



June 18, 2018

David Knoepke, P.E.
City of Helena
3001 E Lyndale Avenue
Helena, MT 59601

RE: Beattie Street Vehicle Speed and Parking Study

Dear David,

Per your request Abelin Traffic Services (ATS) has reviewed the existing speed limit on Beattie Street between Broadway Street and the Beattie Street Trailhead parking area (0.5 miles). The current posted speed limit on Beattie Street is 25 MPH. The City of Helena requested that ATS perform a speed study to determine if the posted speed limit is appropriate for the existing road conditions or if any traffic calming measures may be warranted on Beattie Street. This study was requested due to citizen concerns about vehicle speeds on the roadway.

Existing Conditions

The study roadway is a 0.5 mile segment of Beattie Street in Helena which begins at the intersection of Beattie Street with East Broadway Street and extends south to the Beattie Street Trailhead south of Rhode Island Street. The road slopes upwards to the south and has a total elevation gain of 160 feet between Broadway and the trailhead. See **Figure 1** for a map of the study roadway.

Beattie Street has a paved width of 36 feet with on-street parking on both sides and is a dedicated Snow Route. The street is lined with residential homes both sides and has intersection and mid-block lighting. Most of the intersections along Beattie Street are uncontrolled (no posted STOP or YIELD signs). Clinton Park is located west of Beattie Street between State Street and 3rd Street. The Beattie Street trailhead is a gravel parking area which leads to Mount Ascension. The lot has room for approximately ten vehicles. Traffic data collected by ATS in May 2018 indicate that the road has an Average Daily Traffic volume of 328 VPD on weekdays and 251 VPD on weekends.

Beattie Street has minimal signing. The road has STOP control signs at the intersection with Broadway Street only. All other intersections are uncontrolled. The Street also has Designated Snow Route signs and Park Warning signs near Clinton Park.

No historic data was available for Beattie Street. However, traffic data was available for Broadway Street from the City of Helena which should provide some guidance on how traffic volume have changed in this area. The historic data for this location is presented in **Table 1**. The Average Annual Daily Traffic (AADT) data indicates that traffic volumes

along Broadway Street have decreased slightly over the last ten years. It is likely that traffic volumes on Beattie Street have remained constant or increased slightly due to residential development which has occurred in along South Beattie Street and Rhode Island Street over the last ten years.

Figure 1 - Vicinity Map

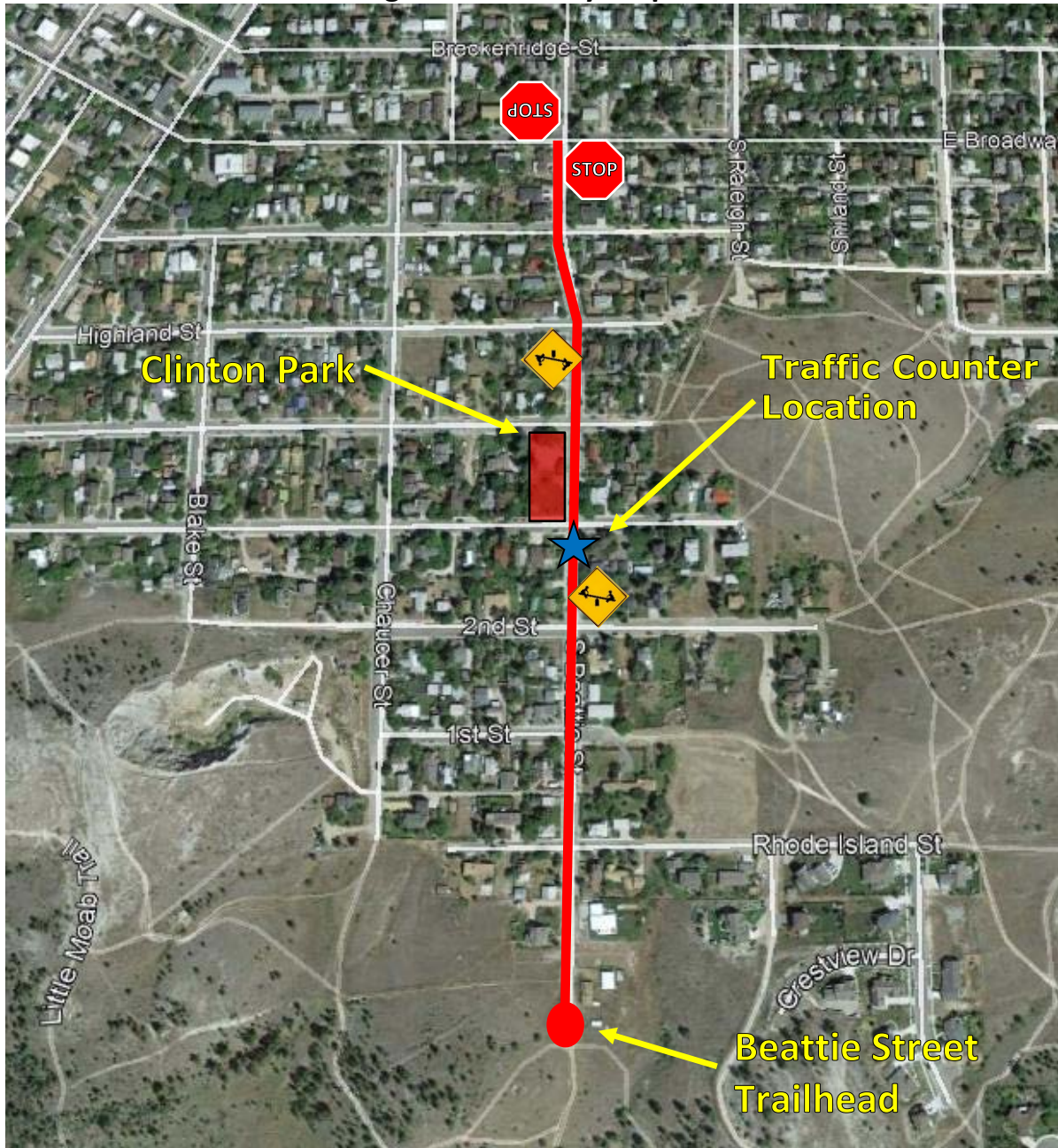


Table 1 – Historic Traffic Data

Location	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Broadway btwn Davis & Chaucer St #25-7C-075	9,054	9,248	8,576	7,484	8,199	8,675	6,676	7,390	6,467	6,714
Broadway btwn Dakota & Montana Ave #25-7C-076	9,463	9,023	9,379	8,729	8,553	9,058	6,999	7,950	6,927	7,151

Crash Data

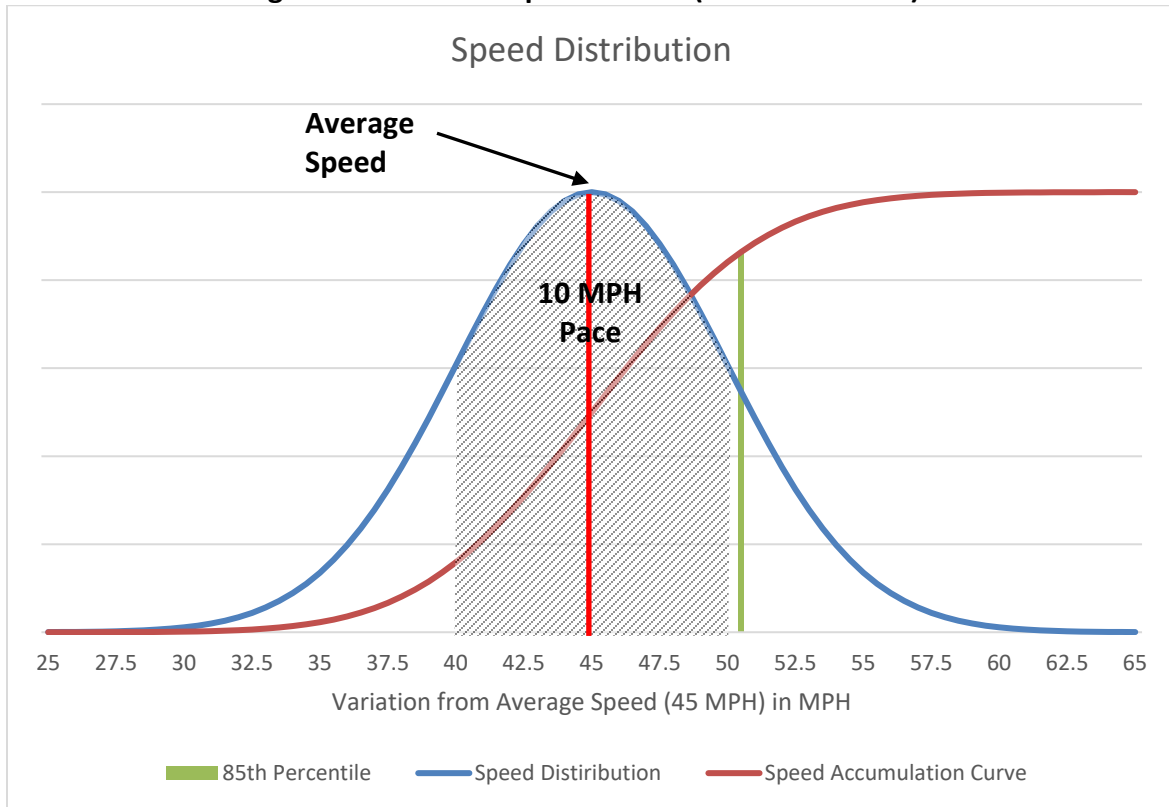
ATS obtained vehicle crash data for the study roadway from the Montana Department of Transportation for 2008 through 2017. This data indicated that four vehicle crashes have occurred along Beattie Street south of Broadway Street over the past ten years. These four crashes occurred at a variety of locations and included a variety of crash types with both single vehicle and multi-vehicle collisions. No specific crash trends were apparent within the crash data that would relate with vehicle speed.

Speed Data

In order to analyze vehicle speed data Engineers calculate a variety of operational characteristics based on vehicle speed distribution data. The significant data includes average vehicle speed, 85th percentile speed, and pace speeds. **Figure 2** shows a standard vehicle speed distribution with a 45 MPH average speed (red line). The 85th Percentile speed is the point at which 85% of traffic falls below on the cumulative speed line (green line). The pace is the 10 MPH increment that has the highest number of observed vehicle speeds.

Vehicle speed data was collected at one locations along Beattie Street between May 23 and May 28, 2018 and included both weekday and weekend traffic data. The traffic count location selected for this project was just south of 3rd Street near Clinton Park. The weather conditions during the traffic study were mild (highs 65 to 80 degree) with mostly dry road conditions and a few periods of rain. The data was collected continuously using Diamond Unicorn Limited traffic counters to record the individual speed data from every vehicle using the road. The results of the data collection are shown in **Table 2**. Detailed speed data information is included in the appendix.

Figure 2 – Standard Speed Profile (EXAMPLE ONLY)



The observed traffic data indicates that the vehicle speeds along Beattie Street are fairly consistent. The most commonly used road operations characteristic for posting a speed limit is the 85th percentile speed. It is sometimes reasonable to set a posted speed limit below the 85th percentile speeds if the road conditions and roadside environment are inconsistent with the observed vehicle speeds. The 85th percentile speeds on Beattie Street was 24 to 25 MPH and the average speed was 19 MPH. Vehicle speeds were only slightly higher for downhill (northbound) compared to uphill traffic (southbound) and varied by less than one MPH by direction. A small amount of traffic was recorded at speeds well above the posted speed limit (+30 MPH), but this traffic account for only 0.5% of total traffic (15 vehicles over six days). Bicycle Speeds averaged 14 MPH uphill and 20 MPH downhill. The percent of vehicles obeying the posted speed limit was 91%.

TABLE 2 – Vehicle Speed Data

	Station 1
Average Speed (MPH)	19.2
85% Percentile Speed (MPH)	24.2
10 MPH Pace Speeds (MPH)	15-25
Percent in Pace	72.8%
Weekday Average Traffic (VPD)	328
Weekend Average Traffic (VPD)	251
Percent Bikes	4%

Parking Data

ATS also reviewed the parking utilization at the Beattie Street Trailhead during the period of the speed investigation to determine the average and maximum parking utilization at the site to help inform the City evaluate the required size of the new proposed parking lot at this location. The study was performed by recording the parking use at the site continuously for five days using a time-lapse camera including the Memorial Day holiday. The parking utilization was then reviewed to determine the average and maximum parking utilization on the side for both weekday and weekend conditions. The results of the parking analysis is shown in **Table 3**. The raw parking utilization numbers are included with this letter. Average parking utilization at the Beattie Street Trailhead was 3-4 vehicles with maximum utilization of 10-14 vehicles. During the study a maximum overflow of four vehicles were observed parking outside of the designated parking area. The current 20 spaces (2 ADA) lot design proposed for this location should be sufficient to meet the current and future parking demand for normal operating conditions.

TABLE 3 – Beattie Street Trailhead Parking Utilization*

Total Available Spaces	10 Spaces
Average Weekday Parking Utilization	3.0 Vehicles
Maximum Weekday Parking Utilization	10 Vehicles
Weekday Peak Period of Parking	11:30 am -12:30 pm
Average Weekend Parking Utilization	4.4 Vehicles
Maximum Weekend Parking Utilization	14 Vehicles
Weekend Peak Period of Parking	10:30 am -11:30 am
Maximum Overflow Parking	4 Vehicles

***6:00 am to 10:00 pm**

Recommendations

There is little evidence that drivers on Beattie Street are exceeding the posted 25 MPH speed limit. The vast majority of drivers (over 99%) are traveling at less than 30 MPH and the average driver is traveling at 19 MPH. The compliance rate with the posted

speed limit is high (91%) and does not suggest a need to take any corrective traffic calming measures on Beattie Street. It could be desirable to increase the signing near Clinton Park to warn drivers that pedestrians and children may be in the area. However, unless a special park speed limit were adopted on Beattie Street near Clinton Park (lower than 25 MPH) there is no specific need to provide traffic calming measures within the area. If you have any questions about these results please feel free to call me at 406-459-1443.

Sincerely,

A handwritten signature in black ink, appearing to read "Bob Abelin". The signature is fluid and cursive, written on a light-colored background.

Bob Abelin, P.E. PTOE
Abelin Traffic Services, Inc.

Basic Volume Report: BEATTIE

Station ID : BEATTIE

Info Line 1 : ATS
 Info Line 2 : Unicorn #6

GPS Lat/Lon :
 DB File : BEATTIE.DB

Last Connected Device Type : Unic-L

Version Number : 1.50
 Serial Number :

Number of Lanes : 1
 Posted Speed Limit : 0.0 mph

Lane #1 Configuration

#	Dir.	Information	Volume Mode	Volume Sensors	Divide By 2	Comment
1.	NB		Normal	Veh.	No	

Lane #1 Basic Volume Data From: 10:00 - 05/23/2018 To: 12:59 - 05/28/2018

Date	DW	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total
052318	W						5	9	24	26	24	14	18	29	21	20	14	20	28	17	14	9	11	5	2	263
052418	T	0	0	0	0	0	6	13	28	33	26	19	21	23	23	15	18	20	30	22	16	15	7	2	5	310
052518	F	0	0	0	0	0	1	0	8	25	25	21	30	26	19	18	18	17	15	8	14	13	8	4	3	276
052618	S	0	3	0	0	0	1	0	8	25	25	21	30	26	19	18	18	17	15	8	14	13	8	4	3	276
052718	S	0	0	1	0	0	1	0	5	11	26	22	18	21	13	15	13	14	11	14	6	9	11	9	6	226
052818	M	2	1	0	0	0	2	1	13	14	16	32	21	8												110
Month Total :		2	4	1	0	0	15	23	78	109	117	136	123	136	98	92	87	89	116	85	64	62	49	22	19	1527
Percent :		0%	0%	0%	0%	0%	1%	2%	5%	7%	8%	9%	8%	9%	6%	6%	6%	6%	8%	6%	4%	4%	3%	1%	1%	
ADT :		0	1	0	0	0	3	5	16	22	23	23	21	23	20	18	17	18	23	17	13	12	10	4	4	293

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Total	Percent
DW Totals :	226	110	0	263	310	342	276	Weekday (Mon-Fri) :	1025 67%
# Days :	1.0	0.5	0.0	0.6	1.0	1.0	1.0	ADT :	328
ADT :	226	203	0	451	310	342	276	Weekend (Sat-Sun) :	502 33%
Percent :	15%	7%	0%	17%	20%	22%	18%	ADT :	251

Classification Summary Report: BEATTIE

Station ID : BEATTIE

Info Line 1 : ATS
Info Line 2 : Unicorn #6

GPS Lat/Lon :

DB File : BEATTIE.DB

Last Connected Device Type : Unic-L

Version Number : 1.50

Serial Number :

Number of Lanes : 2

Posted Speed Limit : 0.0 mph

Lane Configuration

#	Dir.	Information	Vehicle Sensors	Sensor Spacing	Loop Length
1.	NB		Axle-Axle	8.0 ft	
3.	SB UP		Axle-Axle	8.0 ft	

Axle Class Summary:

(AXLE)		#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	Other	Total
Description	Lane																
Total Count :	#1.	64	1004	381	1	4	0	1	10	10	1	1	0	2	26	1505	
	#3.	18	1057	393	1	3	1	1	1	14	0	2	0	2	29	1522	
		<u>82</u>	<u>2061</u>	<u>774</u>	<u>2</u>	<u>7</u>	<u>1</u>	<u>2</u>	<u>11</u>	<u>24</u>	<u>1</u>	<u>3</u>	<u>0</u>	<u>4</u>	<u>55</u>	<u>3027</u>	
Percents :	#1.	4%	67%	25%	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%	2%	50%	
	#3.	1%	69%	26%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	2%	50%	
		<u>3%</u>	<u>68%</u>	<u>26%</u>	<u>0%</u>	<u>0%</u>	<u>0%</u>	<u>0%</u>	<u>0%</u>	<u>1%</u>	<u>0%</u>	<u>0%</u>	<u>0%</u>	<u>0%</u>	<u>2%</u>		

Speed Class Summary:

(COSTALOW)		#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15	#16	#17	Other	Total
		0.0 - 4.9	5.0 - 9.9	10.0 - 14.9	15.0 - 19.9	20.0 - 24.9	25.0 - 29.9	30.0 - 34.9	35.0 - 39.9	40.0 - 44.9	45.0 - 49.9	50.0 - 54.9	55.0 - 59.9	60.0 - 69.9	70.0 - 79.9	80.0 - 89.9	90.0 - 99.9			
Total Count :	#1.	3	37	244	509	535	165	9	0	1	0	1	0	1	0	0	0	0	0	1505
	#3.	7	30	215	625	534	108	1	0	0	1	0	0	0	0	1	0	0	0	1522
		<u>10</u>	<u>67</u>	<u>459</u>	<u>1134</u>	<u>1069</u>	<u>273</u>	<u>10</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>3027</u>
Percents :	#1.	0%	2%	16%	34%	36%	11%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%
	#3.	0%	2%	14%	41%	35%	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%
		<u>0%</u>	<u>2%</u>	<u>15%</u>	<u>37%</u>	<u>35%</u>	<u>9%</u>	<u>0%</u>	<u>0%</u>	<u>0%</u>	<u>0%</u>	<u>0%</u>	<u>0%</u>	<u>0%</u>	<u>0%</u>	<u>0%</u>	<u>0%</u>	<u>0%</u>	<u>0%</u>	<u>0%</u>
Avg, 50, 67, 85 :	#1.	19.4	19.6	22.1	24.5	Pace (pace %) :					15.0 - 24.9	69.4%	Days & ADT : #1.					5.1	293	
	#3.	19.0	19.1	21.4	23.9						15.0 - 24.9	76.1%	#3.					5.1	296	
		<u>19.2</u>	<u>19.3</u>	<u>21.7</u>	<u>24.2</u>						<u>15.0 - 24.9</u>	<u>72.8%</u>						<u>5.1</u>	<u>589</u>	

Beattie Street Trailhead Count Data

Total Parked Cars

	24-May	25-May	26-May	27-May	28-May	Average	Weekday	Weekend
6:00 AM		3	0	1	1	1.3	3.0	0.7
6:15 AM		3	0	1	1	1.3	3.0	0.7
6:30 AM		3	1	2	2	2.0	3.0	1.7
6:45 AM		2	4	2	3	2.8	2.0	3.0
7:00 AM		1	5	3	5	3.5	1.0	4.3
7:15 AM		1	6	3	5	3.8	1.0	4.7
7:30 AM		2	6	4	5	4.3	2.0	5.0
7:45 AM		3	7	4	4	4.5	3.0	5.0
8:00 AM		2	8	4	2	4.0	2.0	4.7
8:15 AM		2	9	4	2	4.3	2.0	5.0
8:30 AM		2	8	5	3	4.5	2.0	5.3
8:45 AM		0	8	6	4	4.5	0.0	6.0
9:00 AM		4	8	6	4	5.5	4.0	6.0
9:15 AM		4	10	7	7	7.0	4.0	8.0
9:30 AM		4	9	5	8	6.5	4.0	7.3
9:45 AM		5	11	7	9	8.0	5.0	9.0
10:00 AM		3	10	7	11	7.8	3.0	9.3
10:15 AM	6	4	11	8	11	8.0	5.0	10.0
10:30 AM	9	4	10	8	13	8.8	6.5	10.3
10:45 AM	5	3	11	9	13	8.2	4.0	11.0
11:00 AM	6	7	10	8	13	8.8	6.5	10.3
11:15 AM	5	7	11	7	12	8.4	6.0	10.0
11:30 AM	6	8	9	6	14	8.6	7.0	9.7
11:45 AM	6	8	4	5	8	6.2	7.0	5.7
12:00 PM	5	10	3	4	10	6.4	7.5	5.7
12:15 PM	6	9	1	6	10	6.4	7.5	5.7
12:30 PM	3	7	2	7	8	5.4	5.0	5.7
12:45 PM	3	7	3	8	9	6.0	5.0	6.7
1:00 PM	1	6	3	7	9	5.2	3.5	6.3
1:15 PM	1	4	2	5		3.0	2.5	3.5
1:30 PM	2	6	3	3		3.5	4.0	3.0
1:45 PM	3	6	3	4		4.0	4.5	3.5
2:00 PM	2	7	4	4		4.3	4.5	4.0
2:15 PM	1	5	2	3		2.8	3.0	2.5
2:30 PM	2	4	2	3		2.8	3.0	2.5
2:45 PM	0	3	2	6		2.8	1.5	4.0
3:00 PM	0	4	3	5		3.0	2.0	4.0
3:15 PM	0	4	3	4		2.8	2.0	3.5
3:30 PM	0	5	3	4		3.0	2.5	3.5
3:45 PM	0	3	2	4		2.3	1.5	3.0
4:00 PM	0	3	2	7		3.0	1.5	4.5
4:15 PM	1	2	3	7		3.3	1.5	5.0
4:30 PM	2	2	3	7		3.5	2.0	5.0
4:45 PM	3	3	3	8		4.3	3.0	5.5
5:00 PM	4	2	2	6		3.5	3.0	4.0
5:15 PM	3	1	0	5		2.3	2.0	2.5
5:30 PM	3	1	0	4		2.0	2.0	2.0
5:45 PM	3	6	0	4		3.3	4.5	2.0
6:00 PM	1	2	0	4		1.8	1.5	2.0
6:15 PM	1	2	0	3		1.5	1.5	1.5
6:30 PM	3	2	0	2		1.8	2.5	1.0
6:45 PM	3	1	2	3		2.3	2.0	2.5
7:00 PM	2	2	2	4		2.5	2.0	3.0
7:15 PM	2	2	2	4		2.5	2.0	3.0
7:30 PM	3	2	2	4		2.8	2.5	3.0
7:45 PM	3	2	2	4		2.8	2.5	3.0
8:00 PM	3	3	1	5		3.0	3.0	3.0
8:15 PM	3	2	0	3		2.0	2.5	1.5
8:30 PM	4	2	1	3		2.5	3.0	2.0
8:45 PM	1	1	2	2		1.5	1.0	2.0
9:00 PM	1	2	2	1		1.5	1.5	1.5
9:15 PM	1	1	2	1		1.3	1.0	1.5
9:30 PM	0	1	1	1		0.8	0.5	1.0
9:45 PM	0	0	1	1		0.5	0.0	1.0
AVERAGE						3.9	3.0	4.4