



**WIM #33  
US 212, MP 78.5  
OLIVIA, MN**

**MARCH 2011**

**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](http://www.dot.state.mn.us/traffic/data/html/wim_reports.html)

For the month of March 2011, the system was operating normally. The data in this report uses the data that was collected for the month, no extrapolation.

### **VOLUME**

For WIM #33 on US 212 at mile post 78.5 near Olivia, there were 144,828 vehicles that passed the site for the month of March. The Average Daily Traffic (ADT) and Heavy Commercial Average Daily Traffic (HCADT) for March 2011 was 4,672 and 837, respectively. Of the heavy commercial vehicles, the top two in volume were the Class 9’s, and 10’s. Figure 1 shows the average number of vehicles, broken down by direction, versus day of the week. The average numbers of vehicles for both directions peaked on Fridays and were lowest on the weekends. 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 March the passenger vehicles going eastbound (EB) had a peak between 10 am and 7 pm and westbound (WB) passenger vehicles peaked from 7 am to 7 pm. The passenger vehicles were reviewed for directional volume differences and it appears that there was less than 2.0% difference in volume. For March the heavy commercial vehicles going EB had a peak between 7 am and 5 pm while the WB had a peak between 6 am and 6 pm. The heavy commercial vehicles were reviewed for directional volume differences and it appears that 22% more are going WB.

### **VEHICLE CLASSIFICATION**

The traffic volume consisted of 118,892 passenger vehicles (82.1%) and 25,936 heavy commercial vehicles (17.9%). 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 #33 the Winter Load Increases (WLI) went into effect on December 13, 2010 and were discontinued after February 18<sup>th</sup>. 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 data was analyzed with normal limits and that data is presented in the tables and graphs.

The total volume and total heavy commercial volume for March 2011 was 144,828 and 25,936, respectively. The total number of vehicles that were overweight was 8,398 or 5.8% of the total traffic or 32.4% 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 EB peaked on Mondays and for WB peaked on Thursdays and were lowest on weekends. The top two

overweight violators by class were the Class 9's and the Class 10'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 overweight vehicles were also reviewed to determine if there is a EB and WB difference. Figure 4 shows the total, EB, and WB overweight vehicles versus hour of the day. For March 2011, the volume of overweight vehicles peaked between 8 am and 4 pm. Over 37% more overweight vehicles were moving WB as compared to EB.

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

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. 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 EB direction during the normal load limits there were 867 vehicles over 88,000 pounds, 640 were Class 9's, 195 were Class 10's. In the WB direction during the normal load limits there were 3,486 vehicles over 88,000 pounds, 20 were Class's 9, 3,449 were Class 10's. Table 2 summarizes the Top 10 Gross Vehicle Weight for Class 9 and Class 10 vehicles for the month of March 2011.

### **SPEED**

The speed limit on US 212 at the WIM site is 55 mph. For March 2011 for both lanes, WIM #33 recorded an average speed of 56 mph, the median speed was 57 mph, and the 85<sup>th</sup> percentile speed was 60 mph. Table 3 summarizes the vehicle data for the Top 20 speeders that crossed WIM #33 in the month of March. The speed of the Top 20 ranged from 83 mph up to 111 mph. Two of the Top 20 speeders appear to be racing. Figure 6 shows the average speed of passenger vehicles and heavy commercial vehicles in both the EB and WB direction. Depending on the hour of the day there is only a 1 to 2 mph difference between the average slowest vehicles and the average fastest vehicles. Figure 7 shows the average speed versus the day of the week. For March 2011 the average speeds varied between 52.5 mph and 59 mph. There was not a significant variation in speed by day of the week. Figure 8 shows the average speed by lane. As expected, there is not much difference based on direction.

### **BRIDGE**

Bridge No. 6299, a box culvert, is approximately 13.4 miles east of WIM #33, and Bridge No. 96640, a box culvert, is 2.5 miles west of WIM #33. For the month of March 2011, WIM #33 saw 144,828 vehicles and recorded a total weight of 1,923,000 kips (1 kip =

1,000 pounds). Figure 9 summarizes the total GVW by direction and class and Figure 10 summarizes the percentages each class contributes to the total GVW. Table 4 provides details on the class breakdowns versus direction for GVW.

## **MATERIALS**

For March 2011 a total of 28,711 ESALs passed over the pavement at WIM #33. Approximately 50.6% of the ESALs were WB and 49.4% were EB. Figure 11 graphically depicts the total ESALs by class and direction. 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 64.1% of the ESALs while they are only 41.7% of the total gross vehicle weight. Table 5 provides details on the class breakdowns versus direction 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 2 lanes for March 2011, the largest is Lane 2, the WB lane. Therefore, the WB driving lane would be the design lane and the growth factor for this section of US 212 in Renville County is 1.6%.

In March for the WB lane, there were 731 Class 9 trucks and 3,614 Class 10 trucks over 80,000 pounds. These 4,345 vehicles generated 13,028 ESALs. If all of these trucks weighed just 80,000 pounds they would have generated 6,469 ESALs, 6,559 ESALs lower. If you take the March WB ESALs of 14,528 and multiply it by 12 to get an annual ESAL number, apply a growth factor of 1.6% for 20 years (1.32) and then multiply it by 20 to get a 20-year BESAL you get 4,602,000. If you go through the same process but start with a monthly value of 7,969, i.e. subtracting out all of the overweight Class 9 and 10 vehicles, you come up with 2,525,000 20-year BESALs. If you take the difference between the 20-year BESAL and divide that by 14,528, the BESALs with the overweight Class 9's and 10's you get 143.02, or the overweight Class 9's and 10's cause the pavement to reach its 20-year design life almost 12 years 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 #33 for March 2011, it was calculated that approximately 333,000 tons of freight crossed the sensors. More freight was shipped WB (209,000 tons) versus EB (124,000 tons). Table 6 summarizes the 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 #33 was calibrated on September 30, 2010 and calibrated again on January 27, 2011. 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 by lane. 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  $\pm 5\%$  and then secondly to have each individual axle stay within a range of  $\pm 9\%$ . As you can see in Table 7, the GVW was within the range of  $\pm 5\%$  for both Classes for both Lanes, except for Class 2 in Lane 2. In Table 8 the front axle weight stayed within  $\pm 9\%$  for all Classes in both 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 and 15 shows histograms of the monthly GVW of Class 9's over the last 10 months for Lanes 1 and 2. Figure 16 is a graph of the unloaded and loaded peaks by lane versus date. There are enough Class 9's in Lanes 1 and 2 that a weekly histogram can be developed. WIM #33 has been working fine and has been staying in the calibration range.

## **SUMMARY**

For March 2011 the average volume peaked on Fridays in both directions and was lowest on the weekends. The overweight vehicles peaked on Mondays EB and on Thursdays WB. The average numbers of overweight vehicles was higher in the WB direction as compared to the EB direction. The overweight vehicles peaked from 8 am to 4 pm. For March 2011, for the Class 9's, 28.5% of them were overweight and for the Class 10's, 79.9% of them were overweight. The speed of the traffic did not significantly vary by vehicle class, lane, day of the week, or hour of the day. The GVW was higher in the WB direction 1,072,000 kips versus 851,000 kips EB. This agrees with the ESALs and the freight data. The WB ESALs were higher 14,528 versus 14,184 EB. The tonnage of freight was higher in the WB direction 209,000 versus 124,000 EB. For March, the overweight Class 9's and 10's were shortening the 20-year BESAL design life by almost 12 years. Table 9 provides a monthly summary of some of the key data for the site during 2010.

Attach: Table 1 – Vehicle Classification Data  
Table 2 – Top 10 Gross Vehicle Weight, Class 9 and Class 10  
Table 3 – Top 20 Speeders  
Table 4 – Gross Vehicle Weight by Class and Direction  
Table 5 – ESALs by Class and Direction and Flexible ESAL Factors  
Table 6 – Freight Summary  
Table 7 – Gross Vehicle Weight by Class and Lane

Table 8 – Front Axle Weight by Class and Lane  
Table 9 – Site Summary  
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 Direction  
Figure 10 – Total Gross Vehicle Weight by Class  
Figure 11 – Total ESALs by Class and Direction  
Figure 12 – ESALs by Class  
Figure 13 – Freight Tonnage and Percentage by Direction and Class  
Figure 14 – Monthly Class 9 GVW Histogram – Lane 1 (EB)  
Figure 15 – Monthly Class 9 GVW Histogram – Lane 2 (WB)  
Figure 16 – Unloaded and Loaded Peaks by Lane vs. Date

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(Please request at least one week in advance).

**TABLE 1 - VEHICLE CLASSIFICATION DATA**  
**WIM #33 - OLIVIA**  
**March 2011**

<b>VEHICLE CLASS</b>	<b>MONTHLY AVERAGE DAILY VOLUME</b>	<b>MONTHLY TOTAL VOLUME</b>	<b>MONTHLY TOTAL VOLUME PERCENTAGE</b>	<b>MONTHLY TOTAL OVERWEIGHT VEHICLES</b>	<b>MONTHLY TOTAL OVERWEIGHT PERCENTAGE</b>
C1	1	27	0.0%	0	0.0%
C2	2,355	73,008	50.4%	0	0.0%
C3	1,479	45,857	31.7%	0	0.0%
C4	4	111	0.1%	5	0.1%
C5	151	4,689	3.2%	157	1.9%
C6	20	630	0.4%	79	0.9%
C7	1	40	0.0%	8	0.1%
C8	20	616	0.4%	23	0.3%
C9	472	14,629	10.1%	4,167	49.6%
C10	157	4,858	3.4%	3,881	46.2%
C11	9	286	0.2%	17	0.2%
C12	2	68	0.0%	54	0.6%
C13	0	9	0.0%	7	0.1%
<b>TOTAL =</b>	4,672	144,828	100.0%	8,398	100.0%

**TABLE 2 - TOP 10 GROSS VEHICLE WEIGHT, CLASS 9 AND CLASS 10**  
**WIM #33 - OLIVIA**  
**March 2011**

<b>DATE</b>	<b>DAY OF WEEK</b>	<b>TIME</b>	<b>VEHICLE CLASS</b>	<b>DIRECTION</b>	<b>LANE</b>	<b>GVW (lbs)</b>
3/9/11	Wednesday	20:43:51	10	Westbound	2	116,000
3/29/11	Tuesday	23:17:13	10	Eastbound	1	115,000
3/10/11	Thursday	13:16:31	10	Eastbound	1	114,000
3/18/11	Friday	7:38:00	10	Westbound	2	113,000
3/1/11	Tuesday	12:51:38	10	Westbound	2	113,000
3/8/11	Tuesday	12:07:29	10	Westbound	2	113,000
3/1/11	Tuesday	12:24:09	10	Westbound	2	113,000
3/6/11	Sunday	10:00:38	10	Westbound	2	113,000
3/10/11	Thursday	16:26:06	10	Westbound	2	113,000
3/1/11	Tuesday	14:50:53	10	Westbound	2	112,000

**TABLE 3 - TOP 20 SPEEDERS**  
**WIM #33 - OLIVIA**  
**March 2011**

DATE	DAY OF WEEK	TIME	VEHICLE CLASS	DIRECTION	LANE	SPEED (mph)
3/26/11	Saturday	20:23:35	2	Eastbound	1	111
3/6/11	Sunday	0:04:39	2	Eastbound	1	101
3/8/11	Tuesday	3:57:00	2	Eastbound	1	101
3/19/11	Saturday	10:41:48	2	Eastbound	1	94
3/19/11	Saturday	19:19:15	2	Westbound	2	94
3/17/11	Thursday	23:41:55	2	Eastbound	1	93
3/20/11	Sunday	0:45:15	3	Westbound	2	92
3/5/11	Saturday	20:46:41	2	Eastbound	1	89
3/12/11	Saturday	22:30:30	2	Eastbound	1	89 *
3/12/11	Saturday	22:30:32	2	Eastbound	1	89 *
3/25/11	Friday	21:53:17	2	Eastbound	1	86
3/27/11	Sunday	10:30:35	3	Westbound	2	86
3/8/11	Tuesday	11:56:58	3	Eastbound	1	85
3/17/11	Thursday	0:18:13	2	Eastbound	1	85
3/11/11	Friday	15:32:36	2	Eastbound	1	84
3/17/11	Thursday	16:30:23	2	Eastbound	1	84
3/20/11	Sunday	1:13:29	2	Eastbound	1	84
3/14/11	Monday	17:11:26	2	Westbound	2	83
3/21/11	Monday	0:04:48	3	Westbound	2	83
3/30/11	Wednesday	14:46:32	2	Eastbound	1	83

\* Appear to be racing

**TABLE 4 - GROSS VEHICLE WEIGHT BY CLASS AND DIRECTION**  
**WIM #33 - OLIVIA**  
**March 2011**

VEHICLE CLASS	EB DRIVING LANE (Kips)	WB DRIVING LANE (Kips)	TOTAL (Kips)	PERCENTAGE
C1	25	8	33	0.0%
C2	159,799	135,465	295,264	15.4%
C3	138,791	132,456	271,247	14.1%
C4	2,388	1,721	4,109	0.2%
C5	41,401	31,474	72,875	3.8%
C6	9,858	9,420	19,278	1.0%
C7	250	1,505	1,755	0.1%
C8	10,690	6,953	17,643	0.9%
C9	429,184	372,695	801,879	41.7%
C10	48,153	369,205	417,358	21.7%
C11	7,260	8,180	15,441	0.8%
C12	2,417	2,704	5,121	0.3%
C13	376	478	854	0.0%

**TOTAL =** 850,592      1,072,266      1,922,857      100.0%  
**GVW/LANE =** 44.2%      55.8%

**TABLE 5 - ESALS BY CLASS AND DIRECTION AND FLEXIBLE ESAL FACTORS**  
**WIM #33 - OLIVIA**  
**March 2011**

VEHICLE CLASS	EB DRIVING LANE	WB DRIVING LANE	TOTAL	PERCENTAGE	FLEXIBLE ESAL FACTOR
C1	0	0	0	0.0%	0.0004
C2	37	22	60	0.2%	0.0007
C3	59	48	107	0.4%	0.0022
C4	52	29	81	0.3%	0.64
C5	953	652	1,605	5.6%	0.24
C6	233	208	442	1.5%	0.85
C7	6	26	31	0.1%	0.96
C8	162	94	256	0.9%	0.32
C9	11,581	6,817	18,398	64.1%	1.02
C10	877	6,370	7,247	25.2%	0.75
C11	152	168	320	1.1%	0.74
C12	57	77	134	0.5%	1.30
C13	15	16	31	0.1%	2.20

**TOTAL =** 14,184      14,528      28,711      100.0%  
**ESALS/LANE =** 49.4%      50.6%

**TABLE 6 - FREIGHT SUMMARY**  
**WIM #33 - OLIVIA**  
**March 2011**

**EASTBOUND**

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	85	7	8.2%	2,959	94	848
C5	8.0	1,996	97	4.9%	35,304	707	9,703
C6	19.0	324	45	13.9%	10,010	777	1,966
C7	11.5	8	1	12.5%	317	11	113
C8	31.0	233	80	34.3%	8,385	1,926	858
C9	33.0	7,149	1,292	18.1%	431,231	38,152	99,899
C10	33.5	884	400	45.2%	44,107	12,635	7,629
C11	36.5	169	8	4.7%	10,260	285	2,049
C12	36.5	53	0	0.0%	4,254	0	1,160
C13	31.5	4	1	25.0%	309	31	92

**TOTAL =** 10,905      1,931      17.7%      547,136      --      124,316

**WESTBOUND**

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	88	13	14.8%	2,477	150	601
C5	8.0	1,790	154	8.6%	29,522	1,063	7,686
C6	19.0	306	71	23.2%	9,569	1,199	1,953
C7	11.5	29	0	0.0%	1,539	0	603
C8	31.0	185	76	41.1%	5,832	1,676	389
C9	33.0	7,480	2,643	35.3%	379,555	71,748	74,093
C10	33.5	3,902	52	1.3%	373,140	1,537	121,314
C11	36.5	147	1	0.7%	8,188	8	1,426
C12	36.5	38	0	0.0%	2,990	0	802
C13	31.5	5	0	0.0%	593	0	218

**TOTAL =** 13,970      3,010      21.5%      813,405      --      209,082

**GRAND TOTAL =** 24,875      4,941      19.9%      1,360,541      --      333,398

**TABLE 7 - GROSS VEHICLE WEIGHT BY CLASS AND LANE**  
**WIM #33 - OLIVIA**  
**March 2011**

MONTH	VEHICLE CLASS	LANE 1 (Kips)	GVW ± 5%	LANE 2 (Kips)	GVW ± 5%
Apr 10	C2	4.39	2.57%	3.97	2.06%
May 10		4.52	5.61%	4.04	3.86%
Jun 10		4.58	7.01%	4.08	4.88%
Jul 10		4.60	7.48%	4.16	6.94%
Aug 10		4.64	8.41%	4.18	7.46%
Sep 10		4.58	7.01%	4.17	7.20%
Oct 10		4.15	--	3.81	--
Nov 10		4.18	0.72%	3.78	-0.79%
Dec 10		4.21	1.45%	3.85	1.05%
Jan 11		4.05	-2.41%	3.78	-0.79%
Feb 11		4.34	--	4.02	--
Mar 11		4.42	1.84%	3.80	-5.47%
Apr 10		C3	6.54	4.98%	5.94
May 10	6.78		8.83%	6.08	6.11%
Jun 10	6.88		10.43%	6.22	8.55%
Jul 10	6.94		11.40%	6.32	10.30%
Aug 10	6.97		11.88%	6.36	10.99%
Sep 10	6.84		9.79%	6.27	9.42%
Oct 10	6.15		--	5.70	--
Nov 10	6.14		-0.16%	5.61	-1.58%
Dec 10	6.10		-0.81%	5.64	-1.05%
Jan 11	5.80		-5.69%	5.56	-2.46%
Feb 11	6.32		--	5.91	--
Mar 11	6.44		1.90%	5.68	-3.89%

**TABLE 8 - FRONT AXLE WEIGHT BY CLASS AND LANE**  
**WIM #33 - OLIVIA**  
**March 2011**

MONTH	VEHICLE CLASS	LANE 1 (Kips)	FRONT AXLE ± 9%	LANE 2 (Kips)	FRONT AXLE ± 9%
Apr 10	C2	2.57	3.21%	2.33	2.64%
May 10		2.63	5.62%	2.37	4.41%
Jun 10		2.67	7.23%	2.39	5.29%
Jul 10		2.68	7.63%	2.43	7.05%
Aug 10		2.70	8.43%	2.45	7.93%
Sep 10		2.67	7.23%	2.43	7.05%
Oct 10		2.41	--	2.22	--
Nov 10		2.43	0.83%	2.20	-0.90%
Dec 10		2.43	0.83%	2.23	0.45%
Jan 11		2.35	-2.49%	2.20	-0.90%
Feb 11		2.52	--	2.34	--
Mar 11		2.57	1.98%	2.21	-5.56%
Apr 10		C3	3.48	3.57%	3.15
May 10	3.57		6.25%	3.19	3.57%
Jun 10	3.62		7.74%	3.24	5.19%
Jul 10	3.63		8.04%	3.29	6.82%
Aug 10	3.65		8.63%	3.31	7.47%
Sep 10	3.60		7.14%	3.29	6.82%
Oct 10	3.25		--	2.99	--
Nov 10	3.27		0.62%	2.98	-0.33%
Dec 10	3.28		0.92%	3.02	1.00%
Jan 11	3.18		-2.15%	2.98	-0.33%
Feb 11	3.41		--	3.17	--
Mar 11	3.48		2.05%	3.04	-4.10%
Apr 10	C9		12.13	4.84%	11.39
May 10		12.33	6.57%	11.39	5.16%
Jun 10		12.40	7.17%	11.42	5.45%
Jul 10		12.42	7.35%	11.39	5.16%
Aug 10		12.39	7.09%	11.42	5.45%
Sep 10		12.28	6.14%	11.30	4.34%
Oct 10		11.01	--	10.33	--
Nov 10		10.98	-0.27%	10.41	0.77%
Dec 10		10.79	-2.00%	10.22	-1.06%
Jan 11		10.66	-3.18%	10.32	-0.10%
Feb 11		11.53	--	11.03	--
Mar 11		11.78	2.17%	10.60	-3.90%

**TABLE 9 - SITE SUMMARY  
WIM #33 - OLIVIA  
March 2011**

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MONTH	TOTAL VOLUME	MONTHLY ADT	MONTHLY HCADT	PASSENGER VEHICLES #	PASSENGER VEHICLES %	HEAVY COMMERCIAL VEHICLES #	HEAVY COMMERCIAL VEHICLES %
Apr 10	156,309	5,155	744	133,498	85.4%	22,811	14.6%
May 10	161,472	5,283	722	140,801	87.2%	20,671	12.8%
Jun 10	157,662	5,241	631	138,285	87.7%	19,377	12.3%
Jul 10	156,462	4,966	611	137,510	87.9%	18,952	12.1%
Aug 10	170,624	5,543	757	147,258	86.3%	23,366	13.7%
Sep 10	167,387	5,550	1,016	136,212	81.4%	31,175	18.6%
Oct 10	169,989	5,562	1,015	140,276	82.5%	29,713	17.5%
Nov 10	149,660	5,059	866	123,268	82.4%	26,392	17.6%
Dec 10	147,165	4,761	810	120,854	82.1%	26,311	17.9%
Jan 11	131,752	4,250	663	111,190	84.4%	20,562	15.6%
Feb 11	124,492	4,446	780	102,653	82.5%	21,839	17.5%
Mar 11	144,828	4,672	837	118,892	82.1%	25,936	17.9%

<b>TOTAL =</b>	1,837,802	--	--	1,550,697	--	287,105	--
<b>AVERAGE =</b>	153,150	5,041	788	129,225	84.4%	23,925	15.6%

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MONTH	ESALS EB DRIVING LANE	ESALS WB DRIVING LANE	TOTAL ESALS	PAVEMENT LIFE DECREASE MONTHS *	SYSTEM OPERATION Days	SYSTEM OPERATION %
Apr 10	15,875	12,106	27,981	34.35	30	100.0%
May 10	15,146	9,646	24,793	39.40	31	100.0%
Jun 10	13,503	9,658	23,160	42.26	30	100.0%
Jul 10	14,373	9,288	23,660	48.34	31	100.0%
Aug 10	19,720	11,977	31,698	52.79	31	100.0%
Sep 10	19,715	18,655	38,370	50.00	30	100.0%
Oct 10	14,438	12,848	27,285	19.30	31	100.0%
Nov 10	10,690	11,111	21,800	6.43	30	100.0%
Dec 10	9,572	11,887	21,458	4.96	31	100.0%
Jan 11	8,884	8,930	17,814	2.20	31	100.0%
Feb 11	10,412	16,579	26,991	12.64	28	100.0%
Mar 11	14,184	14,528	28,711	13.19	31	100.0%

<b>TOTAL =</b>	166,511	147,211	313,722	--	365	--
<b>AVERAGE =</b>	13,876	12,268	26,143	27.2	--	100.0%

\* Based on WLI of 88,000 lbs in effect until March 8, 2010 and then again starting December 13, 2010 and ending on February 19, 2011.

**TABLE 9 - SITE SUMMARY (contd.)  
WIM #33 - OLIVIA  
March 2011**

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MONTH	GVW EB DRIVING LANE	GVW WB DRIVING LANE	TOTAL GVW KIPS
Apr 10	914,871	853,603	1,768,474
May 10	901,036	782,982	1,684,018
Jun 10	843,685	758,133	1,601,818
Jul 10	835,096	756,552	1,591,648
Aug 10	1,026,445	890,610	1,917,055
Sep 10	1,113,359	1,173,319	2,286,677
Oct 10	1,008,605	1,049,732	2,058,337
Nov 10	870,429	975,496	1,845,925
Dec 10	833,753	1,018,993	1,852,746
Jan 11	701,405	771,068	1,472,473
Feb 11	669,915	1,112,950	1,782,865
Mar 11	850,592	1,072,266	1,922,857

<b>TOTAL =</b>	10,569,192	11,215,702	21,784,894
<b>AVERAGE =</b>	880,766	934,642	1,815,408

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MONTH	TOTAL NUMBER OF OVERWEIGHT VEHICLES	OVERWEIGHT/ TOTAL VOLUME %	OVERWEIGHT/ HEAVY COMMERCIAL VOLUME %	NUMBER OVER 88,000 LBS	NUMBER OVER 98,000 LBS
Apr 10	6,963	4.5%	30.5%	1,347	98
May 10	6,043	3.7%	29.2%	1,713	123
Jun 10	5,326	3.4%	27.5%	1,740	173
Jul 10	5,441	3.5%	28.7%	2,097	216
Aug 10	7,783	4.6%	33.3%	3,225	263
Sep 10	10,749	6.4%	34.5%	4,271	314
Oct 10	6,985	4.1%	23.5%	1,386	416
Nov 10	5,385	3.6%	20.4%	1,548	77
Dec 10	4,869	3.3%	18.5%	2,291	379
Jan 11	2,998	2.3%	14.6%	919	45
Feb 11	8,487	6.8%	38.9%	5,353	2710
Mar 11	8,398	5.8%	32.4%	4,353	2161

<b>TOTAL =</b>	79,427	--	--	30,243	6,975
<b>AVERAGE =</b>	6,619	4.3%	27.7%	2,520	581

\* Based on WLI of 88,000 lbs in effect until March 8, 2010 and then again starting December 13, 2010 and ending on February 19, 2011.

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MONTH	AVERAGE SPEED (mph)	MEDIAN SPEED (mph)	85th PERCENTILE SPEED (mph)
Apr 10	57	58	61
May 10	57	58	61
Jun 10	58	58	61
Jul 10	58	58	61
Aug 10	57	58	61
Sep 10	57	58	61
Oct 10	58	58	61
Nov 10	58	58	61
Dec 10	55	56	60
Jan 11	56	56	60
Feb 11	56	57	60
Mar 11	56	57	60

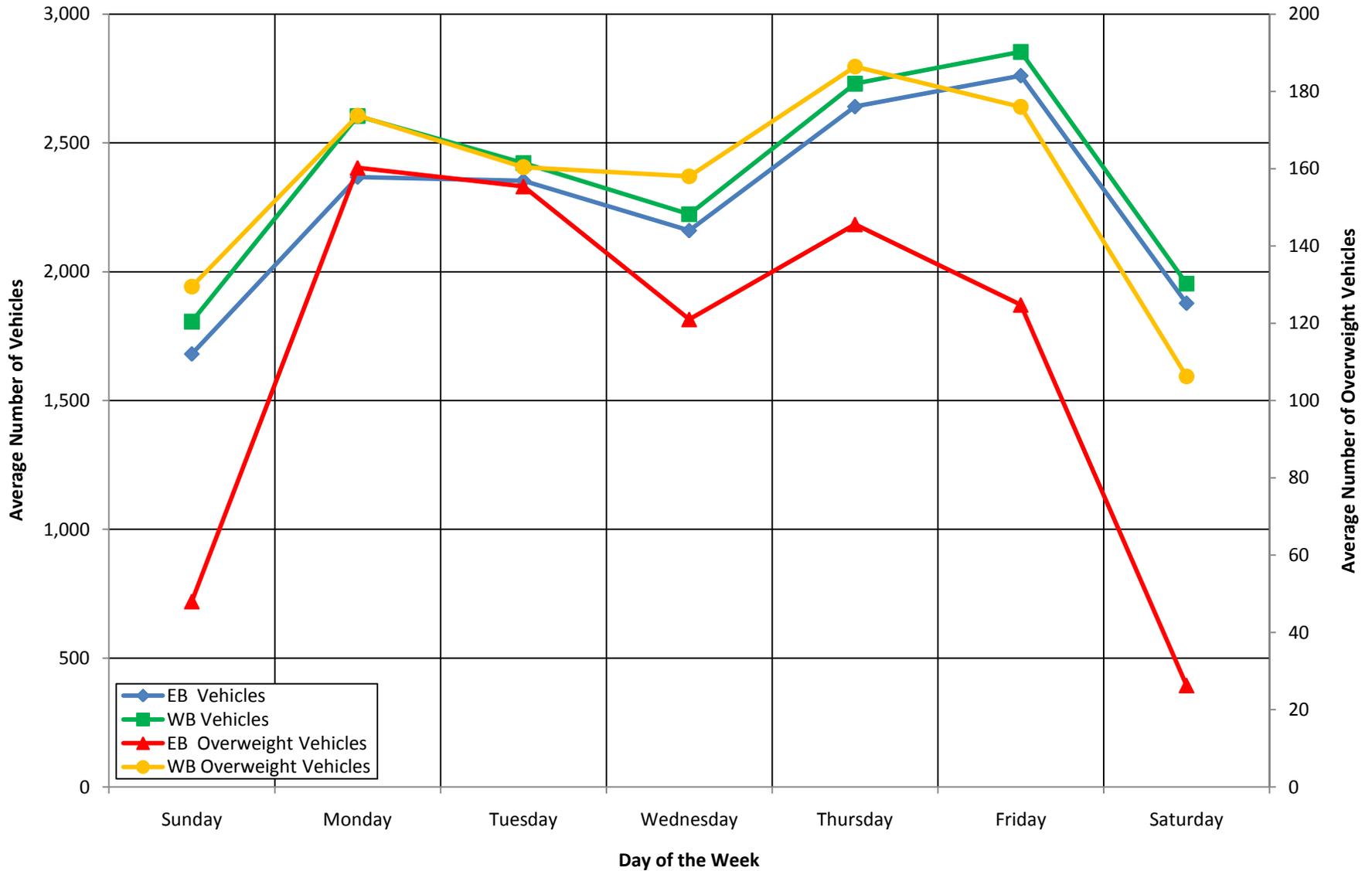
<b>TOTAL =</b>	--	--	--
<b>AVERAGE =</b>	57	58	61

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MONTH	EB FREIGHT TONS	WB FREIGHT TONS	TOTAL FREIGHT TONS	EB FREIGHT %	WB FREIGHT %
Apr 10	137,894	119,658	257,552	53.5%	46.5%
May 10	118,771	79,573	198,344	59.9%	40.1%
Jun 10	115,349	94,184	209,533	55.1%	44.9%
Jul 10	120,643	89,312	209,955	57.5%	42.5%
Aug 10	165,626	112,877	278,503	59.5%	40.5%
Sep 10	164,013	205,311	369,324	44.4%	55.6%
Oct 10	140,651	169,001	309,652	45.4%	54.6%
Nov 10	106,489	166,095	272,584	39.1%	60.9%
Dec 10	25,691	43,336	69,027	37.2%	62.8%
Jan 11	77,052	78,016	155,068	49.7%	50.3%
Feb 11	94,460	247,329	341,789	27.6%	72.4%
Mar 11	124,316	209,082	333,398	37.3%	62.7%

<b>TOTAL =</b>	1,390,954	1,613,774	3,004,729	--	--
<b>AVERAGE =</b>	115,913	134,481	250,394	46.3%	53.7%

**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**

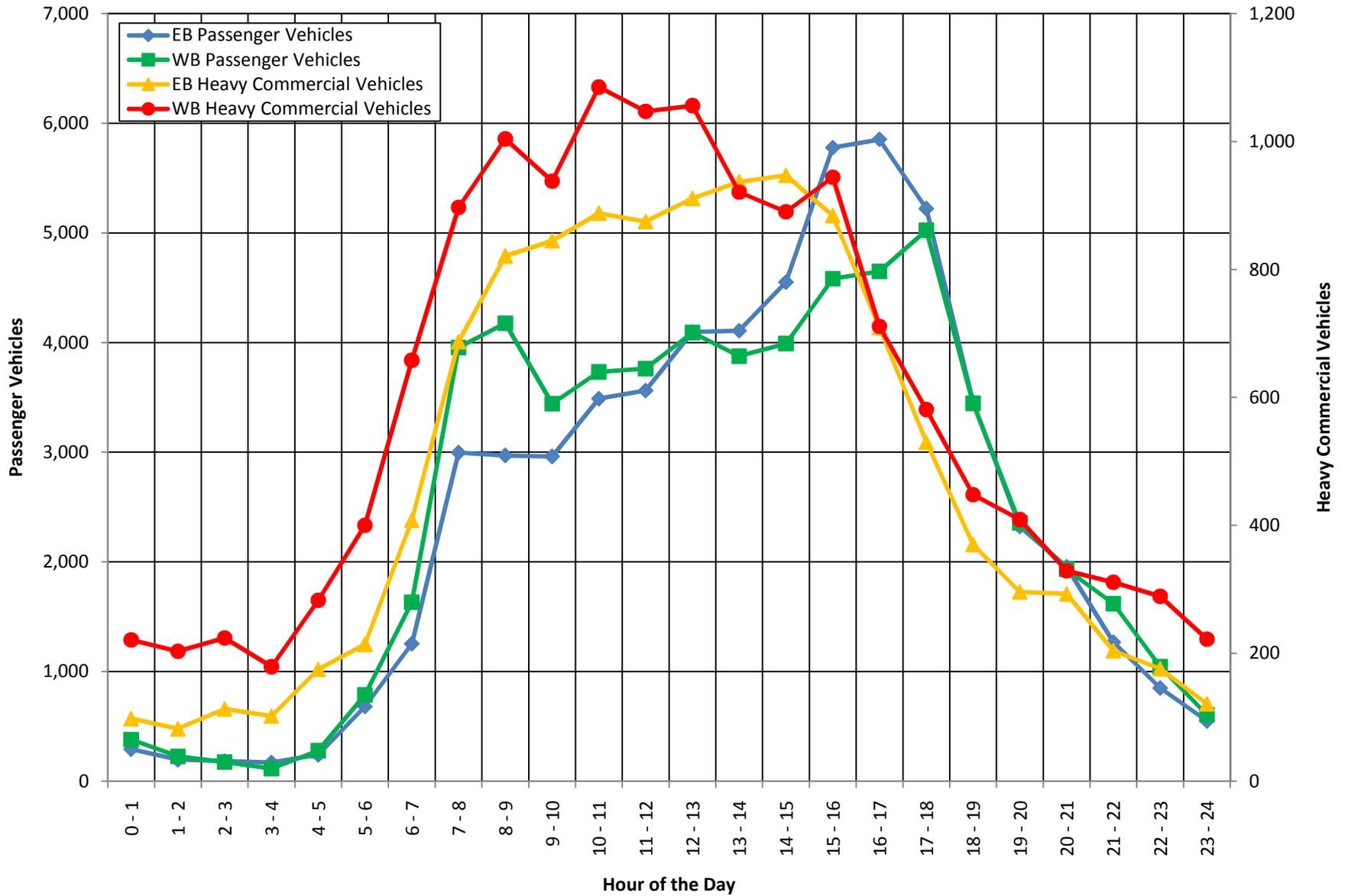
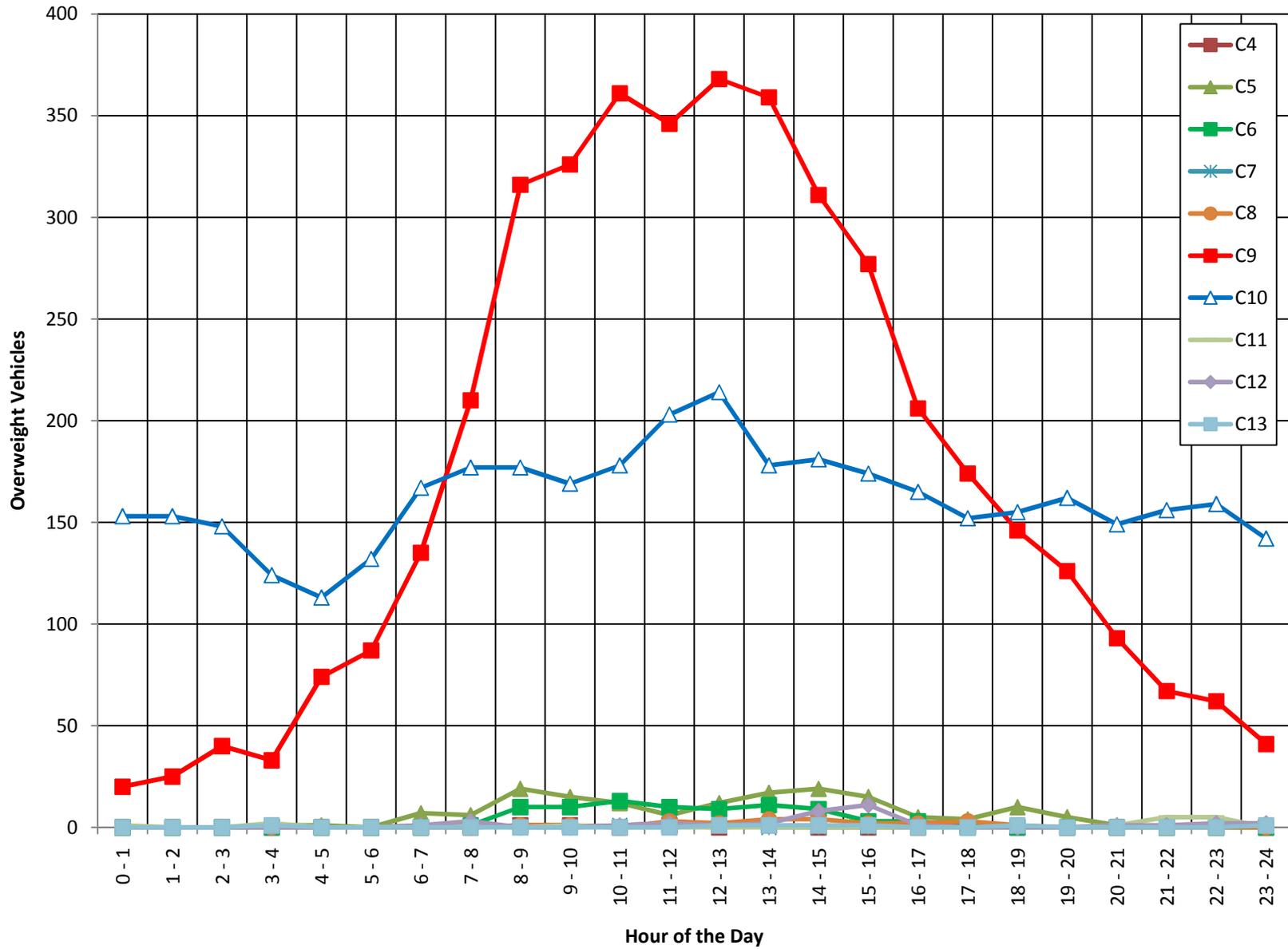
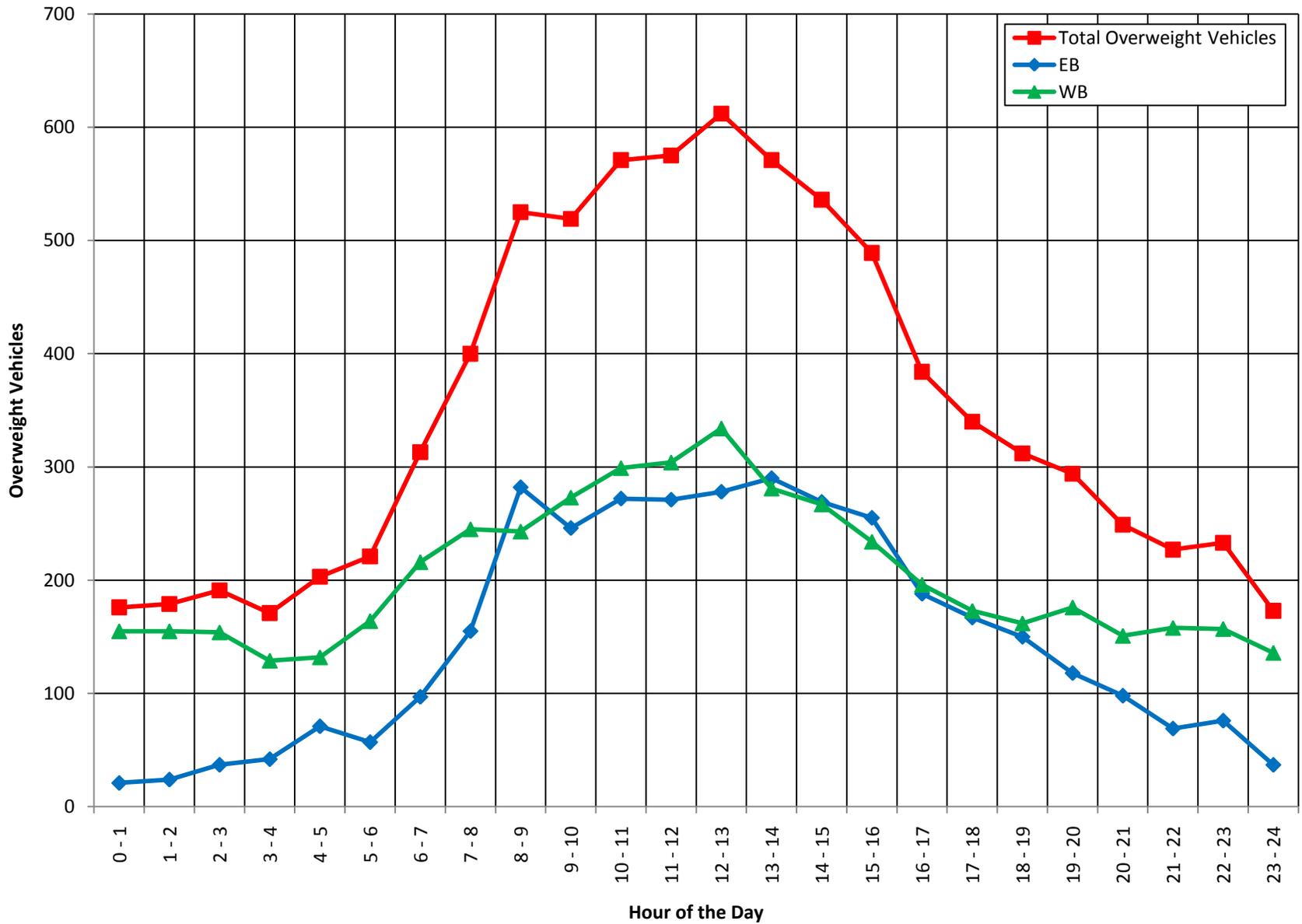


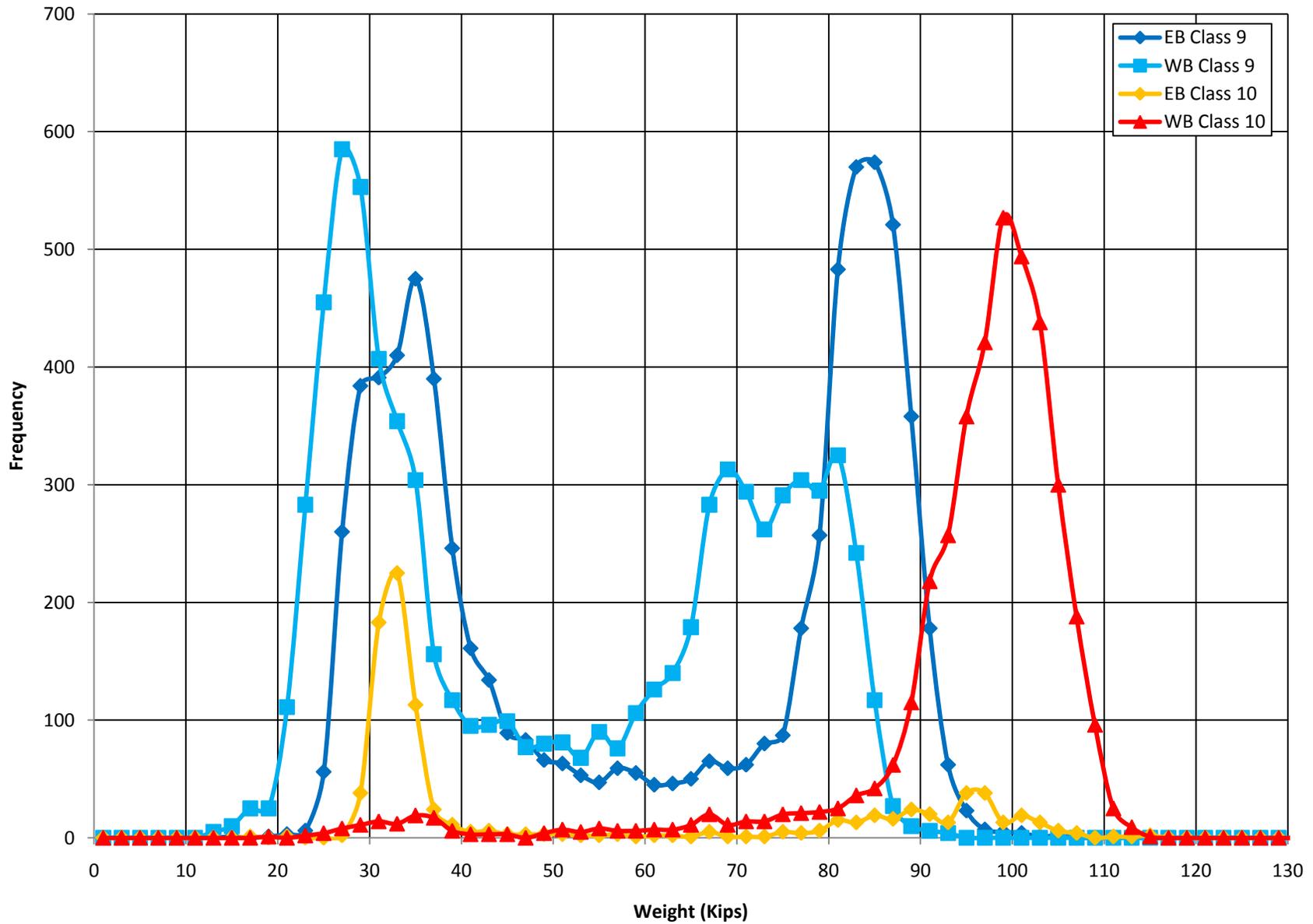
Figure 3 - Overweight Vehicles by Class vs. Hour of the Day



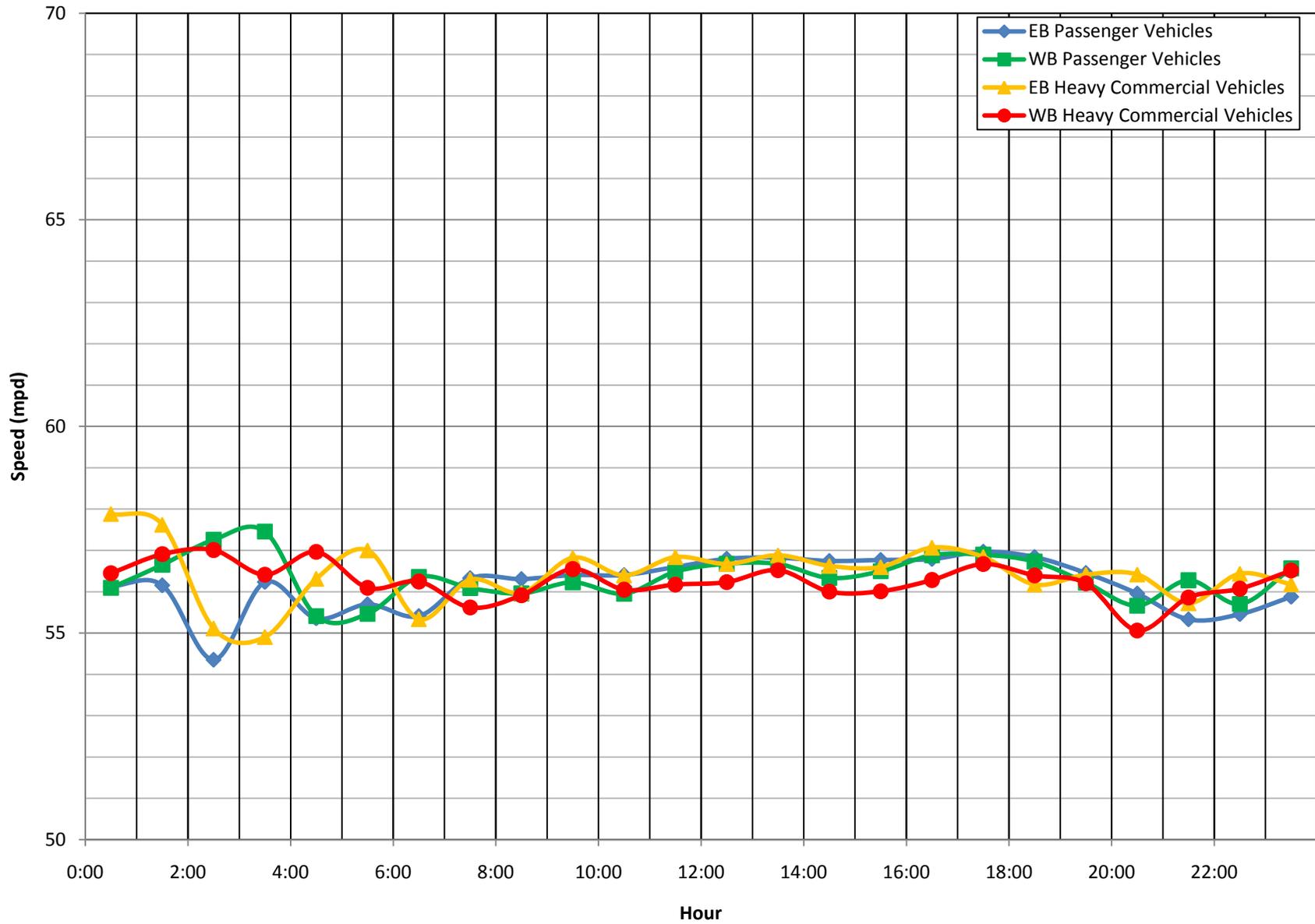
**Figure 4 - Overweight Vehicles by Direction vs. Hour of the Day**



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

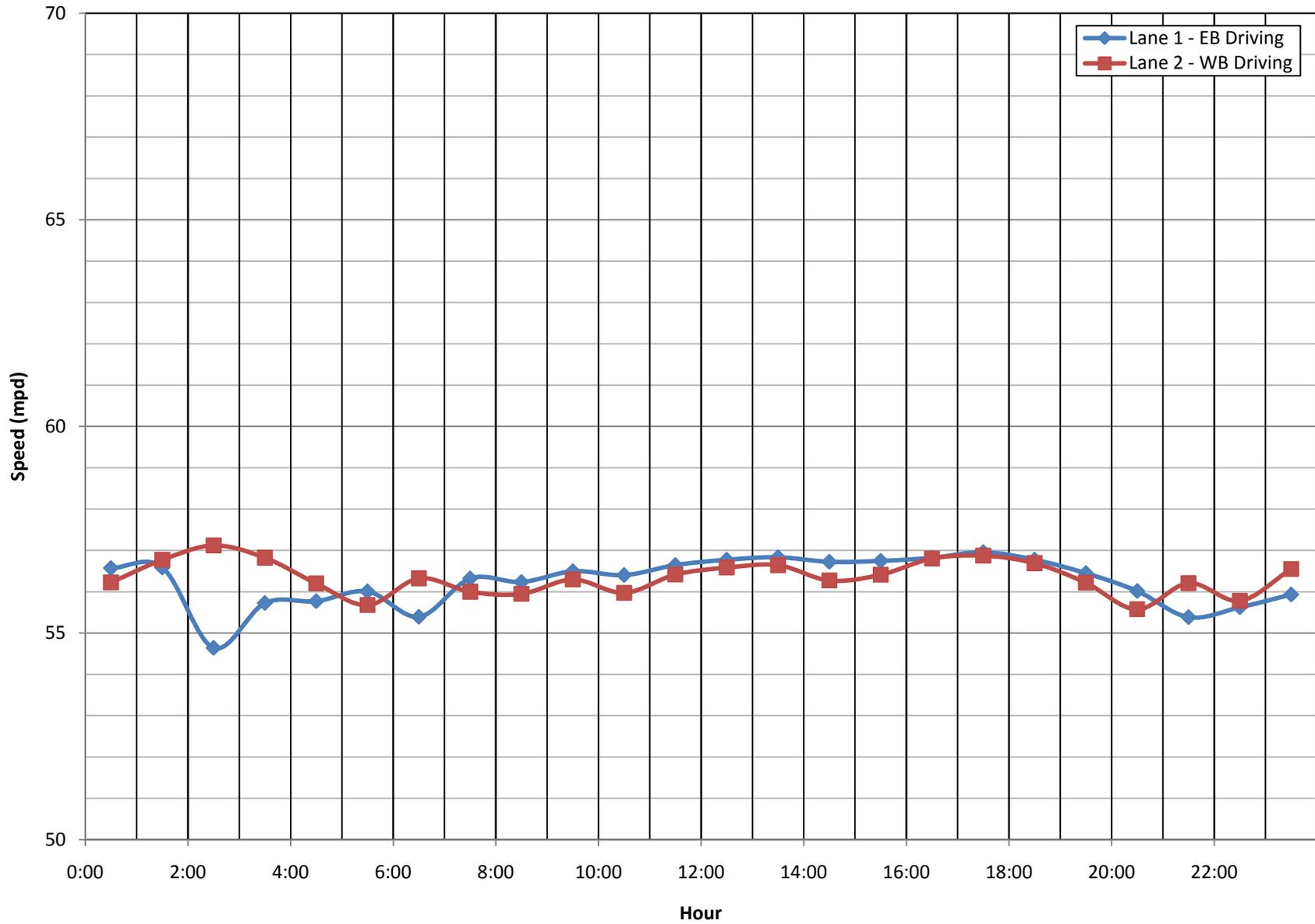


**Figure 6 - Average Speed by Lane and Vehicle Type vs. Hour of the Day**

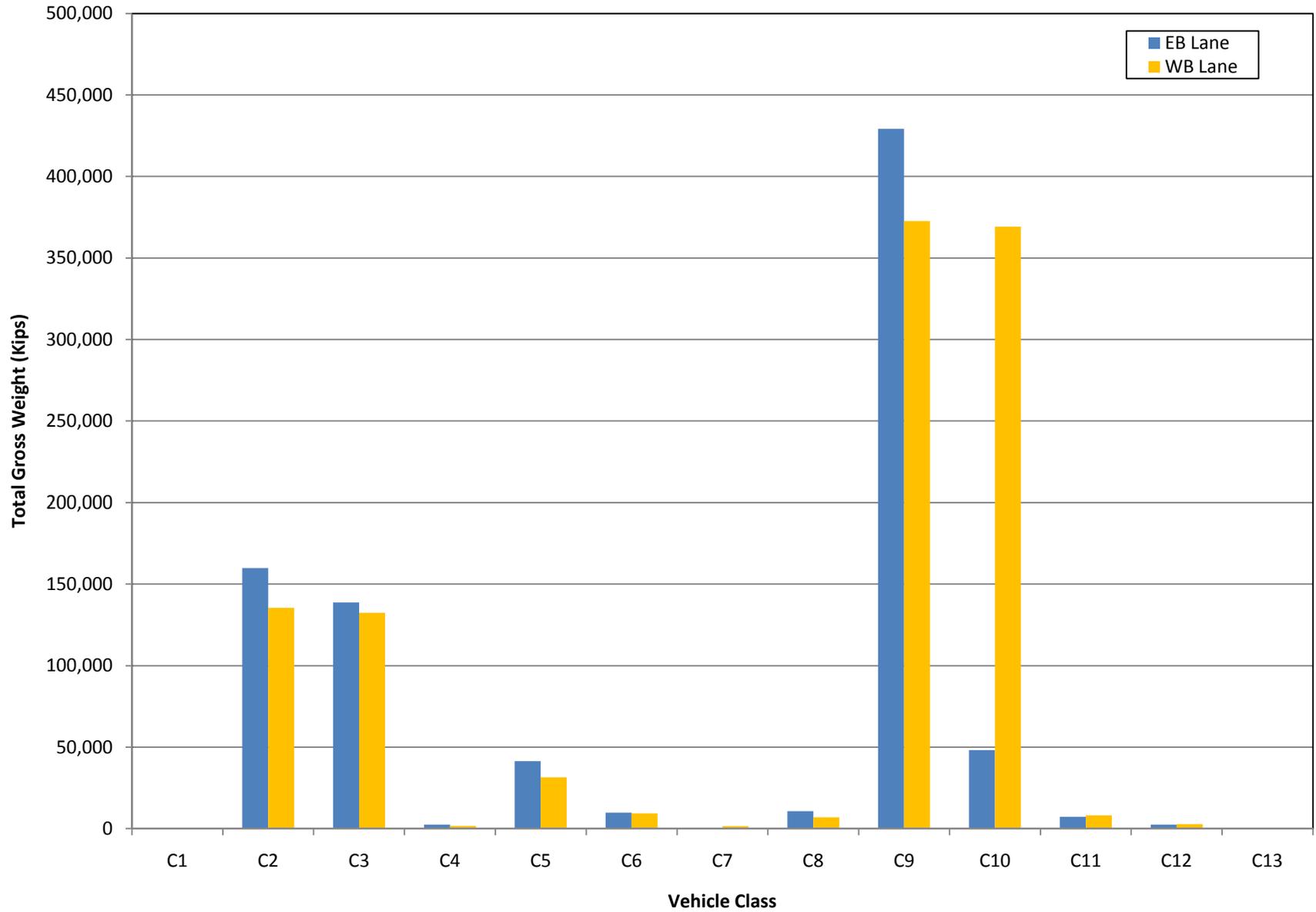




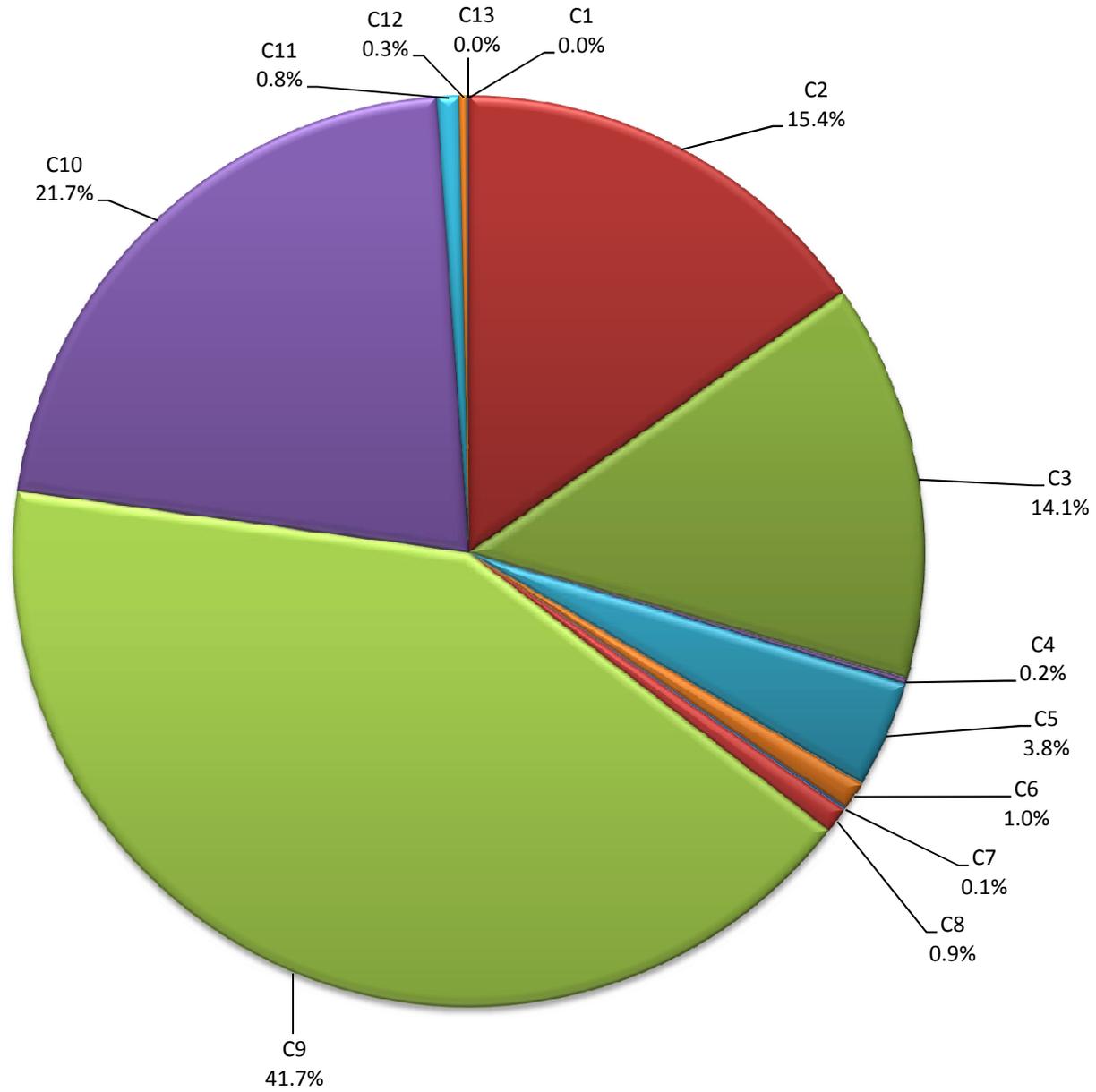
**Figure 8 - Average Speed by Lane and Direction vs. Hour of the Day**



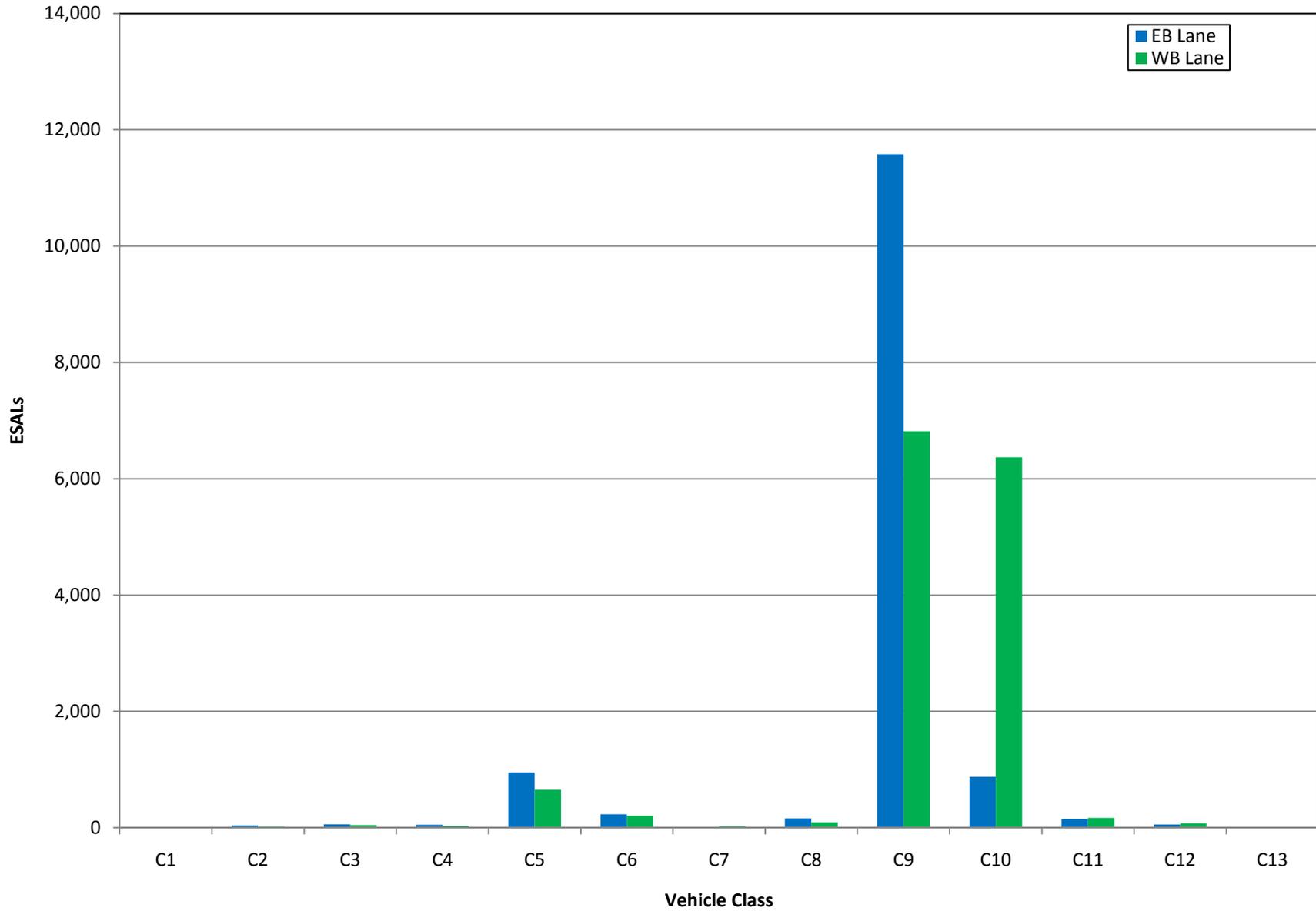
**Figure 9 - Total Gross Vehicle Weight by Class and Direction**



**Figure 10 - Total Gross Vehicle Weight by Class**



**Figure 11 - Total ESALs by Class and Direction**



**Figure 12 - ESALs by Class**

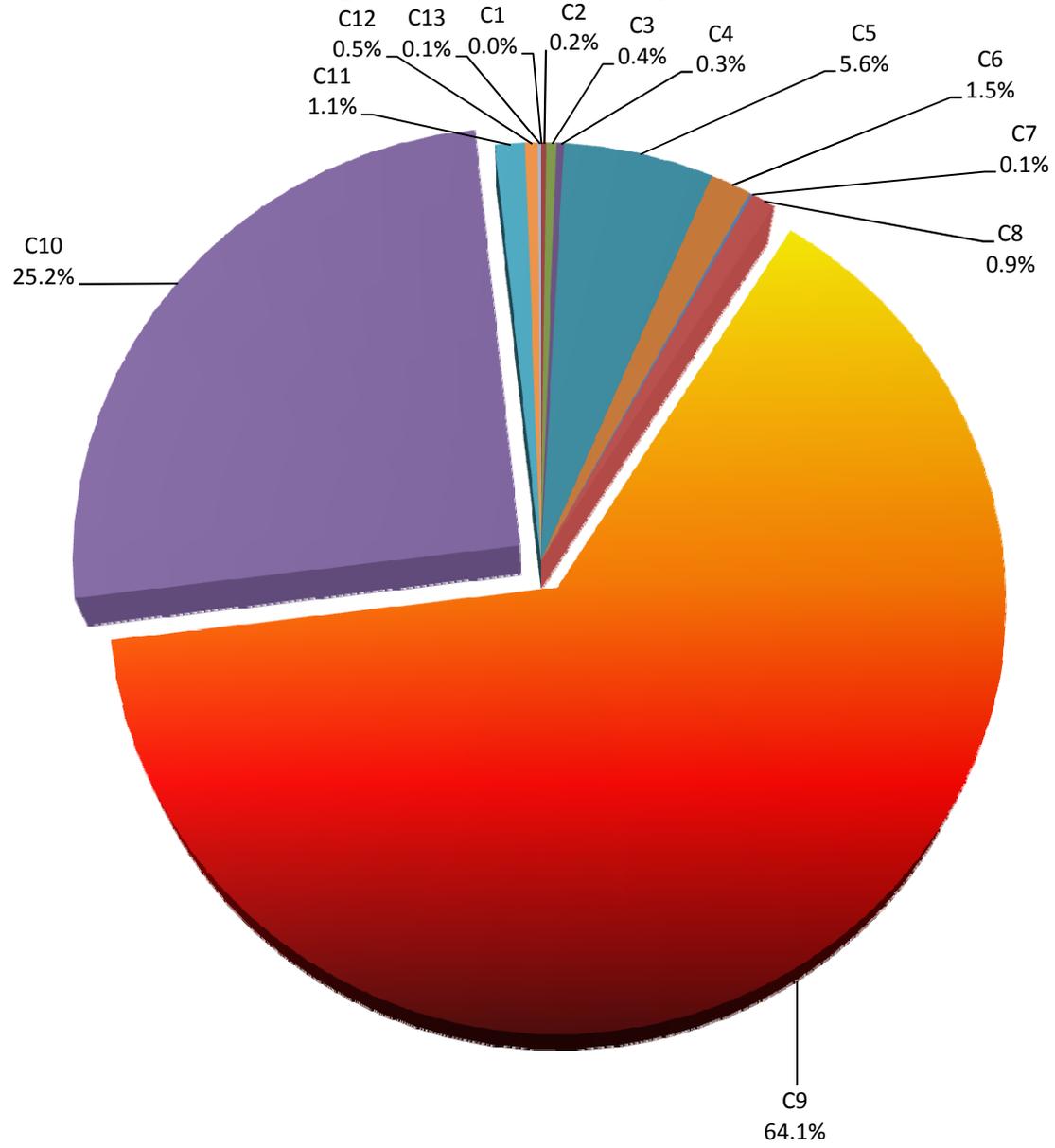
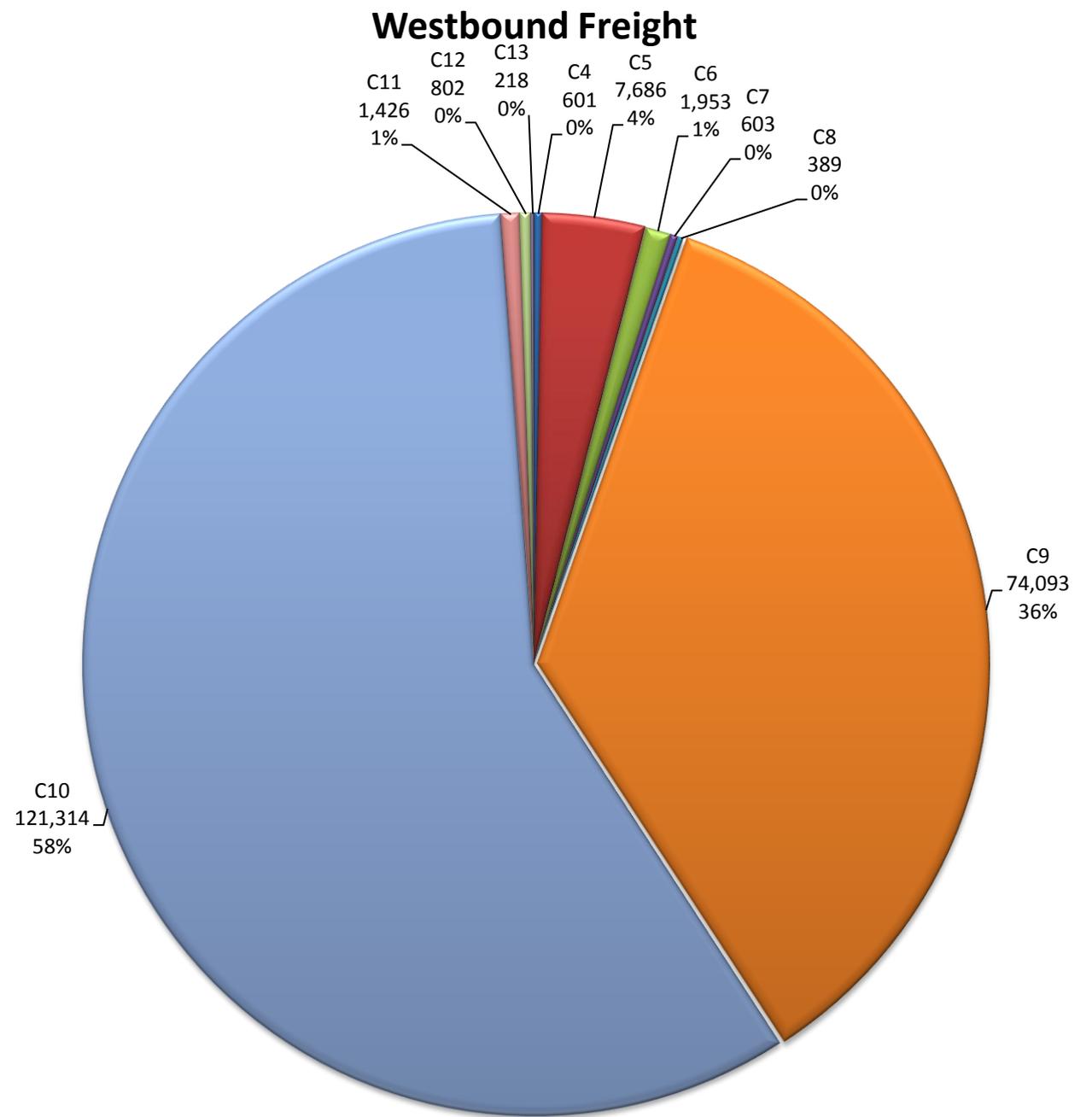
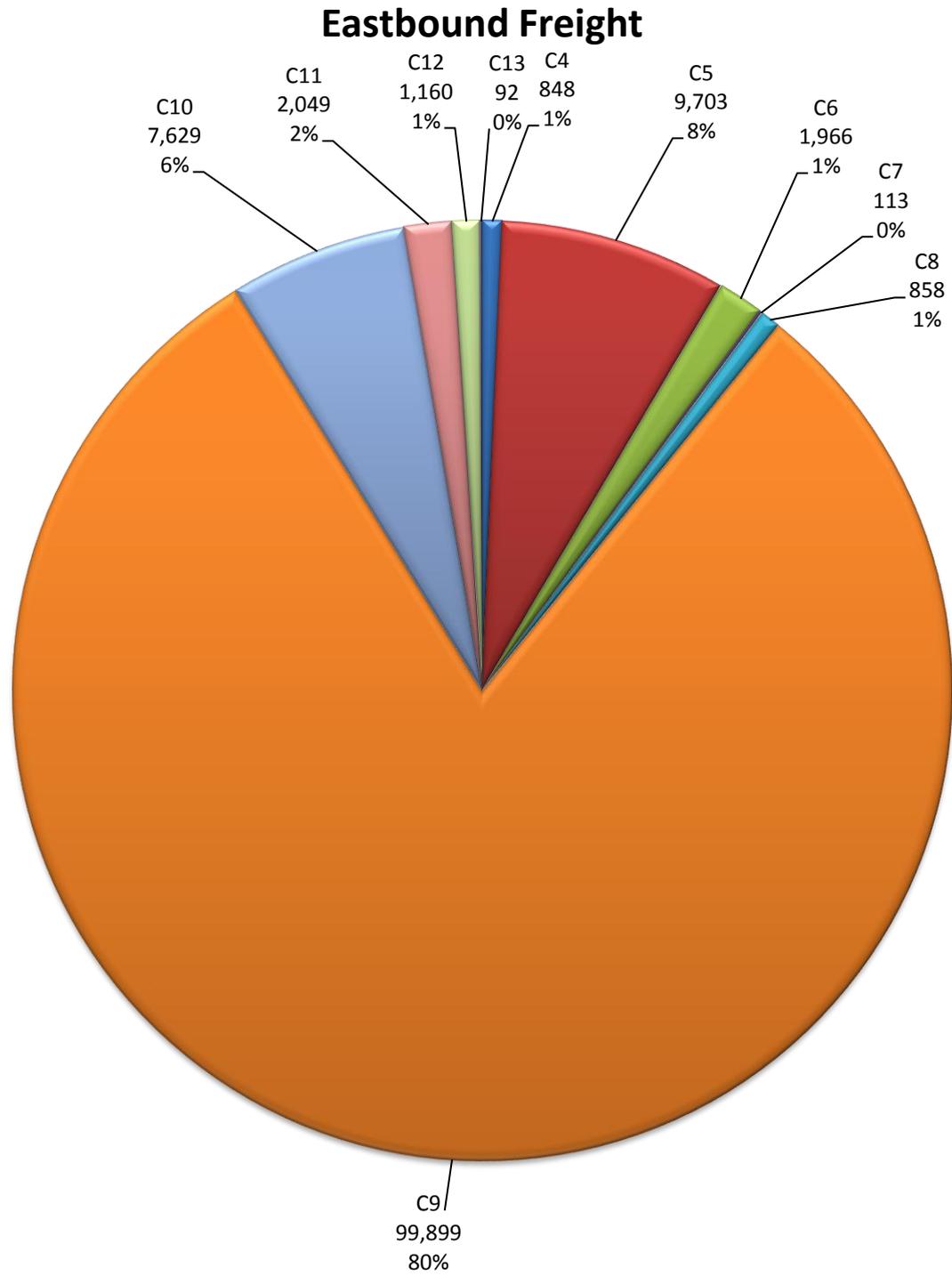
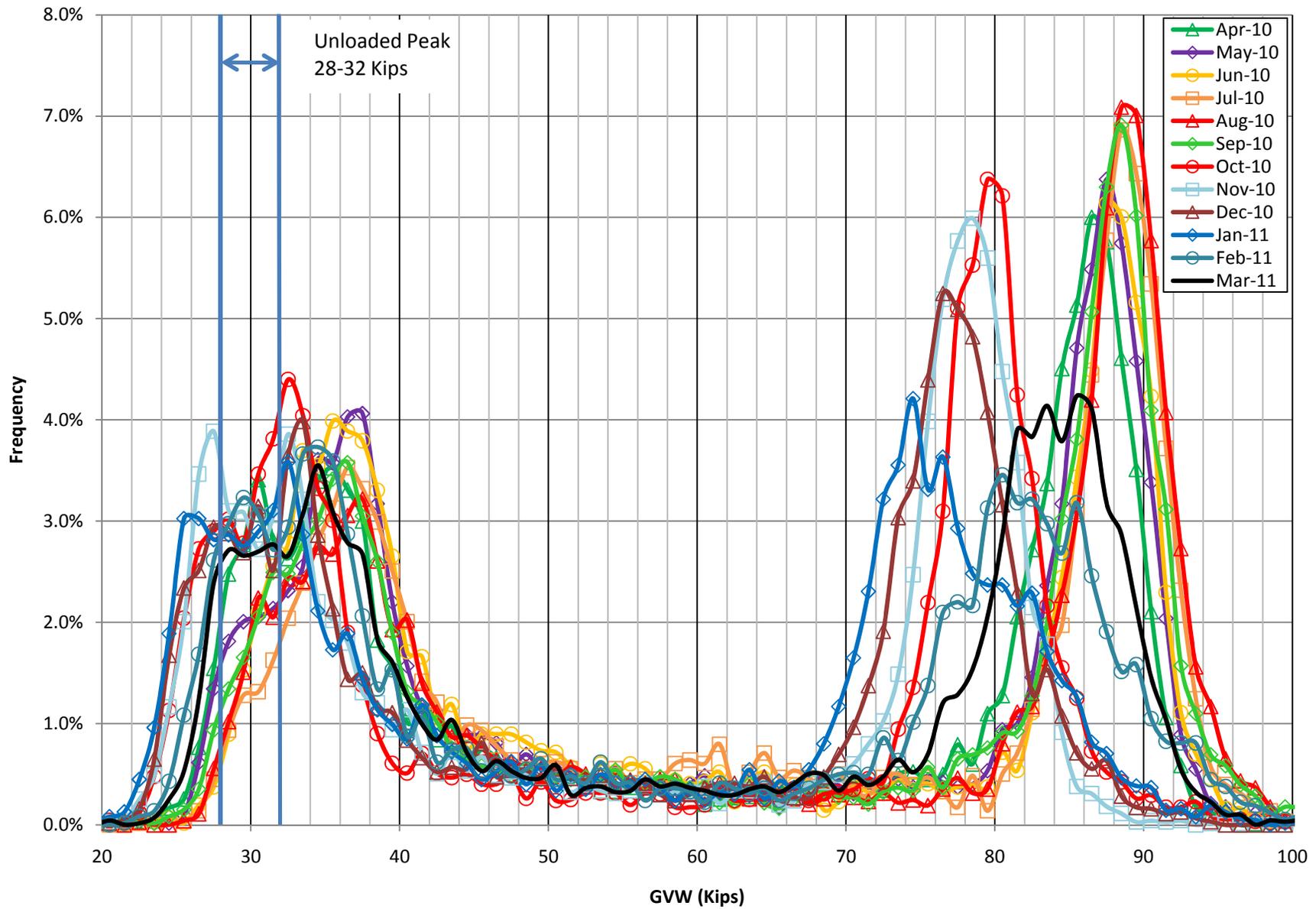


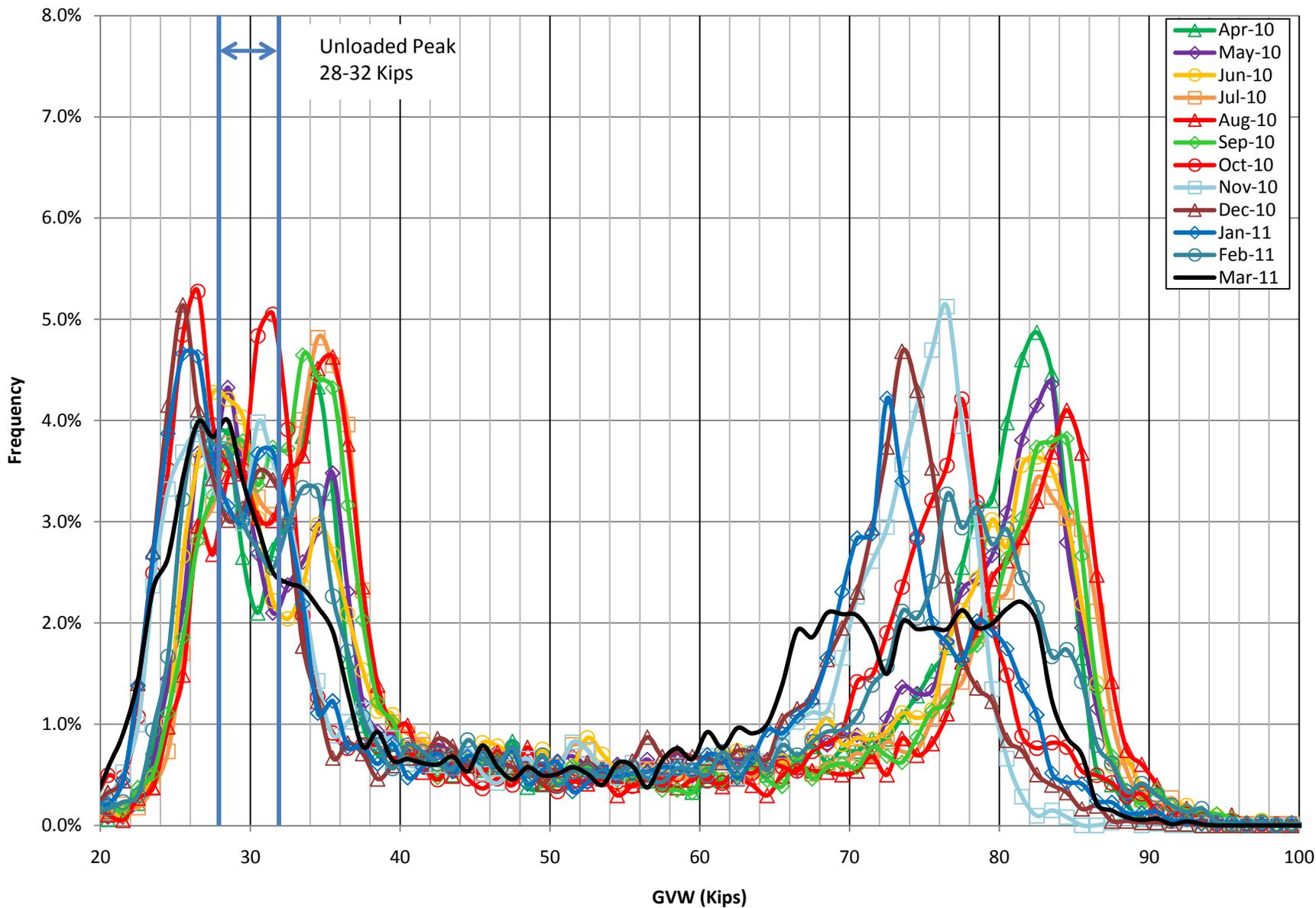
Figure 13 - Freight Tonnage and Percentage by Direction and Class



**Figure 14 - Monthly Class 9 GVW Histogram - Lane 1 (EB)**



### Figure 15 - Monthly Class 9 GVW Histogram - Lane 2 (WB)



**Figure 16 - Unloaded and Loaded Peaks by Lane vs. Date**

