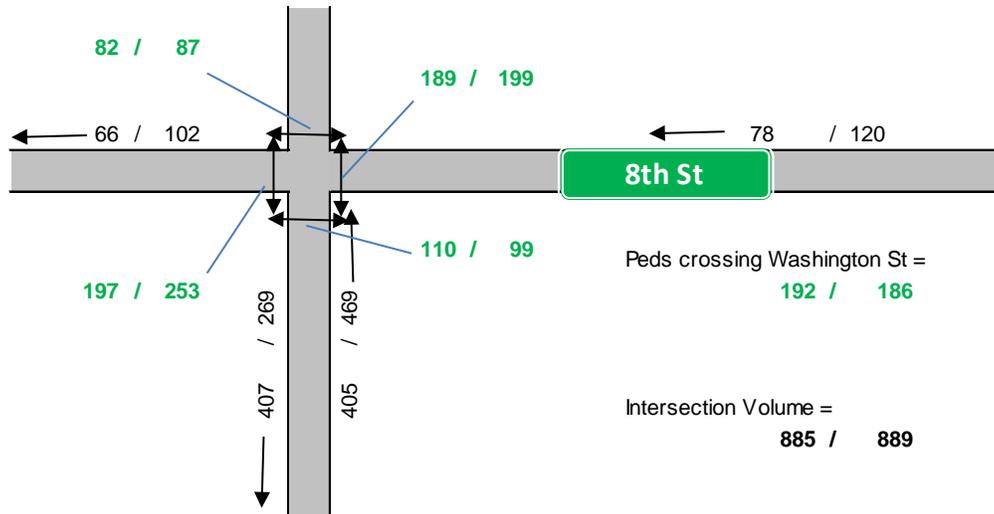
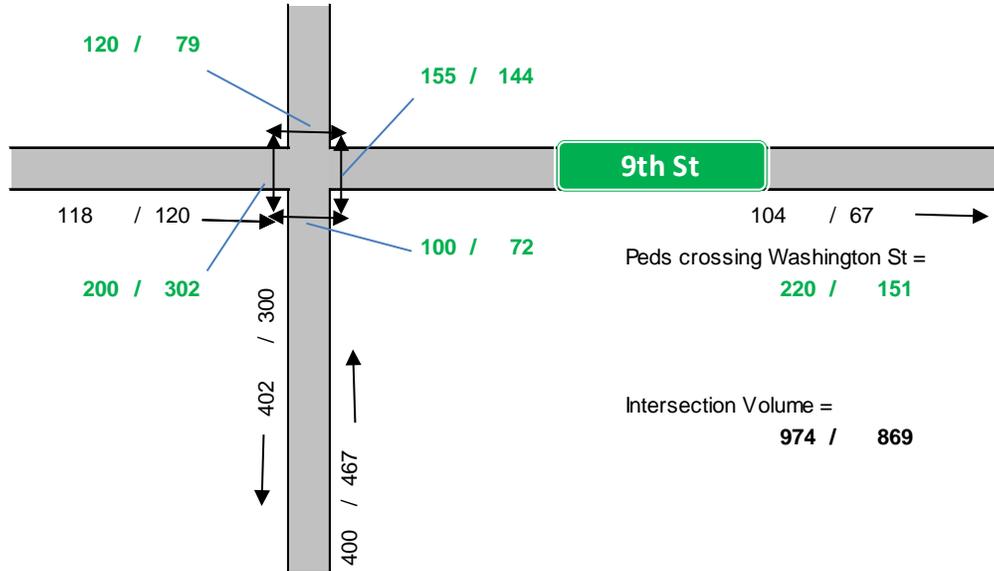
Washington Street Pedestrian Volumes





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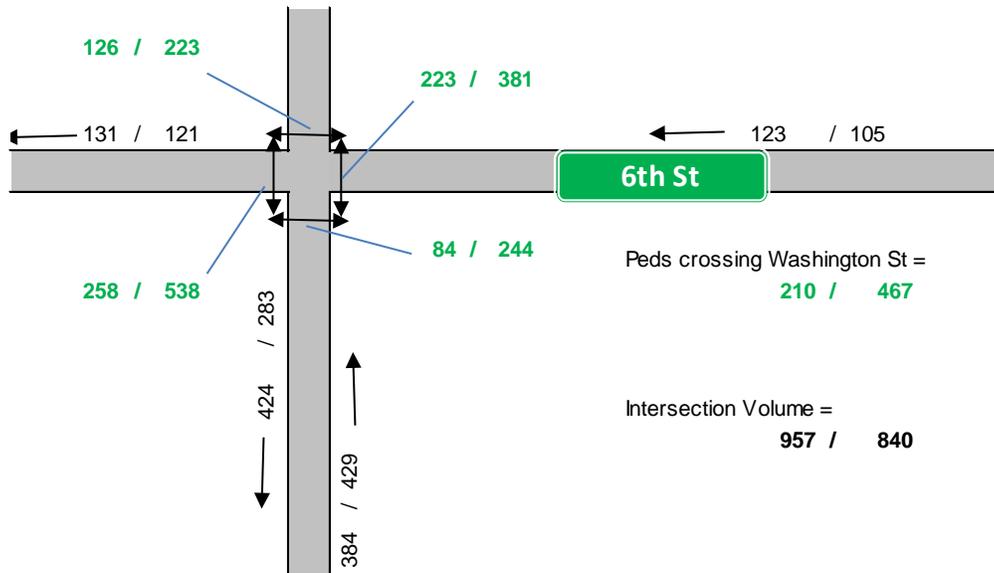
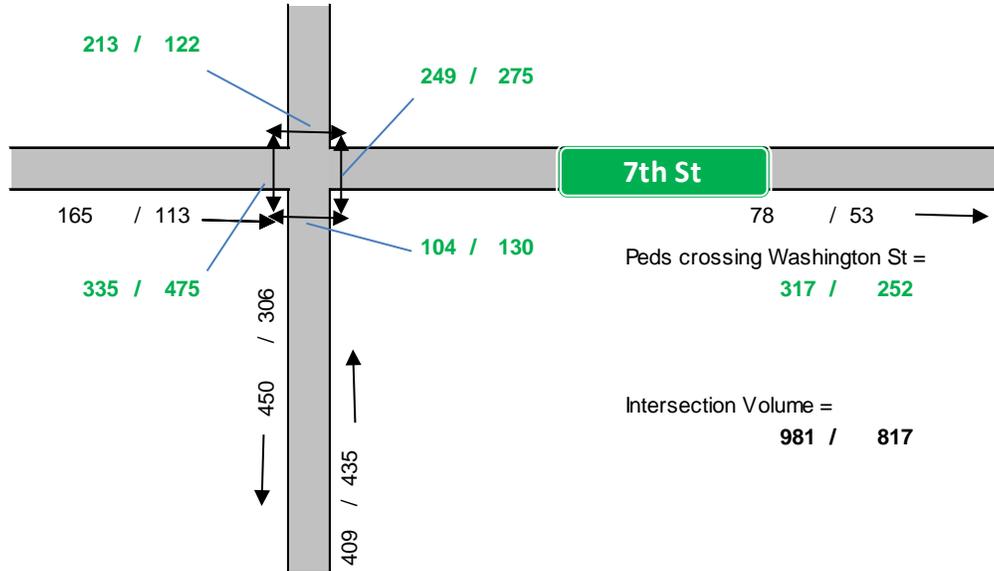
Washington Street Pedestrian Volumes





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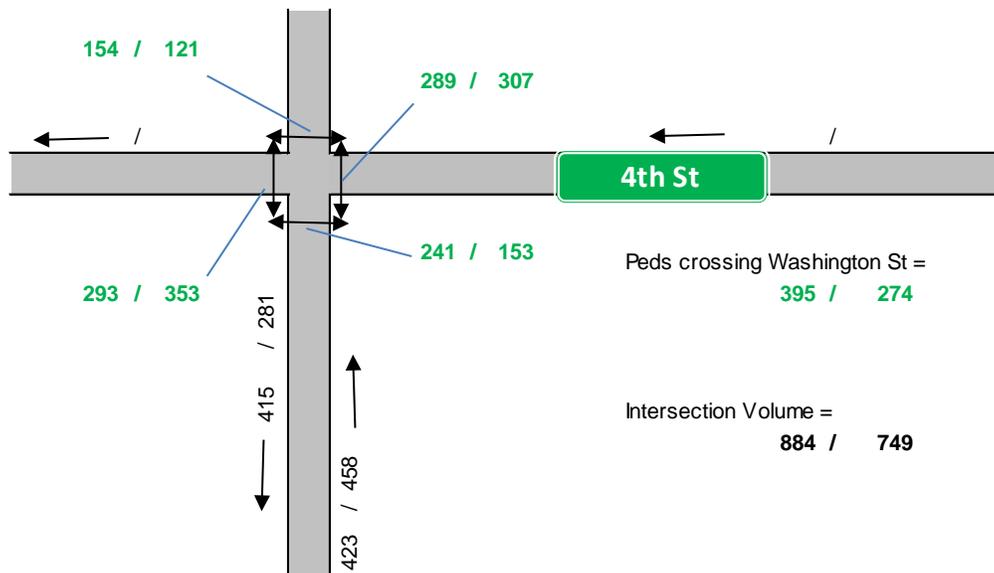
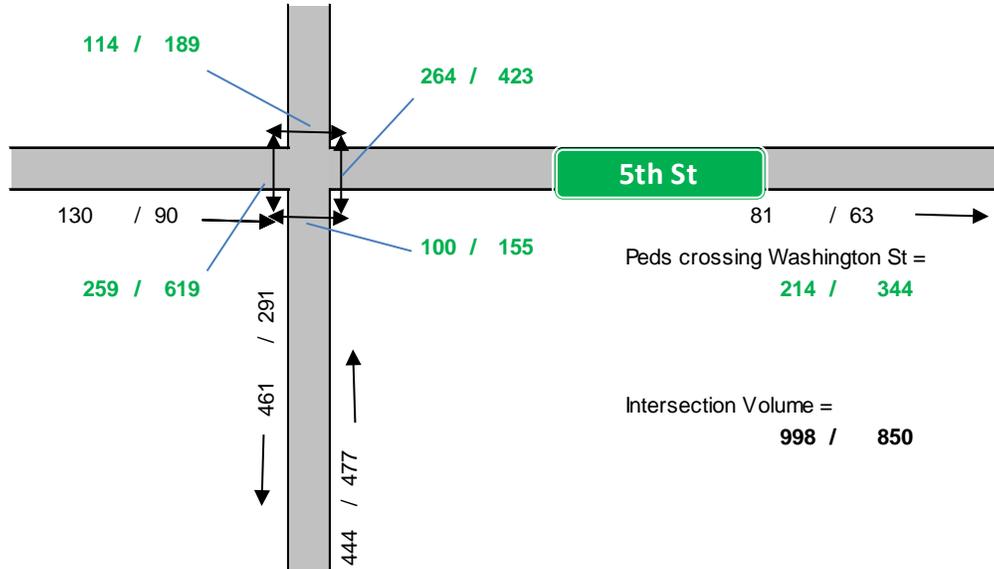
Washington Street Pedestrian Volumes





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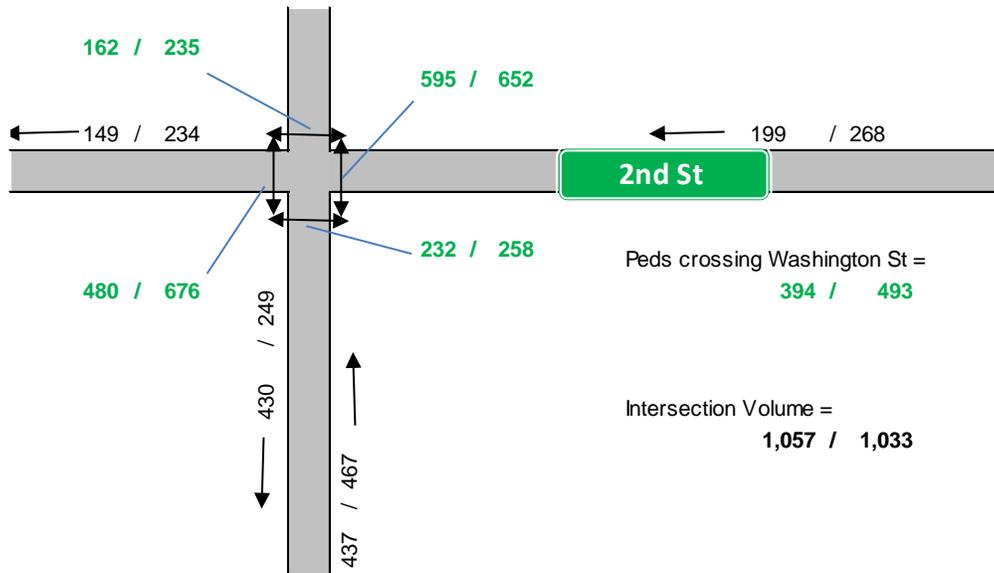
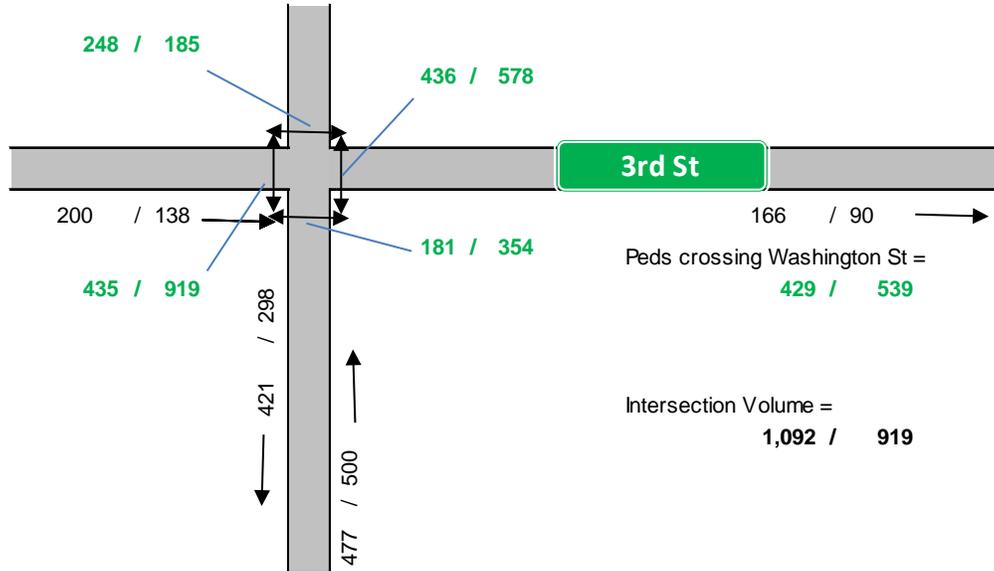
Washington Street Pedestrian Volumes





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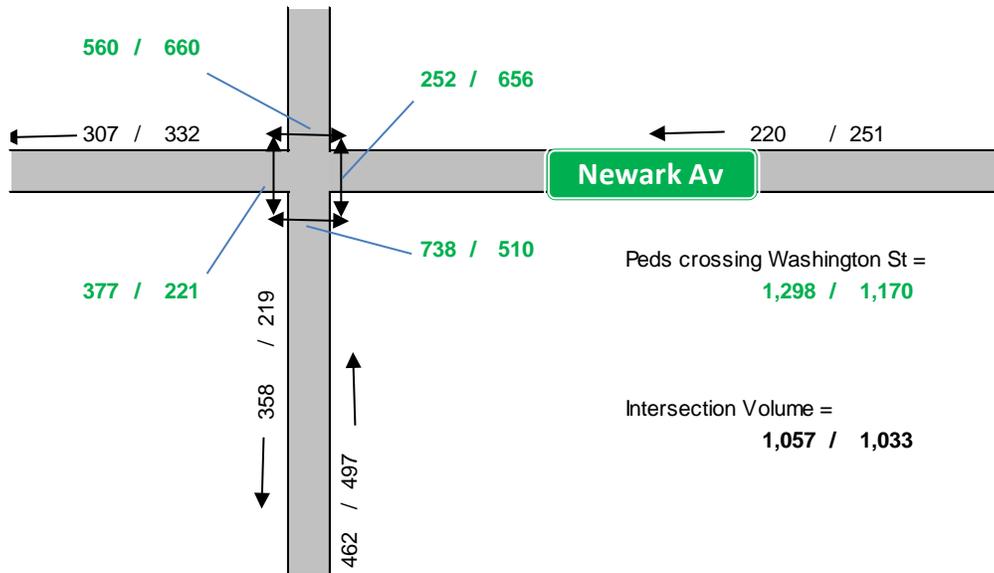
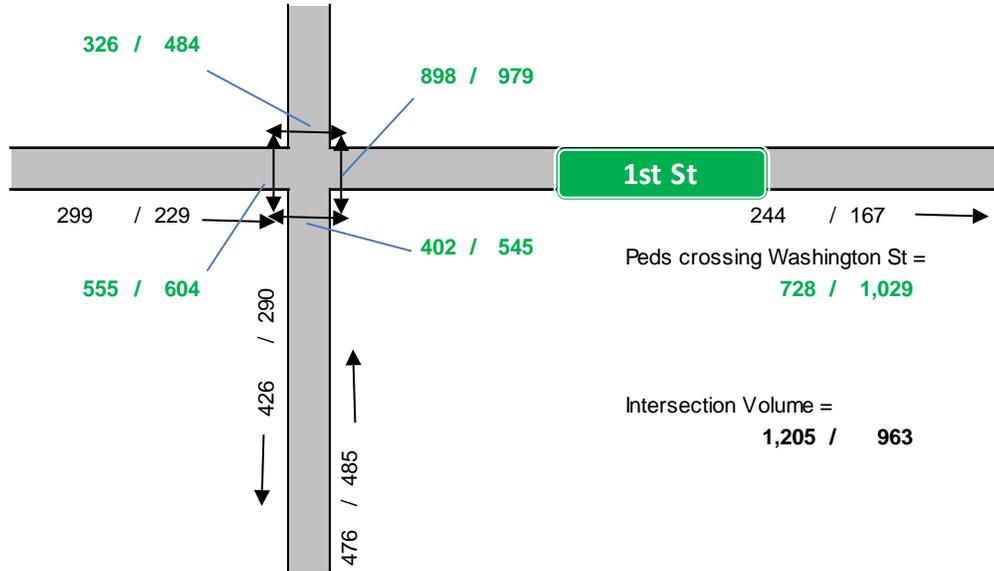
Washington Street Pedestrian Volumes





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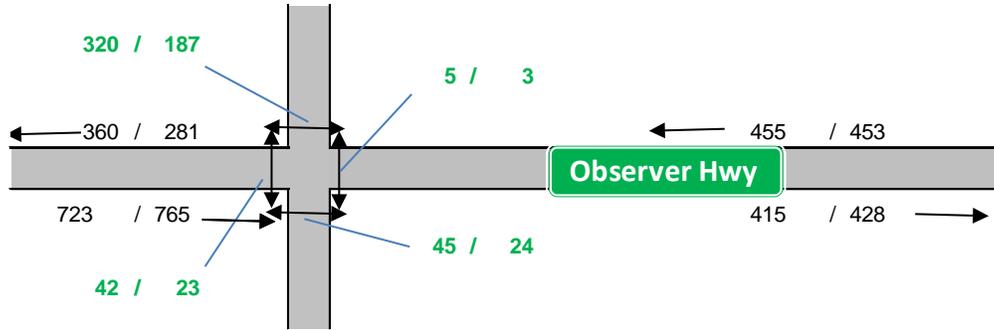
Washington Street Pedestrian Volumes





Washington Street Complete Streets Redesign Traffic Count Results & Traffic Analysis Summary

Washington Street Pedestrian Volumes



Intersection Volume =
1,558 / 1,451

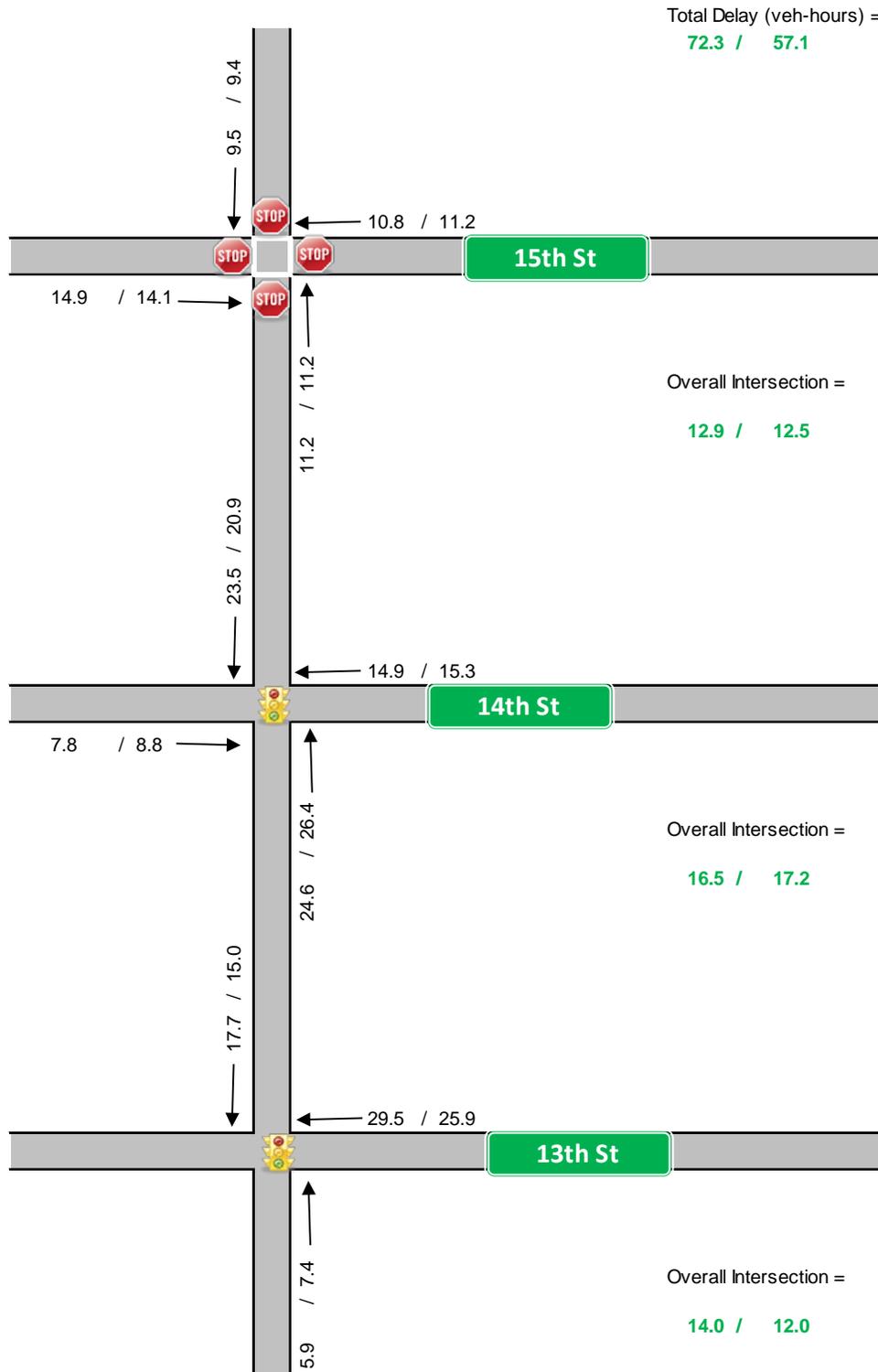


Washington Street Complete Streets Redesign

Traffic Count Results & Traffic Analysis Summary

Existing Average Delay per Vehicle

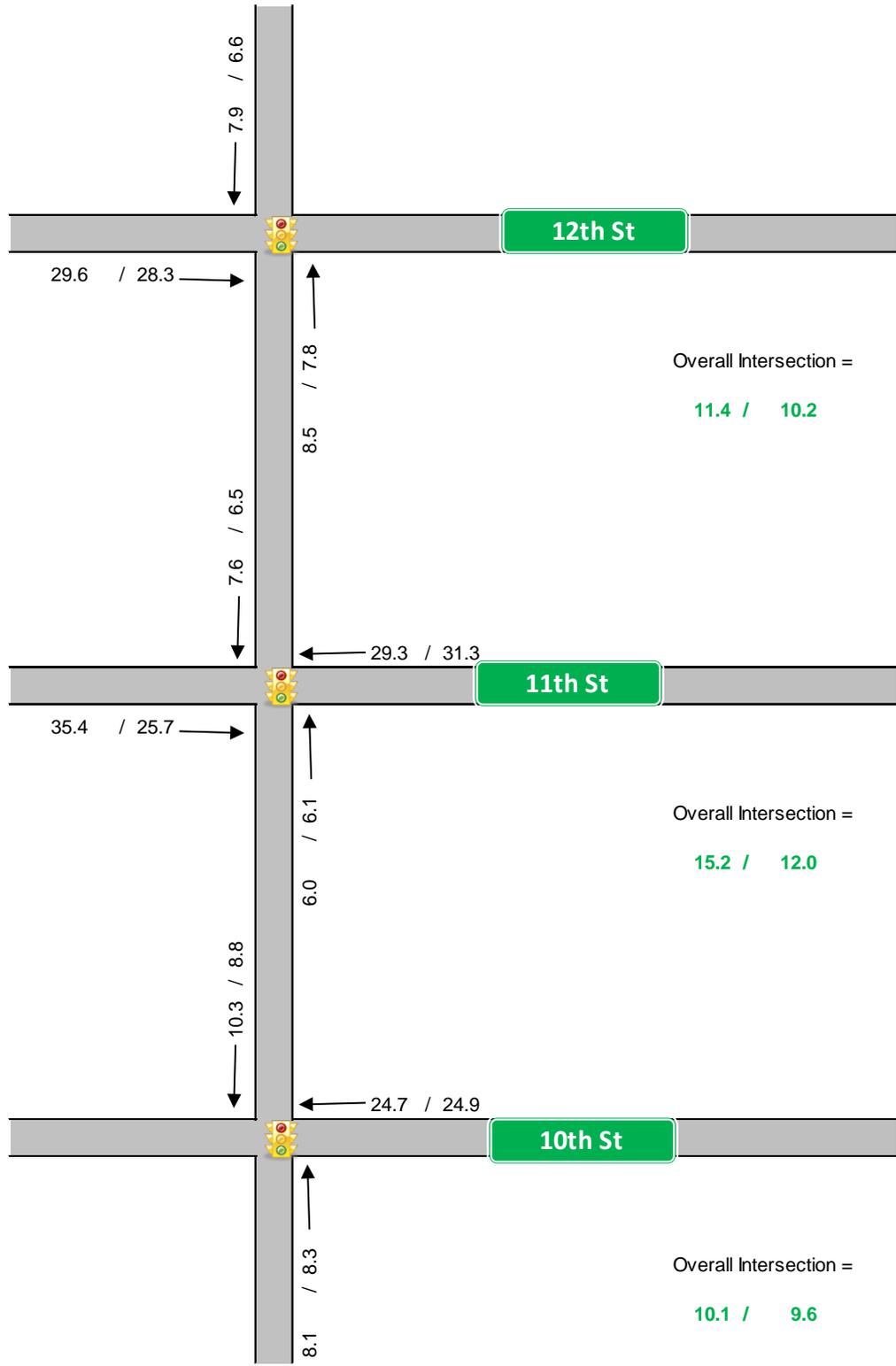
MORNING (8:00-9:00 AM) / AFTERNOON (5:30-6:30 PM)





Washington Street Complete Streets Redesign Traffic Count Results & Traffic Analysis Summary

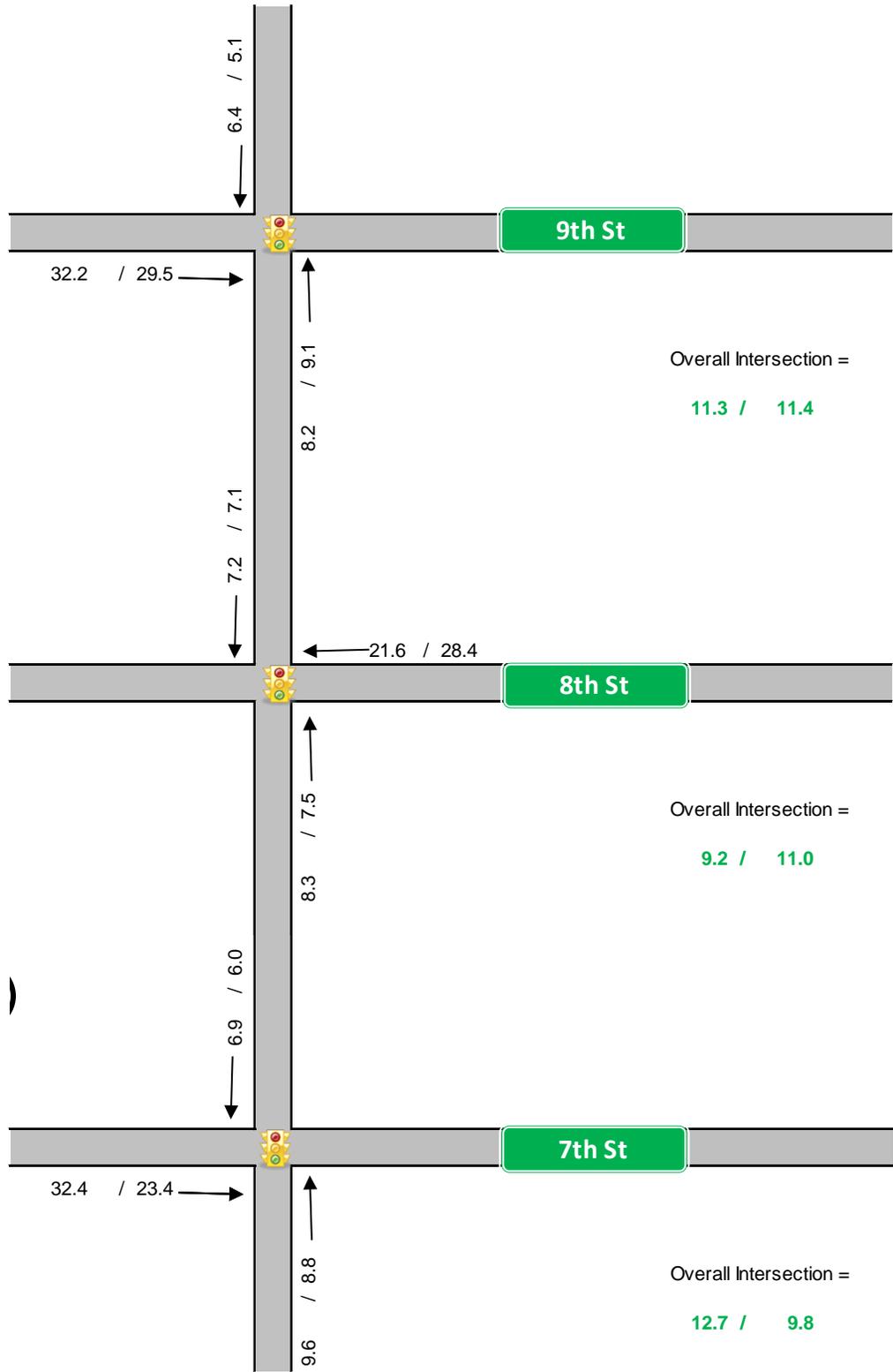
Existing Average Delay per Vehicle





Washington Street Complete Streets Redesign Traffic Count Results & Traffic Analysis Summary

Existing Average Delay per Vehicle





Washington Street Complete Streets Redesign Traffic Count Results & Traffic Analysis Summary

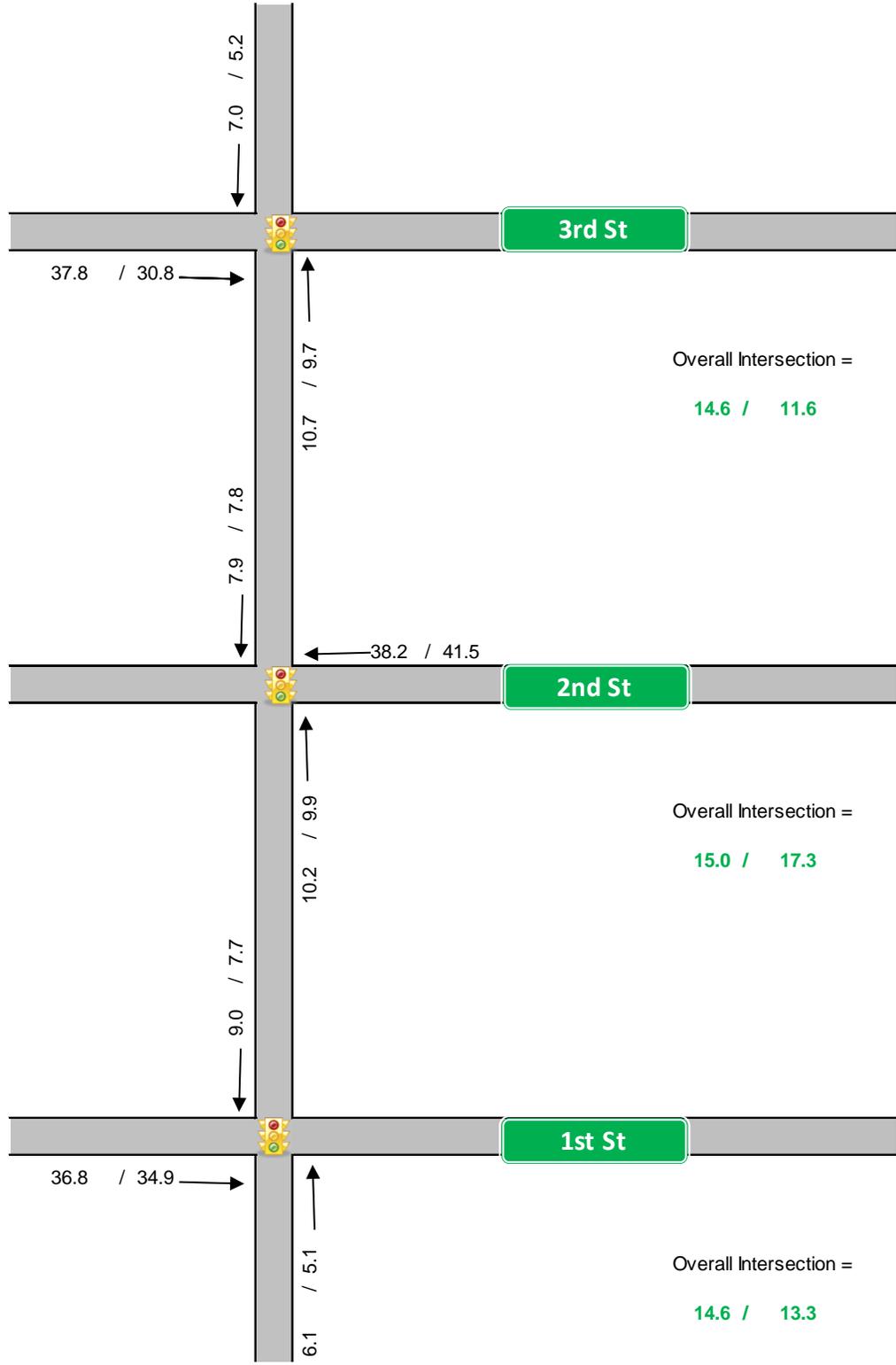
Existing Average Delay per Vehicle





Washington Street Complete Streets Redesign Traffic Count Results & Traffic Analysis Summary

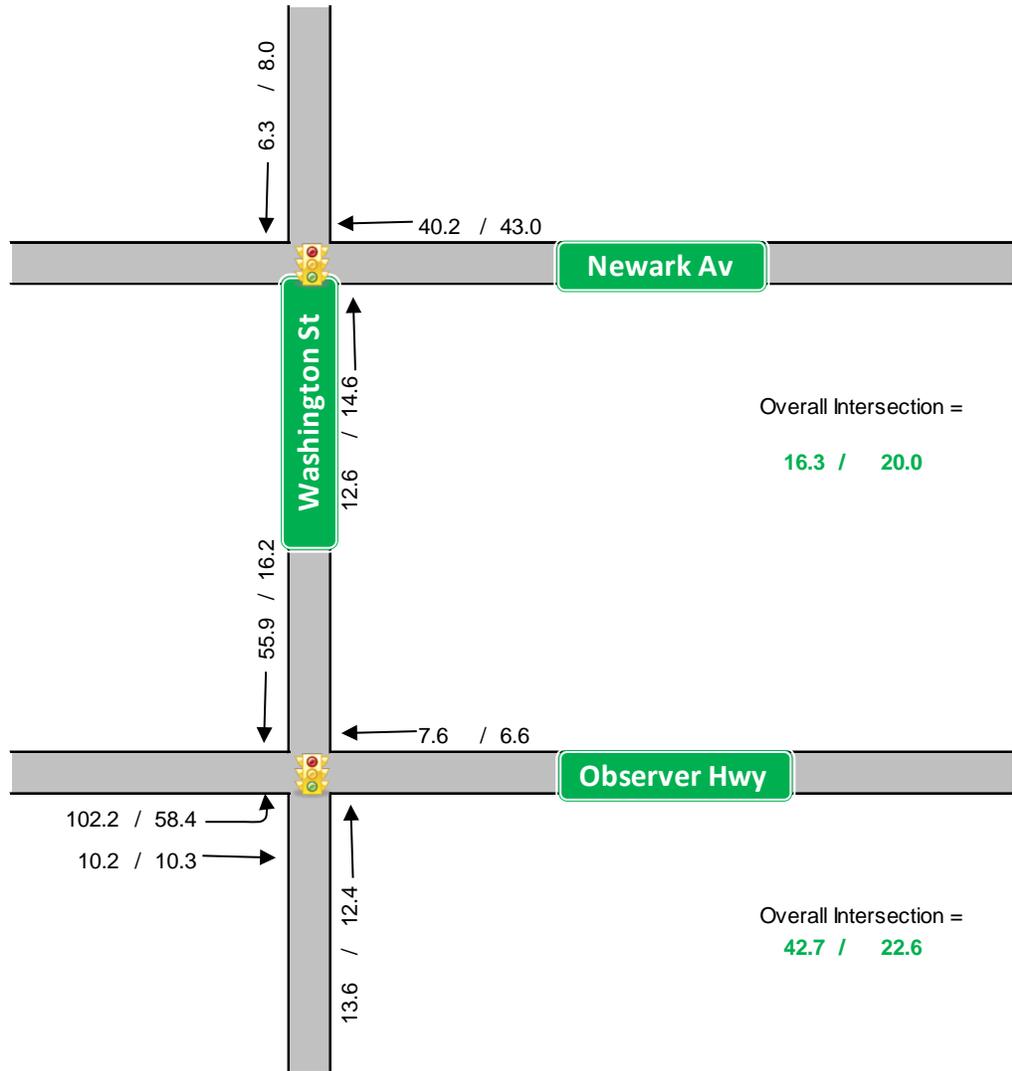
Existing Average Delay per Vehicle





Washington Street Complete Streets Redesign Traffic Count Results & Traffic Analysis Summary

Existing Average Delay per Vehicle

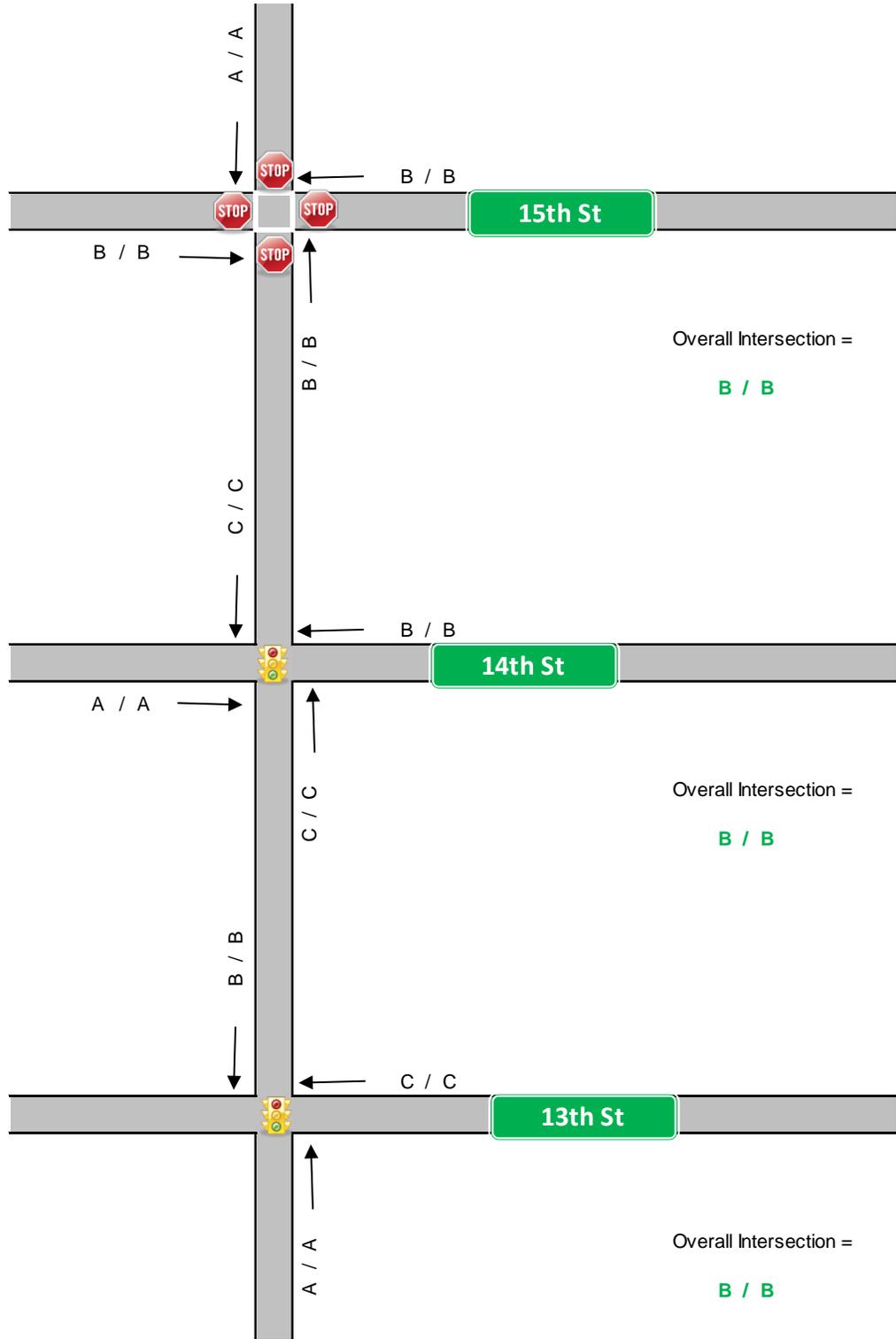




Washington Street Complete Streets Redesign Traffic Count Results & Traffic Analysis Summary

Existing Vehicle Level of Service

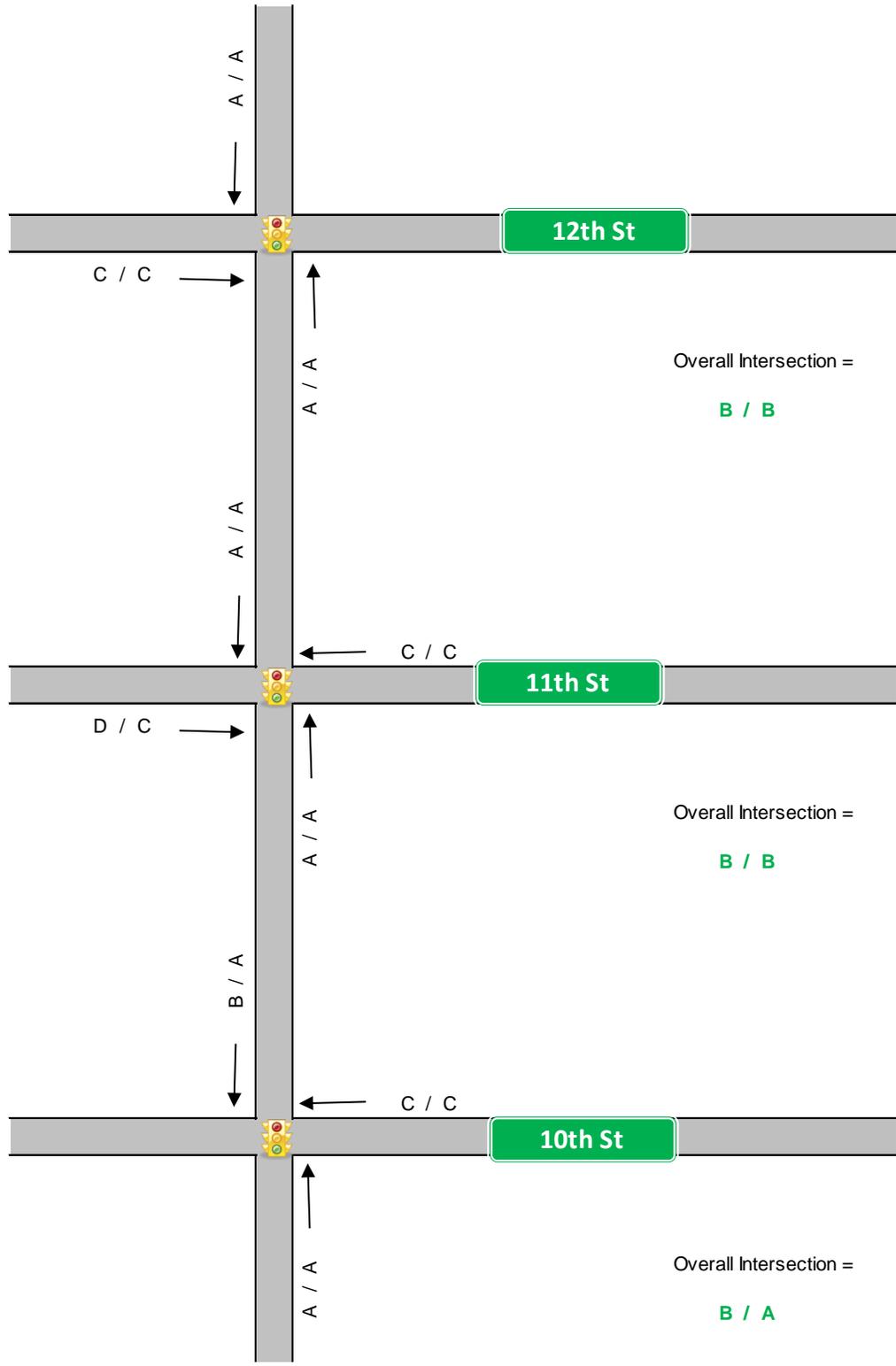
MORNING (8:00-9:00 AM) / AFTERNOON (5:30-6:30 PM)





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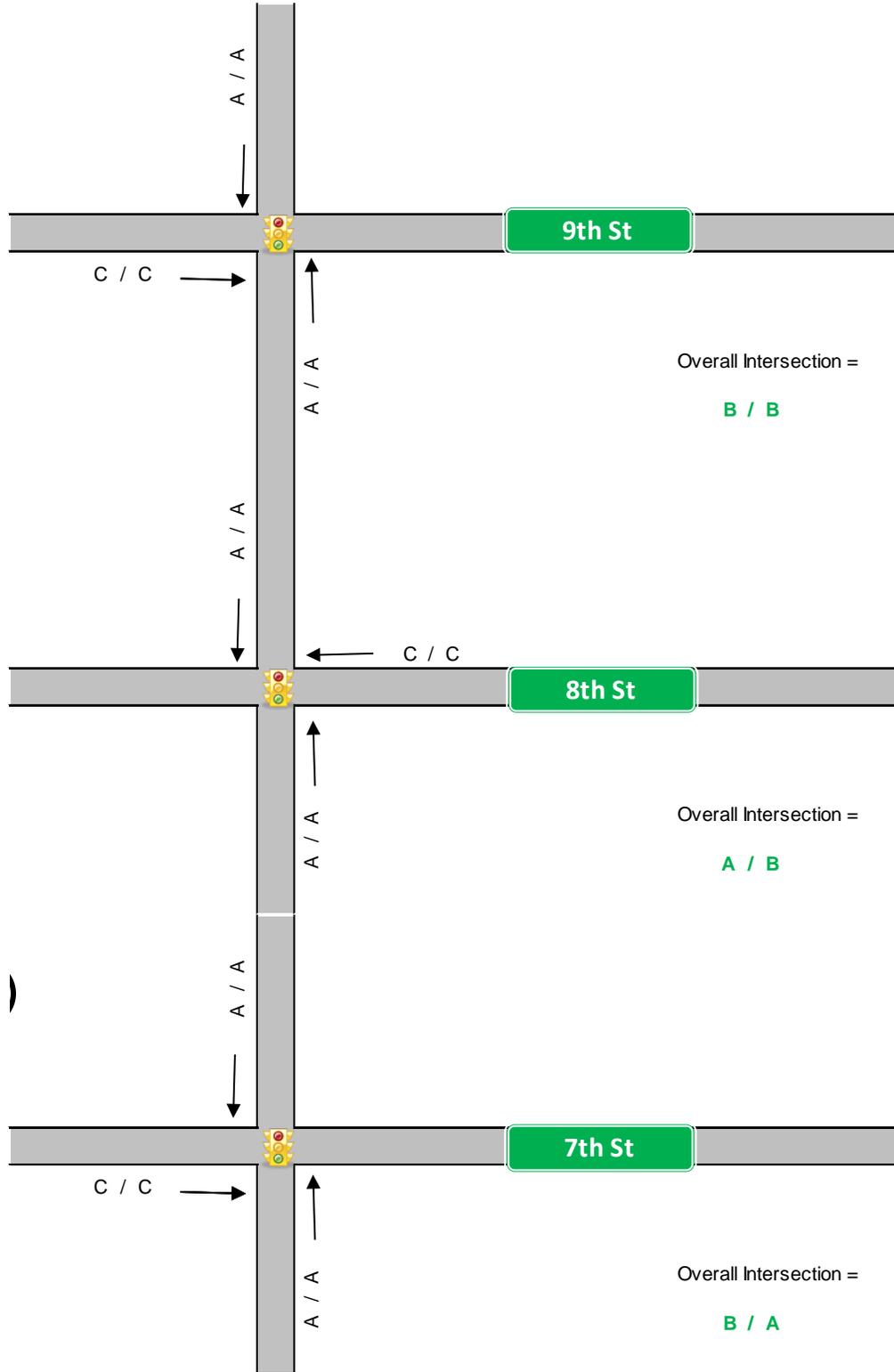
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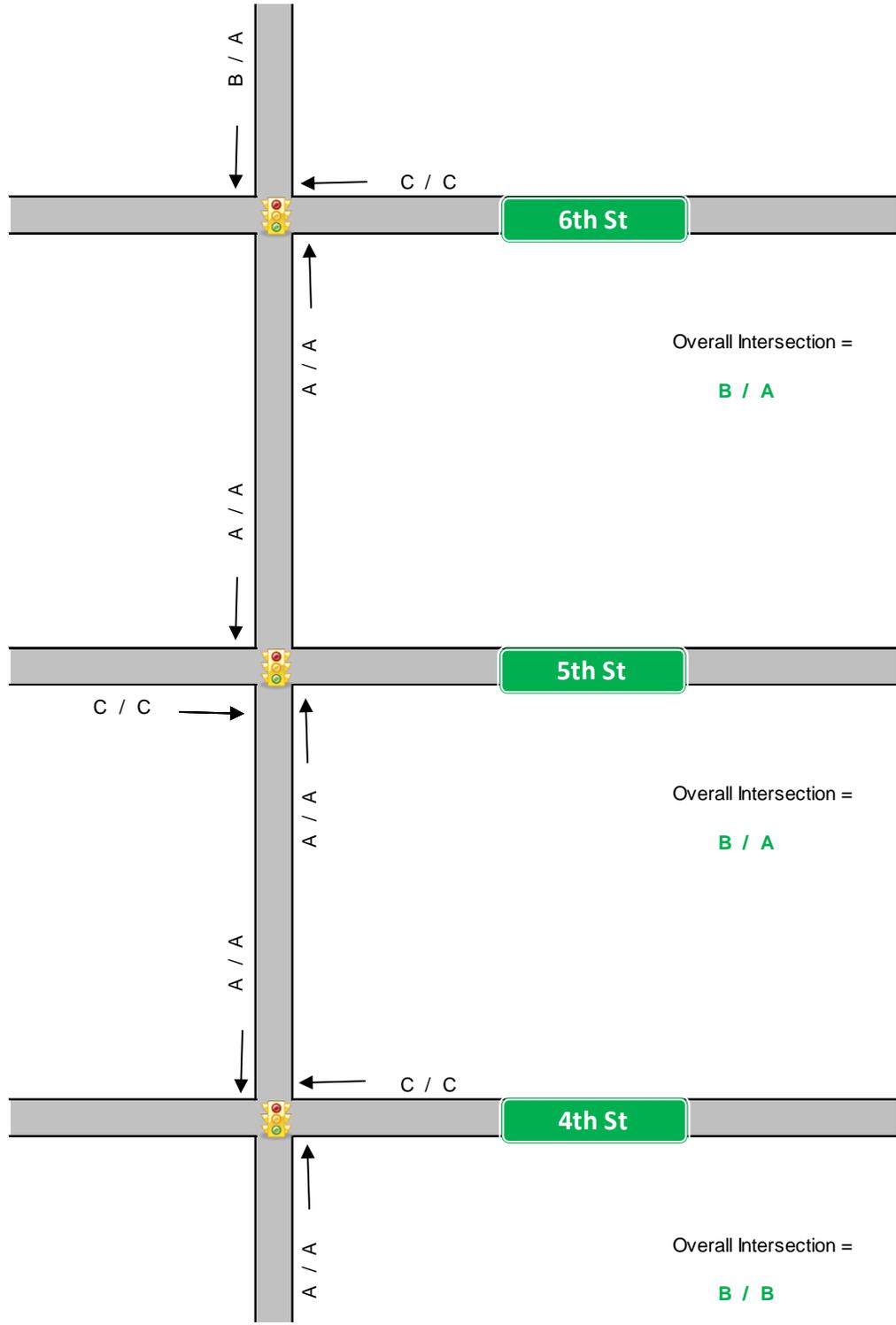
Existing Vehicle Level of Service





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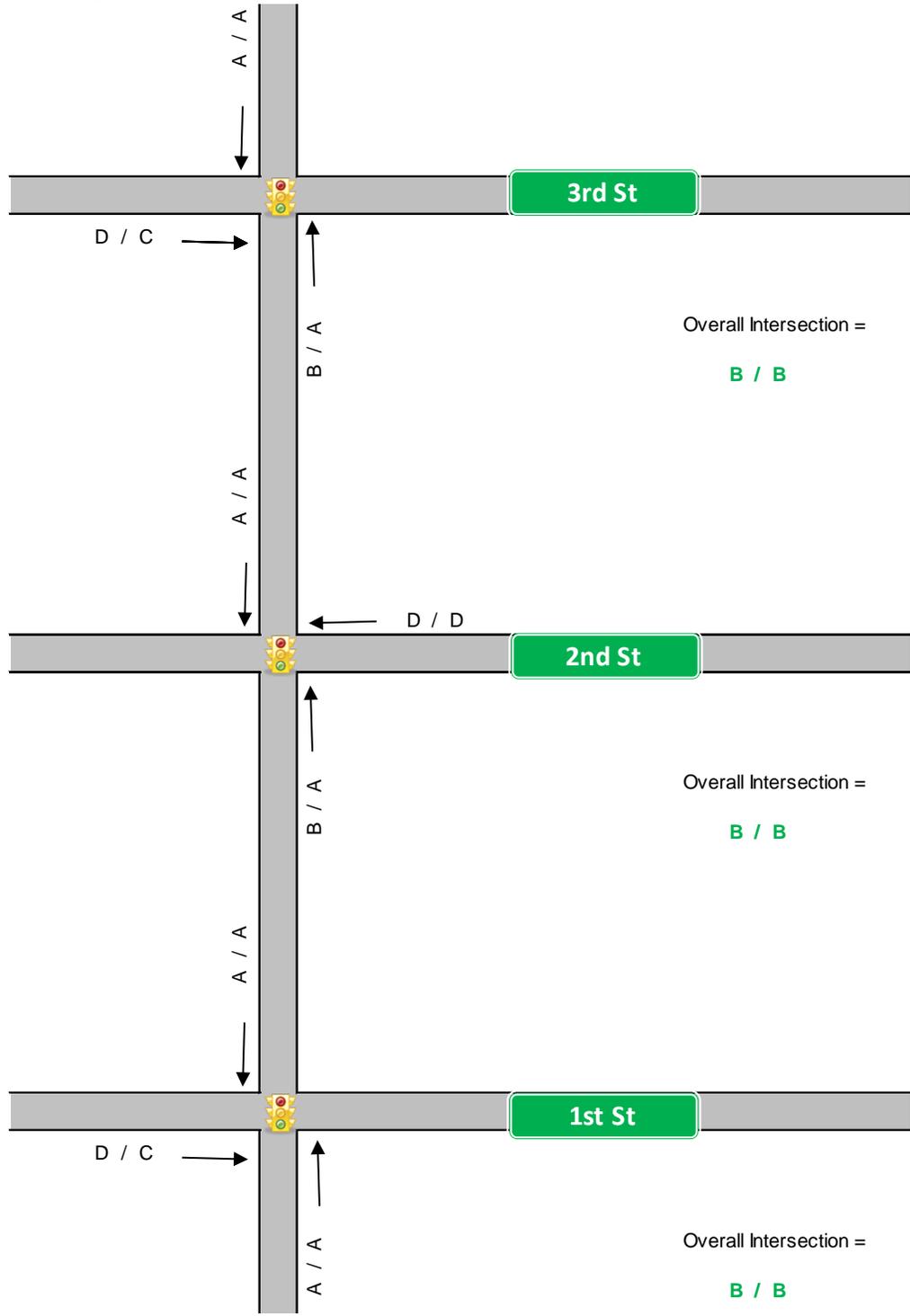
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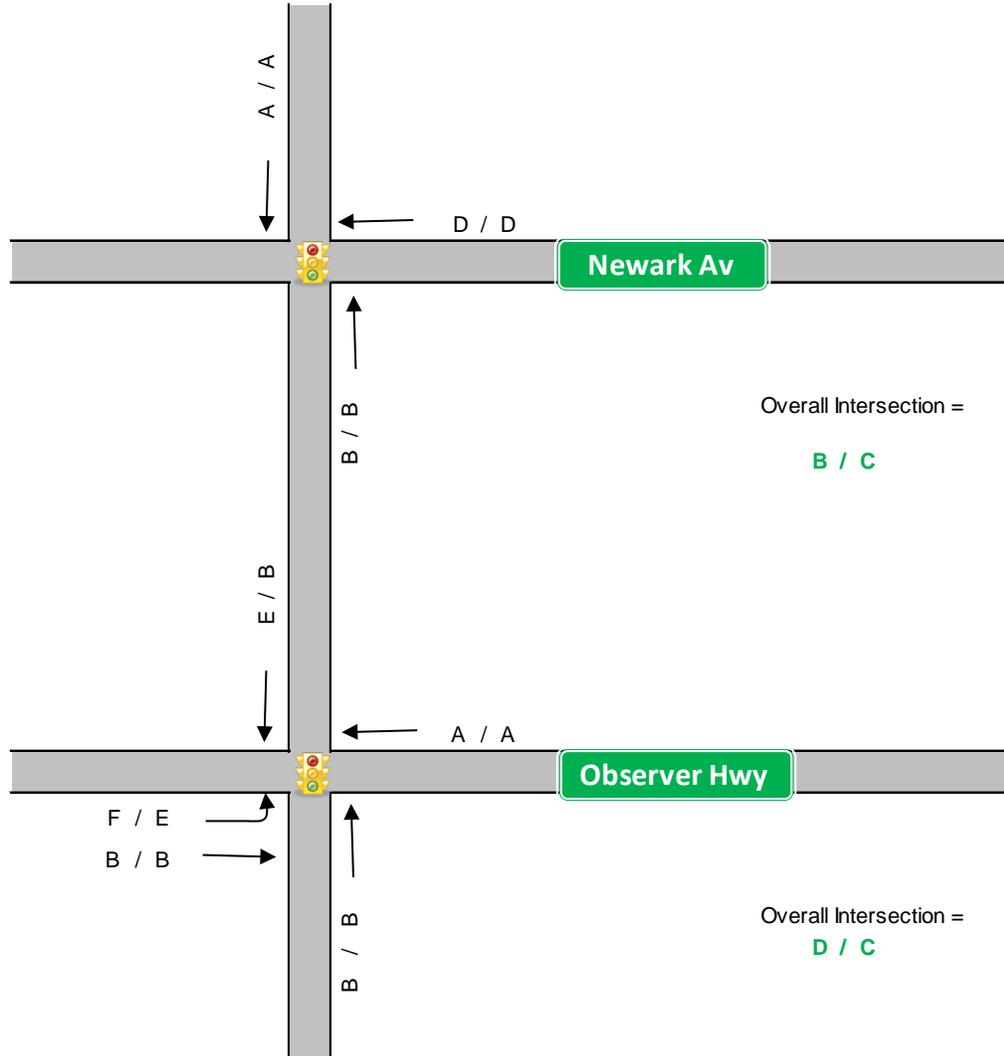
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Washington Street Complete Streets Redesign Traffic Count Results & Traffic Analysis Summary

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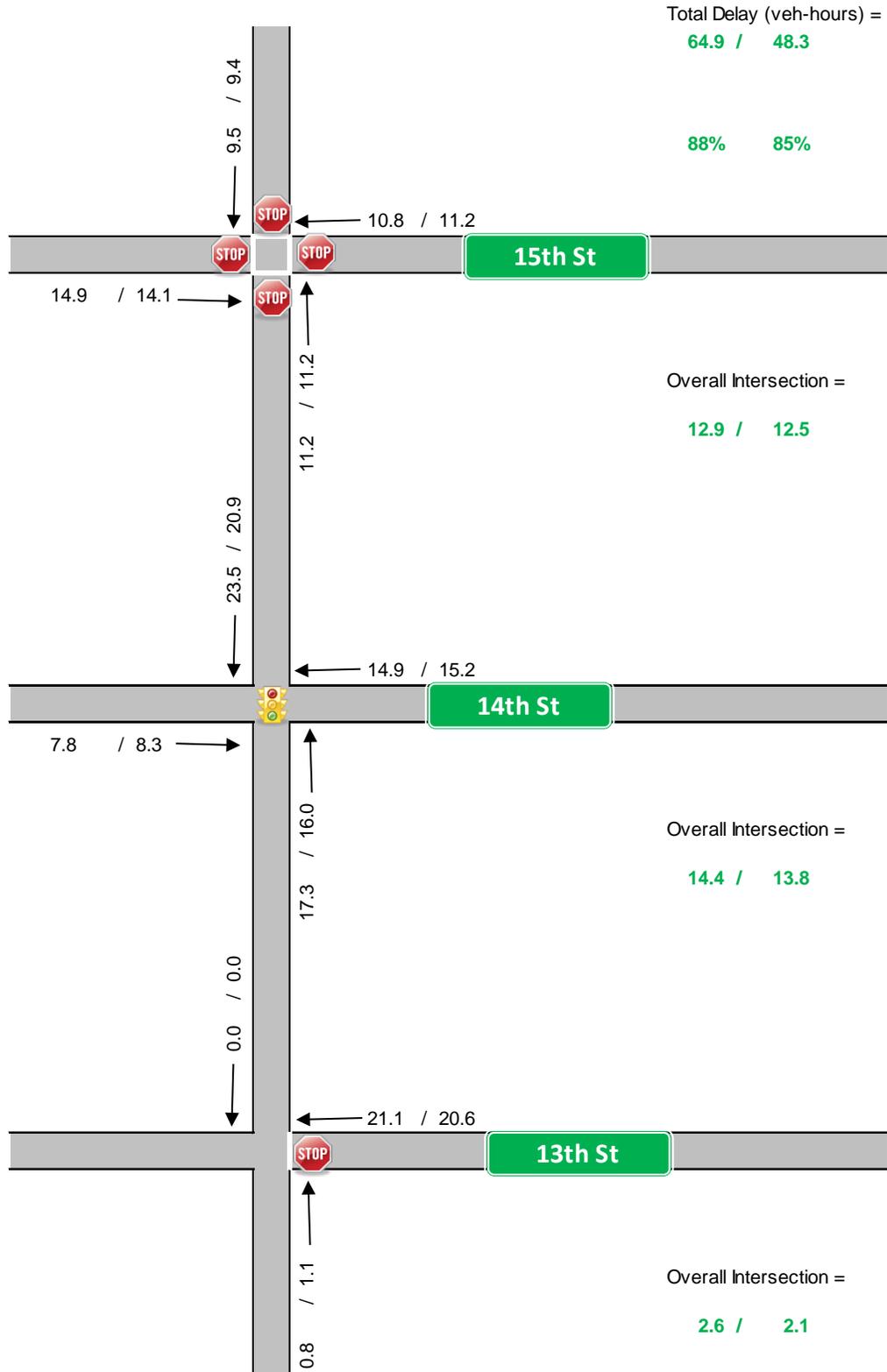




Washington Street Complete Streets Redesign

Traffic Count Results & Traffic Analysis Summary

Peak Hour Average Vehicle Delay (Alternative)





Washington Street Complete Streets Redesign Traffic Count Results & Traffic Analysis Summary

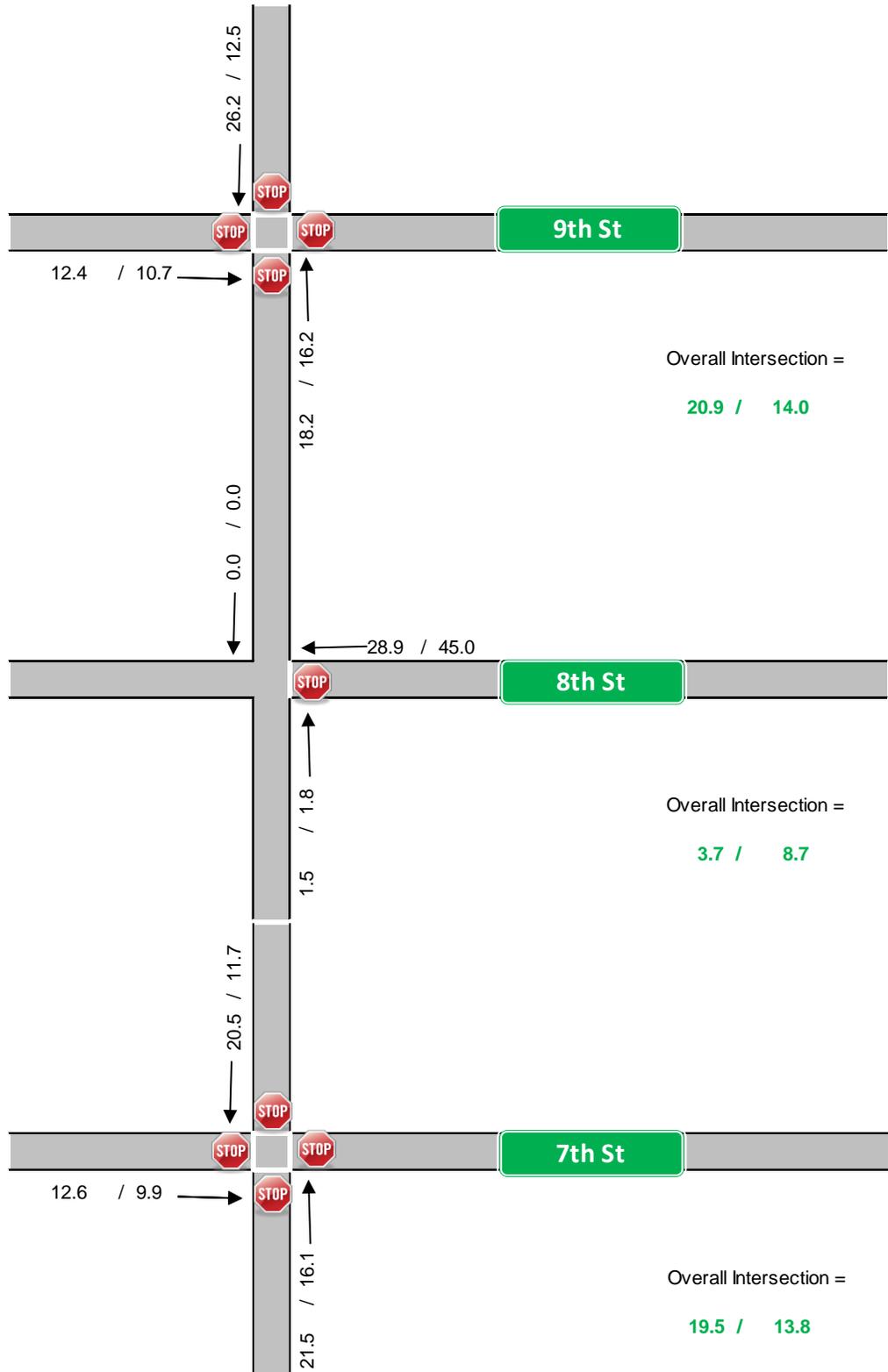
Peak Hour Average Vehicle Delay (Alternative)





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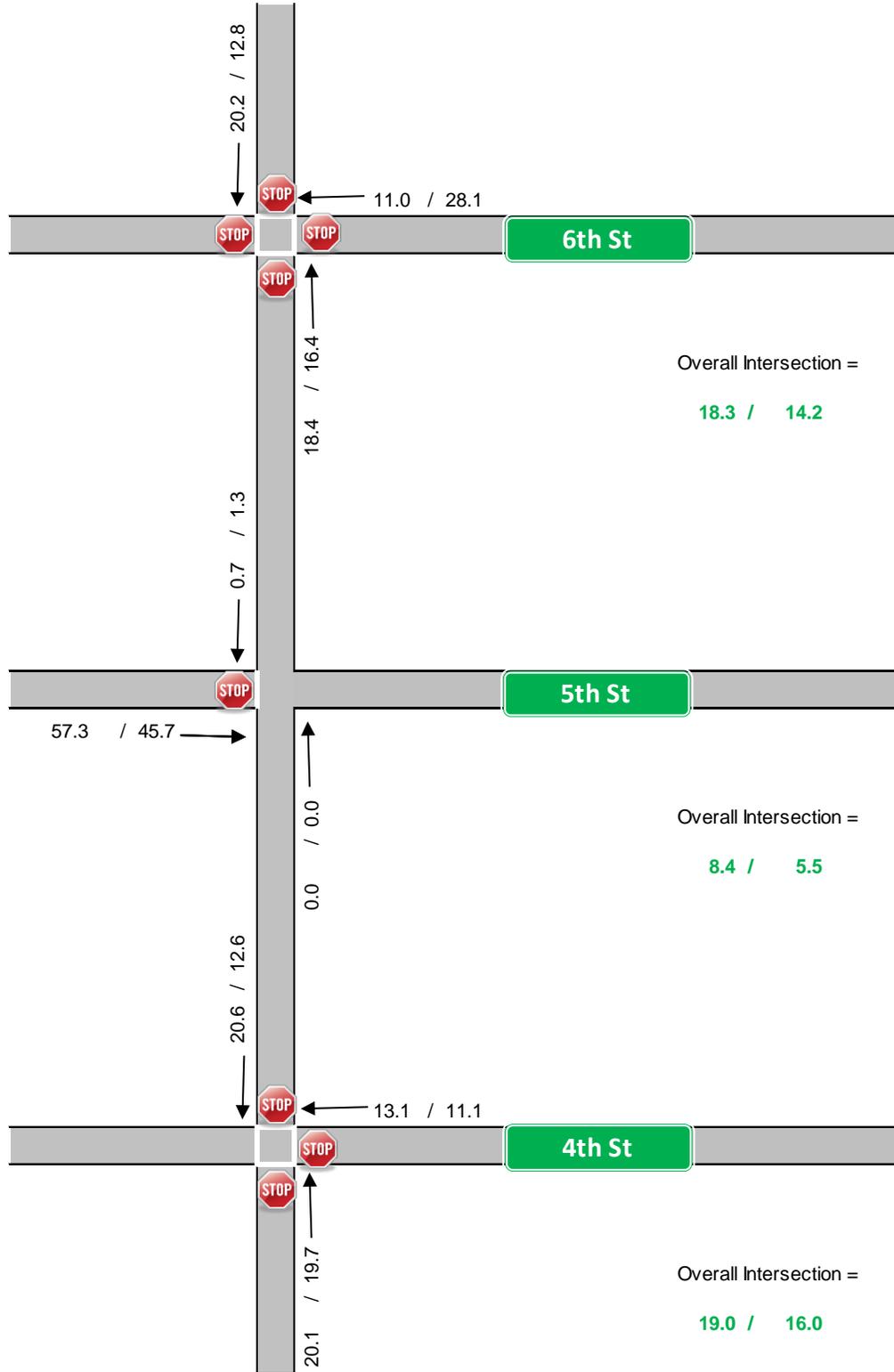
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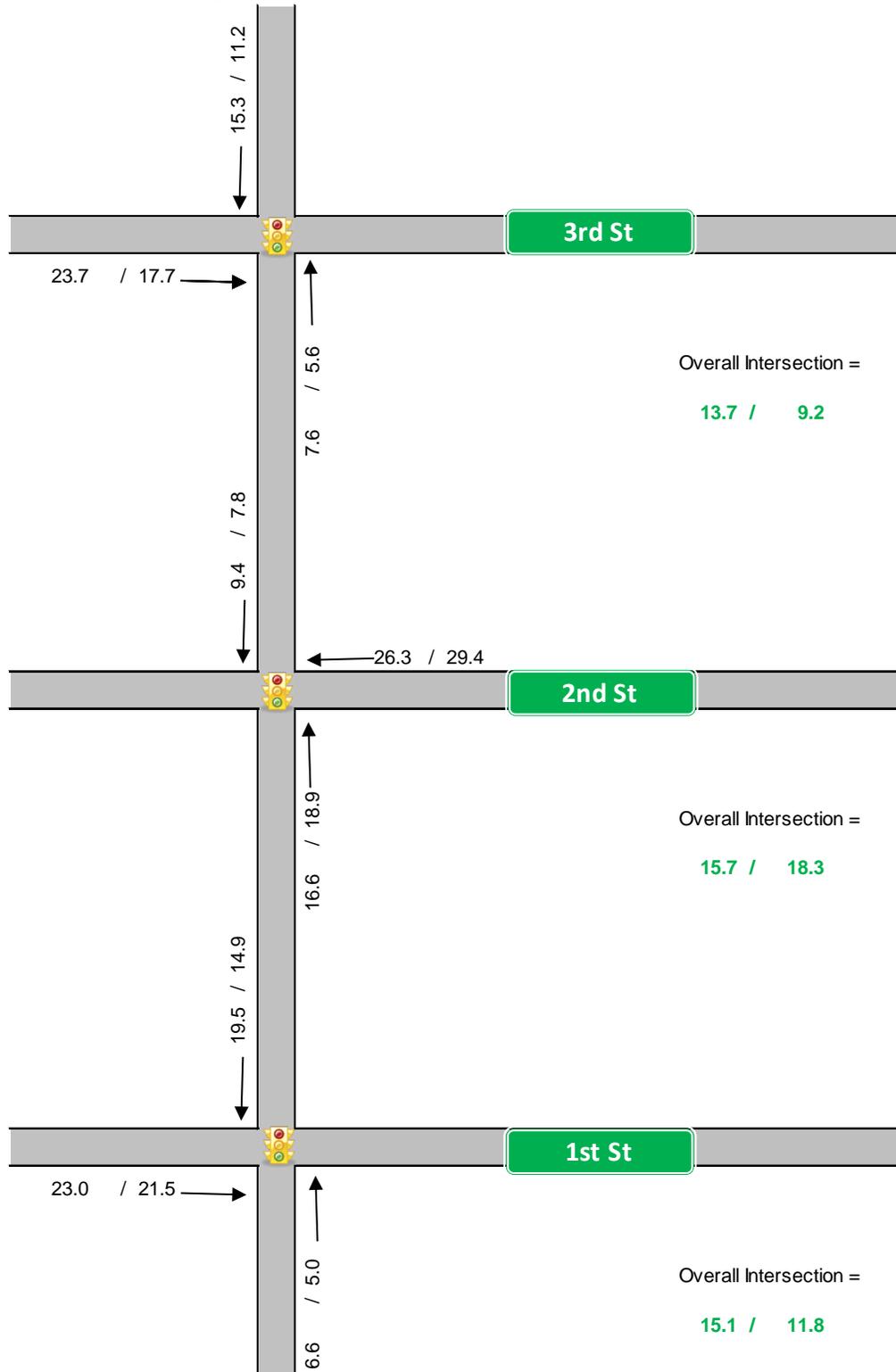
Peak Hour Average Vehicle Delay (Alternative)





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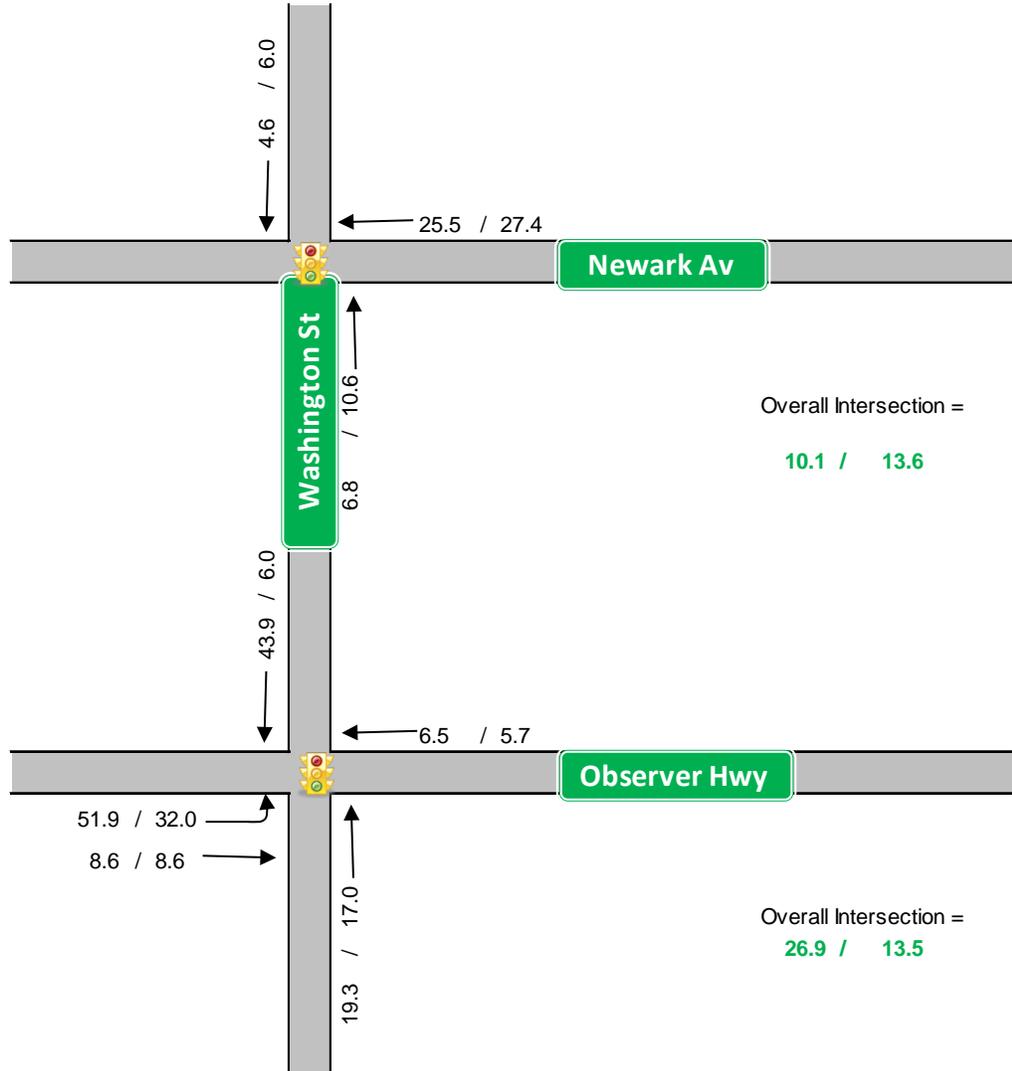
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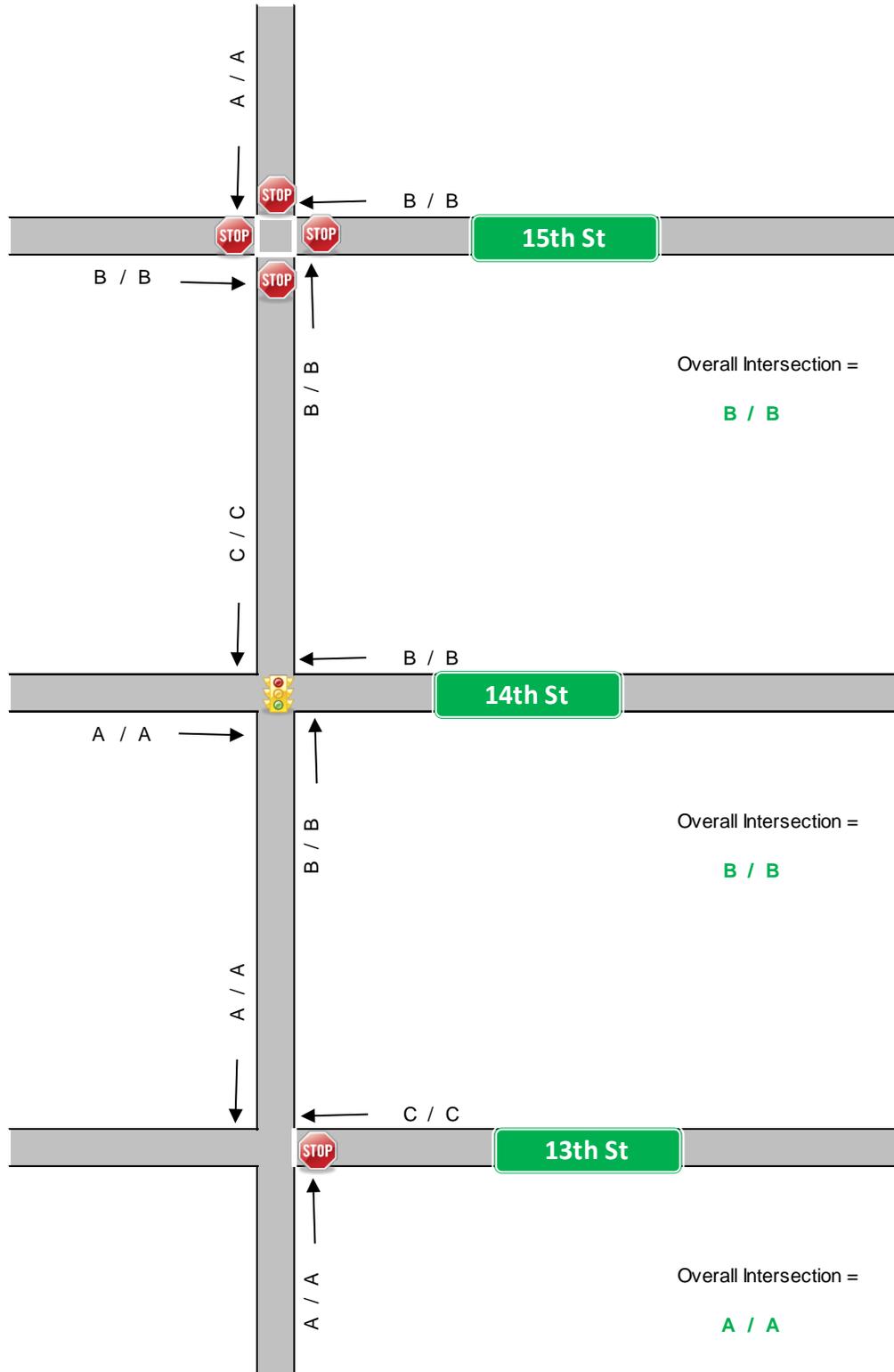
Peak Hour Average Vehicle Delay (Alternative)





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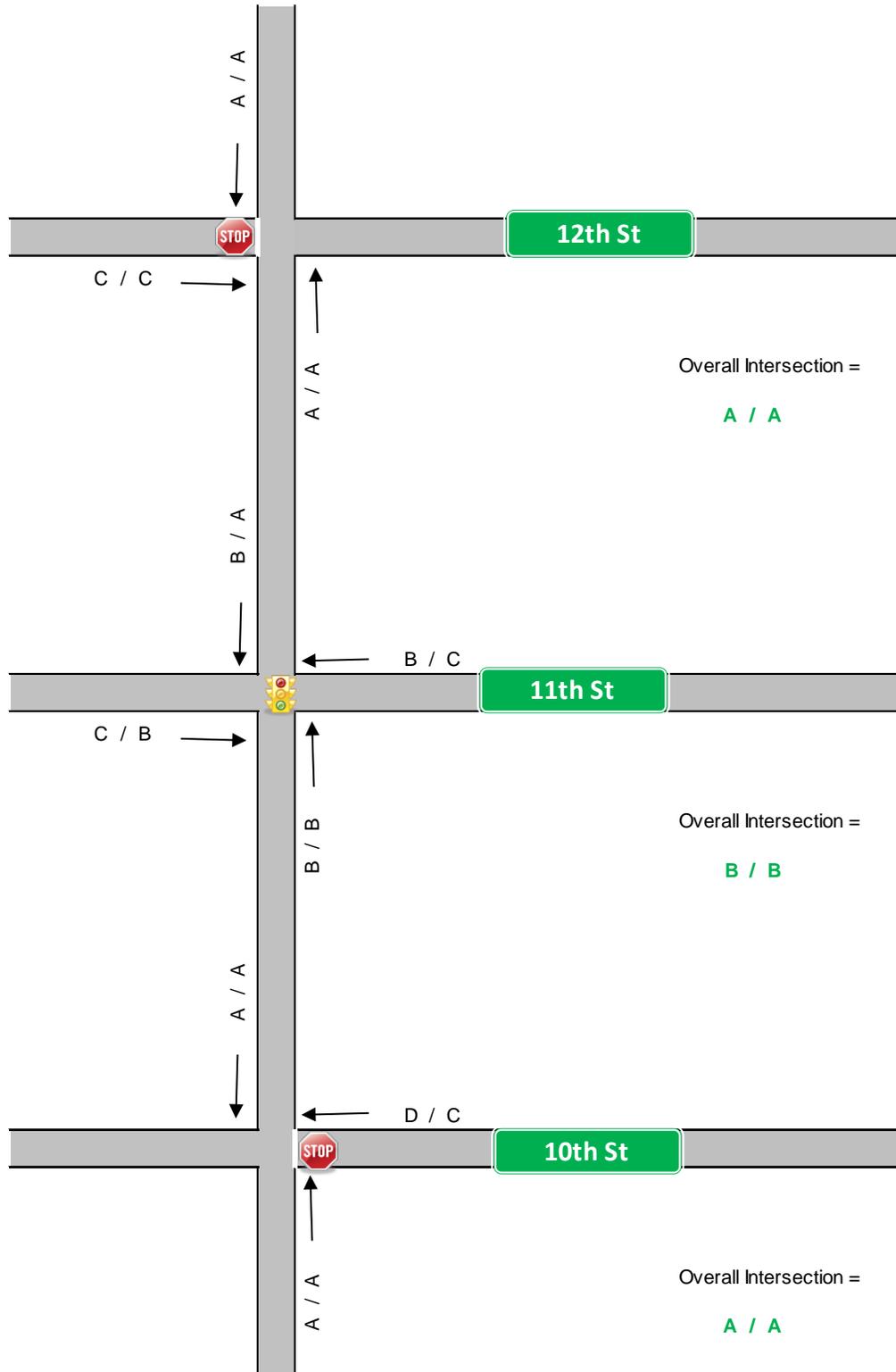
Level of Service (Alternative)





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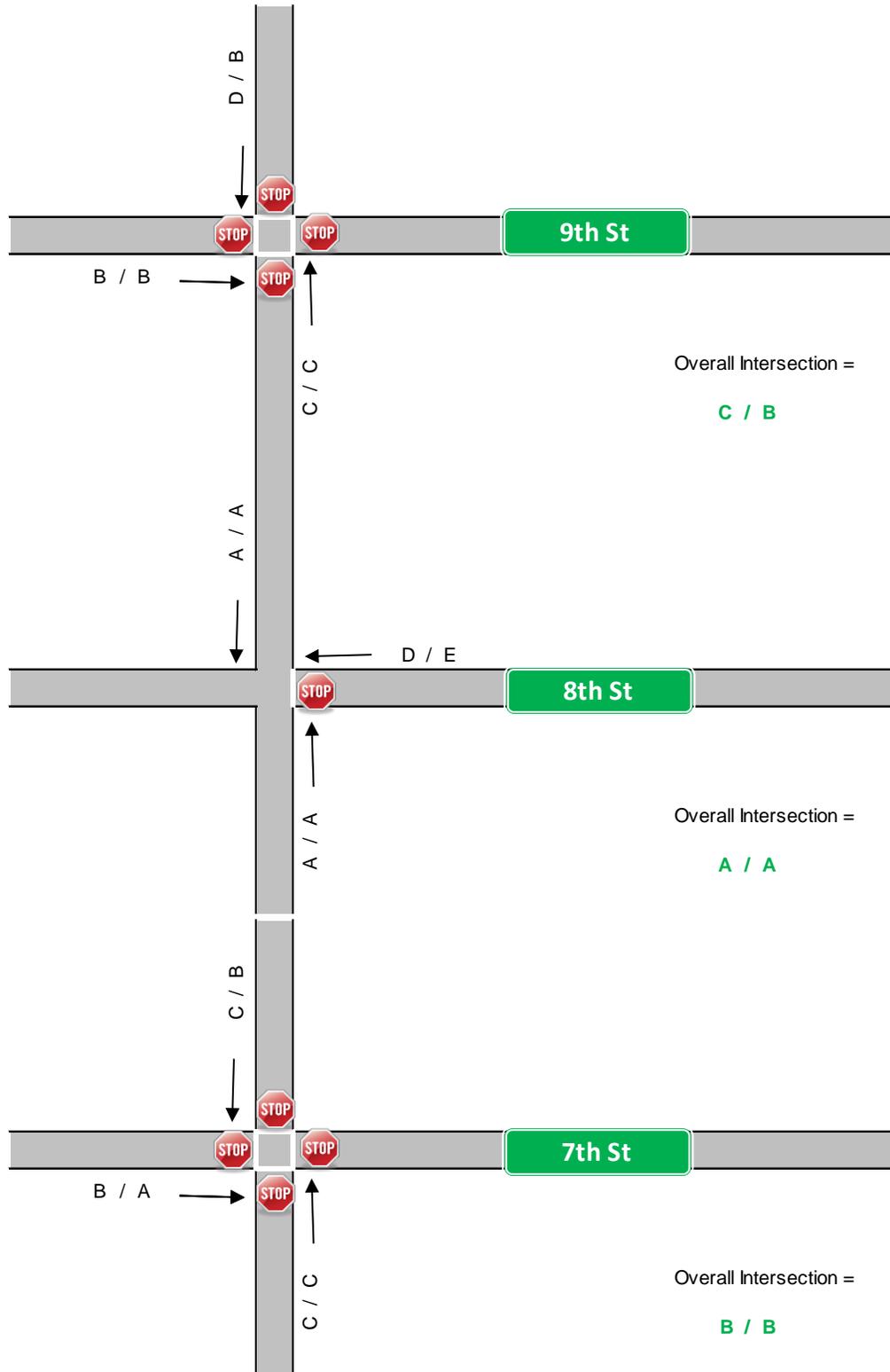
Level of Service (Alternative)





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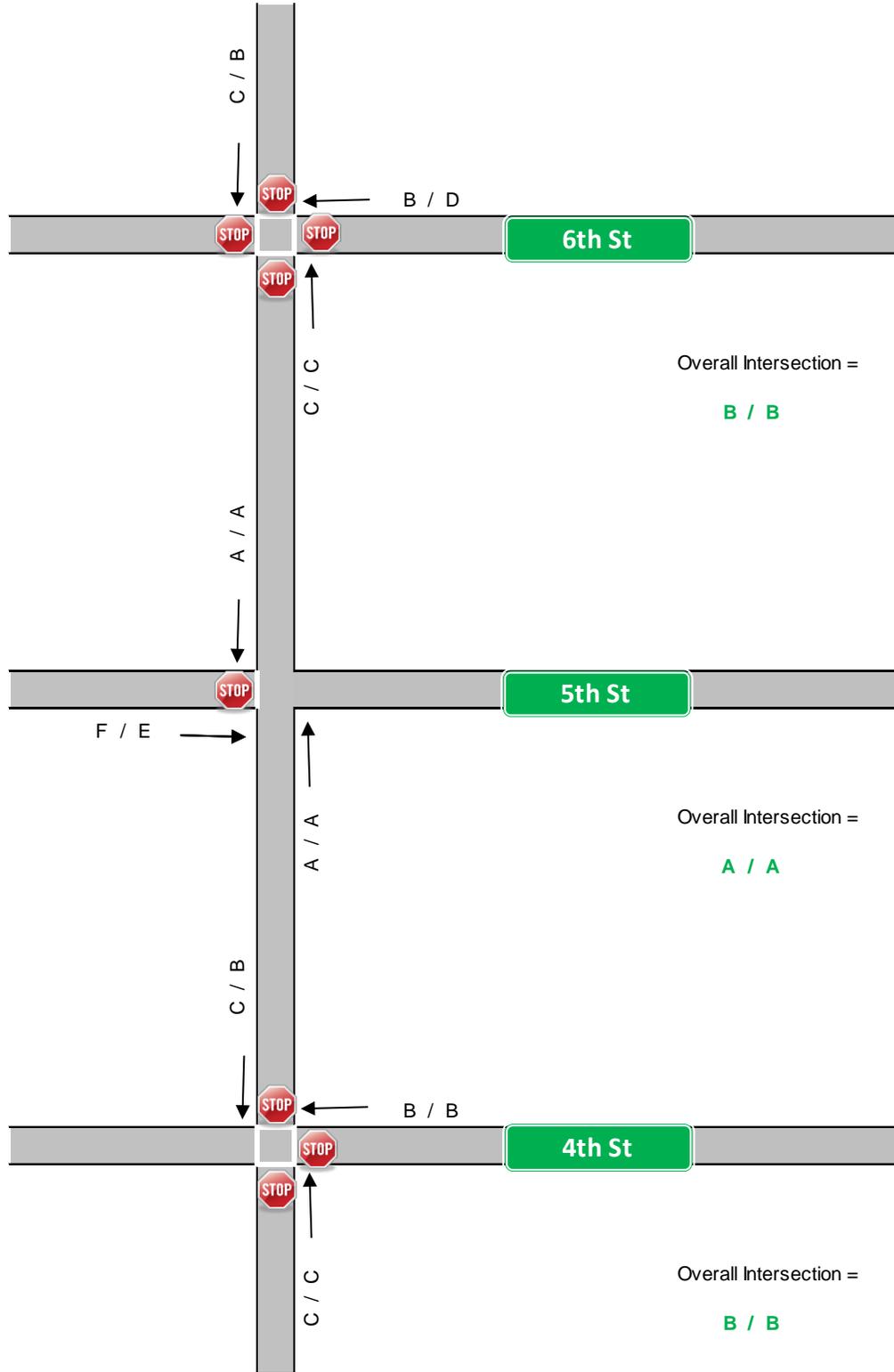
Level of Service (Alternative)





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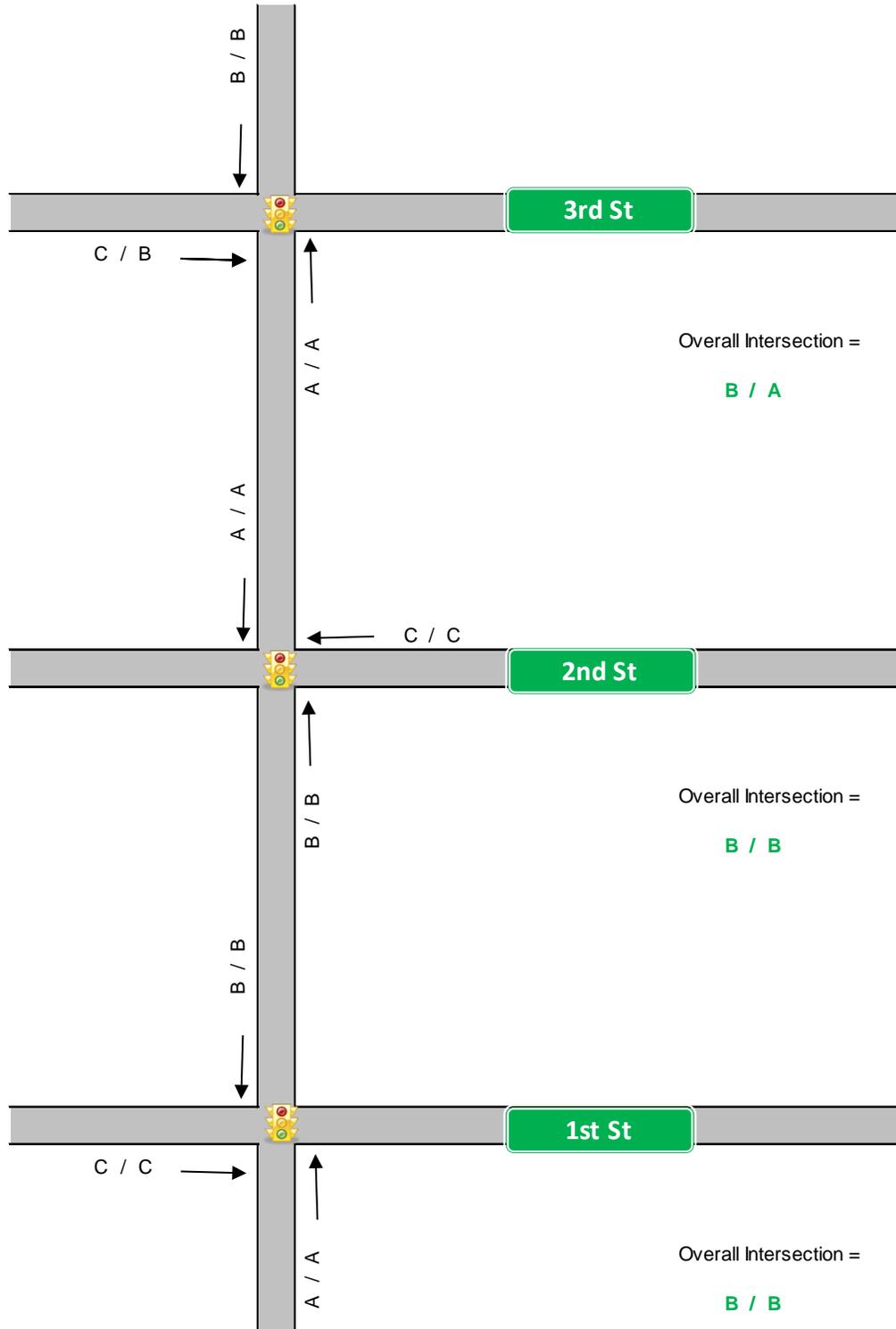
Level of Service (Alternative)





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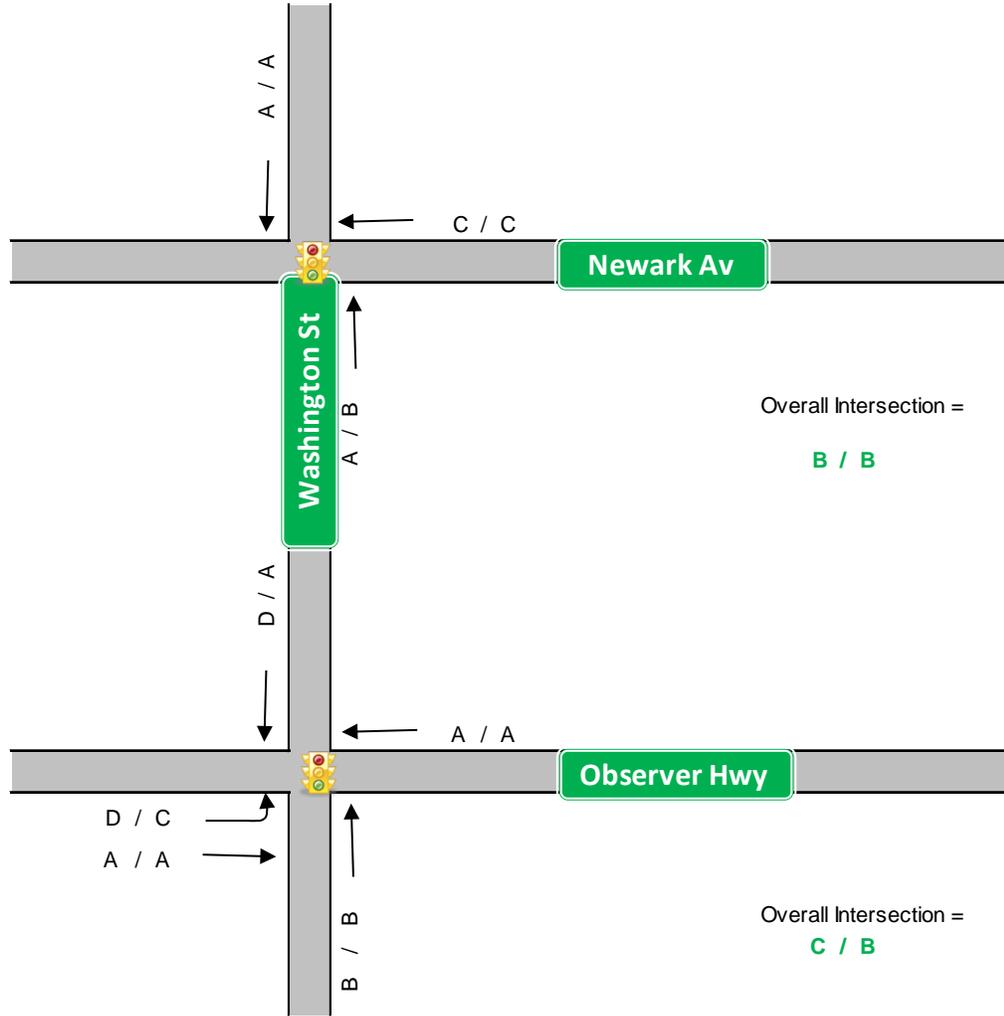
Level of Service (Alternative)





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Level of Service (Alternative)





Washington Street Complete Streets Redesign

Traffic Count Results & Traffic Analysis Summary

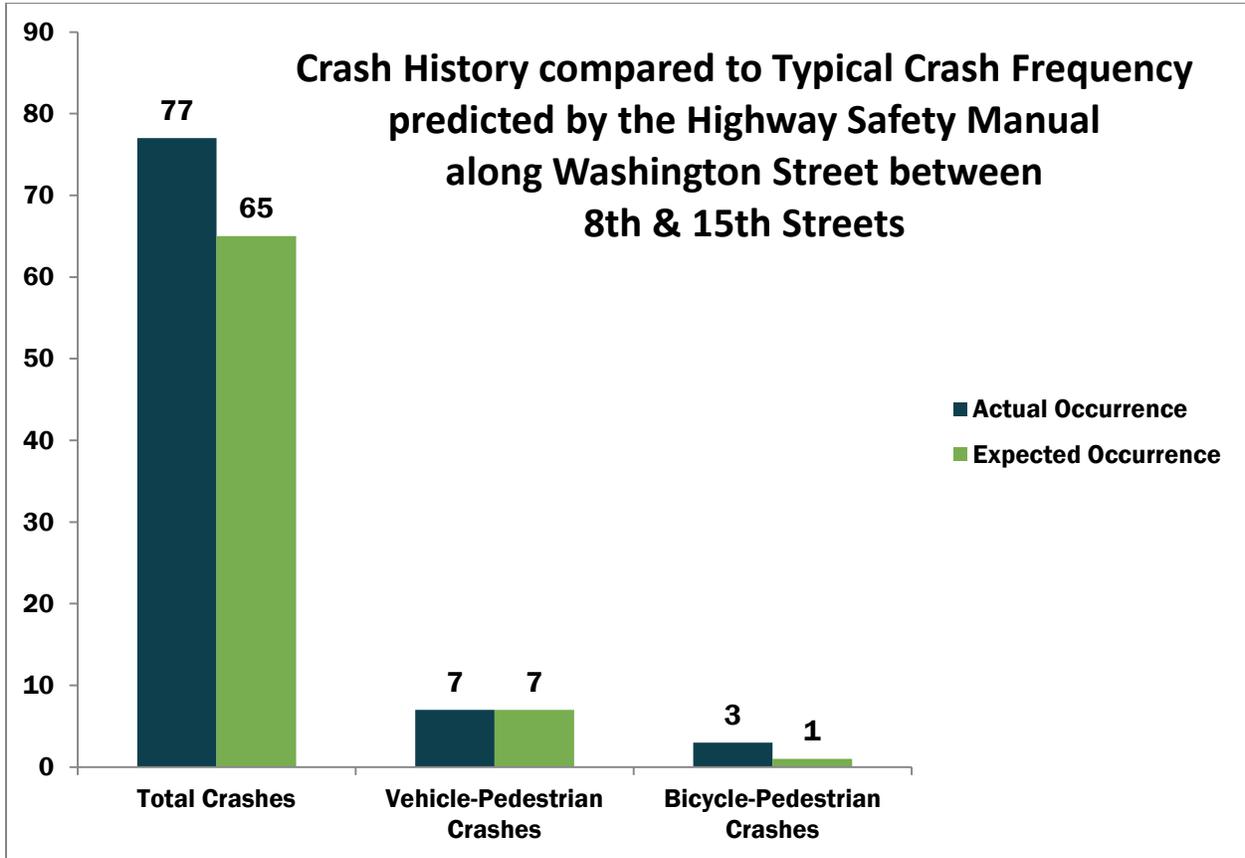
Crash History

Year	Total Crashes
2010	67
2011	117
2012	143
	327

Type	Total Crashes	Percent
1 Same Direction - Rear End	59	18%
2 Same Direction - Sideswipe	66	20%
3 Angle	21	6%
4 Opposite Direction (Head-On)	4	1%
5 Opposite Direction (Sideswipe)	2	1%
6 Struck Parked Vehicle	96	29%
7 Left Turn / U-Turn	3	1%
8 Backing	48	15%
9 Encroachment	0	0%
10 Overturned	0	0%
11 Fixed Object	9	3%
12 Animal	1	0%
13 Pedestrian	13	4%
14 Pedalcyclist	5	2%
15 Non-fixed Object	0	0%
16 Railcar-vehicle	0	0%
	327	100%

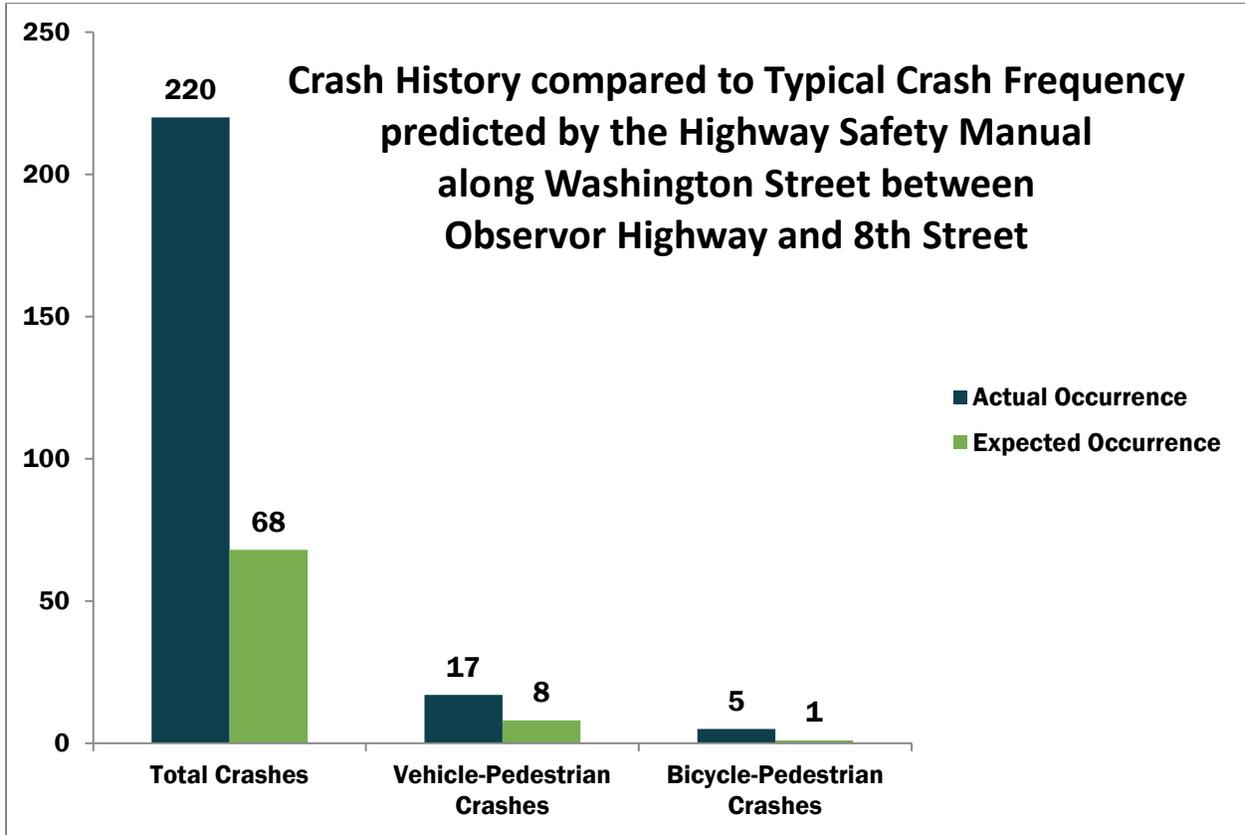


Washington Street Complete Streets Redesign Traffic Count Results & Traffic Analysis Summary





Washington Street Complete Streets Redesign Traffic Count Results & Traffic Analysis Summary





Washington Street Complete Streets Redesign Traffic Count Results & Traffic Analysis Summary

Accident Summary

STREET	pedestrian	bicycle	animal	fixed obj	parked	backing	head on	rear end	sideswipe	left turn	angle	TOTAL	
15th				1				1				2	
						3						3	
14th (CR 670)	0.00	2			3			1	2		4	12	
						4		4				8	
13th	0.06				3			2			1	6	
		1			3	1		4	1			10	
12th	0.15	3	1		1			1	1			7	
				1	1	1						3	
11th	0.23		1				1	1	1			4	
					1	1		2	1			5	
10th	0.33	1										1	
						2		2				4	
9th	0.42		1		4			2	1		1	9	
					1	1			1			3	
8th	0.51						2	1			1	4	
Sub-Total	0.59	7	3	0	2	17	16	0	21	8	0	7	81
		8.6%	3.7%	0.0%	2.5%	21.0%	19.8%	0.0%	25.9%	9.9%	0.0%	8.6%	100.0%



Washington Street Complete Streets Redesign

Traffic Count Results & Traffic Analysis Summary

STREET	pedestrian	bicycle	animal	fixed obj	parked	backing	head on	rear end	sideswipe	left turn	angle	TOTAL	
	1	1		1	5	1		2				11	
7th	0.60			2	1			1	3			7	
					7	1		1	1			10	
6th	0.69				2			2				4	
					2		2		2			7	
5th	0.78	1			2			3			2	9	
		2	1	1	5	3		2	4			18	
4th	0.85	1			4			2	2		2	11	
					2	3	1	1	6			13	
3rd	0.94	3	1	1	12	1		2	3		1	24	
		2		1	3	2		1	4			13	
2nd	1.03	2		1	7	2	1	1		1		15	
		1			7	3		3	3			17	
1st (CR 638)	1.12	2			4	1		3	4		4	18	
					4				5			9	
Newark (CR 636)	1.16	1	1	1	1	6		4	5		2	21	
					5	2		2	4			13	
Sub-Total	0.73	17	5	1	7	73	25	4	30	46	1	11	220
		7.7%	2.3%	0.5%	3.2%	33.2%	11.4%	1.8%	13.6%	20.9%	0.5%	5.0%	100.0%
STREET	pedestrian	bicycle	animal	fixed obj	parked	backing	head on	rear end	sideswipe	left turn	angle	TOTAL	
Observer (CR 681)	1.24	3				1	1	5	8	2	3	23	