

NOVEMBER 2019



**WIM #49
I-90,
MP 42.6
WORTHINGTON,
MN**

**MONTHLY
REPORT**



Your Destination...Our Priority



WIM Site Location

WIM #49 is located on I-90 near Worthington in Nobles county.

System Operation

WIM #49 was operational for the entire month of November 2019. Volume was computed using all monthly data.

System Calibration

WIM #49 was most recently calibrated on 2019-01-24. Table 1 summarizes the front axle weights of class 9s by lane ¹. Figure 1 shows the distribution of gross vehicle weights (GVW) in Class 9 vehicles at this site for the last 12 months of operation ². Figure 2 depicts the average front axle weight as a percent difference from the first full month following calibration.

Summary of Volume Statistics

Total Monthly Volume: 288551 | Passenger Vehicles: 238750 | Heavy Commercial Vehicles: 49801

Monthly Average Daily Traffic (MADT): 9627 | Monthly Heavy Commercial Average Daily Traffic (MHCADT): 1660

See Table 2 for vehicle class breakdown

Passenger Vehicles (PVs) and Heavy Commercial Vehicles (HCVs)

Volume trends. EB vehicles typically reached highest volume levels on Fridays, with lowest volumes reported on Wednesdays. WB vehicles typically reached highest volume levels on Sundays, with lowest volumes reported on Wednesdays (see Figure 3 and 4).

Passenger Vehicles (PVs)

Volume trends. On an average 24-hour day (see Figure 5), EB PVs generally reached peak volume levels between 02 PM and 04 PM. Similarly, WB PVs peaked in volume between 02 PM and 04 PM

Heavy Commercial Vehicles (HCVs)

Volume trends. On an average 24-hour day, HCVs traveling EB typically reached peak volume levels between 02 PM and 04 PM, while volume going WB peaked between 02 PM and 04 PM. See Figure 6. Out of all HCVs, the two highest traffic volumes were generated by Class 9's and Class 5's.

Overweight HCVs

Volume trends. Of a total of 49801 HCVs, 2245 of them were overweight ³. These overweight HCVs contributed to 0.8% of total monthly volume, and 4.9% of total monthly

HCV volume. EB overweight vehicles typically reached highest numbers on Tuesdays, with lowest volumes reported on Sundays. WB overweight vehicles tended to reach highest volumes on Fridays, with lowest volumes reported on Sundays. See Figure 3 .

The top two overweight violators by class were the class 9 and class 10 vehicles . Overall, overweight vehicles tended to reach peak volume concentrations during typical business hours, with 51.6% of all overweight vehicles traveling EB this month (see Figure 7 & 8). Figure 9 shows the number of vehicles exceeding 88,000 pounds that crossed the WIM over the last 12 months. The highest number of 88,000+ vehicles within the last 12 months occurred in December.

WIMs are currently used as a screening tool for weight enforcement, and it is estimated that the WIM scales can measure gross vehicle weights (GVW) within 90-95% of static weight scale measurements. Due to the possibility of measurement error, vehicles exceeding 10% of their legal weight limits (or 1.1 times their legal weight limits) are considered overweight in this report ⁴.

Using normal load limits ,472 EB vehicles exceeded 88,000 pounds (411 vehicles were Class 9's; 29 vehicles were Class 10's). Of vehicles traveling WB,

123 EB vehicles exceeded 88,000 pounds (48 vehicles were Class 9's; 39 vehicles were Class 13's). Refer to Table 3 for the Top 10 highest recorded GVWs from Classes 9 and 10 from November 2019.

Loaded vs. Unloaded HCVs. Figure 10 shows the GVW distributions of Class 9s and 10s in November 2019. Data suggests that there were greater numbers of fully_loaded Class 9's than empty Class 9's traveling EB, while there were more fully_loaded Class 9's than empty traveling WB. Data also suggests that there were more fully_loaded Class 10's than empty traveling in the EB direction. In the WB direction, there were more fully_loaded class 10 vehicles.

Freight Totals. A total of 425640 tons of freight was recorded to have crossed the WIM. More freight was shipped WB (52%) than EB (48%). See Table 4 and Figure 11 for more freight information.

####Infrastructure Considerations Bridge. Bridge No. 53815 and 53816 (Prestressed Beam Span) are approximately .18 miles east of WIM #49. Bridge No. 53813 and 53814 (Prestressed Beam Span) are approximately .43 miles west of WIM #49. WIM #49 recorded a total of 288551 vehicles with a combined GVW of 3196861 kips (1 kip = 1,000 pounds = 0.5 tons) in November 2019. See Table 5 and Figures 12-13 for GVW information by vehicle class and lane.

Pavement Design. A total of 36157 equivalent single axle loads (ESALs) passed over the pavement at this site. Approximately 50.8% of all ESALs were recorded WB while 49.2% was observed EB. In particular, 84% of all ESALs were generated by the Class 9's (Class 9's were also responsible for generating 57% of total GVW observed this month). See Table 6 and Figures 14-15 for more information on ESALs (Table 6 also provides flexible ESAL factors for each vehicle class using a terminal serviceability of 2.5 and a structural number of 5).

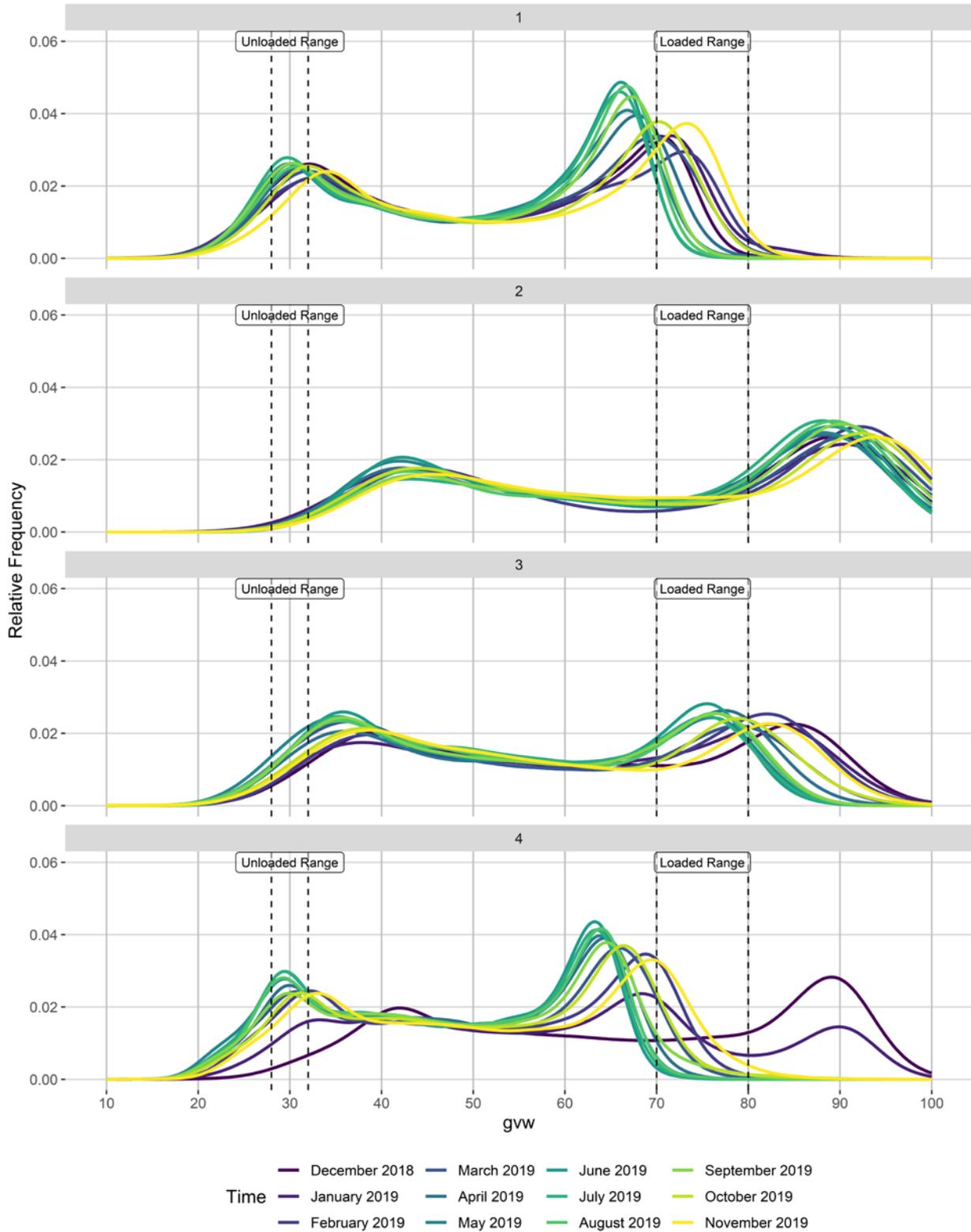
#####WIM monthly reports can be found at:

<http://www.dot.state.mn.us/traffic/data/reports-monthly-wim.html> MnDOT's vehicle classification scheme and vehicle class groupings for traffic forecasting can be found at: <http://www.dot.state.mn.us/traffic/data/data-products.html#weight>

- ¹ Front axle weights of Class 9s are monitored on a monthly basis to assure performance between calibrations. The current goal of the WIM scale calibration is to have each individual axle weight stay within a range of ±9% of baseline calibration values
- ² Previous WIM research indicates that unloaded Class 9s typically weigh 28-32 kips, while loaded Class 9s generally fall in the 70-80 kip range. More recent data from several WIM sites suggests that the unloaded Class 9 range may have moved a little higher over time (due to increased presence of sleeper cabs, etc.), although these ranges are also thought to be site-specific.
- ³ An HCV is considered overweight during normal load limits in this report if they satisfy any of the following 1) exceed a gross vehicle weight (GVW) of 80,000 pounds, 2) exceed any of the legal weight maximums on any axle configurations (legal maximums are: single axle = 20,000 pounds; tandem axles spaced 8' or less = 34,000 pounds; tridem axles spaced 9' or less = 43,000 pounds; quad axles spaced 13' or less = 51,000 pounds). Monthly reports use this standard regardless of the time of year however, the Winter Load Increase (WLI) allows a 10% across the board increase in axle and gross vehicle weights without a permit on US, state routes, and county roads. An HCV is considered overweight during Winter Load Increase(WLI) if they satisfy any of the following 1) exceed a gross vehicle weight (GVW) of 88,000 pounds, 2) exceed any of the legal weight maximums on any axle configurations (legal maximums are: single axle = 22,000 pounds; tandem axles spaced 8' or less = 37,400 pounds; tridem axles spaced 9' or less = 47,300 pounds; quad axles spaced 13' or less = 56,100 pounds). An overweight HCV is only included once in the overweight volume calculations regardless of how many of the aforementioned conditions are violated. For information on MN weight limit dates and statutes: http://www.mrr.dot.state.mn.us/research/seasonal_load_limits/sllindex.asp
- ⁴ For example, Class 9s and 10s can legally have gross vehicle weights up to 80,000 lbs (with the exception of permitted loads) during normal load limits. To account for measurement error on the WIM scales, those exceeding 10% of the legal GVW maximum (or 1.1 times the legal GVW) should be screened (e.g., 80,000 lbs + 8,000 lbs = 88,000 lbs). Similarly during WLI vehicles weighing 96,800 lbs should be screened.

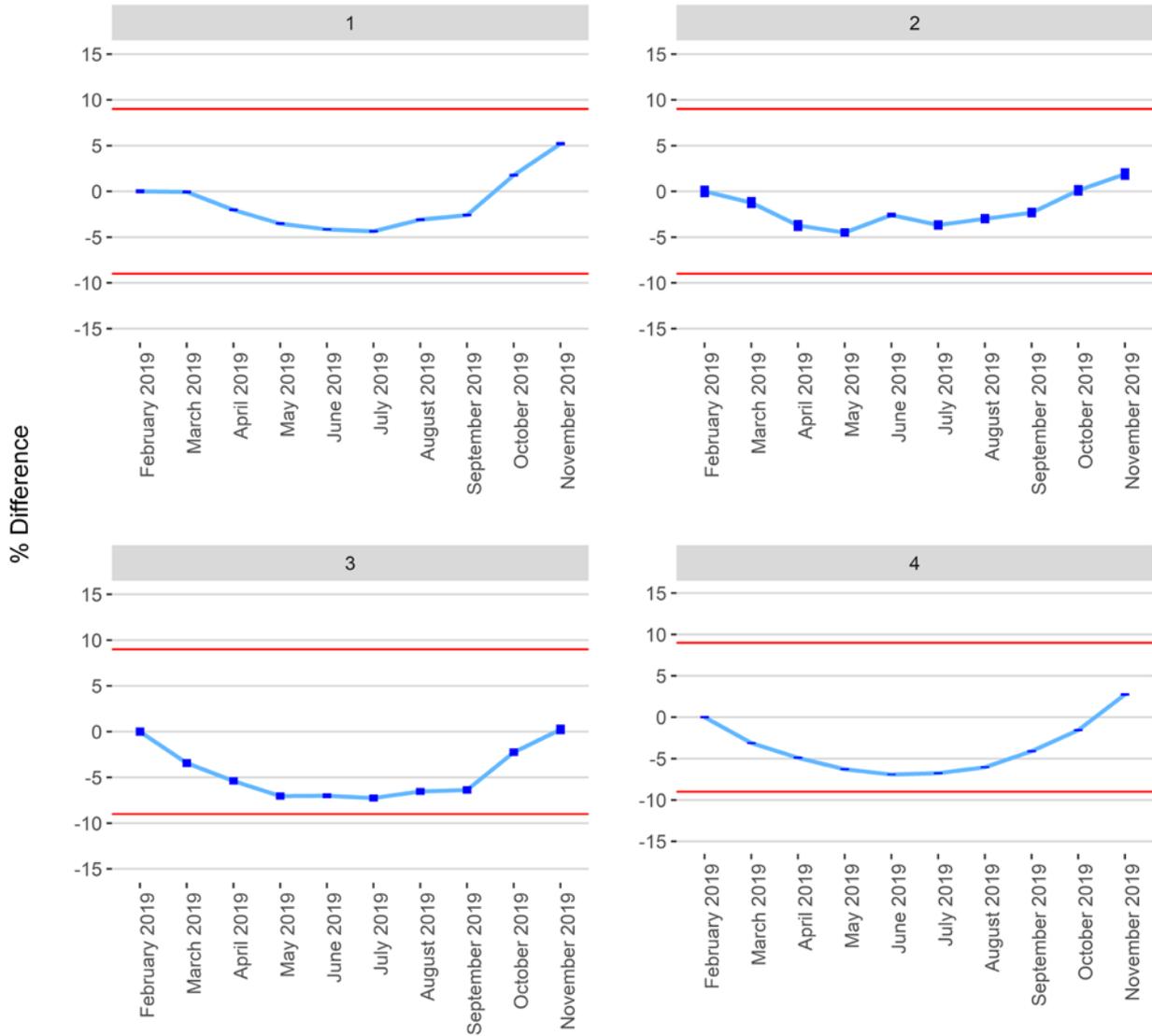
To request this document in an alternative format, please call 651-366-4718 or 1-800-657-3774, or email your request to ADArequest.dot@state.mn.us. Please request at least one week in advance.

Figure 1 - Monthly Class 9 GVW Histogram



Months that have not passed QC parameters are not displayed

Figure 2 - Percent Difference of Front Axle Weight from Last Calibration (+/- 95% CI)



Months that have not passed QC parameters are not displayed

Figure 2 - Average Vehicle Volume vs. Day of the Week

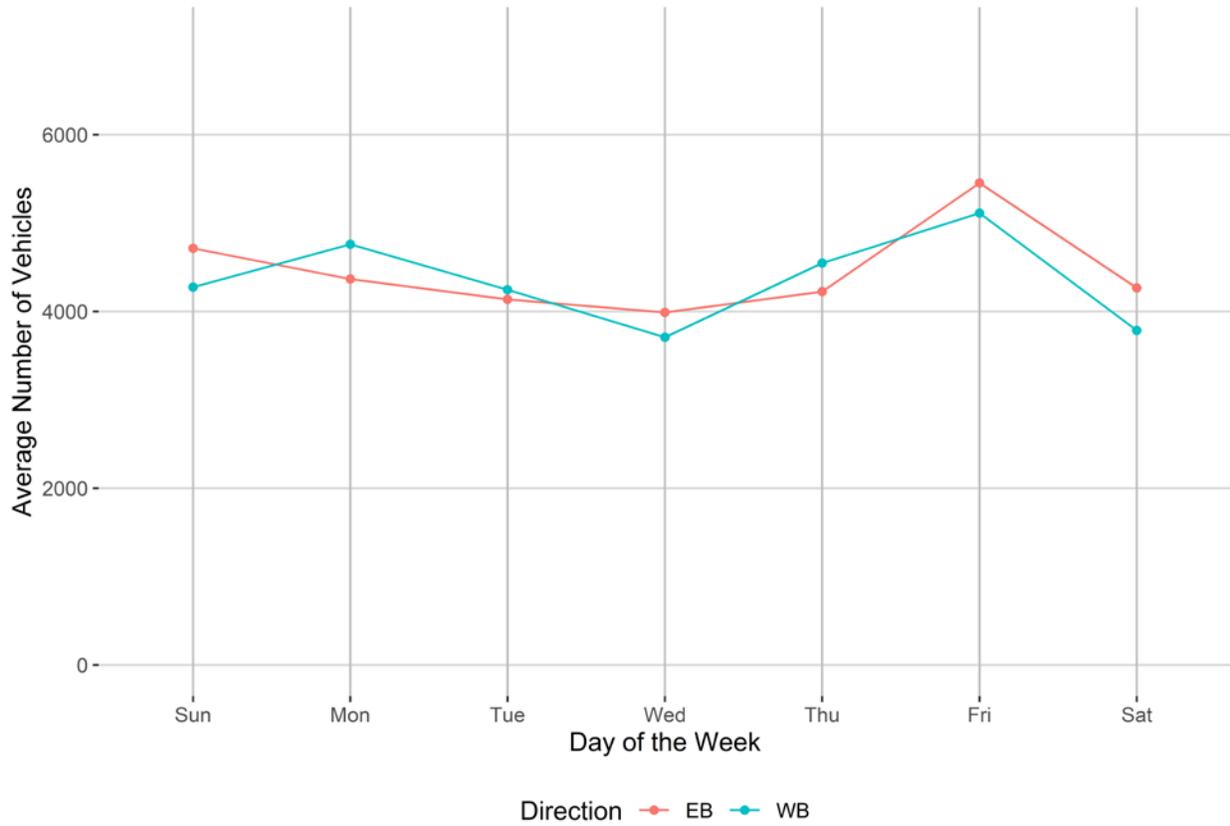


Figure 3 - Average Overweight Vehicle Volume vs. Day of the Week

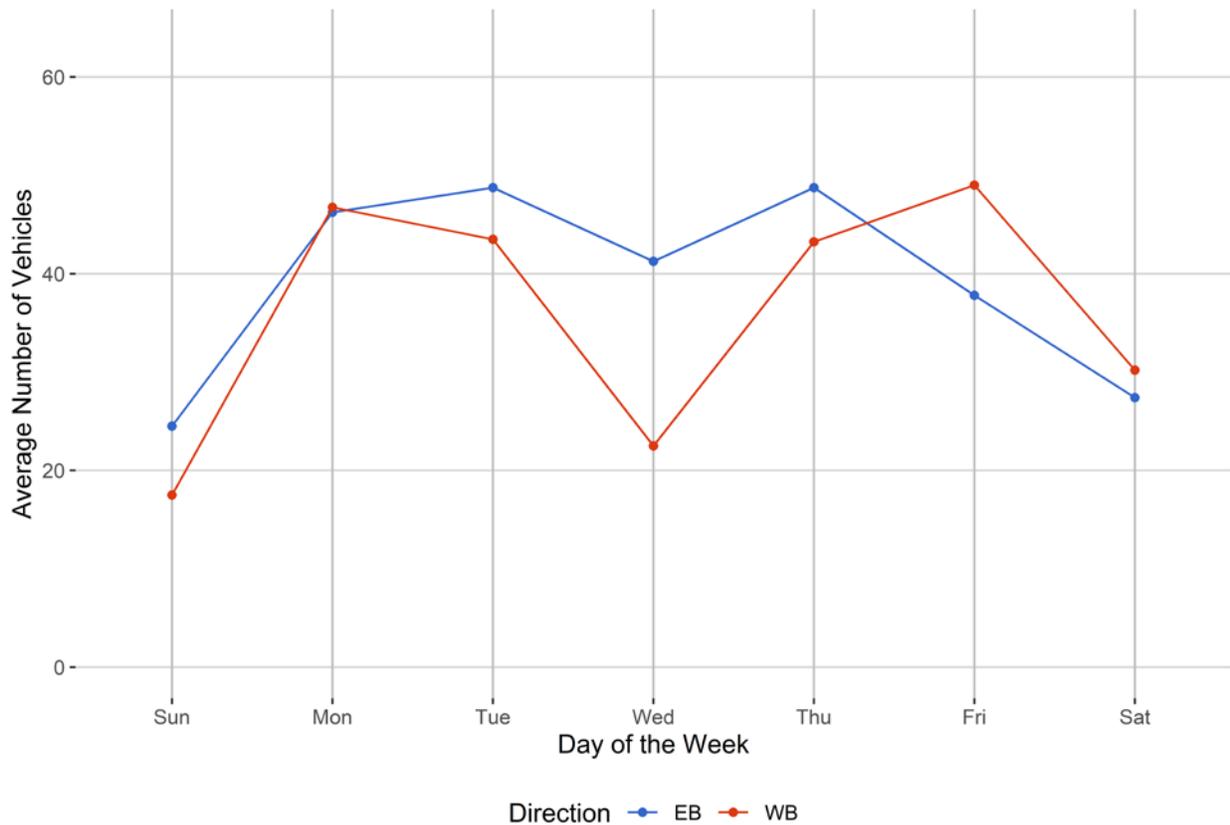


Figure 4 - Passenger Vehicles vs. Hour of the Day

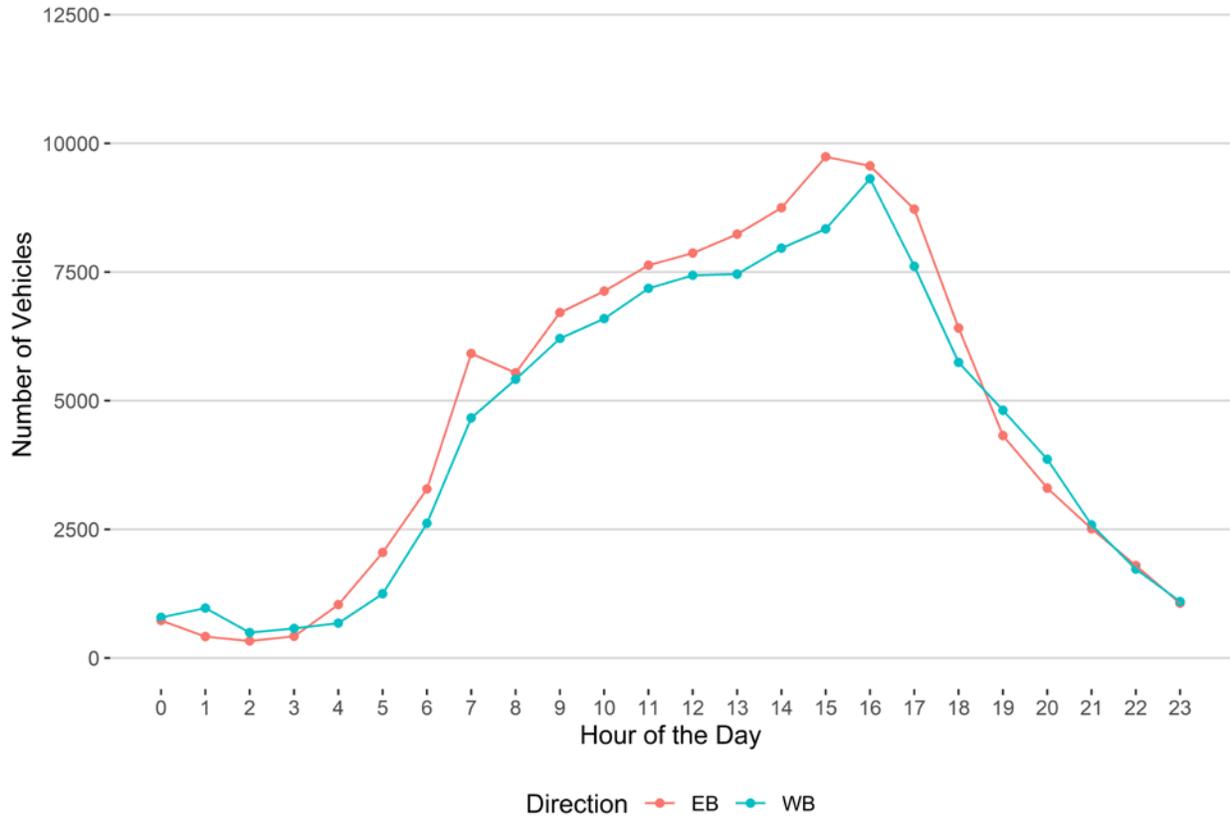


Figure 5 - Heavy Commercial Vehicles vs. Hour of the Day

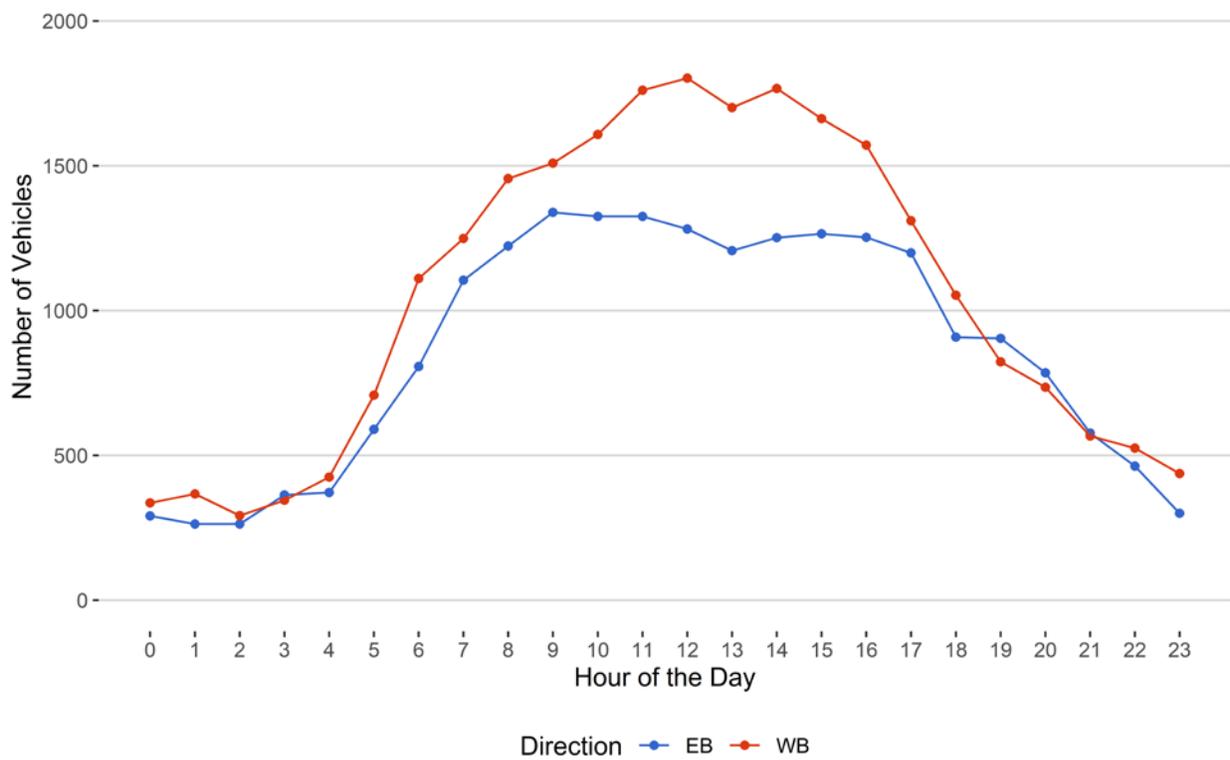


Figure 6 - Overweight Vehicles by Class vs. Hour of the Day

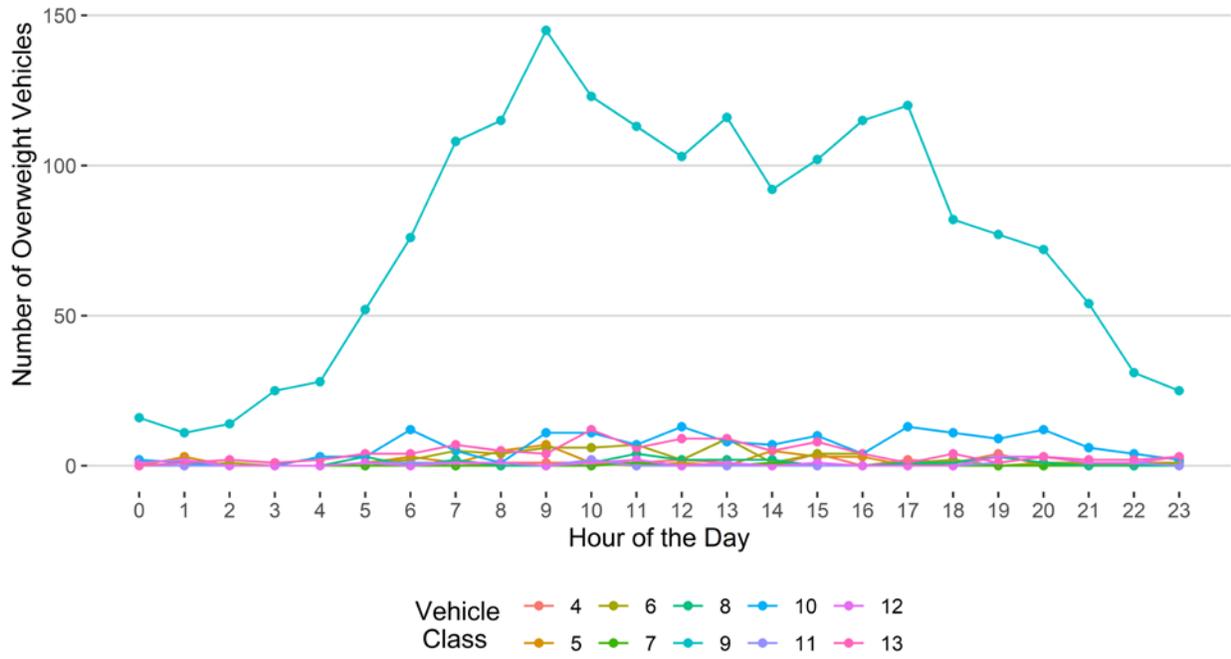


Figure 7 - Overweight Vehicles by Direction
Hour of the Day

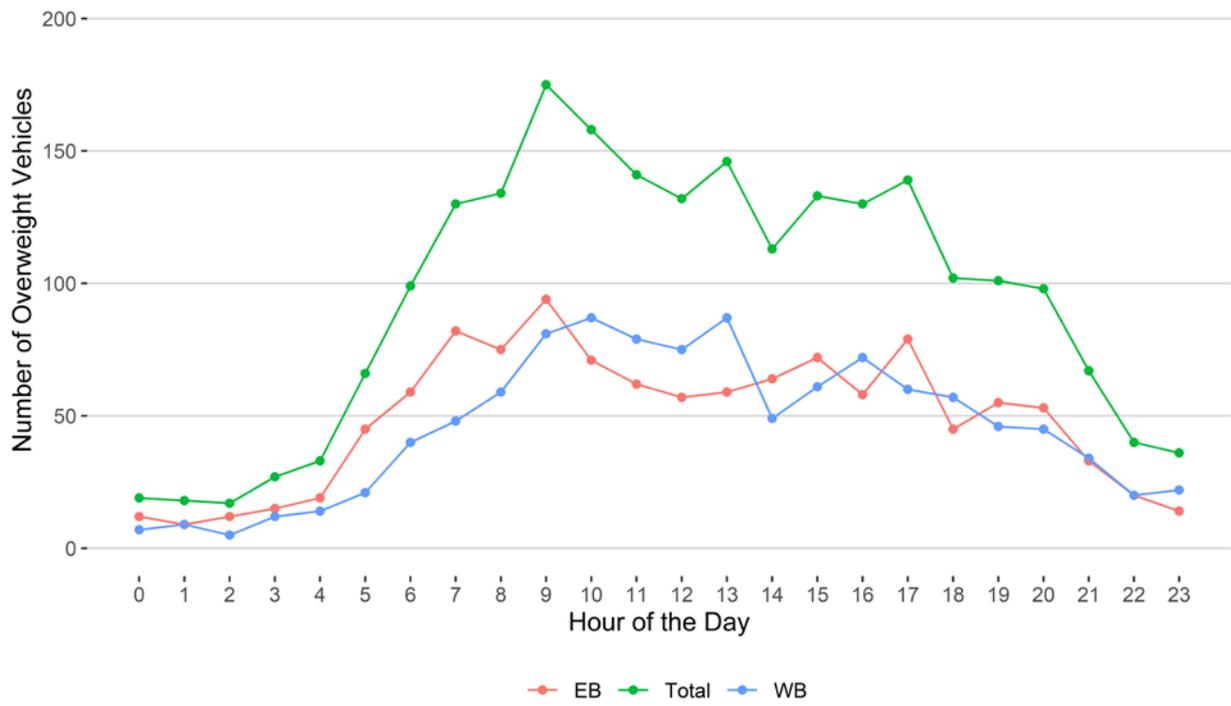
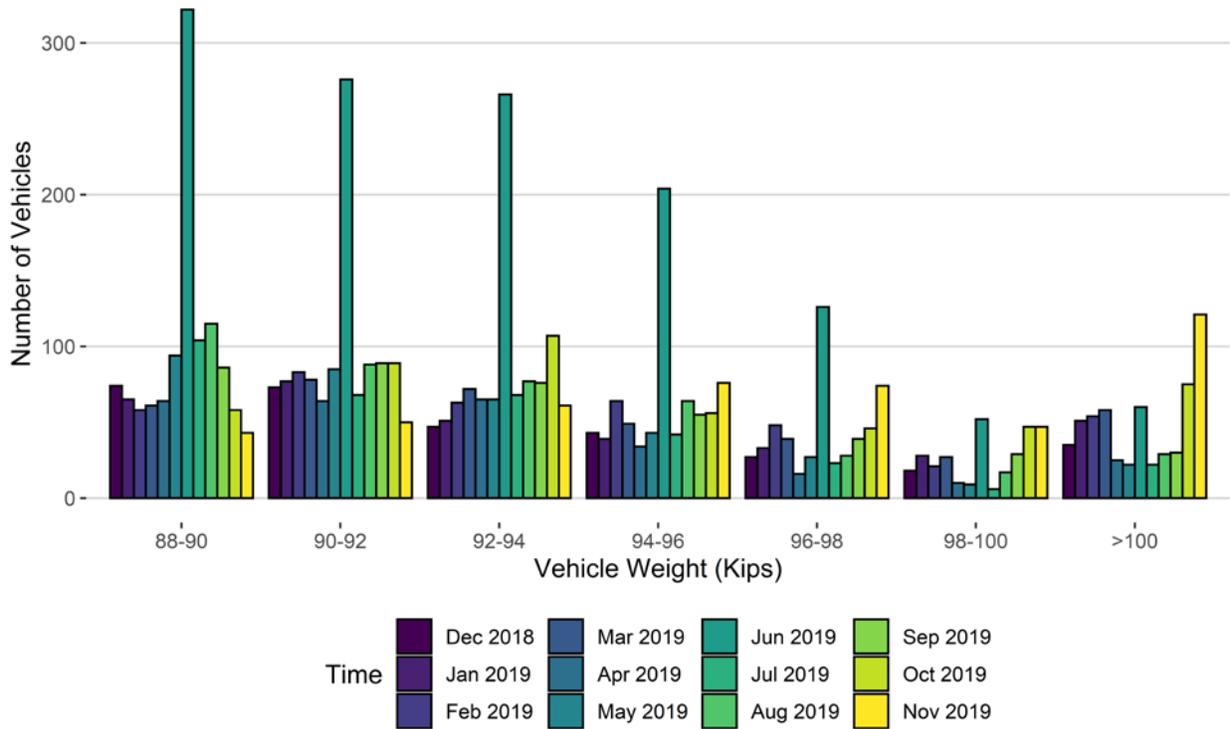
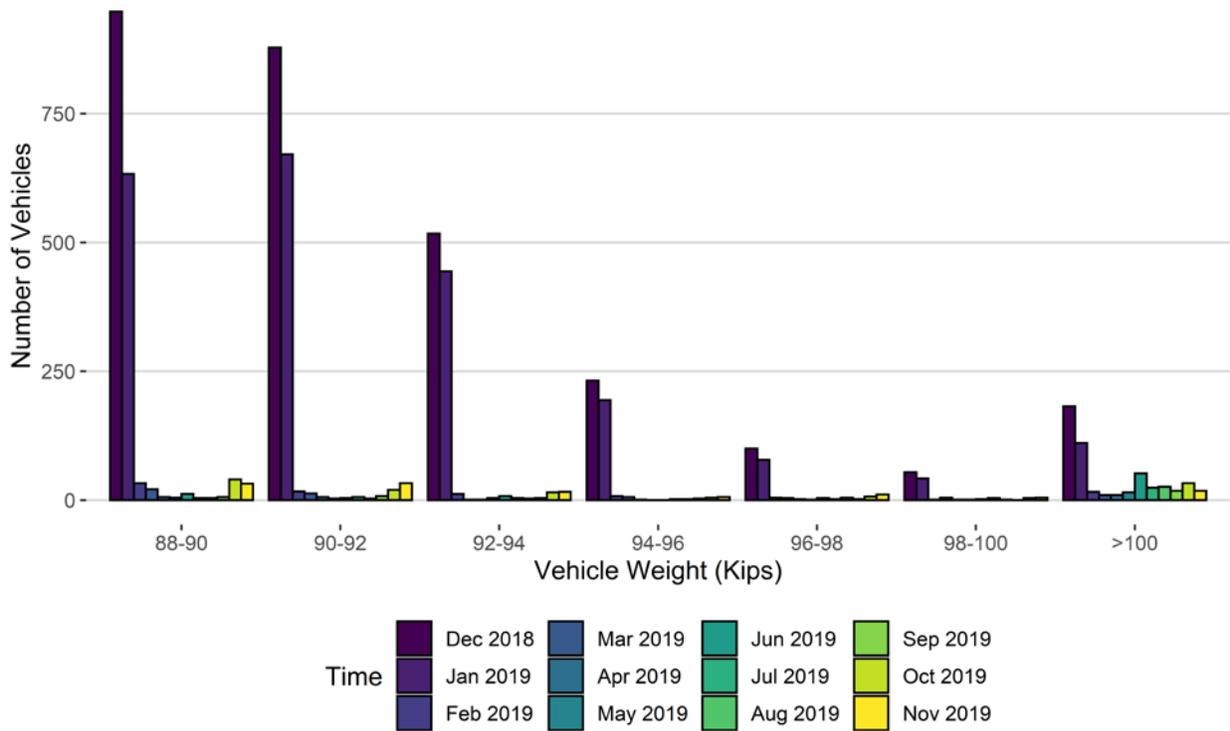


Figure 8 - Histogram of EB Vehicles Over 88,000 Pounds for Current Month



Vehicle Weights (Kips)	Dec 2018	Jan 2019	Feb 2019	Mar 2019	Apr 2019	May 2019	Jun 2019	Jul 2019	Aug 2019	Sep 2019	Oct 2019	Nov 2019
88-90	74	65	58	61	64	94	322	104	115	86	58	43
90-92	73	77	83	78	64	85	276	68	88	89	89	50
92-94	47	51	63	72	65	65	266	68	77	76	107	61
94-96	43	39	64	49	34	43	204	42	64	55	56	76
96-98	27	33	48	39	16	27	126	23	28	39	46	74
98-100	18	28	21	27	10	9	52	6	17	29	47	47
>100	35	51	54	58	25	22	60	22	29	30	75	121
Total	317	344	391	384	278	345	1306	333	418	404	478	472

Figure 8 - Histogram of WB Vehicles Over 88,000 Pounds for Current Month



Vehicle Weights (Kips)	Dec 2018	Jan 2019	Feb 2019	Mar 2019	Apr 2019	May 2019	Jun 2019	Jul 2019	Aug 2019	Sep 2019	Oct 2019	Nov 2019
88-90	948	633	33	21	6	5	12	4	4	6	40	32
90-92	878	671	17	13	6	3	4	6	3	8	20	33
92-94	517	444	12	1	1	4	8	4	3	4	15	16
94-96	232	194	8	6	1	0	0	2	2	3	5	6
96-98	100	78	5	4	2	1	4	2	5	2	7	11
98-100	54	42	1	5	1	1	2	4	1	0	4	5
>100	182	111	16	10	10	15	52	24	26	18	33	18
Total	2911	2173	92	60	27	29	82	46	44	41	124	121

Figure 8 - Class 9's and 10's by Direction vs Gross Vehicle Weight

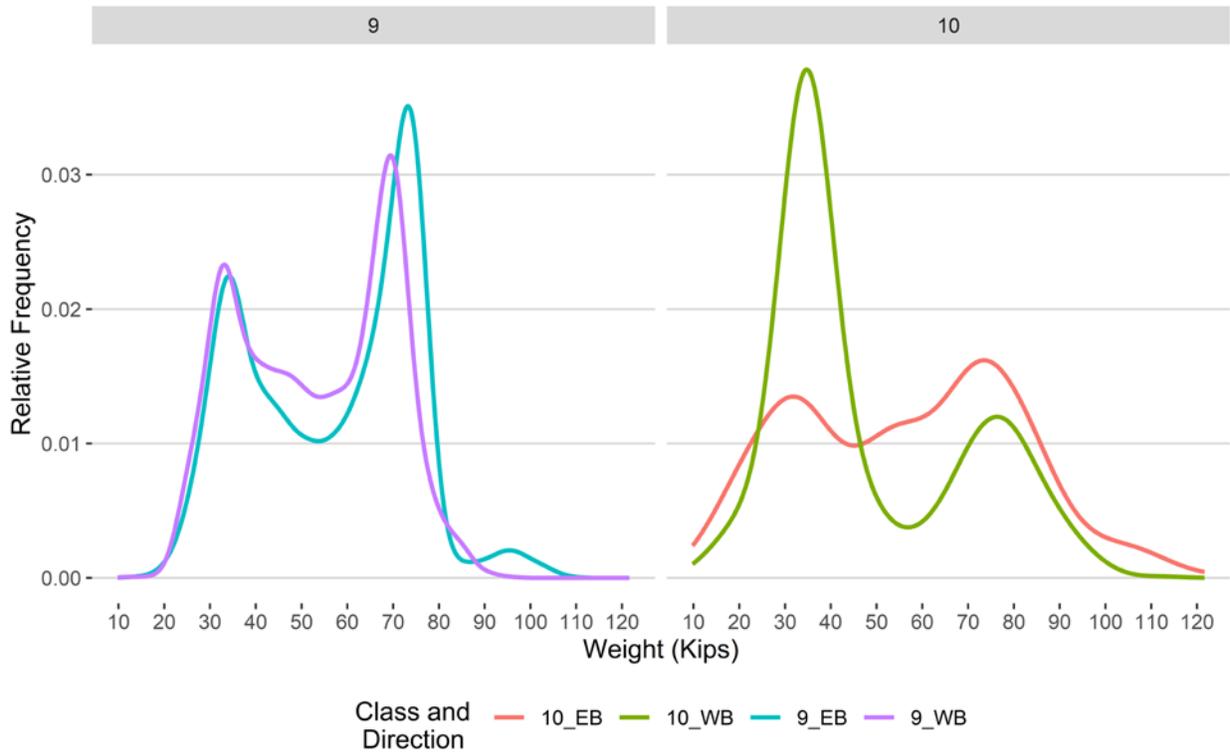


Figure 9 - Freight Percentage by Direction and Class

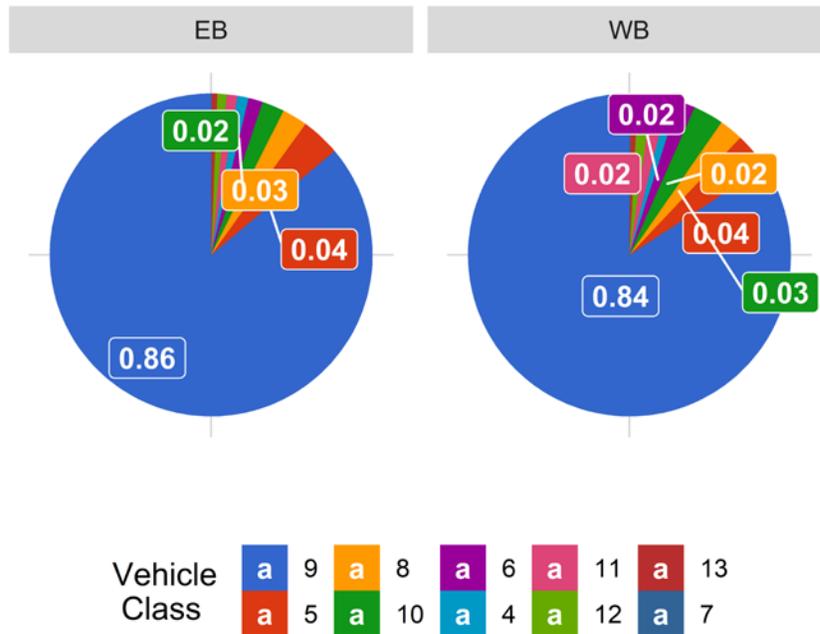


Figure 10 - Total Gross Vehicle Weight Percentage by Class and Lane

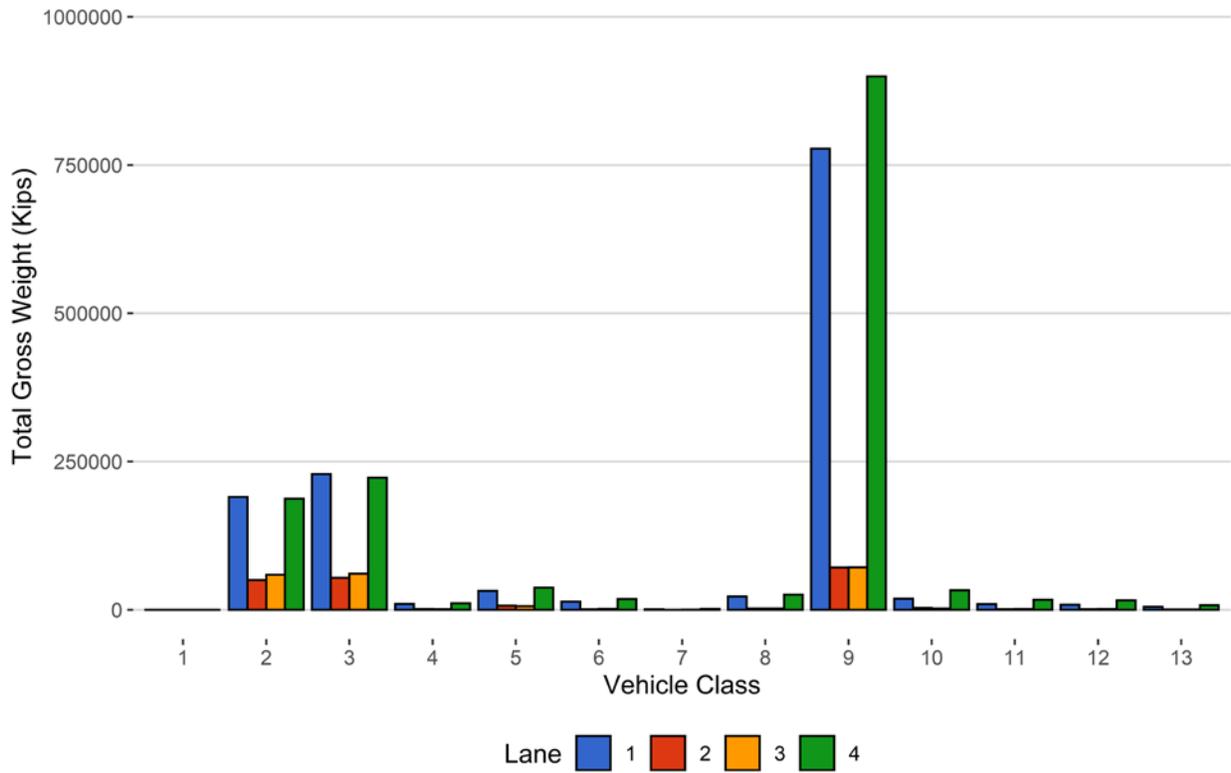


Figure 11 - Total Gross Vehicle Weight t

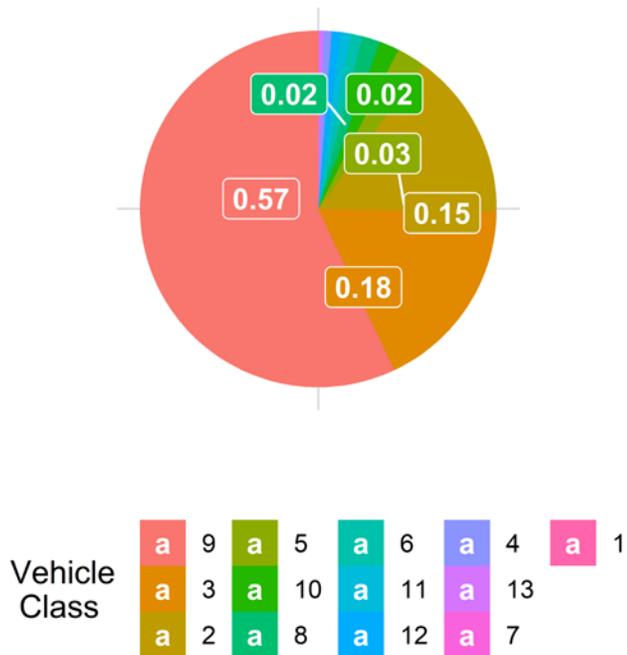


Figure 12 - Total ESALs by Class and Lane

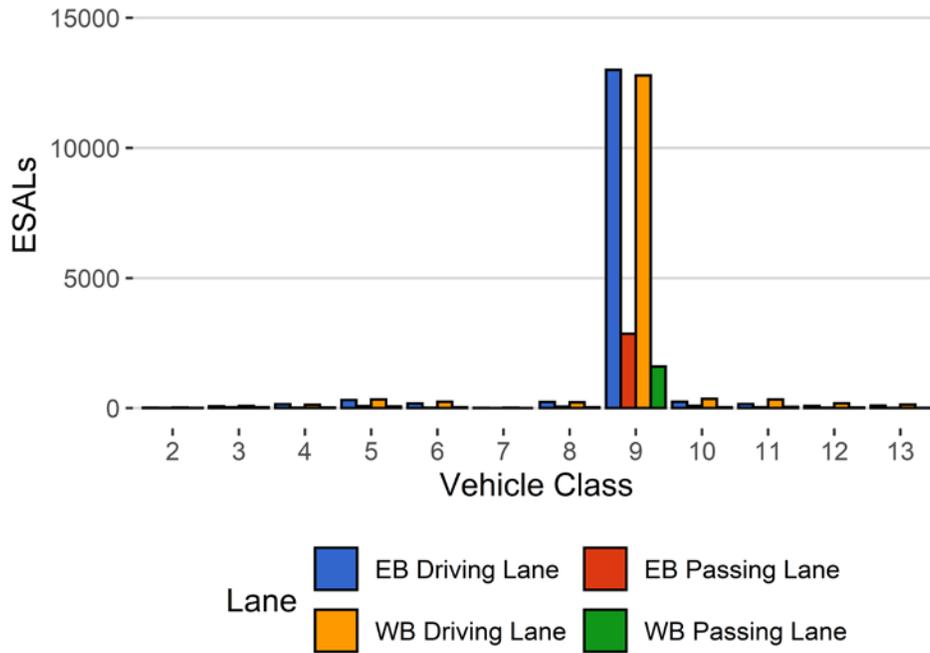


Figure 13 - ESALs by Class

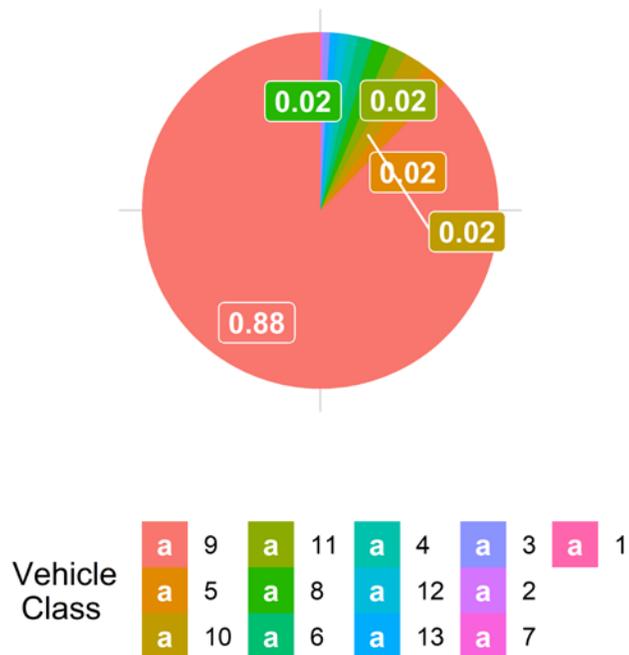


Table 1 Class 9 Front Axle Weight by Lane

<i>Month</i>	<i>Lane 1 (Kips)</i>	<i>Front Axle +/- 9%</i>	<i>Lane 2 (Kips)</i>	<i>Front Axle +/- 9%</i>	<i>Lane 3 (Kips)</i>	<i>Front Axle +/- 9%</i>	<i>Lane 4 (kips)</i>	<i>Front Axle +/- 9%</i>
February 2019	9.78	0.00	13.14	0.00	12.28	0.00	9.93	0.00
March 2019	9.78	-0.06	12.98	-1.23	11.86	-3.43	9.62	-3.12
April 2019	9.58	-2.02	12.65	-3.73	11.62	-5.38	9.44	-4.90
May 2019	9.44	-3.53	12.55	-4.49	11.42	-7.04	9.31	-6.28
June 2019	9.38	-4.15	12.80	-2.59	11.42	-7.00	9.24	-6.91
July 2019	9.35	-4.36	12.66	-3.67	11.39	-7.25	9.26	-6.76
August 2019	9.48	-3.09	12.75	-2.99	11.48	-6.53	9.33	-6.05
September 2019	9.53	-2.59	12.83	-2.32	11.50	-6.37	9.52	-4.10
October 2019	9.95	1.77	13.15	0.11	12.01	-2.25	9.78	-1.55
November 2019	10.29	5.21	13.39	1.89	12.31	0.24	10.20	2.75

Table 2 Vehicle Classification Data

<i>Vehicle Class</i>	<i>Monthly Average Daily Volume</i>	<i>Monthly Total Volume</i>	<i>Monthly Total Volume Percentage</i>	<i>Monthly Total Overweight Vehicles</i>	<i>Monthly Total Overweight Percentage</i>
1	0	7	0	0	0
2	4564	136924	47.5	0	0
3	3394	101820	35.3	0	0
4	31	929	0.3	19	0.8
5	232	6965	2.4	40	1.8
6	47	1400	0.5	58	2.6
7	2	47	0	3	0.1
8	61	1843	0.6	22	1
9	1206	36184	12.5	1815	80.8
10	41	1216	0.4	155	6.9
11	19	557	0.2	12	0.5
12	16	494	0.2	22	1
13	6	166	0.1	99	4.4
TOTAL	9618	288551	100	2245	100

Table 3 Top 10 Gross Vehicle Weight, Class 9 and 10

<i>Date</i>	<i>Day of Week</i>	<i>Time</i>	<i>Vehicle Class</i>	<i>Direction</i>	<i>Lane</i>	<i>GVW (lbs)</i>
2019-11-30	Saturday	06:40:31	10	EB	2	142.91
2019-11-05	Tuesday	03:26:01	9	WB	4	131.27
2019-11-04	Monday	23:01:09	10	WB	4	130
2019-11-23	Saturday	11:01:46	9	WB	4	126.58
2019-11-07	Thursday	15:40:16	10	EB	2	121.64
2019-11-26	Tuesday	06:48:03	10	EB	2	115.86
2019-11-24	Sunday	16:35:32	10	EB	2	113.65
2019-11-10	Sunday	16:59:33	10	EB	2	112.2
2019-11-22	Friday	11:30:42	10	EB	2	112.17
2019-11-22	Friday	17:30:45	10	WB	4	111.96

Table 4 Freight Summary

<i>Vehicle Class</i>	<i>Direction</i>	<i>Weight of Empty Vehicle (Kips)</i>	<i>Total Number of Vehicles</i>	<i>Number of Empty Vehicles</i>	<i>Percentage of Empty Vehicles</i>	<i>Total Weight of Vehicles with Freight (Kips)</i>	<i>Total Weight of Empty Vehicles (Kips)</i>	<i>Total Weight of Freight (Tons)</i>
4	EB	15	406	76	18.7	9966	961	2508
5	EB	8	3077	712	23.1	33917	4906	7498
6	EB	19	556	180	32.4	11297	3051	2077
7	EB	11.5	13	0	0	639	0	245
8	EB	31	792	361	45.6	16477	8280	1558
9	EB	33	14989	1838	12.3	795566	53485	180791
10	EB	33.5	386	84	21.8	19913	2093	4898
11	EB	36.5	205	38	18.5	9141	1260	1523
12	EB	36.5	178	10	5.6	9111	326	1490
13	EB	31.5	59	0	0	5310	0	1726
TOTAL	****	****	20661	3299	****	911337	****	204313
<i>Vehicle Class</i>	<i>Direction</i>	<i>Weight of Empty Vehicle (Kips)</i>	<i>Total Number of Vehicles</i>	<i>Number of Empty Vehicles</i>	<i>Percentage of Empty Vehicles</i>	<i>Total Weight of Vehicles with Freight (Kips)</i>	<i>Total Weight of Empty Vehicles (Kips)</i>	<i>Total Weight of Freight (Tons)</i>
4	WB	15	448	79	17.6	10745	1036	2605
5	WB	8	3326	552	16.6	39591	3972	8699
6	WB	19	731	227	31.1	15933	3902	3179
7	WB	11.5	30	0	0	1449	0	552
8	WB	31	902	477	52.9	16075	11530	1450
9	WB	33	18276	2781	15.2	890466	80606	189565
10	WB	33.5	732	180	24.6	29976	5146	5742
11	WB	36.5	307	1	0.3	18050	21	3440
12	WB	36.5	276	3	1.1	16867	64	3451
13	WB	31.5	94	2	2.1	8185	48	2643
TOTAL	****	****	25122	4302	****	1047336	****	221327
GRAND TOTAL	****	****	45783	7601	340	1958673	180687	425640

Table 5 Gross Vehicle Weight by Class and Lane

<i>Vehicle Class</i>	<i>EB Driving Lane</i>	<i>EB Passing Lane</i>	<i>WB Passing Lane</i>	<i>WB Driving Lane</i>	<i>Total</i>	<i>Percentage</i>
1	1	0	0	3	4	0
2	190253	50227	59156	187439	487076	15.3
3	228862	53923	61007	222695	566486	17.7
4	9803	1124	1001	10780	22708	0.7
5	31800	7023	6235	37327	82386	2.6
6	13734	614	1565	18270	34183	1.1
7	639	0	125	1324	2087	0.1
8	22439	2318	2126	25479	52362	1.6
9	777735	71316	71553	899518	1820122	57
10	18695	3311	2230	32892	57128	1.8
11	9451	951	1272	16798	28472	0.9
12	8606	831	1137	15794	26368	0.8
13	4990	320	412	7820	13542	0.4
TOTAL	1317008	191957	207821	1476139	3192926	100
GVW/LANE	41.25	6.01	6.51	46.23	100	0

Table 6 ESALs by Class and Lane and Flexible ESAL Factors

<i>Vehicle Class</i>	<i>EB Driving Lane</i>	<i>EB Passing Lane</i>	<i>WB Passing Lane</i>	<i>WB Driving Lane</i>	<i>Total</i>	<i>Percentage</i>	<i>Flexible ESAL Factor</i>
1	0	0	0	0	0	0	0.1429
2	16	10	11	22	59	0.17	0.001
3	65	31	30	80	207	0.6	0.0045
4	147	16	22	130	315	0.91	0.74
5	313	76	65	335	789	2.29	0.25
6	180	14	30	245	468	1.36	0.73
7	11	0	3	19	33	0.1	1.46
8	235	54	34	221	544	1.58	0.64
9	12998	2855	1598	12786	30238	87.63	1.82
10	244	94	31	357	727	2.11	1.3
11	155	35	45	334	569	1.65	2.2
12	84	18	21	184	308	0.89	1.35
13	95	8	11	137	251	0.73	3.11
TOTAL	14542	3215	1899	14852	34508	100	14
ESALS/LANE	42.1	9.3	5.5	43	100	-	-

Table 7 Site Summary: Volume and Vehicle Class

<i>Month</i>	<i>Total Volume</i>	<i>Monthly ADT</i>	<i>Monthly HCAD T</i>	<i>Passenger Vehicles</i>	<i>Passenger Vehicles %</i>	<i>Heavy Commercial Vehicles</i>	<i>Heavy Commercial Vehicles %</i>	<i>Heavy Commercial Vehicles in Driving Lane %</i>	<i>Heavy Commercial Vehicles in Passing Lane %</i>
Dec 2018	249836	8615	1330	208619	83.5	41216.7	16.5	91.7	8.3
Jan 2019	237632	7666	1585	188493	79.3	49138.8	20.7	93.6	6.4
Feb 2019	203760	7277	1529	160956	79	42803.6	21	92.4	7.6
Mar 2019	275186	8877	1710	222175	80.7	53010.7	19.3	93.1	6.9
Apr 2019	290206	9674	1771	237070	81.7	53135.6	18.3	92.9	7.1
May 2019	360874	11568	1847	303630	84.1	57244.3	15.9	91.7	8.3
Jun 2019	400718	13357	2006	340534	85	60184.1	15	89	11
Jul 2019	427176	13874	1976	365919	85.7	61256.9	14.3	91.6	8.4
Aug 2019	435975	13961	2028	373117	85.6	62857.5	14.4	91.3	8.7
Sep 2019	359424	11974	1980	300014	83.5	59410.2	16.5	92	8
Oct 2019	342071	11093	1929	282268	82.5	59803.1	17.5	92.1	7.9
Nov 2019	288551	9627	1660	238750	82.7	49800.5	17.3	92.1	7.9
TOTAL	3871409	-	-	3221545	-	649862	-	-	-
AVERAGE	322617	10630	1779	268462	83	54155	17	92	8

###ESALS

<i>Month</i>	<i>ESALS EB Passing Lane</i>	<i>ESALS EB Driving Lane</i>	<i>ESALS WB Driving Lane</i>	<i>ESALS WB Passing Lane</i>	<i>Total ESALS</i>	<i>Driving Lane ESALS %</i>	<i>Passing Lane ESALS %</i>	<i>Pavement Life Decrease Months</i>
Dec 2018	12572	2548	2315	27559	44994	89	11	44.8
Jan 2019	15427	2515	2039	26307	46288	90	10	35.2
Feb 2019	11829	3709	2133	13009	30680	81	19	0.4
Mar 2019	14419	2617	1904	14178	33118	86	14	0.5
Apr 2019	12589	3407	1777	12322	30096	83	17	0.3

May 2019	11950	3256	1712	12107	29025	83	17	0.1
Jun 2019	23167	11821	3770	23583	62341	75	25	0.1
Jul 2019	12316	3275	1958	11890	29439	82	18	0.1
Aug 2019	12933	3646	2141	12756	31476	82	18	0.1
Sep 2019	12528	3209	1874	13878	31489	84	16	0.2
Oct 2019	14480	3195	2179	16922	36776	85	15	0.9
Nov 2019	14558	3226	1902	16472	36157	86	14	1.1
TOTAL	168769	46421	25705	200985	441880	-	-	-
AVERAGE	14064	3868	2142	16749	36823	84	16	7

###Gross Vehicle Weight

<i>Month</i>	<i>GVW EB Passing Lane</i>	<i>GVW EB Driving Lane</i>	<i>GVW WB Passing Lane</i>	<i>GVW WB Driving Lane</i>	<i>Total GVW Kips</i>
Dec 18	1297542	166610	203153	1450218	3117523
Jan 19	1318897	132672	166003	1612384	3229956
Feb 19	1052899	129123	157838	1259469	2599329
Mar 19	1361595	164259	199086	1585945	3310885
Apr 19	1325756	180407	211379	1556974	3274517
May 19	1423938	260130	265009	1700873	3649951
Jun 19	2939660	809623	639308	3533060	7921650
Jul 19	1616775	307221	340173	1791764	4055932
Aug 19	1640953	322458	343031	1861861	4168303
Sep 19	1473408	243119	267034	1684716	3668276
Oct 19	1474233	225471	268145	1804192	3772042
Nov 19	1319010	192225	207923	1477704	3196861
TOTAL	18244665	3133318	3268082	21319159	45965224
AVERAGE	1520389	261110	272340	1776597	3830435

###Overweight Vehicles

<i>Month</i>	<i>Total Number of Overweight Vehicles</i>	<i>Overweight / Total Volume</i>	<i>Overweight / Heavy Commercial Volume</i>	<i>Number Over 88,000 lbs</i>	<i>Number Over 98,000 lbs</i>
Dec 2018	6713	2.7	16.2	3230	289
Jan 2019	5490	2.4	11.7	2523	234
Feb 2019	1777	0.9	4.4	487	93
Mar 2019	1390	0.5	2.7	447	100
Apr 2019	958	0.3	1.9	306	47
May 2019	1034	0.3	1.9	374	47
Jun 2019	3062	0.4	2.6	1390	166
Jul 2019	1028	0.2	1.7	380	56
Aug 2019	1195	0.3	1.9	462	73

Sep 2019	1311	0.4	2.3	446	77
Oct 2019	1756	0.5	3.1	602	159
Nov 2019	2254	0.9	4.9	595	193
TOTAL	27968	-	-	11242	1534
AVERAGE	2330.7	0.8	4.6	936.8	127.8

###Freight

<i>Month</i>	<i>EB Freight Tons</i>	<i>WB Freight Tons</i>	<i>Total Freight</i>	<i>EB Freight %</i>	<i>WB Freight %</i>
Dec 2018	189465	263947	453412	41.8	58.2
Jan 2019	214358	285394	499753	42.9	57.1
Feb 2019	169293	197643	366936	46.1	53.9
Mar 2019	210425	229917	440342	47.8	52.2
Apr 2019	195045	212731	407776	47.8	52.2
May 2019	198928	211636	410564	48.5	51.5
Jun 2019	440455	421133	861588	51.1	48.9
Jul 2019	208712	210195	418907	49.8	50.2
Aug 2019	214388	225896	440283	48.7	51.3
Sep 2019	203138	225059	428197	47.4	52.6
Oct 2019	213924	260048	473972	45.1	54.9
Nov 2019	204313	221327	425640	48	52
TOTAL	2662444	2964925	5627369	-	-
AVERAGE	221870.3	247077.1	468947.4	47.1	52.9