WIM #26
I-35, MP 30.1
OWATONNA, MN

DECEMBER 2010

MONTHLY REPORT

Your Destination...Our Priority

In order to understand the vehicle classes and groupings the Mn/DOT "Vehicle Classification Scheme" and the "Vehicle Class Groupings for Forecasting" are shown on the WIM Reports home page at
http://www.dot.state.mn.us/traffic/data/html/wim_reports.html

For the month of December 2010, the system was operating normally. The data in this report uses the data that was collected for the month, no extrapolation.

VOLUME

For WIM #26 on I-35 at mile post 30.1 south of Owatonna, there were 531,769 vehicles that passed the site for the month of December. The Average Daily Traffic (ADT) and Heavy Commercial Average Daily Traffic (HCADT) for December 2010 were 17,123 and 3,892, respectively. Of the heavy commercial vehicles, the top two in volume were the Class 9's and 5's. Figure 1 shows the average number of vehicles, broken down by direction, versus day of the week. The average numbers of vehicles for northbound (NB) peaked on Sundays and were lowest on Saturdays. The average numbers of vehicles for southbound (SB) peaked on Wednesdays and were lowest on Saturdays. Figure 2 shows the passenger vehicles (Class 1, 2, and 3), and heavy commercial vehicles (Class 4 to 13) by direction versus hour of day. For December the NB passenger vehicles had a peak between 10 am and 7 pm while the SB passenger vehicles had a peak between 9 am and 6 pm. The passenger vehicles were reviewed for directional volume differences and it appears that there are slightly more going in the SB direction. For December the NB heavy commercial vehicles had a peak between 7 am and 7 pm and the SB heavy commercial vehicles had a peak between 8 am and 8 pm. The heavy commercial vehicles were reviewed for directional volume differences and it appears that there are slightly more heavy commercial vehicles going in the NB direction.

VEHICLE CLASSIFICATION

The traffic volume consisted of 412,054 passenger vehicles (77.5%) and 119,715 heavy commercial vehicles (22.5%). Table 1 summarizes vehicle class volumes and percentages; and overweight vehicles and the percentages as compared to total overweight vehicles.

OVERWEIGHT VEHICLES

In the area of WIM #26, the Winter Load Increases (WLI) went into effect on December 13, 2010. The normal maximum allowable weight for a single axle is 20,000 pounds; tandem axles, spaced 8' or less, can be up to 34,000 pounds; tridem axles, spaced 9' or less, can be up to 43,000 pounds; quad axles, spaced 13' or less, can be up to 51,000 pounds; and the maximum GVW is 80,000 pounds. The WLI allows a 10% across the board increase in axle and gross vehicle weights (GVW) without a permit on US, state routes, and county roads. A permit is required to operate on the interstate at the WLI levels. The WLI means that the maximum allowable weight for a single axle is 22,000 pounds; tandem axles, spaced 8' or less, can be up to 37,400 pounds; tridem axles, spaced 9' or less, can be up to 47,300 pounds; quad axles, spaced 13' or less, can be up to 56,100 pounds; and the maximum GVW is 88,000 pounds.

The data was analyzed with the normal limits in effect up to December 13th and then the WLI after December 13th and that data is presented in the tables and graphs. The total volume and total heavy commercial volume for December 2010 was 531,769 and 119,715, respectively. The total number of vehicles that were overweight was 5,468 or 1.0% of the total traffic or 4.6% of the heavy commercial vehicles. Figure 1 shows the average number of overweight vehicles, broken down by direction, versus day of the week. The average numbers of overweight vehicles for NB peaked on Tuesdays and for SB peaked on Thursdays. The average numbers of overweight vehicles were lowest on the weekends for both directions. The top two overweight violators by class were the Class 9's and the Class 6's. Overweight vehicles by class versus hour of the day are shown in Figure 3. Two different methods are being used to classify vehicles at the WIM. One system uses a "first fit" to classify the vehicles and the other uses a "best fit" method. With either method, the same number of axles, axle spacing, and axle weights are used. This is why there are some differences concerning the numbers of Class 9, 10, and 13 overweight vehicles. The Class 9 overweight vehicles peaked between 9 am and 5 pm. The overweight vehicles were also reviewed to determine if there is a NB and SB difference. Figure 4 shows the total, NB, and SB overweight vehicles versus hour of the day. Figure 4 shows that for December 2010, over 13% more overweight vehicles were going in the SB direction.

Figure 5 shows the gross vehicle weight for Class 9's and 10's in both the NB and SB direction. From Figure 5 it is apparent that the Class 9's and 10's had more full than empty vehicles in the both directions.

For weight enforcement the WIMs are a screening tool. Currently, piezo-quartz WIM systems are considered to be accurate within 5% to 10% on Gross Vehicle Weight (GVW). During normal load limits and with an accuracy of about 10% anything over a GVW of 88,000 pounds is overweight. With the 10% WLI and accuracy of about 10% anything over a GVW of 96,800 pounds is overweight. These may still be permitted loads. For the most efficient use of personnel and equipment, these are the vehicles that should be weighed on static scales and reviewed for permits. In the NB direction during the normal load limits there were 92 vehicles over 88,000 pounds, 13 were Class 9's and 22 were Class 10's. In the NB direction during the WLI there were 105 vehicles over 98,000 pounds, none were Class 9's, 13 were Class 10's, and 57 were Class 13's. In the SB direction during the normal load limits there were 63 vehicles over 88,000 pounds, 13 were Class 9's and 17 were Class 10's. In the SB direction during the WLI there were 36 vehicles over 98,000 pounds, none were Class 9's, 6 were Class 10's, and 29 were Class 13's. Table 2 summarizes the Top 10 Gross Vehicle Weight for Class 9 and Class 10 vehicles for the month of December 2010.

SPEED

The speed limit on I-35 at the WIM site is 70 mph. For December 2010 for all four lanes, WIM #26 recorded an average speed of 71 mph, the median speed was 73 mph, and the 85th percentile speed was 80 mph. Table 3 summarizes the vehicle data for the Top 20 speeders that crossed WIM #26 in the month of December. The speed of the Top 20 ranged from 103 mph up to 121 mph. Figure 6 shows the average speed of passenger

vehicles and heavy commercial vehicles in both the NB and SB direction by lane. The slowest vehicles are the heavy commercial vehicles in the NB passing lane followed by heavy commercial vehicles in the driving lanes and the fastest vehicles are the passenger vehicles in the passing lanes. Depending on the hour of the day there is between a 9 and 13 mph difference between the average slowest vehicles and the average fastest vehicles. During the overnight hours the volume drops way off, which is why there are unusual dips during those times. Figure 7 shows the average speed versus the day of the week. For December 2010 the average speeds varied between 60 mph and 75 mph. There was a variation in speed by day of the week due to snow storms, otherwise there would be consistent variation in speed throughout the day with the slowest speeds generally between midnight and 6 am. Figure 8 shows the average speed by lane. The passing lanes are consistently about 5 to 6 mph faster than the driving lanes.

BRIDGE

Bridge No.91086, a box culvert, is approximately 0.5 miles north of WIM #26, and Bridge No. 91095, a box culvert, is 6.9 miles south of WIM #26. For the month of December 2010, WIM #26 saw 531,769 vehicles with a total weight of 7,201,000 kips (1 kip = 1,000 pounds). Figure 9 summarizes the total GVW by lane and class and Figure 10 summarizes the percentages each class contributes to the total GVW. Table 4 provides details on the class breakdowns versus lane for GVW.

MATERIALS

For December 2010 a total of 89,892 ESALs passed over the pavement at WIM #26. Approximately 81.1% of the ESALs were in the driving lane, 38.4% NB and 42.7% SB. Figure 11 graphically depicts the total ESALs by class and lane. Figure 12 summarizes the percentages that each vehicle class contributes to the total ESALs. It is interesting to note that the Class 9's provide 84.7% of the ESALs while they are only 64.0% of the total gross vehicle weight. Table 5 provides details on the class breakdowns versus lane for ESALs. Table 5 also provides the flexible ESAL factors for each vehicle class using a terminal serviceability of 2.5 and a structural number of 5.

Reviewing the ESALs in the 4 lanes for December 2010, the largest is Lane 4, the SB driving lane. Therefore, the SB driving lane is the design lane and the growth factor for this section of I-35 in Steele County is 2.5%.

From December 1st to 13th for the SB lane, there were 348 Class 9 trucks and 39 Class 10 trucks over 80,000 pounds. These 387 vehicles generated 1,105 ESALs. If all of these trucks weighed just 80,000 pounds they would have generated 985 ESALs, 120 ESALs lower. From December 13th to the end of the month for the SB lane, there were 18 Class 9 trucks and 18 Class 10 trucks over 88,000 pounds. These 36 vehicles generated 128 ESALs. If all of these trucks weighed just 88,000 pounds they would have generated 107 ESALs, 21 ESALs lower. If you take the December SB ESALs of 38,421 and multiply it by 12 to get an annual ESAL number, apply a growth factor of 2.5% for 20 years (1.50) and then multiply it by 20 to get a 20-year BESAL you get 13,832,000. If you go through the same process but start with a monthly value of 38,279, i.e. subtracting out all of the overweight Class 9 and 10 vehicles, you come up with 13,780,000 20-year

BESALs. If you take the difference between the 20-year BESAL and divide that by 38,421, the BESALs with the overweight Class 9's and 10's you get 1.33, or the overweight Class 9's and 10's cause the pavement to reach its 20-year design life over 1 month early.

This is a quick, back of the napkin calculation, this only looks at Class 9's and 10's, not the other 8 heavy commercial classes. As part of a technical implementation research project we are looking at developing a report function that will perform this calculation for all heavy commercial classes. Because the heavy commercial haulers are looking to move that tonnage of freight we will add additional legal-weight trucks so that the total tonnage being shipped stays the same.

FREIGHT

For WIM #26 for December 2010, it was calculated that approximately 1,153,000 tons of freight crossed the sensors. Slightly more freight was shipped NB (582,000 tons) versus SB (571,000 tons). Table 6 summarizes number of vehicles by class and the number of empty vehicles. Table 6 and Figure 13 summarize the freight shipment by class, direction, and tonnage.

CALIBRATION

WIM #26 was calibrated after installation on July 27th and 28th. As part of the on-going monitoring to assure the performance between calibrations, gross vehicle weights and front axle weights of Class 2's, 3's, and 9's are being monitored on a monthly basis. Table 7 summarizes the gross vehicle weight of the Class 2's and 3's. Currently, all Class 2's and 3's are included in this data. In the future, the goal would be to only monitor the Class 2's and 3's that are not pulling trailers. Table 8 summarizes the front axle weight of the Class 2's, 3's, and 9's by lane. The current goal of the calibration is to first have the GVW for each class and each lane stay within a range of ±5% and then secondly to have each individual axle stay within a range of ±9%. As you can see in Table 7, the GVW was within the range for all 4 Lanes in both Classes, except lane 1 and lane 4 Class 3 and lane 2 Class 2. In Table 8 the front axle weight stayed within ±9% for all Classes in all 4 Lanes.

Past WIM research indicates that an unloaded Class 9 should weigh 28 to 32 kips. Data from the MnROAD site indicates that this unloaded range may have moved a little higher. The range for loaded Class 9's is generally in the 70 to 80 kip range but varies more by site and season. Figures 14 to 17 shows histograms of the monthly GVW of Class 9's over the last 4 months for Lanes 1 to 4. Figure 18 is a graph of the unloaded and loaded peaks by lane versus date. There are enough Class 9's in Lanes 1 to 4 that a weekly histogram can be developed. With only about 5 months of data, so far WIM #26 is working fine and is generally staying in the calibration range.

SUMMARY

For December 2010 the average volumes peaked on Sundays in the NB direction and on Wednesdays in the SB direction. The overweight vehicles peaked in the NB direction on Tuesdays and in the SB direction on Thursdays and were lowest on the weekends. The

average numbers of overweight vehicles were 13% higher for SB than NB. The overweight vehicles peaked from 9 am to 5 pm. For December 2010, for the Class 9's, 4.9% of them were overweight and for the Class 10's, 15.1% of them were overweight. The speed of the traffic varies slightly based on vehicle class, lane, and hour of the day and some differences in speed were observed due to snow storms. The GVW was a little higher in the SB direction 3,648,000 kips versus 3,554,000 kips NB. The NB ESALs were higher 45,097 versus 44,796 SB. The tonnage of freight was higher in the NB direction 582,000 versus 571,000 SB. For December 2010, the overweight Class 9's and 10's were shortening the 20-year BESAL design life by over 1 month. Table 9 provides a monthly summary of some of the key data for the site during 2010.

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Figure 18 – Unloaded and Loaded Peaks by Lane vs. Date

TABLE 1 - VEHICLE CLASSIFICATION DATA
WIM #26 - OWATONNA
December 2010

VEHICLE CLASS	MONTHLY AVERAGE DAILY VOLUME	MONTHLY TOTAL VOLUME	MONTHLY TOTAL VOLUME PERCENTAGE	MONTHLY TOTAL OVERWEIGHT VEHICLES	MONTHLY TOTAL OVERWEIGHT PERCENTAGE
C1	0	1	0.0%	0	0.0%
C2	8,039	250,012	47.0%	0	0.0%
C3	5,192	162,041	30.5%	0	0.0%
C4	83	2,557	0.5%	77	1.4%
C5	330	10,224	1.9%	136	2.5%
C6	188	5,710	1.1%	310	5.7%
C7	4	112	0.0%	4	0.1%
C8	95	2,947	0.6%	70	1.3%
C9	2,927	89,927	16.9%	4,375	80.0%
C10	50	1,546	0.3%	233	4.3%
C11	145	4,530	0.9%	14	0.3%
C12	60	1,857	0.3%	37	0.7%
C13	10	305	0.1%	212	3.9%
TOTAL =	17,123	531,769	100.0%	5,468	100.0%

TABLE 2 - TOP 10 GROSS VEHICLE WEIGHT, CLASS 9 AND CLASS 10
WIM #26 - OWATONNA
December 2010

DATE	DAY OF WEEK	TIME	VEHICLE CLASS	DIRECTION	LANE	GVW (lbs)
12/14/10	Tuesday	9:12:31	10	Northbound	2	144,000
12/13/10	Monday	5:57:26	10	Southbound	4	143,000
12/22/10	Wednesday	12:59:40	10	Northbound	1	137,000
12/3/10	Friday	13:46:31	10	Southbound	4	134,000
12/2/10	Thursday	12:23:27	10	Southbound	4	133,000
12/10/10	Friday	8:47:11	10	Southbound	4	131,000
12/10/10	Friday	13:40:38	10	Northbound	1	131,000
12/13/10	Monday	11:56:04	10	Northbound	2	130,000
12/13/10	Monday	9:19:27	10	Southbound	4	129,000
12/15/10	Wednesday	11:15:09	10	Northbound	2	127,000

TABLE 3 - TOP 20 SPEEDERS
WIM #26 - OWATONNA
December 2010

DATE	DAY OF WEEK	TIME	VEHICLE CLASS	DIRECTION	LANE	SPEED (mph)
12/28/10	Tuesday	12:38:13	2	Northbound	1	121
12/22/10	Wednesday	17:09:58	3	Northbound	2	119
12/27/10	Monday	13:05:23	2	Northbound	2	109
12/2/10	Thursday	8:09:35	3	Northbound	2	108
12/7/10	Tuesday	6:36:05	2	Northbound	2	107
12/18/10	Saturday	5:53:06	3	Southbound	3	107
12/7/10	Tuesday	6:40:36	3	Southbound	3	106
12/17/10	Friday	0:50:30	2	Southbound	3	106
12/19/10	Sunday	18:37:16	2	Southbound	3	106
12/22/10	Wednesday	14:55:50	3	Southbound	3	106
12/24/10	Friday	21:56:24	2	Southbound	3	106
12/28/10	Tuesday	17:19:14	3	Northbound	2	106
12/2/10	Thursday	20:17:19	2	Southbound	4	104
12/3/10	Friday	6:04:30	3	Northbound	2	104
12/5/10	Sunday	12:10:07	2	Southbound	3	104
12/9/10	Thursday	6:43:52	3	Southbound	3	104
12/4/10	Saturday	13:20:07	2	Southbound	4	103
12/9/10	Thursday	9:08:57	2	Northbound	2	103
12/26/10	Sunday	11:00:25	2	Northbound	2	103
12/28/10	Tuesday	13:53:28	3	Southbound	4	103

TABLE 4 - GROSS VEHICLE WEIGHT BY CLASS AND LANE
WIM #26 - OWATONNA
December 2010

VEHICLE CLASS	NB DRIVING LANE (Kips)	NB PASSING LANE (Kips)	SB PASSING LANE (Kips)	SB DRIVING LANE (Kips)	TOTAL (Kips)	PERCENTAGE
C1	3	3	4	11	21	0.0%
C2	242,378	185,481	160,742	262,152	850,753	11.8%
C3	255,578	188,058	175,336	292,901	911,874	12.7%
C4	12,980	4,437	3,990	20,726	42,134	0.6%
C5	49,391	22,417	15,766	45,628	133,202	1.8%
C6	26,177	6,786	21,027	59,405	113,396	1.6%
C7	1,458	466	309	3,249	5,482	0.1%
C8	38,523	11,682	7,130	45,591	102,927	1.4%
C9	1,843,279	451,652	268,708	2,042,842	4,606,481	64.0%
C10	39,426	11,708	10,387	43,361	104,882	1.5%
C11	90,272	20,145	8,416	109,204	228,037	3.2%
C12	36,131	8,240	4,964	41,564	90,898	1.3%
C13	5,803	1,469	241	3,867	11,380	0.2%
TOTAL =	2,641,399	912,544	677,021	2,970,502	7,201,466	100.0%
GVW/LANE =	36.7%	12.7%	9.4%	41.2%		
GVW/DIRECTION =	49.4%		50.6%			

TABLE 5 - ESALs BY CLASS AND LANE AND FLEXIBLE ESAL FACTOR
WIM #26 - OWATONNA
December 2010

VEHICLE CLASS	NB DRIVING LANE	NB PASSING LANE	SB PASSING LANE	SB DRIVING LANE	TOTAL	PERCENTAGE	FLEXIBLE ESAL FACTOR
C1	0	0	0	0	0	0.0%	0.0004
C2	38	32	24	35	129	0.1%	0.0005
C3	89	73	62	93	317	0.4%	0.0021
C4	225	104	97	431	857	1.0%	0.79
C5	436	310	231	712	1,689	1.9%	0.13
C6	371	100	375	1,015	1,862	2.1%	0.47
C7	21	9	6	65	100	0.1%	0.87
C8	444	144	106	650	1,345	1.5%	0.33
C9	30,099	9,007	5,039	31,974	76,119	84.7%	1.06
C10	670	243	160	670	1,744	1.9%	1.02
C11	1,595	439	210	2,226	4,470	5.0%	1.25
C12	336	95	62	432	925	1.0%	0.76
C13	168	48	2	119	336	0.4%	2.74
TOTAL =	34,492	10,605	6,375	38,421	89,892	100.0%	
ESALS/LANE =	38.4%	11.8%	7.1%	42.7%			
ESALS/DIRECTION =	50.2%		49.8%				

TABLE 6 - FREIGHT SUMMARY
WIM #26 - OWATONNA
December 2010

NORTHBOUND

VEHICLE CLASS	WEIGHT OF EMPTY VEHICLE (Kips)	TOTAL NUMBER OF VEHICLES	NUMBER OF EMPTY VEHICLES	PERCENTAGE OF EMPTY VEHICLES	TOTAL WEIGHT OF FREIGHT & VEHICLES (Kips)	WEIGHT OF EMPTY VEHICLES (Kips)	TOTAL WEIGHT OF FREIGHT (Tons)
C4	15.0	1,211	250	20.6%	31,834	3,076	7,172
C5	8.0	5,503	1,087	19.8%	68,701	7,745	12,814
C6	19.0	1,794	577	32.2%	48,155	9,062	7,985
C7	11.5	47	0	0.0%	1,875	0	667
C8	31.0	1,421	705	49.6%	44,688	16,118	3,187
C9	33.0	45,774	7,679	16.8%	2,484,293	216,874	505,142
C10	33.5	760	156	20.5%	44,097	4,040	9,912
C11	36.5	2,302	178	7.7%	122,251	5,653	19,536
C12	36.5	972	64	6.6%	52,933	1,963	8,914
C13	31.5	197	3	1.5%	20,447	61	7,138
TOTAL =		59,981	10,699	17.8%	2,919,274	--	582,466

SOUTHBOUND

VEHICLE CLASS	WEIGHT OF EMPTY VEHICLE (Kips)	TOTAL NUMBER OF VEHICLES	NUMBER OF EMPTY VEHICLES	PERCENTAGE OF EMPTY VEHICLES	TOTAL WEIGHT OF FREIGHT & VEHICLES (Kips)	WEIGHT OF EMPTY VEHICLES (Kips)	TOTAL WEIGHT OF FREIGHT (Tons)
C4	15.0	1,440	235	16.3%	39,461	2,891	9,248
C5	8.0	4,410	932	21.1%	62,708	6,579	14,153
C6	19.0	3,899	621	15.9%	117,487	10,181	22,512
C7	11.5	84	0	0.0%	2,928	0	981
C8	31.0	1,356	507	37.4%	46,452	11,356	4,389
C9	33.0	44,187	5,965	13.5%	2,382,652	174,690	473,318
C10	33.5	812	100	12.3%	49,535	2,619	11,532
C11	36.5	2,229	123	5.5%	123,727	3,839	21,510
C12	36.5	885	42	4.7%	50,406	1,348	9,144
C13	31.5	113	0	0.0%	11,247	0	3,844
TOTAL =		59,415	8,525	14.3%	2,886,603	--	570,629
GRAND TOTAL =		119,396	19,224	16.1%	5,805,877	--	1,153,095

TABLE 7 - GROSS VEHICLE WEIGHT BY CLASS AND LANE
WIM #26 - OWATONNA
December 2010

MONTH	VEHICLE CLASS	LANE 1 (Kips)	GVW ± 5%	LANE 2 (Kips)	GVW ± 5%	LANE 3 (Kips)	GVW ± 5%	LANE 4 (Kips)	GVW ± 5%
August	C2	3.94	--	3.81	--	3.84	--	3.57	--
September		3.82	-3.05%	3.81	0.00%	3.83	-0.26%	3.58	0.28%
October		3.77	-4.31%	3.74	-1.84%	3.79	-1.30%	3.56	-0.28%
November		3.81	-3.30%	3.87	1.57%	3.91	1.82%	3.60	0.84%
December		3.77	-4.31%	4.01	**5.25%**	3.92	2.08%	3.54	-0.84%
August	C3	6.18	--	5.83	--	5.73	--	5.76	--
September		5.98	-3.24%	5.84	0.17%	5.74	0.17%	5.80	0.69%
October		5.82	**-5.83%**	5.68	-2.57%	5.64	-1.57%	5.70	-1.04%
November		5.79	**-6.31%**	5.83	0.00%	5.73	0.00%	5.66	-1.74%
December		5.65	**-8.58%**	6.01	3.09%	5.72	-0.17%	5.38	**-6.60%**

TABLE 8 - FRONT AXLE WEIGHT BY CLASS AND LANE
WIM #26 - OWATONNA
December 2010

MONTH	VEHICLE CLASS	LANE 1 (Kips)	FRONT AXLE ± 9%	LANE 2 (Kips)	FRONT AXLE ± 9%	LANE 3 (Kips)	FRONT AXLE ± 9%	LANE 4 (Kips)	FRONT AXLE ± 9%
August	C2	2.34	--	2.20	--	2.19	--	2.03	--
September		2.28	-2.56%	2.21	0.45%	2.19	0.00%	2.05	0.99%
October		2.26	-3.42%	2.17	-1.36%	2.18	-0.46%	2.05	0.99%
November		2.27	-2.99%	2.24	1.82%	2.24	2.28%	2.07	1.97%
December		2.25	-3.85%	2.31	5.00%	2.23	1.83%	2.03	0.00%
August	C3	3.23	--	3.01	--	2.95	--	2.83	--
September		3.14	-2.79%	3.04	1.00%	2.96	0.34%	2.87	1.41%
October		3.10	-4.02%	2.98	-1.00%	2.93	-0.68%	2.85	0.71%
November		3.13	-3.10%	3.07	1.99%	3.00	1.69%	2.88	1.77%
December		3.11	-3.72%	3.16	4.98%	2.99	1.36%	2.77	-2.12%
August	C9	11.44	--	11.18	--	11.25	--	11.10	--
September		11.23	-1.84%	11.15	-0.27%	11.07	-1.60%	11.13	0.27%
October		11.12	-2.80%	10.98	-1.79%	11.00	-2.22%	11.07	-0.27%
November		11.19	-2.19%	11.10	-0.72%	11.22	-0.27%	11.14	0.36%
December		10.76	-5.94%	11.20	0.18%	11.03	-1.96%	10.53	-5.14%

TABLE 9 - SITE SUMMARY
WIM #26 - OWATONNA
December 2010

VOLUME & VEHICLE CLASS

MONTH	TOTAL VOLUME	MONTHLY ADT	MONTHLY HCADT	PASSENGER VEHICLES #	PASSENGER VEHICLES %	HEAVY COMMERCIAL VEHICLES #	HEAVY COMMERCIAL VEHICLES %	HEAVY COMMERCIAL VEHICLES IN DRIVING LANE %	HEAVY COMMERCIAL VEHICLES IN PASSING LANE %
January	--	--	--	--	--	--	--	--	--
February	--	--	--	--	--	--	--	--	--
March	--	--	--	--	--	--	--	--	--
April	--	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	--	--	--
June	--	--	--	--	--	--	--	--	--
July	--	--	--	--	--	--	--	--	--
August	691,254	22,557	4,508	551,564	79.8%	139,690	20.2%	90.1%	9.9%
September	610,358	20,407	4,380	475,677	77.9%	134,681	22.1%	89.9%	10.1%
October	629,178	20,396	4,636	489,929	77.9%	139,249	22.1%	90.4%	9.6%
November	569,872	19,267	4,083	445,444	78.2%	124,428	21.8%	90.1%	9.9%
December	531,769	17,123	3,892	412,054	77.5%	119,715	22.5%	82.9%	17.1%

ESALS

MONTH	ESALS NB DRIVING LANE	ESALS NB PASSING LANE	ESALS SB PASSING LANE	ESALS SB DRIVING LANE	TOTAL ESALS	DRIVING LANE ESALS %	PASSING LANE ESALS %	PAVEMENT LIFE DECREASE MONTHS*
January	--	--	--	--	--	--	--	--
February	--	--	--	--	--	--	--	--
March	--	--	--	--	--	--	--	--
April	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	--	--
June	--	--	--	--	--	--	--	--
July	--	--	--	--	--	--	--	--
August	59,041	4,858	5,851	56,035	125,786	91.5%	8.5%	1.79
September	54,088	4,907	5,523	55,604	120,121	91.3%	8.7%	1.82
October	54,479	4,620	5,315	59,034	123,449	92.0%	8.0%	3.03
November	48,937	4,441	5,504	54,935	113,818	91.3%	8.7%	4.94
December	34,492	10,605	6,375	38,421	89,892	81.1%	18.9%	1.33

* Based on WLI of 88,000 lbs in effect starting december 13, 2010.

TABLE 9 - SITE SUMMARY (contd.)
WIM #26 - OWATONNA
December 2010

GROSS VEHICLE WEIGHT

MONTH	GVW NB DRIVING LANE	GVW NB PASSING LANE	GVW SB PASSING LANE	GVW SB DRIVING LANE	TOTAL GVW KIPS
January	--	--	--	--	--
February	--	--	--	--	--
March	--	--	--	--	--
April	--	--	--	--	--
May	--	--	--	--	--
June	--	--	--	--	--
July	--	--	--	--	--
August	3,816,740	671,567	753,699	3,834,162	9,076,168
September	3,664,543	615,926	656,648	3,687,539	8,624,656
October	3,746,250	608,336	672,745	3,863,146	8,890,477
November	3,372,732	557,946	651,605	3,525,881	8,108,163
December	2,641,399	912,544	677,021	2,970,502	7,201,466

OVERWEIGHT VEHICLES

MONTH	TOTAL NUMBER OF OVERWEIGHT VEHICLES *	OVERWEIGHT/ TOTAL VOLUME %	OVERWEIGHT/ HEAVY COMMERCIAL VOLUME %	NUMBER OVER 88,000 LBS	NUMBER OVER 98,000 LBS
January	--	--	--	--	--
February	--	--	--	--	--
March	--	--	--	--	--
April	--	--	--	--	--
May	--	--	--	--	--
June	--	--	--	--	--
July	--	--	--	--	--
August	15,156	2.2%	10.8%	230	105
September	12,752	2.1%	9.5%	361	173
October	10,902	1.7%	7.8%	540	250
November	12,718	2.2%	10.2%	481	185
December	5,468	1.0%	4.6%	423	227

* Based on WLI of 88,000 lbs in effect starting december 13, 2010.

SPEED

MONTH	AVERAGE SPEED (mph)	MEDIAN SPEED (mph)	85th PERCENTILE SPEED (mph)	SYSTEM OPERATION Days	SYSTEM OPERATION %
January	--	--	--	--	--
February	--	--	--	--	--
March	--	--	--	--	--
April	--	--	--	--	--
May	--	--	--	--	--
June	--	--	--	--	--
July	--	--	--	--	--
August	75	76	80	31	100.0%
September	75	75	80	30	100.0%
October	75	76	80	31	100.0%
November	75	76	80	30	100.0%
December	71	73	79	31	100.0%

FREIGHT

MONTH	NB FREIGHT TONS	SB FREIGHT TONS	TOTAL FREIGHT TONS	NB FREIGHT %	SB FREIGHT %
January	--	--	--	--	--
February	--	--	--	--	--
March	--	--	--	--	--
April	--	--	--	--	--
May	--	--	--	--	--
June	--	--	--	--	--
July	--	--	--	--	--
August	743,336	695,898	1,439,234	51.6%	48.4%
September	719,391	704,501	1,423,892	50.5%	49.5%
October	732,495	743,491	1,475,986	49.6%	50.4%
November	646,637	691,687	1,338,324	48.3%	51.7%
December	582,466	570,629	1,153,095	50.5%	49.5%

Figure 1 - Average Volume and Average Overweight Volume vs. Day of the Week

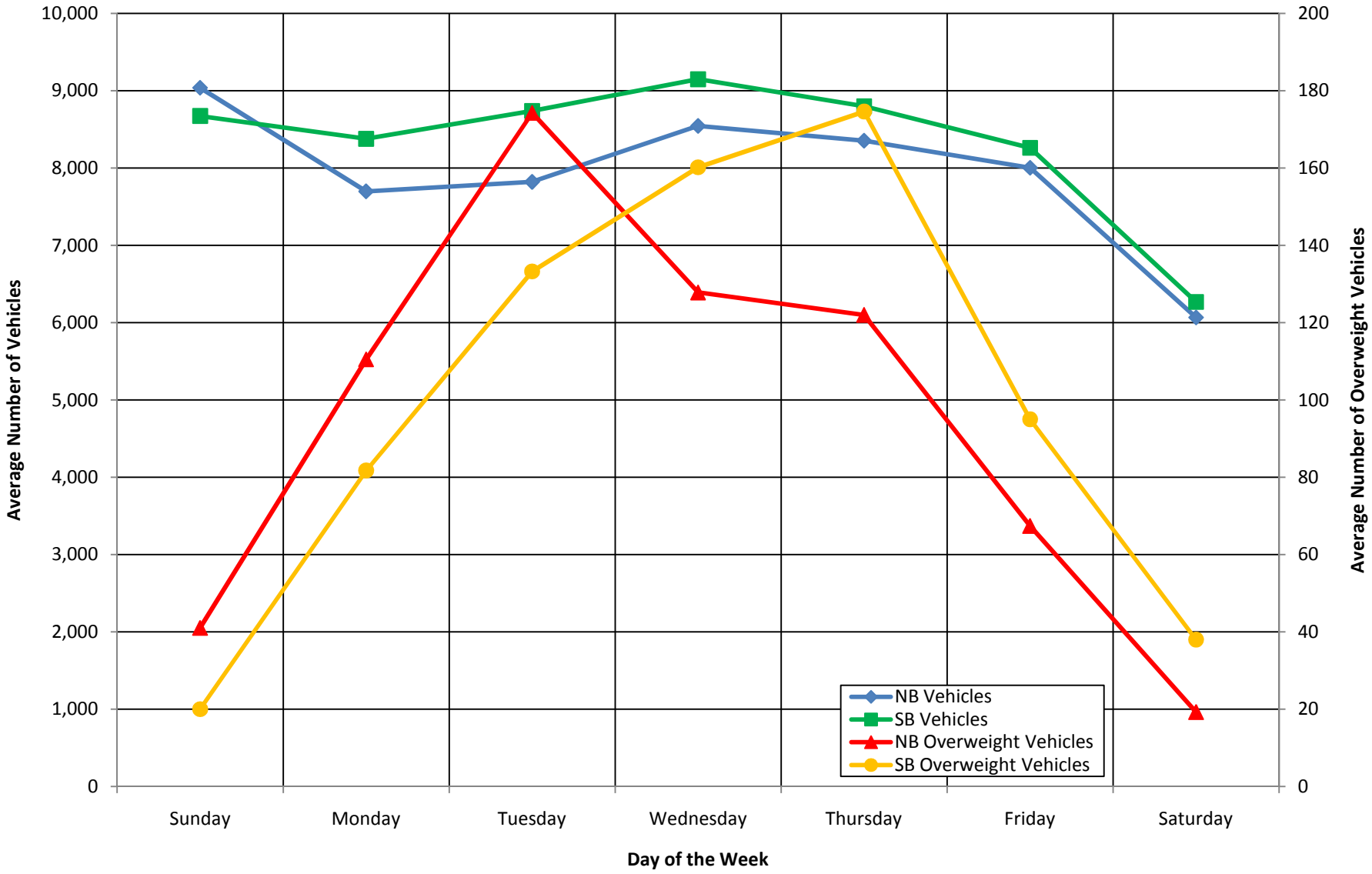


Figure 2 - Passenger and Heavy Commercial Vehicles vs. Hour of the Day

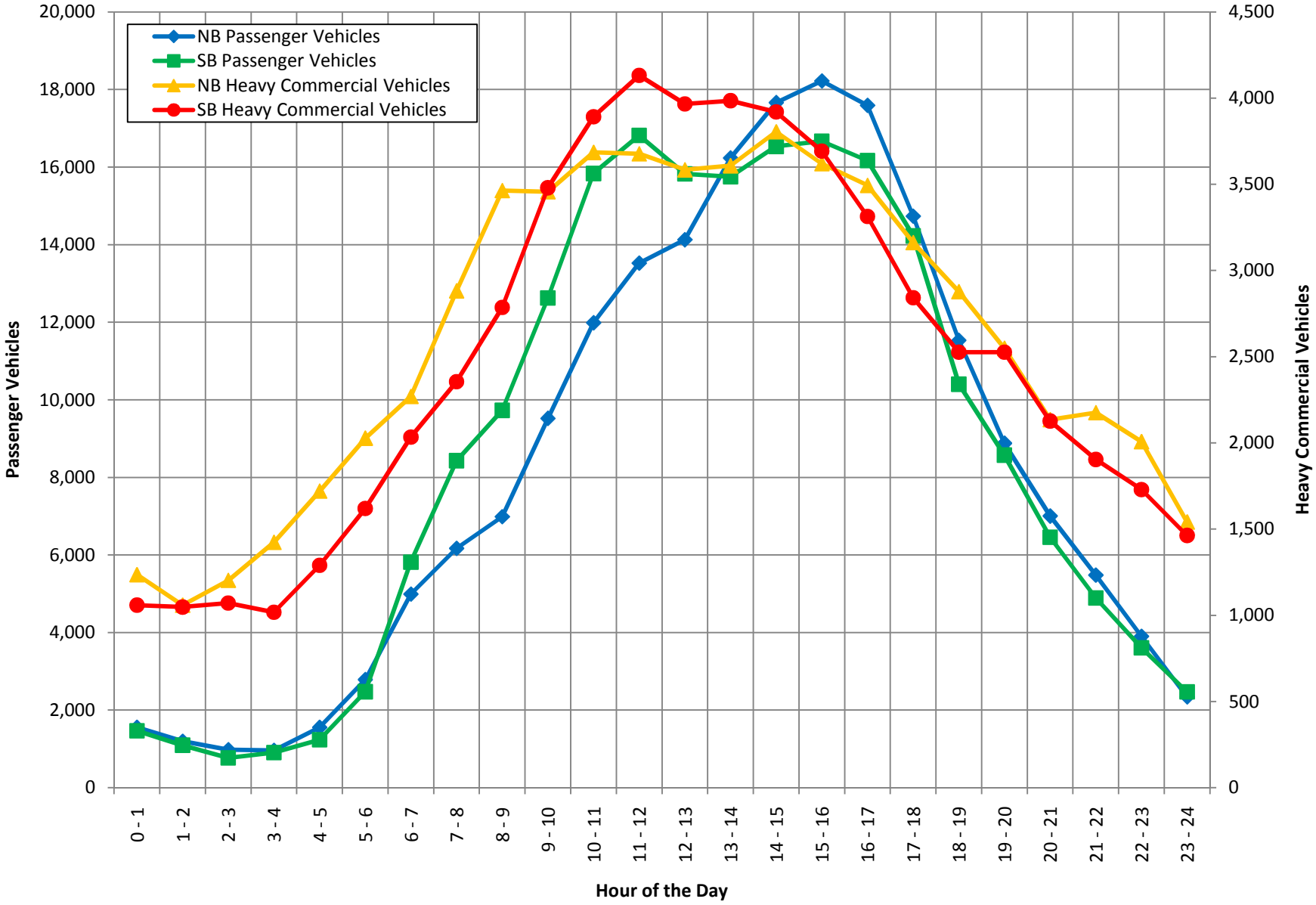


Figure 3 - Overweight Vehicles by Class vs. Hour of the Day

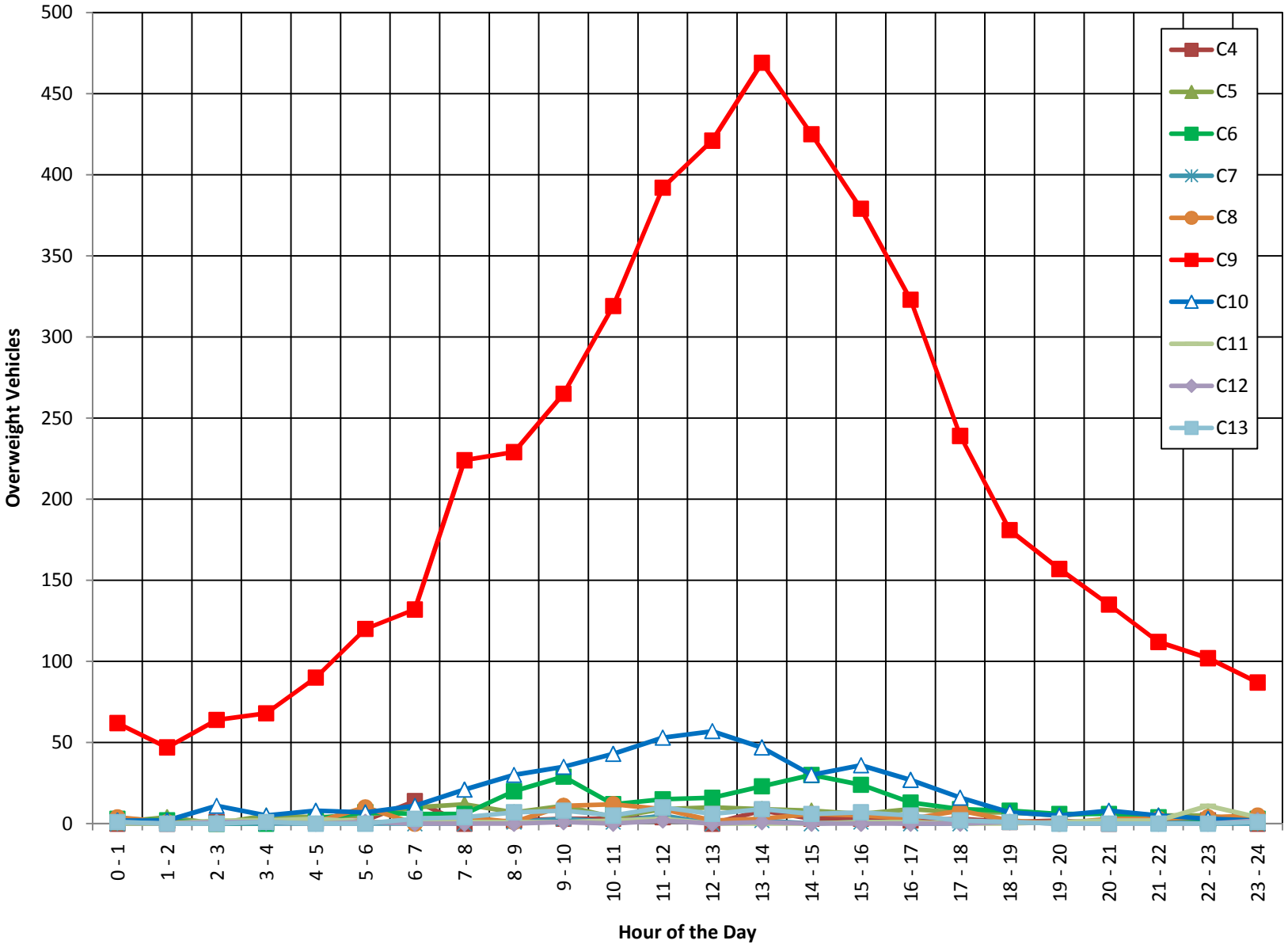


Figure 4 - Overweight Vehicles by Direction vs. Hour of the Day

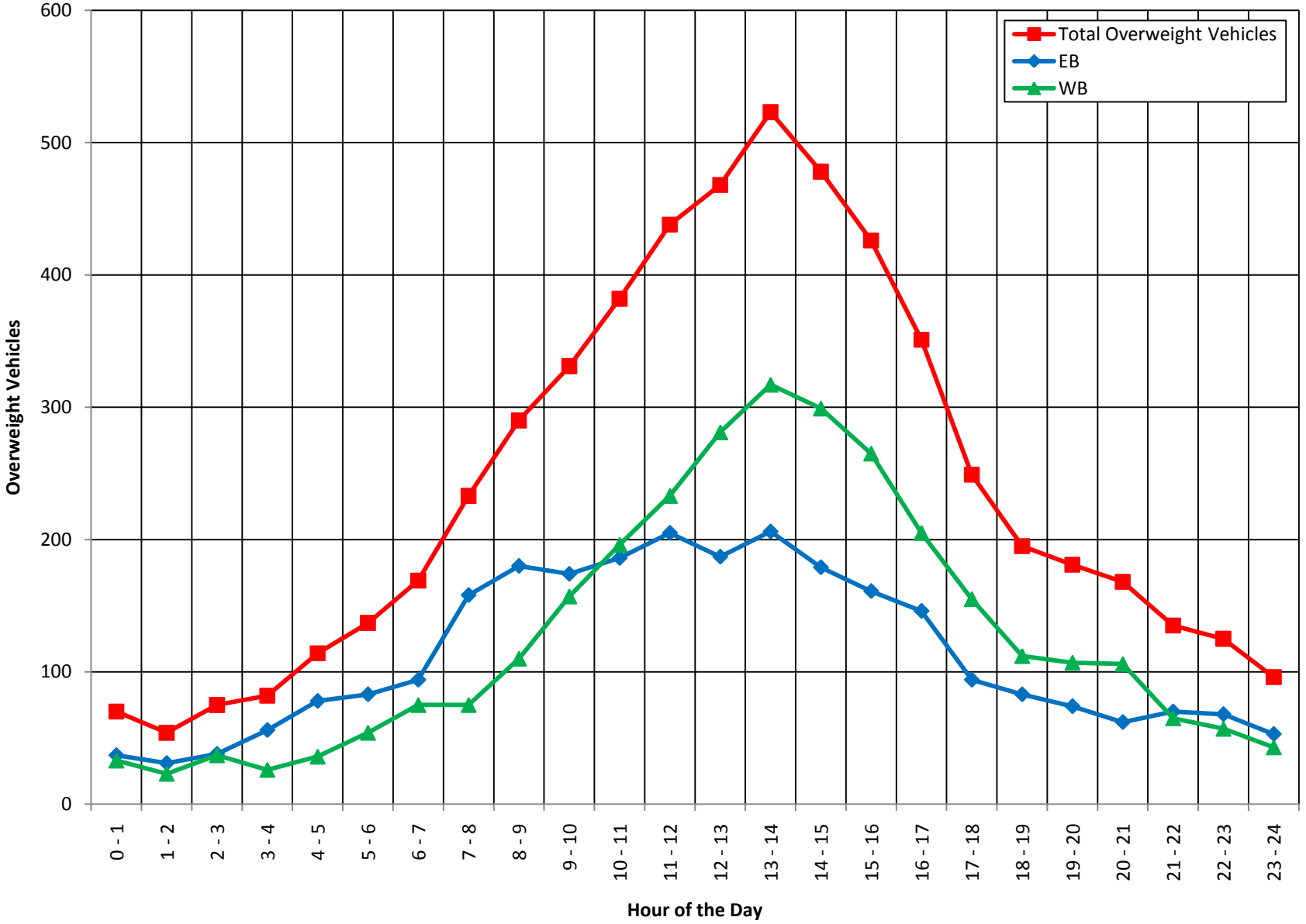


Figure 5 - Class 9's and 10's by Direction vs. Gross Vehicle Weight

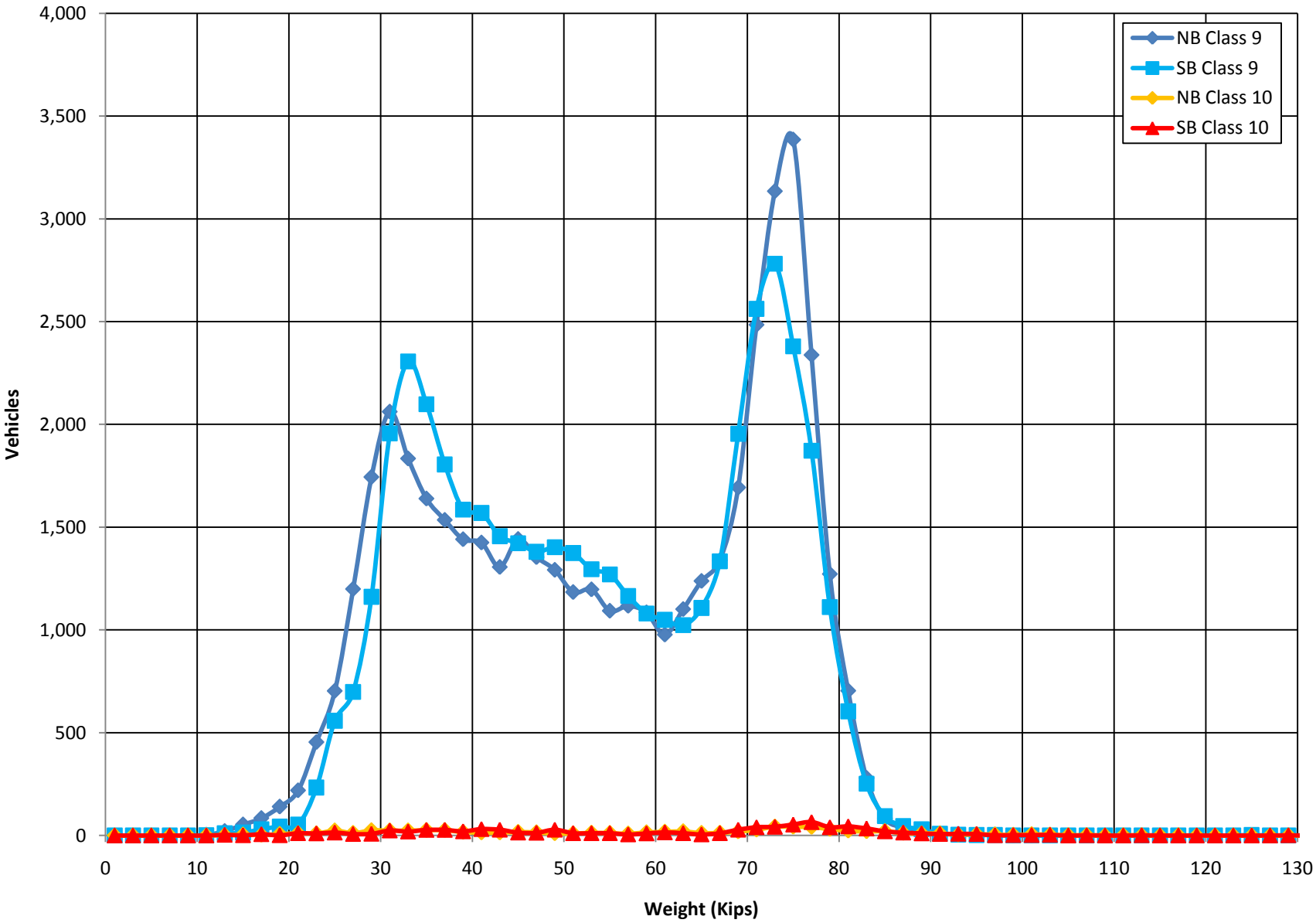


Figure 6 - Average Speed by Lane and Vehicle Type vs. Hour of the Day

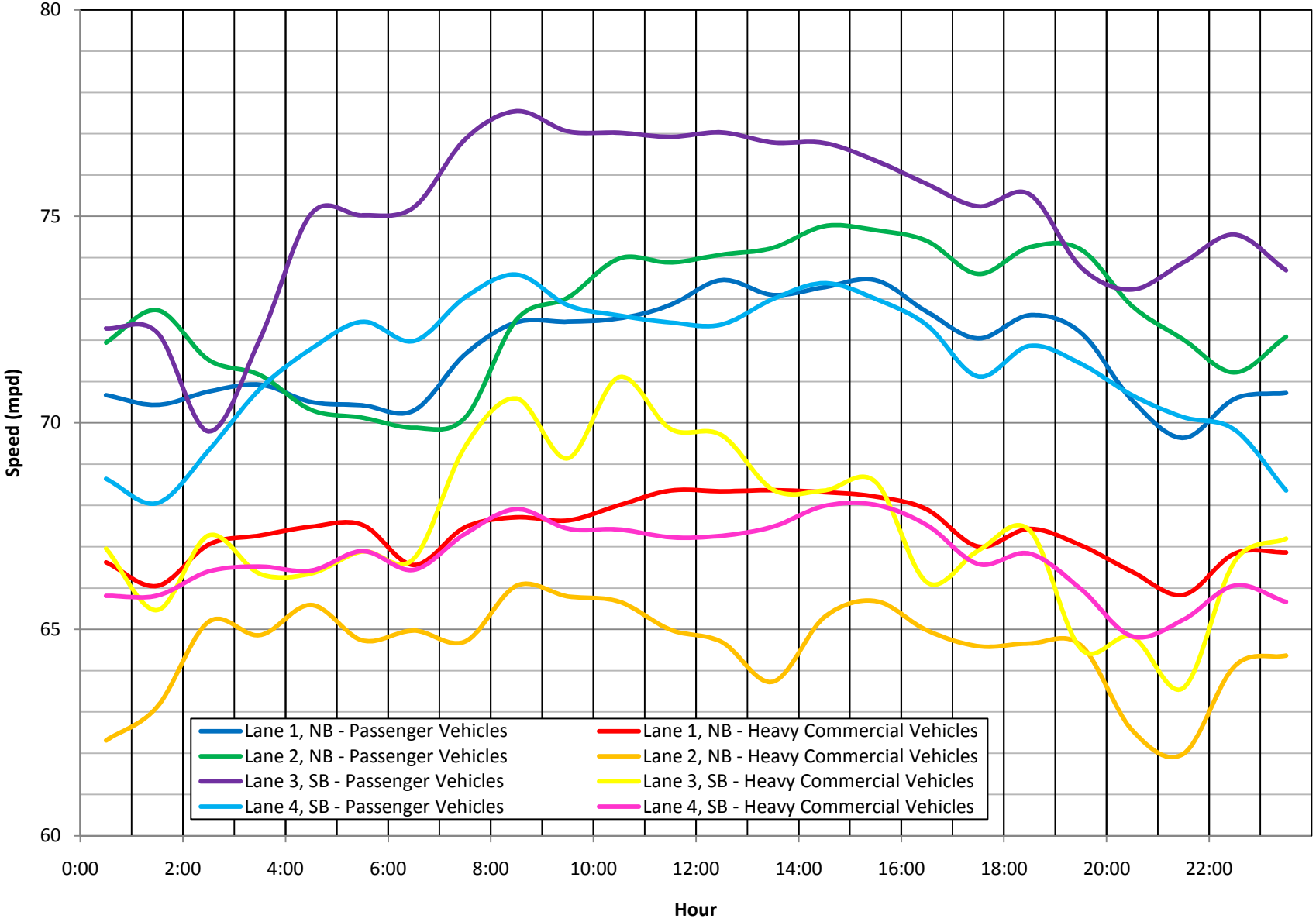


Figure 7 - Average Speed vs. Day of the Week

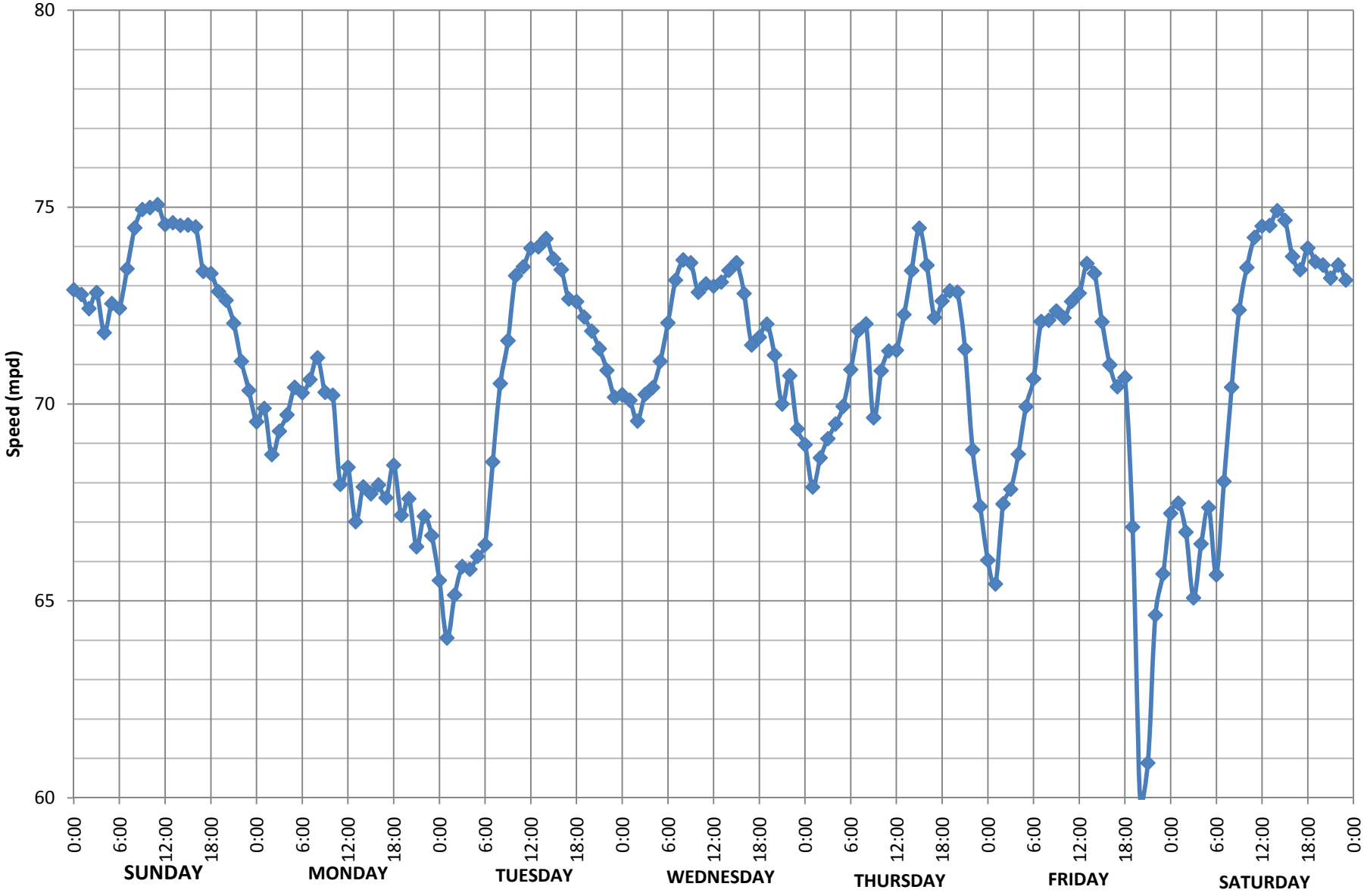


Figure 8 - Average Speed by Lane and Direction vs. Hour of the Day

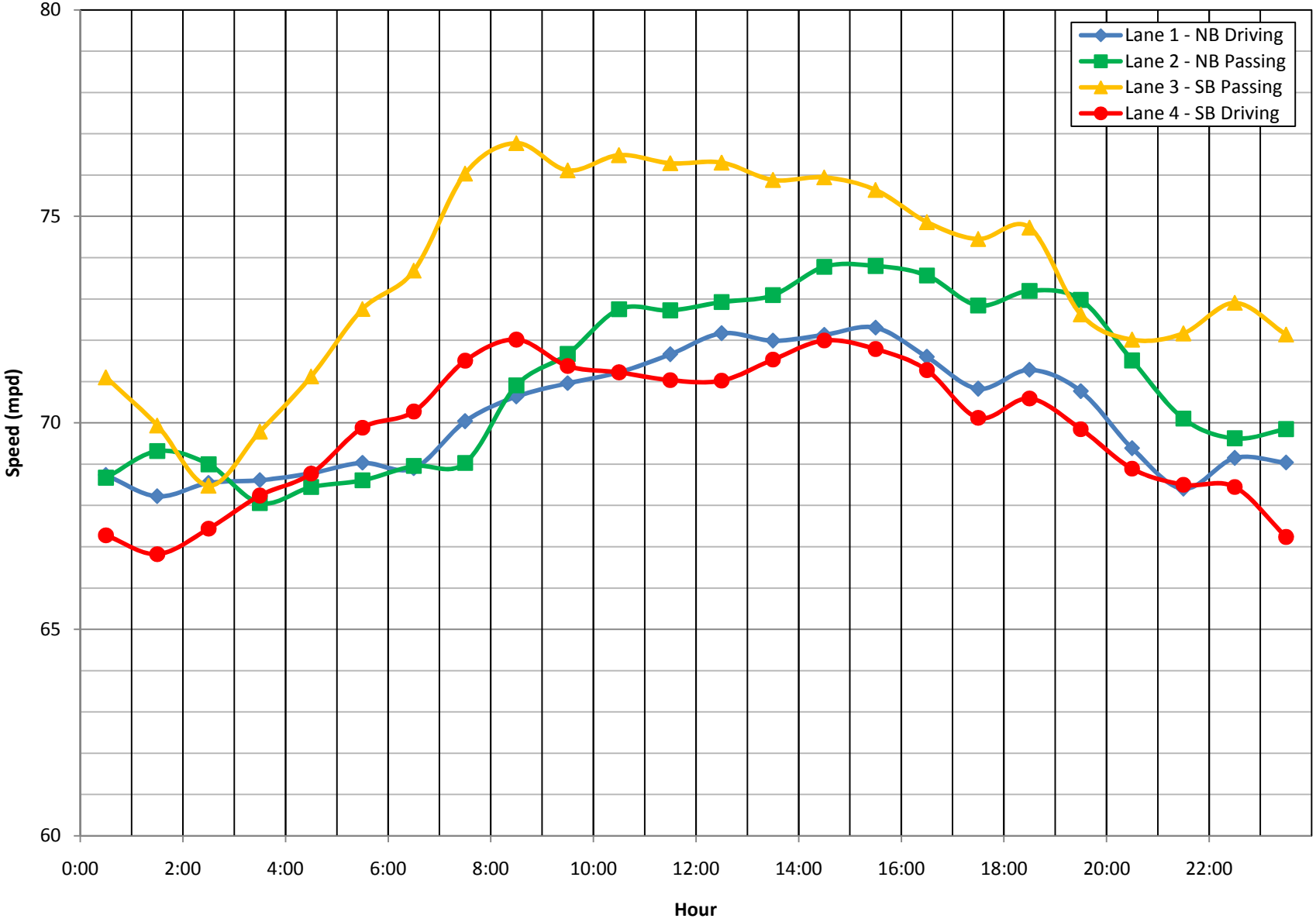


Figure 9 - Total Gross Vehicle Weight by Class and Lane

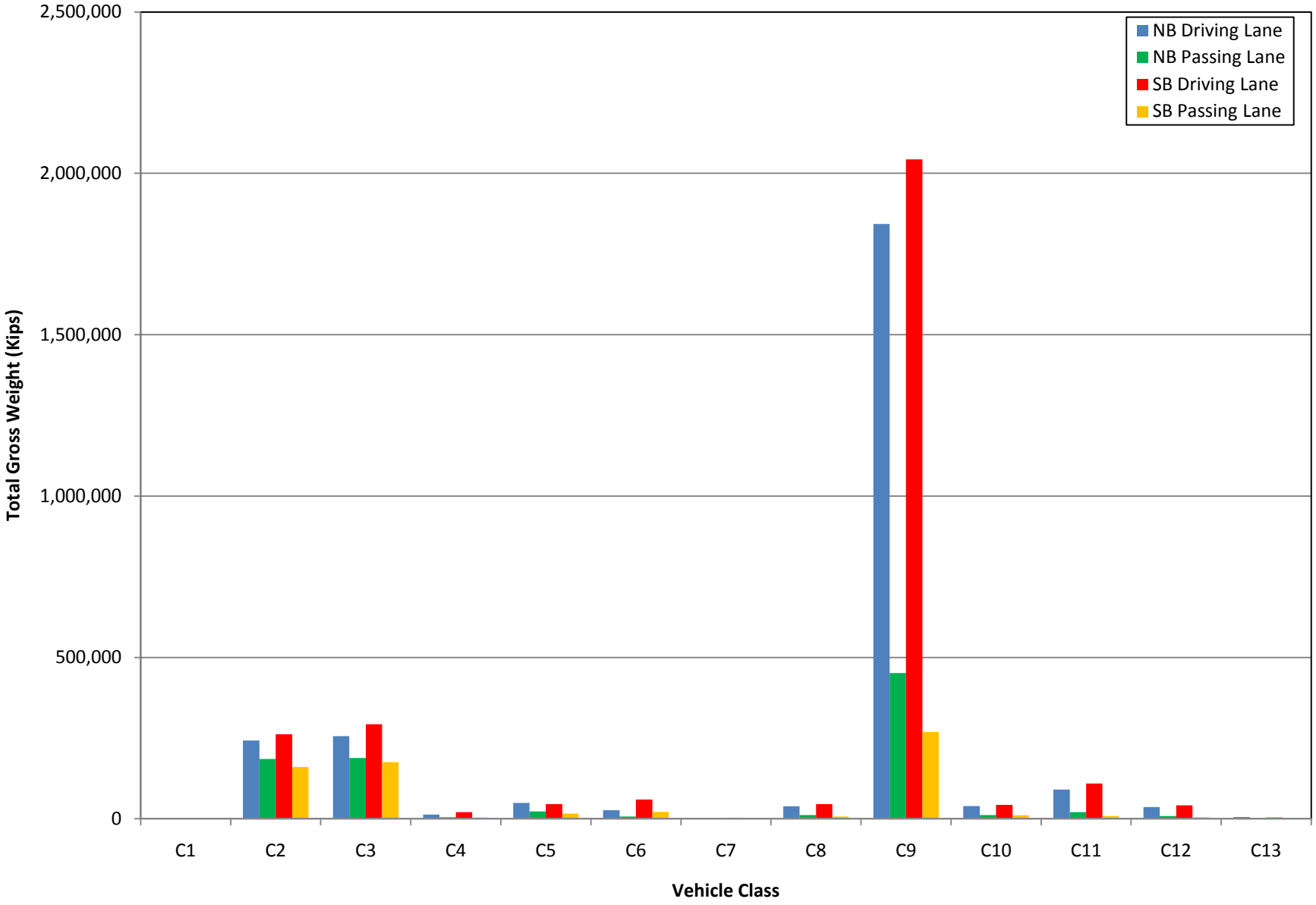


Figure 10 - Total Gross Vehicle Weight by Class

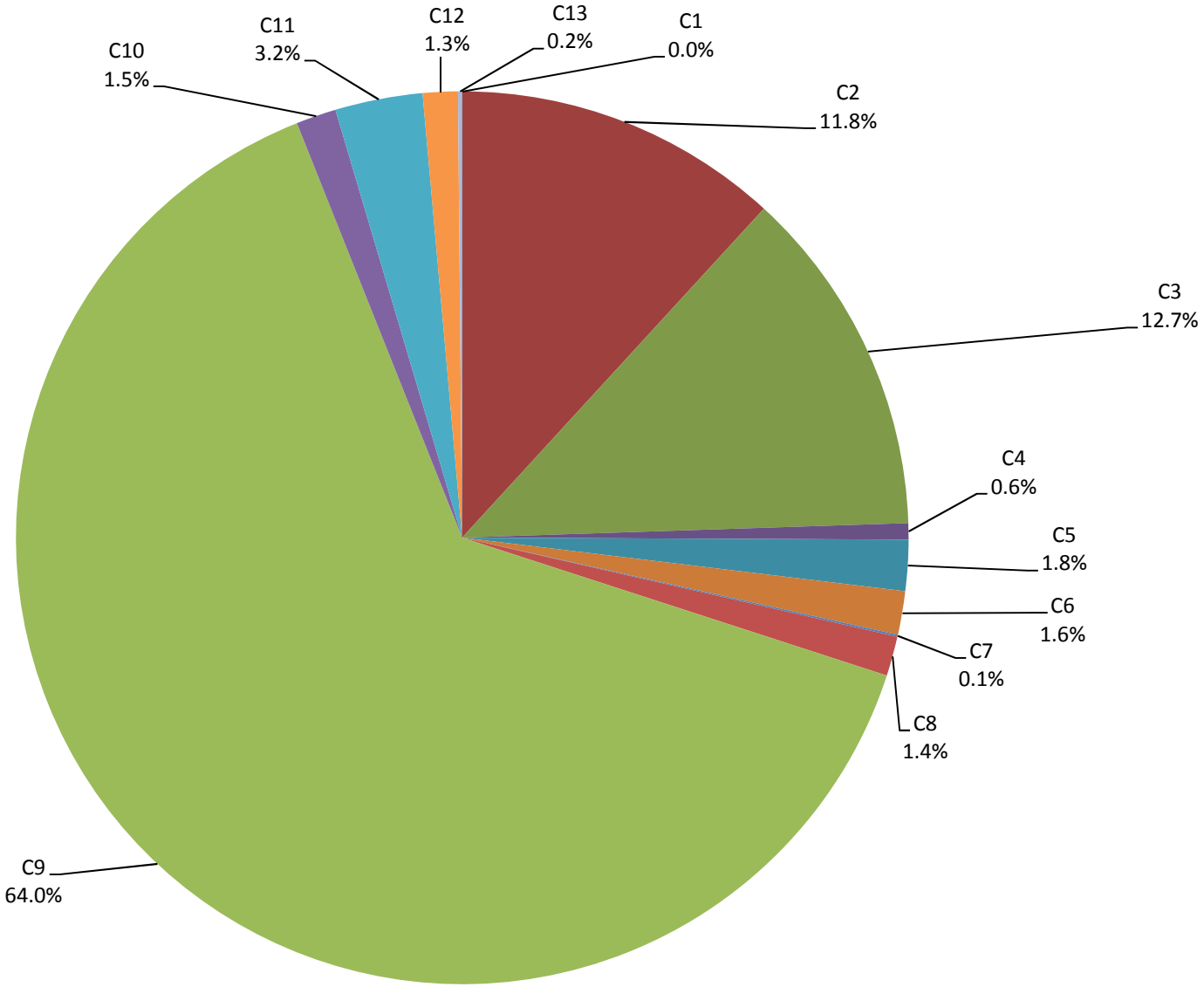


Figure 11 - Total ESALs by Class and Lane

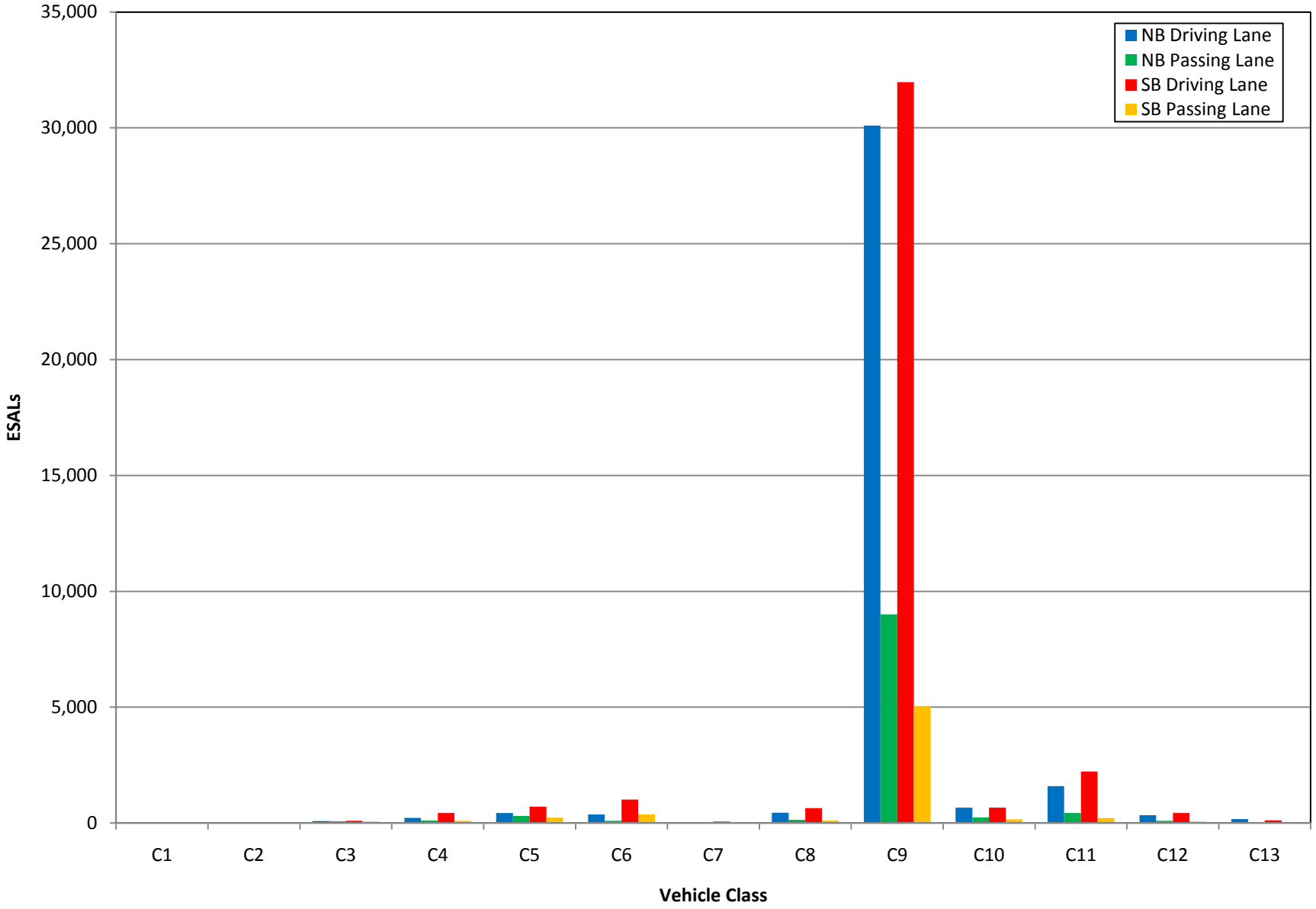


Figure 12 - ESALs by Class

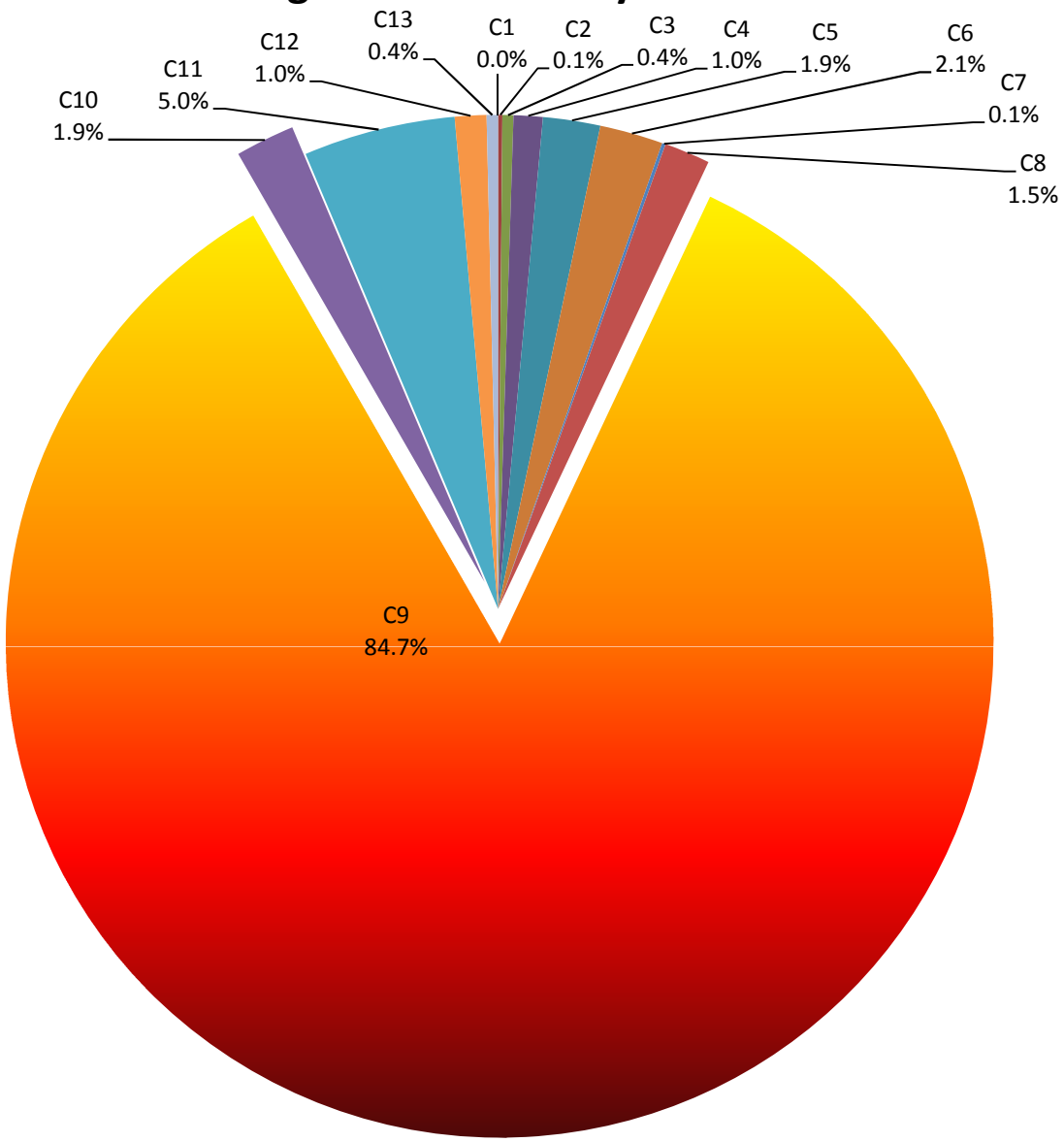
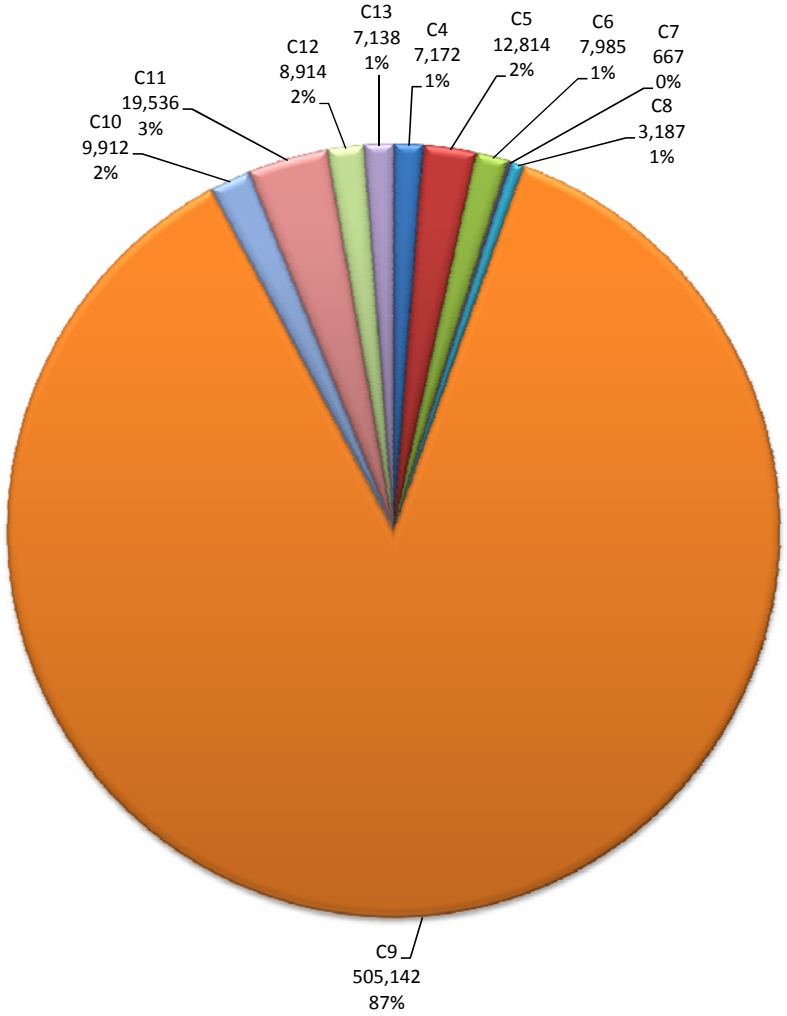


Figure 13 - Freight Tonnage and Percentage by Direction and Class

Northbound Freight



Southbound Freight

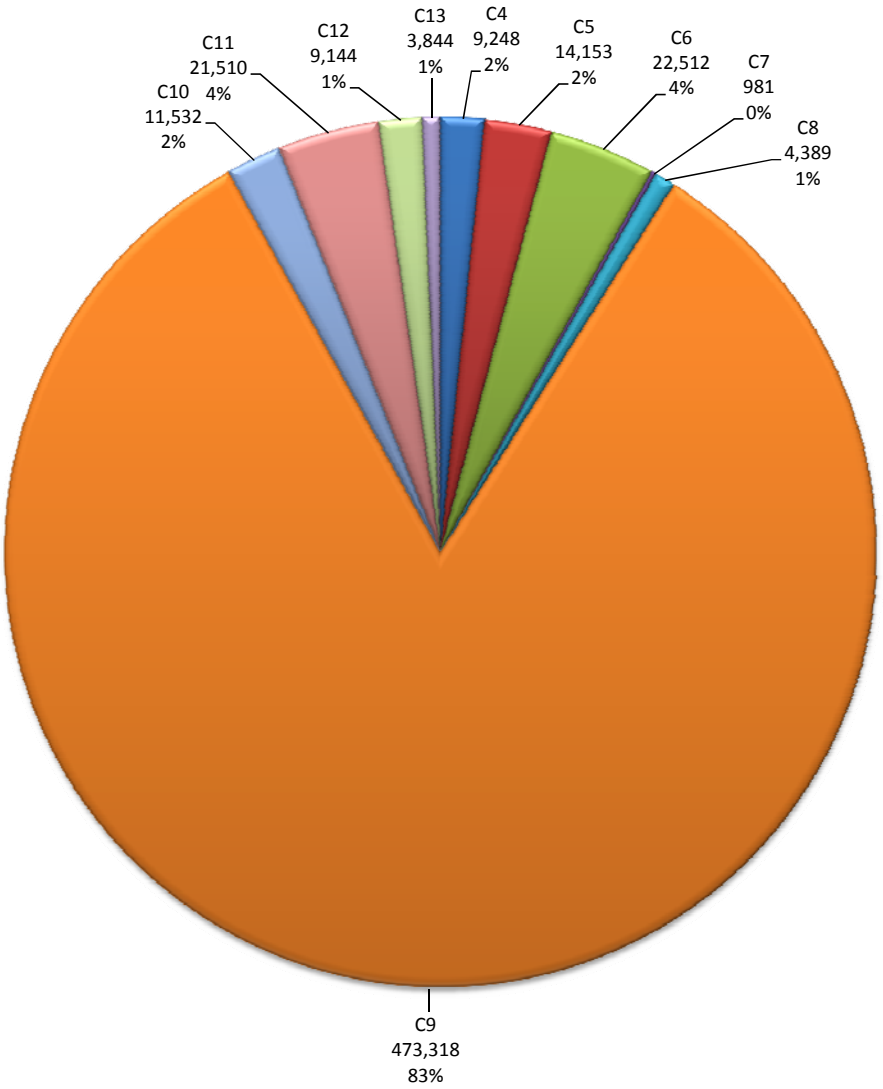


Figure 14 - Monthly Class 9 GVW Histogram - Lane 1 (NB Driving)

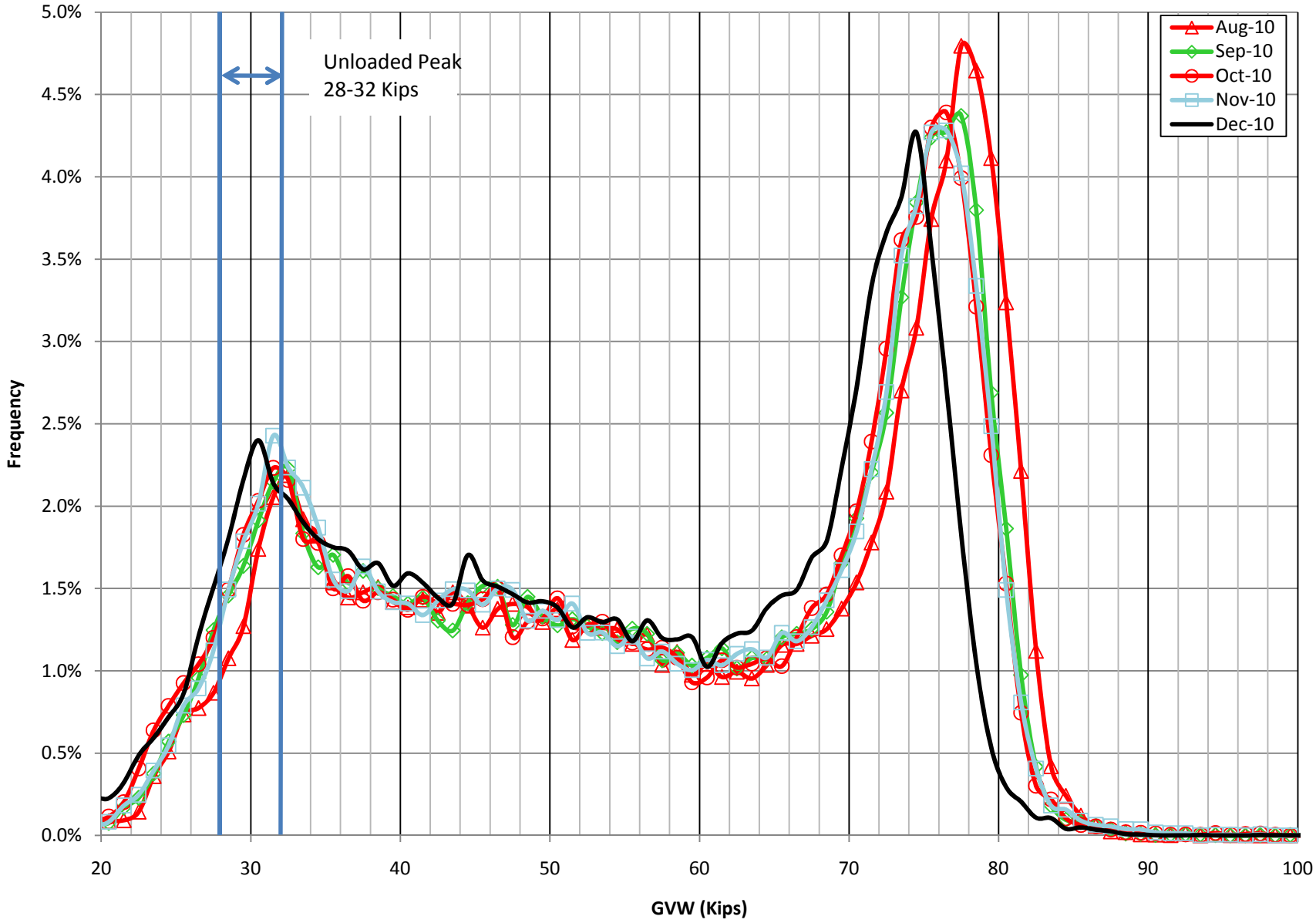


Figure 15 - Monthly Class 9 GVW Histogram - Lane 2 (NB Passing)

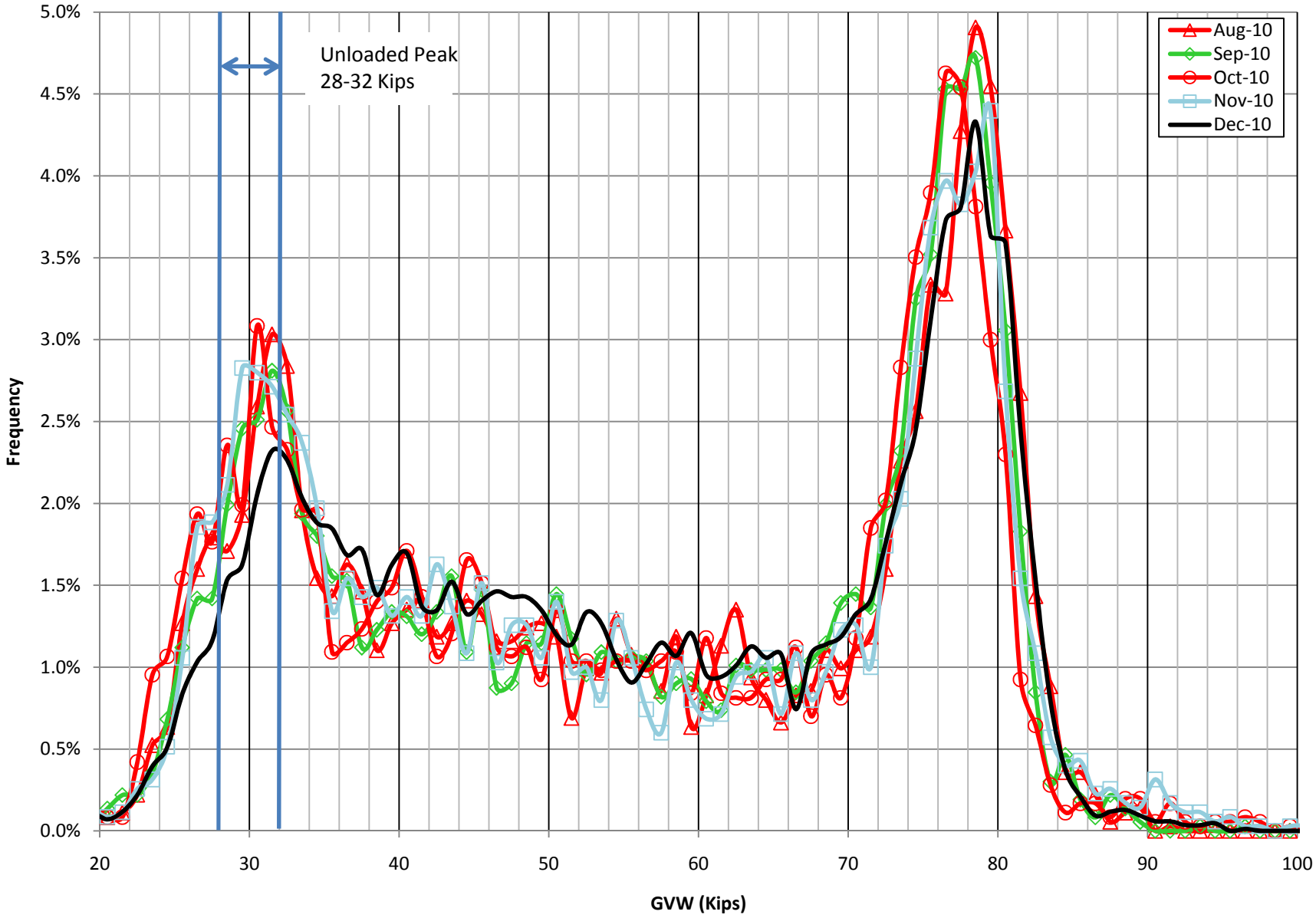


Figure 16 - Monthly Class 9 GVW Histogram - Lane 3 (SB Passing)

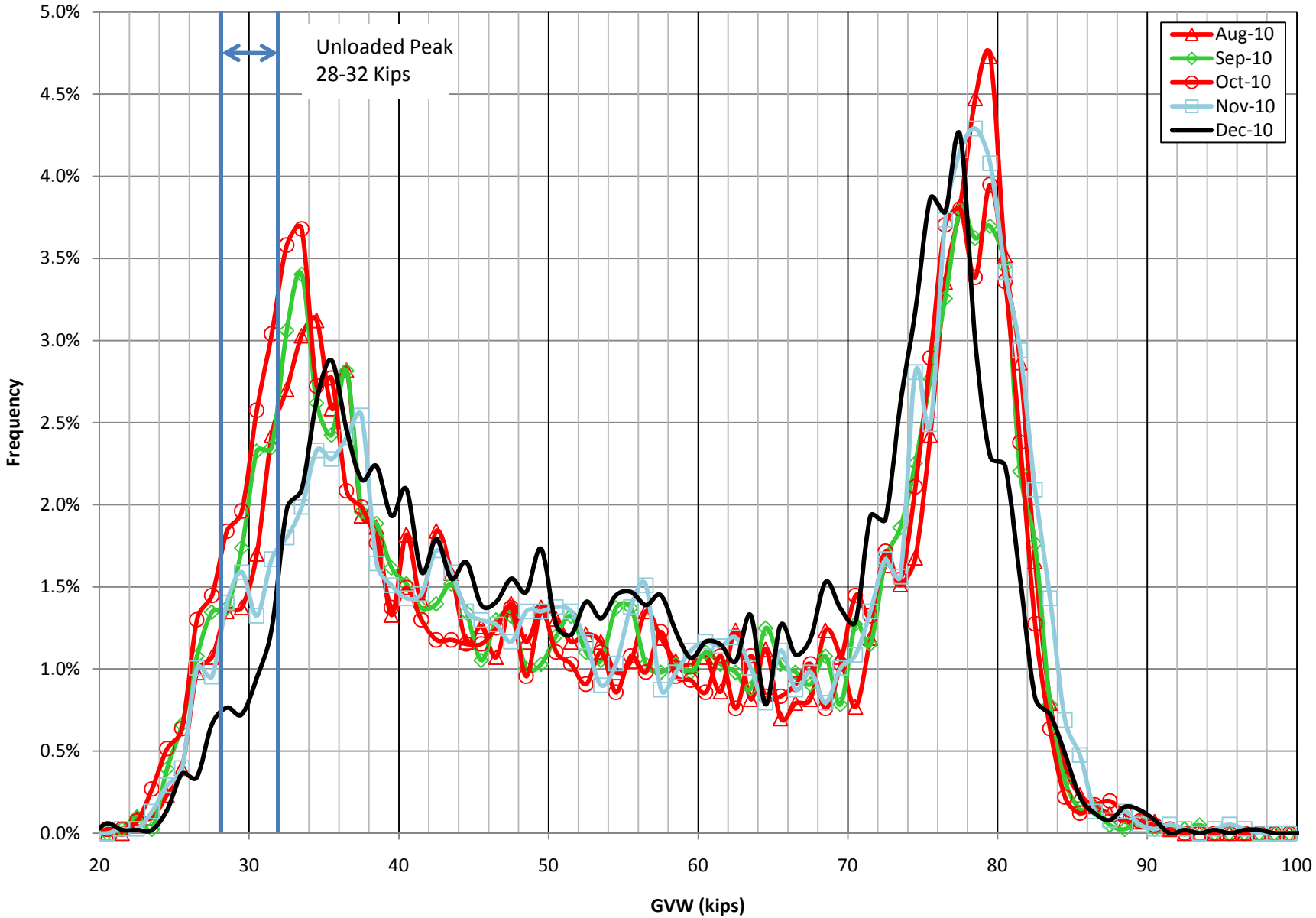


Figure 17 - Monthly Class 9 GVW Histogram - Lane 4 (SB Driving)

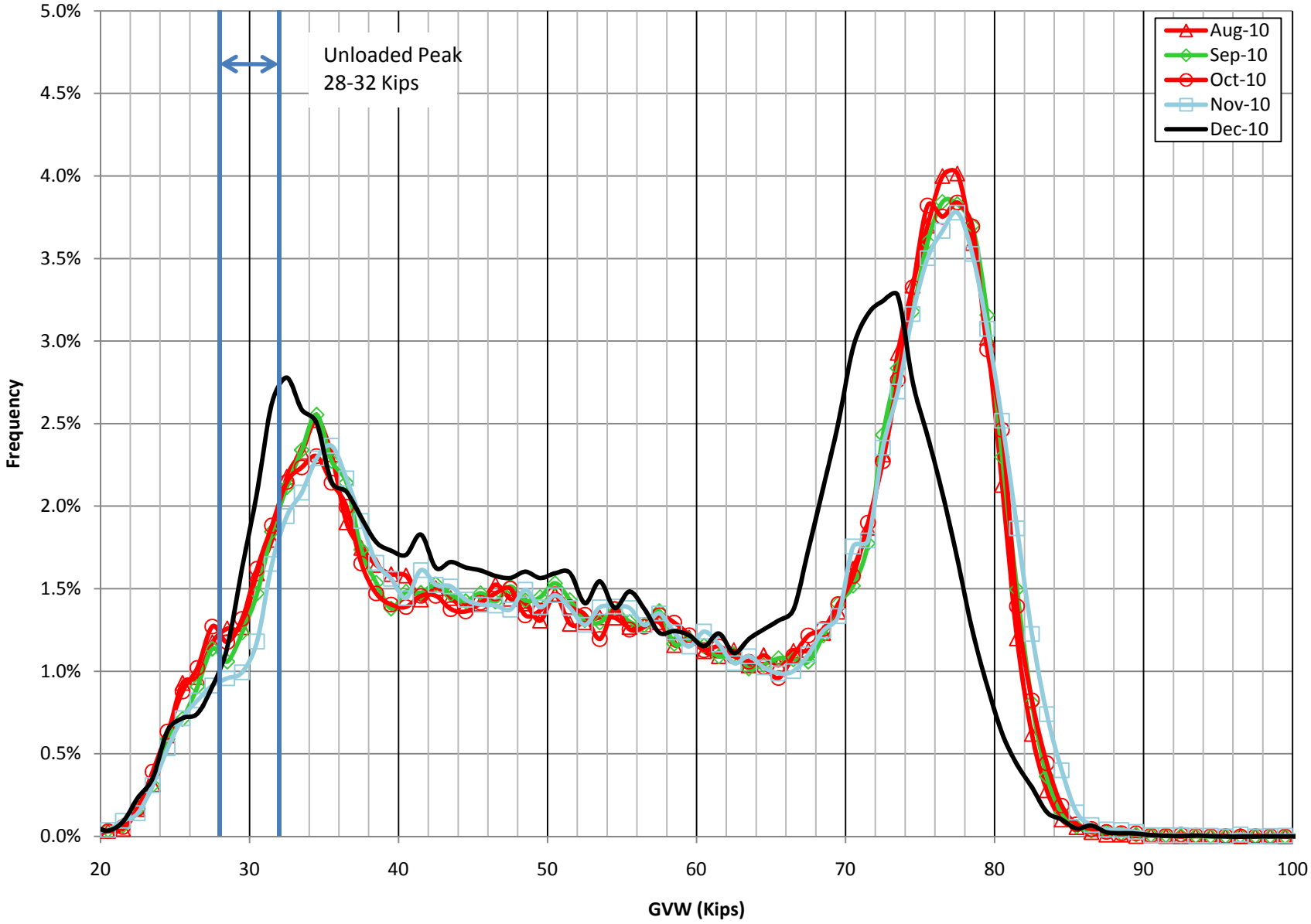


Figure 18 - Unloaded and Loaded Peaks by Lane vs. Date