

Validation Report

Florida, SPS-1

Task Order 8, CLIN 2
February 28 and March 1, 2005

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1 Executive Summary

A visit was made to the Florida SPS-1 on February 28th and March 1st, 2005 for the purposes of conducting a Validation of the WIM system located on US Route 27, located 13.8 miles south of SR 80, milepost 12.03. The validation procedures were in accordance with LTPP's SPS WIM Data Collection Guide (SPS WIM DCG) dated August 21, 2001.

This is the second validation visit we have made to this site, the first being December 16, 2003. At that time, this site did not meet the precision requirements for research quality data.

This site was successfully validated on March 1, 2005 and is currently providing research quality WIM data. Although the classification algorithm is not providing research quality classification information as defined in the SPS WIM DCG.

The site is instrumented with Kistler quartz piezo sensors and IRD/PAT Traffic electronics and installed in asphalt concrete pavement.

The validation used the following trucks:

- 1) 3S2 with a tractor having an air suspension tandem and a trailer with standard rear tandem and air suspension loaded to 78,440 lbs.
- 2) 3S2 with a tractor having a tapered spring leaf suspension tandem and a trailer with standard rear tandem and air suspension loaded to 45,930 lbs.

The validation speeds ranged from approximately 45 to 65 miles per hour. The pavement temperatures ranged from 77 to 95 degrees Fahrenheit.

Table 1-1 Post-Validation results – 120100 – 01 Mar 2005

SPS-1, -2, -5, -6 and -8	95 %Confidence Limit of Error	Site Values	Pass/Fail
Loaded single axles	± 20 percent	2.3% $\pm$ 10.2%	Pass
Loaded tandem axles	± 15 percent	0.2% $\pm$ 10.1%	Pass
Gross vehicle weights	± 10 percent	0.5% $\pm$ 8.2%	Pass
Vehicle speed	± 1 mph [2 km/hr]	N/A	Pass
Axle spacing length	± 0.5 ft [150 mm]	-0.1 $\pm$ 0.2 ft	Pass

This site meets the overall classification requirement of less than two percent misclassified. It does not meet the less than two percent trucks unclassified criteria. When the pre and post- validation classification data is combined the errors are associated with recreational vehicles which are not significant in the population on this route.

MACTEC field staff worked with the agency representative to compute weight compensation factor adjustments. The agency representative made all equipment changes. This was expected given the information on the Traffic Sheet 18 completed as part of the assessment visit held on date.

The pavement condition was nominally satisfactory for conducting a validation. There was moderate pavement damage observed in the left wheel-path approximately two feet after the trailing WIM sensor and on the right edge of the travel lane approximately ten feet following the trailing WIM sensor. Neither of the distresses appears to influence truck motions significantly. A visual survey determined that there is no discernable bouncing or avoidance by trucks in the sensor area.

The WIM index was exceeded at various locations throughout the WIM site, none of which had a significant impact on equipment performance.

As the equipment passed the majority of the performance weight and spacing validation performance specifications, no action regarding pavement smoothness is recommended at this time.

In June 2003, when the new equipment was installed and the controller was upgraded, the LTPP lane was incorrectly designated as Lane 4 in the controller. After the validation visit of December 16, 2003, the State had the controller rewired to correct the LTPP lane in the controller from Lane 4 to Lane 1. Only data collected during the period of June 23, 2003 to December 16, 2003 had the LTPP Lane coded as Lane 4. All data collected before June 23, 2003 and since December 16, 2003 has been designated as Lane 1.

2 Corrective Actions Recommended

Pavement that has broken away at the locations described in the Executive Summary should be repaired. There are no other corrective actions are required at this time. **While the WIM smoothness conditions have not been met, the site is not recommended for pavement remediation since the performance specifications were met.**

3 Post Calibration Analysis

This final analysis is based on test runs conducted March 1, 2005 from late morning to mid-afternoon at test site 120100 on US Route 27, 13.8 miles south of SR 80. This SPS-1 site is located at milepost 12.03 on the southbound, right hand lane of a divided four-lane facility. No auto-calibration was used during test runs. The site does not use auto-calibration in its normal operation.

The two trucks used for testing were:

1. 3S2 with a tractor having an air suspension tandem and a trailer with standard rear tandem and air suspension loaded to 78,440 lbs.
2. 3S2 with a tractor having a tapered spring leaf suspension tandem and trailer with a standard rear tandem and air suspension loaded to 45,930 lbs.

Each truck made a total of 21 passes over the WIM scale at speeds ranging from approximately 45 to 65 miles per hour. Pavement surface temperatures recorded during the test runs ranged from 77 to 95 degrees Fahrenheit. The computed values of 95% confidence limits of each statistic for the total population are in Table 3-1.

As shown in Table 3-1, the site passed all of the performance criteria for weight and spacing. No post-calibration speed checks were considered necessary given the validation of speed measurement pre-calibration and consistent spacing validation.

Table 3-1 Post-Validation Results - 120100 – 01 Mar 2005

SPS-1, -2, -5, -6 and -8	95 %Confidence Limit of Error	Site Values	Pass/Fail
Loaded single axles	± 20 percent	2.3% $\pm$ 10.2%	Pass
Loaded tandem axles	± 15 percent	0.2% $\pm$ 10.1%	Pass
Gross vehicle weights	± 10 percent	0.5% $\pm$ 8.2%	Pass
Vehicle speed	± 1 mph [2 km/hr]	N/A	Pass
Axle spacing length	± 0.5 ft [150 mm]	-0.1 $\pm$ 0.2 ft	Pass

The test runs were conducted primarily during the late morning to mid-afternoon hours, resulting in a moderate range of pavement temperatures. The runs were also conducted at various speeds to determine the effects of these variables on the performance of the WIM scale.

To investigate these effects, the data set was split into three speed groups and two temperature groups. The distribution of runs within these groupings is illustrated in Figure 3-1. The speed groups were divided as follows: Low speed = 44-51 mph, Medium speed = 52-58 mph and High speed = 59+ mph. The two temperature groups were created by splitting the runs between those at 77 to 85 for Low temperature, 86 to 95 for High temperature.

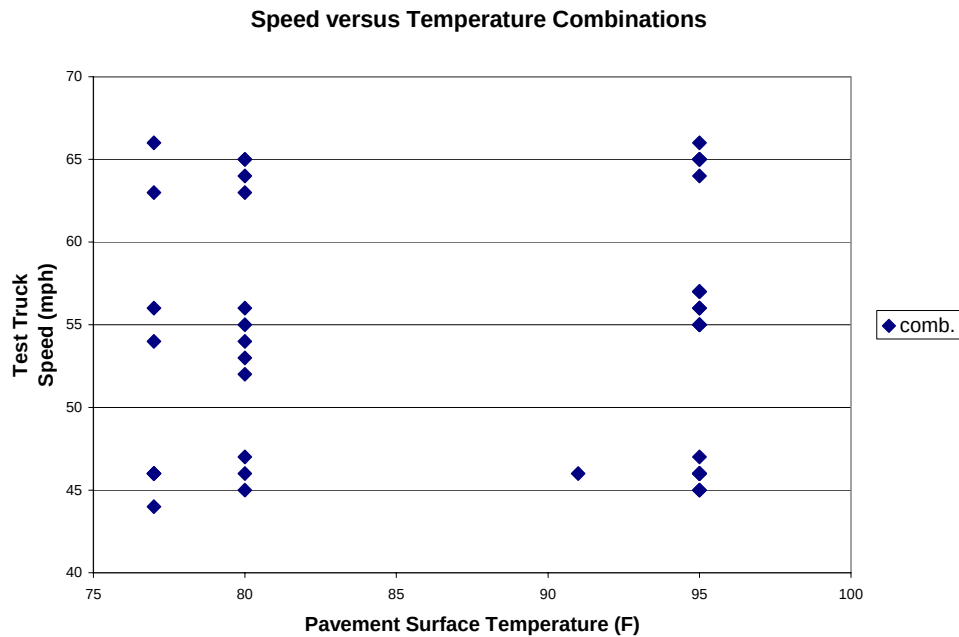


Figure 3-1 Post-Validation Speed-Temperature Distribution – 120100 – 01 Mar 2005

A series of graphs was developed to check visually for any sign of a relationship between speed or temperature and the scale performance.

Figure 3-2 shows the by truck GVW percent error vs. speed graph for the population as a whole. From the figure it appears that the variability in GVW errors is larger for the light truck compared to the loaded truck. Diamonds are used to identify the light truck. The equipment estimates GVW fairly accurately at low speeds, underestimates its GVW at mid-range speeds, and overestimates its GVW at high speeds. The heavy truck is represented by squares and tends to have GVW overestimated at all speeds. There is greater scatter for GVW errors at the lower end of the speed range than the upper. Given the speed limit of 65 mph and the prevailing speed of the traffic, this was not considered an issue.

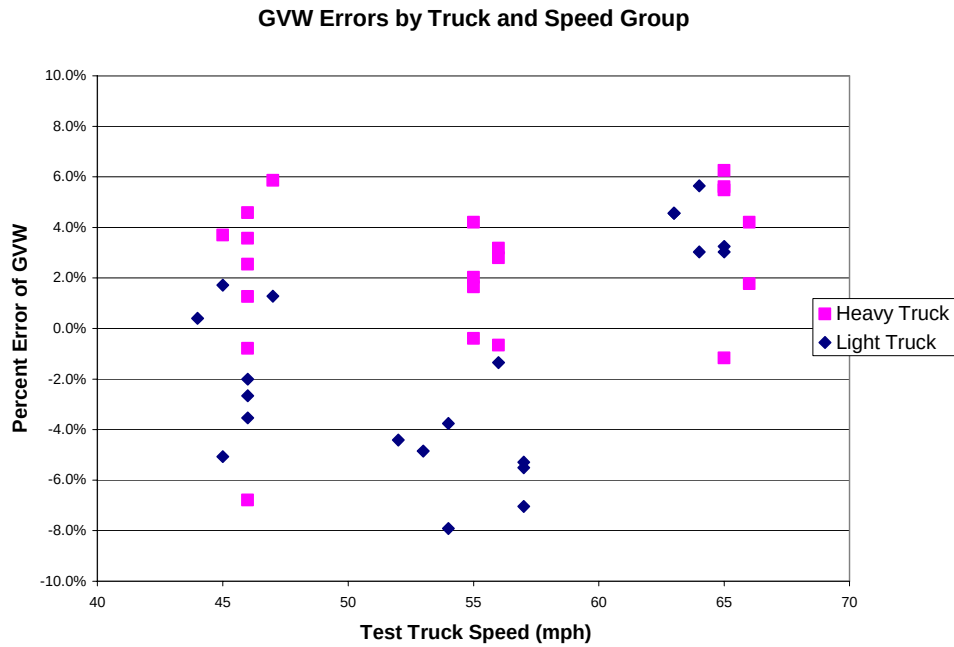


Figure 3-2 Post-validation GVW Percent Error vs. Speed by Truck – 120100 – 01 Mar 2005

Figure 3-3 shows the lack of relationship between temperature and GVW percentage error. Combined, the test trucks exhibited the same level of scatter throughout the temperature range.

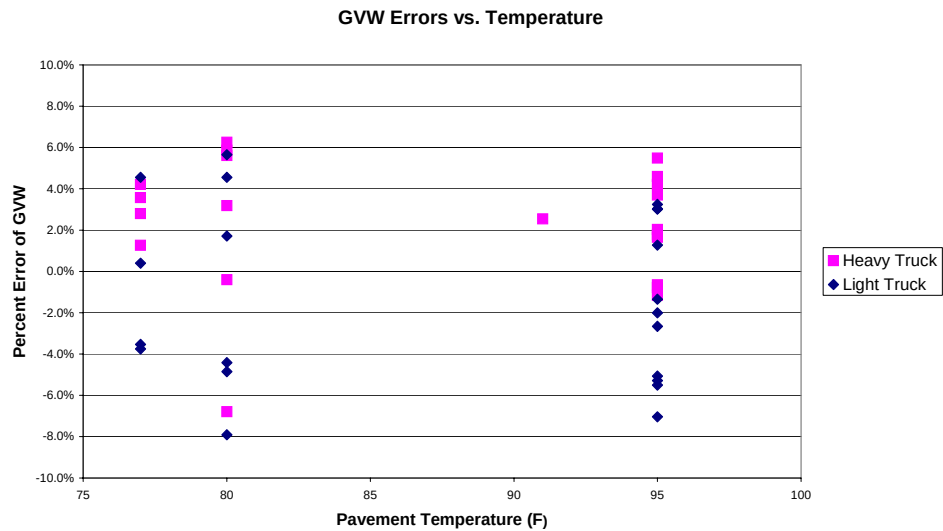


Figure 3-3 Post-Validation GVW Percent Error vs. Temperature by Truck – 120100 – 01 Mar 2005

Figure 3-4 shows the relationship between the spacing errors in feet and speeds. The graph indicates that the errors in tandem-spacings for the test trucks were generally not affected by changes in speed.

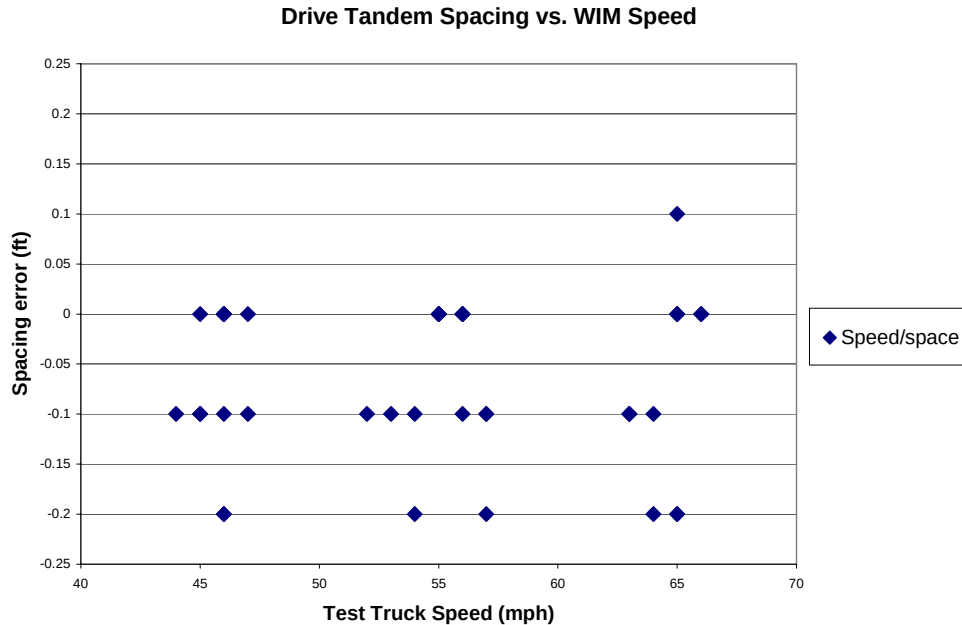


Figure 3-4 Post-Validation Speed vs. Spacing - 120100 – 01 Mar 2005

3.1 Temperature-based Analysis

The two temperature groups were created by splitting the runs between those at 77 to 85 degrees Fahrenheit for Low temperature and 86 to 95 degrees Fahrenheit for High temperature.

Table 3-2 Post-Validation Results by Temperature Bin – 120100 – 01 Mar 2005

Element	95% Limit	Low Temp. 77-85F	High Temp. 86-95F
Single axles	$\pm 20\%$	2.3% $\pm$ 11.9%	2.3% $\pm$ 9.5%
Tandem axles	$\pm 15\%$	0.6% $\pm$ 11.3%	-0.2% $\pm$ 9.3%
GVW	$\pm 10\%$	0.9% $\pm$ 9.5%	0.2% $\pm$ 7.6%
Speed	± 1 mph	N/A	N/A
Axle spacing	± 0.5 ft	0.0 $\pm$ 0.1 ft	-0.1 $\pm$ 0.2

From Table 3-2 it appears that mean error is not particularly affected by temperature. There is some decrease, numerically in variability at higher temperatures. Figure 3-5 and Figure 3-6 reflect the similarity in scatter for the two temperature ranges with the slightly lesser one at higher temperatures for both GVW and single axle weights.

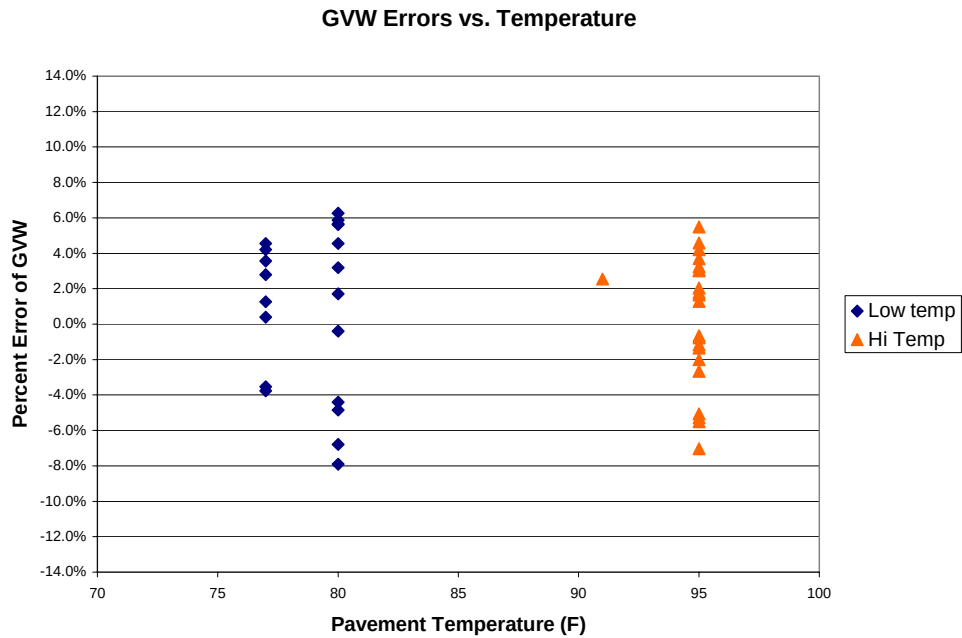


Figure 3-5 Post-Validation GVW Percent Error vs. Temperature by Group – 120100 – 01 Mar 2005

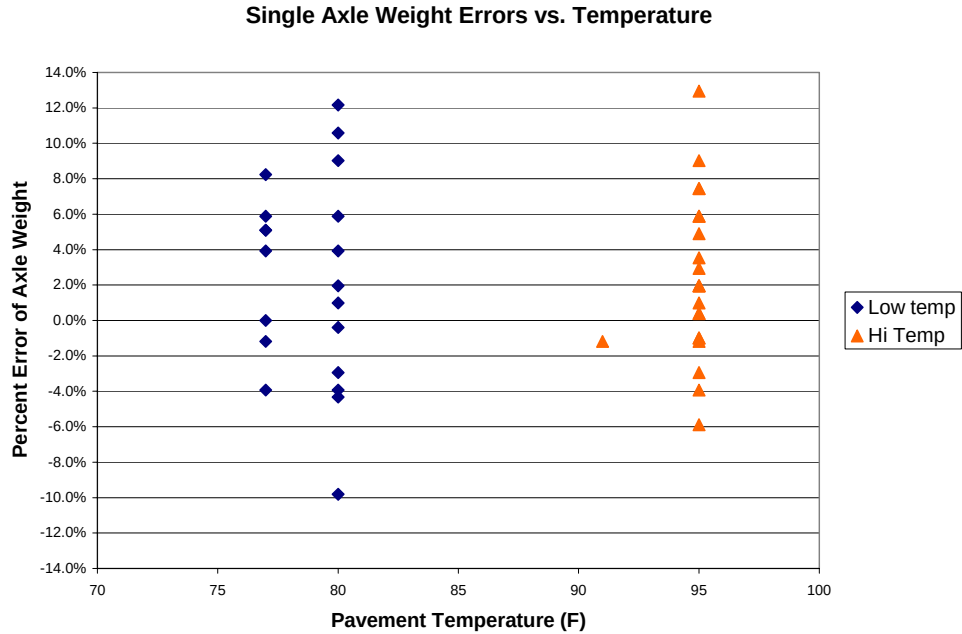


Figure 3-6 Post-Validation Single Axle Error vs. Temperature by Group - 120100 – 01 Mar 2005

3.2 Speed-based Analysis

The speed groups were divided as follows: Low speed = 44 to 51 mph, Medium speed = 52 to 58 mph and High speed = 59+ mph.

Table 3-3 Post-Validation Results by Speed Bin – 120100 – 01 Mar 2005

Element	95% Limit	Low Speed 44-51 mph	Med. Speed 52-58 mph	High Speed 59+ mph
Single axles	+20 %	0.4%+10.0%	1.3%+10.8%	5.9%+8.4%
Tandem axles	+15 %	0.5%+11.6%	-2.6%+8.9%	3.3%+6.1%
GVW	+10 %	0.3%+7.9%	-1.8%+8.6%	3.9%+4.6%
Speed	+1 mph	N/A	N/A	N/A
Axle spacing	± 0.5 ft	0.2±0.2 ft	-0.1±0.2 ft	-0.1±0.2 ft

From Table 3-3 and Figure 3-7, it appears that GVW variability is higher at the low and medium range speeds. At the high speeds it appears that the system overestimates the gross weights by about 4 percent and it appears that the variability decreases.

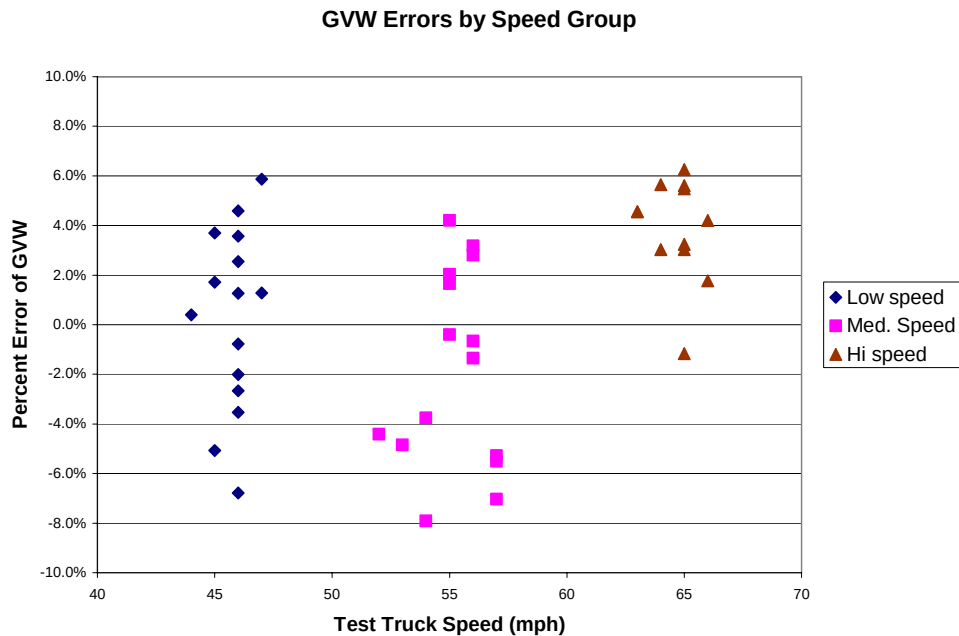


Figure 3-7 Post-Validation GVW Percent Error vs. Speed Group - 120100 – 01 Mar 2005

As shown in Figure 3-8 the light truck tended to have underestimates of GVW at low and medium speeds. It showed a level of overestimation similar to that of the heavy truck at speeds approaching the speed limit. The scatter of the population decreases with higher speeds.

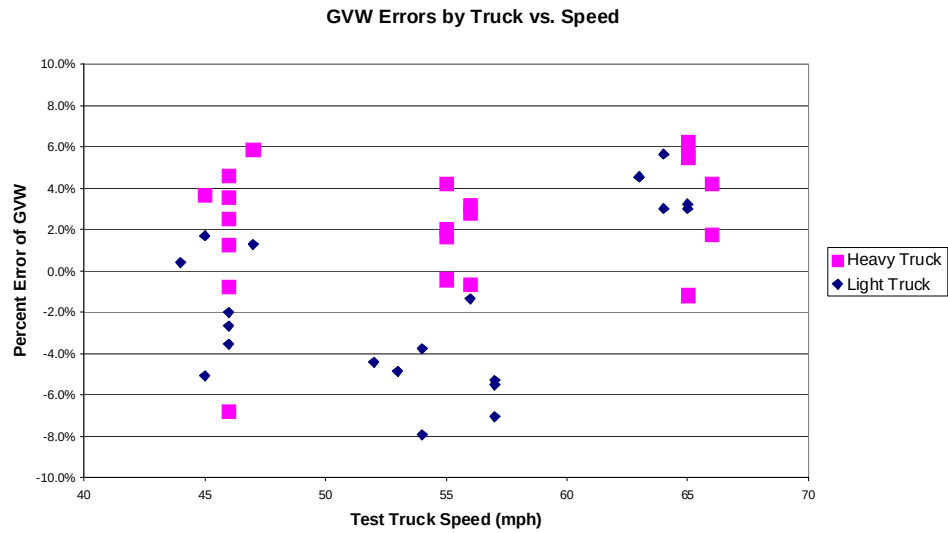


Figure 3-8 Post-Validation GVW Percent Error vs. Speed by Truck – 120100 – 01 Mar 2005

From Figure 3-9 it appears that the WIM equipment produces a progressively higher overestimation of single axle weights as the speeds of the test trucks increase.



Figure 3-9 Post-Validation Single Axle Percent Error vs. Speed Group - 120100 – 01 Mar 2005

As shown in Figure 3-10 when the single axle weight errors for speeds are grouped by truck, it appears that the WIM equipment exhibited a progressively higher overestimation

of single axle weights for the heavy truck as the speed increased. For the light truck, the single axle errors did not exhibit as strong a trend.

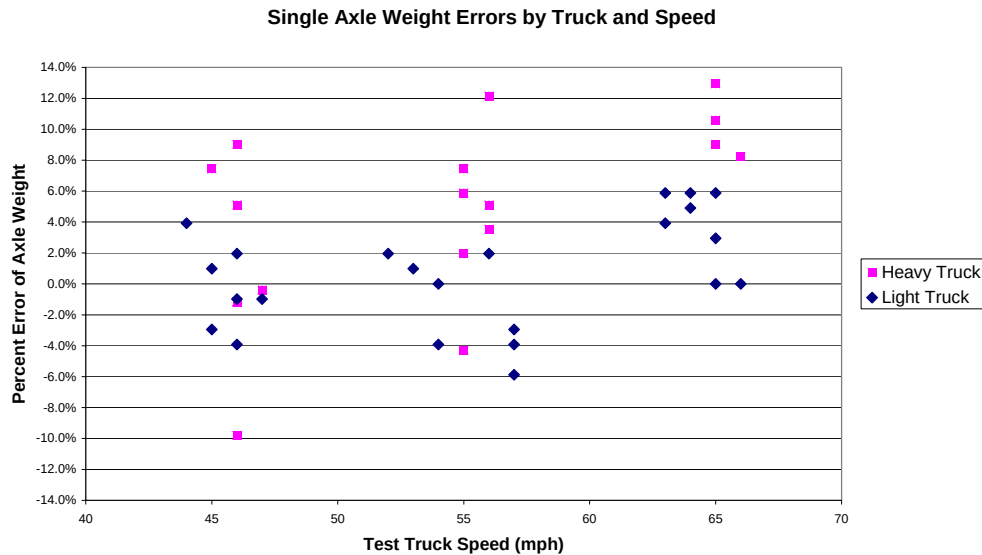


Figure 3-10 Post-Validation Single Axle Percent Error vs. Speed by Truck - 120100 – 01 Mar 2005

3.3 Classification Validation

The agency uses a modified FHWA 13 bin classification scheme. The modification utilizes a Class 15 for unknown vehicles.

A sample of 100 trucks was collected at the site. Video was taken at the site to provide ground truth for the evaluation. Based on a 100 percent sample it was determined that there were zero percent unknown vehicles and three percent unclassified vehicles. The unclassified vehicles are typically recreational vehicles towing trailers.

The second check is the ability of the algorithm to correctly distinguish between truck classes with no more than 2% errors in such classifications. The following are the classification error rates by class where trucks are defined as FHWA Classes 4 - 13:

Table 3-4 Truck Misclassification Percentages for 120100 - 01 Mar 2005

Class	Percent Error	Class	Percent Error	Class	Percent Error
4	N/A	5	0	6	0
7	0				
8	0	9	0	10	0
11	N/A	12	N/A	13	N/A

The misclassification percentage is computed as the probability that a pair containing the class of interest does NOT include a match. Thus if there are eight pairs of observations

with at least one Class 9 and only six of them are matches, the error rate is 25 percent. The percent error reported above and the mean differences reported below do not represent the same statistic. It is possible to have error rates greater than 0 with a mean difference of zero.

Table 3-5 Truck Classification Mean Differences for 120100 - 01 Mar 2005

Class	Mean Difference	Class	Mean Difference	Class	Mean Difference
4	N/A	5	0	6	0
7	0				
8	0	9	0	10	0
11	N/A	12	N/A	13	N/A

These error rates are normalized to represent how many vehicles of the class are expected to be over or under-counted for every hundred of that class observed by the equipment. Thus a value of 0 means the class is identified correctly on average. A number between -1 and -100 indicates at least that number of vehicles either missed or not assigned to the class by the equipment. It is not possible to miss more than all of them or one hundred out of one hundred. Numbers 1 or larger indicate at least how many more vehicles are assigned to the class than the actual “hundred observed”. Classes marked Unknown are those identified by the equipment but no vehicles of the type were seen by the observer. There is no way to tell how many more than those that might actually present exist. N/A means no vehicles of the class recorded by either the equipment or the observer.

4 Pavement Discussion

Since the previous Validation visit on December 16, 2003 the leading piezo sensor was ground flush with the pavement surface and the pavement within 12 inches on either side of the sensor was also ground to ensure a smooth transition over the WIM sensor. The new pavement condition did not appear to significantly influence truck movement across the sensors.

4.1 Profile analysis

The WIM site is a section of pavement that is 305 meters long with the WIM scale located at 274.5 meters from the beginning of the test section. An ICC profiler was used to collect longitudinal profiles of the test section with a sampling interval of 25 millimeters. The Long Range Index (LRI) incorporates the pavement profile starting 25.8 m prior to the scale and ending 3.2 m after the scale in the direction of travel. The Short Range Index (SRI) incorporates a shorter section of pavement profile beginning 2.7 m prior to the WIM scale and ending 0.5 m after the scale.

Profile data was collected at this SPS WIM location by Fugro/BRE, Inc. on April 5, 2004 and were processed through the LTPP SPS WIM Index software (Alpha version). This WIM scale is installed on a flexible pavement. The results are shown in Table 5-1.

A total of 8 profiler passes were conducted over the WIM site. Since the issuance of the LTPP directive on collection of longitudinal profile data for SPS WIM section, the requirements have been a minimum of 3 passes in the center of the lane and one shifted to each side. For this site the RSC has done 4 passes at the center of the lane, 2 passes shifted to the left side of the lane, and 2 passes shifted to the right side of the lane. Shifts to the sides of the lanes were made such that data were collected as close to the lane edges as was safely possible. For each profiler pass, profiles were recorded under the left wheel path (LWP) and the right wheel path (RWP).

Table 4-1 shows the computed index values for all 8 profiler passes for this WIM site. The average values over the four passes only at the center of the lane at each path were calculated, as shown in the right most column of the table. The average values over the two passes at the right side and left side of the lane are not calculated because of the lower reliability associated with the average of only two passes. Values above the index limits are presented in italics.

Table 4-1 Long Range Index (LRI) and Short Range Index (SRI) - 120100 – 05 Apr 2004

Profiler Passes			Pass 1	Pass 2	Pass 3	Pass 4	Ave.
Center	LWP	LRI (m/km)	0.570	0.582	0.609	0.757	0.630
		SRI (m/km)	0.760	0.749	0.700	<i>1.041</i>	<i>0.813</i>
	RWP	LRI (m/km)	<i>1.597</i>	<i>0.845</i>	<i>1.601</i>	<i>0.868</i>	<i>1.228</i>
		SRI (m/km)	<i>1.682</i>	0.766	0.696	0.738	<i>0.971</i>
Left Shift	LWP	LRI (m/km)	<i>0.836</i>	<i>0.803</i>			
		SRI (m/km)	0.605	0.594			
	RWP	LRI (m/km)	0.608	0.670			
		SRI (m/km)	0.764	0.775			
Right Shift	LWP	LRI (m/km)	<i>0.830</i>	<i>0.934</i>			
		SRI (m/km)	<i>1.173</i>	<i>0.983</i>			
	RWP	LRI (m/km)	<i>0.978</i>	<i>0.793</i>			
		SRI (m/km)	<i>1.135</i>	0.674			

All passes have multiple index values that exceed the WIM Index limit of 0.789 m/km as can be seen in the table. Most index values exceeding the index limit happened on the RWP of the center lane and on both the wheel paths of the right shift of the center lane, indicating the pavement condition is rougher on the right side of the lane than the left. When all values are less than 0.789 it is presumed unlikely that pavement conditions will significantly influence sensor output. Values above that level may or may not influence the reported weights and potentially vehicle-spacings. **Based on the profile data analysis, the Florida SPS-1 WIM site does not meet the smoothness requirements for WIM site locations.** If any remedial action is taken it should be done for the entire section.

However, until such time as this site fails to produce research quality data, no pavement remediation is recommended to change WIM site smoothness.

4.2 Distress survey and any applicable photos

Except for the distresses described below, the pavement appears to be in good condition. The trucks' movement over the site did not appear to be affected by any pavement distresses.

During the distress survey, pavement breakout was observed at two locations; approximately two feet following the trailing WIM sensor in the left wheel path (Figure 4-1) and at a location approximately ten feet following the trailing WIM sensor on the right edge of the travel lane (Figure 4-2). Neither of these distresses appeared to influence truck movements over the WIM scale area. These locations should be monitored during future site visits, and considered for routine maintenance.



Figure 4-1 - Pavement Distress in Left Wheelpath – 120100 – 01 Mar 2005



Figure 4-2 - Pavement Distress at Right Edge of Lane – 120100 – 01 Mar 2005

4.3 Vehicle-pavement interaction discussion

There appears to be a slight bouncing of trucks approximately 350 feet prior to the WIM scale area; however the trucks do appear to stabilize prior to entering the WIM scale area and do not appear to display significant vertical movement while approaching, traversing or exiting the WIM scale area. Trucks track down the wheel path. Daylight is not apparent between the tires and any of the sensors for the equipment.

5 Equipment Discussion

The traffic monitoring equipment at this location includes Kistler quartz piezo sensors and an IRD/PAT Traffic DAW-190 controller. The sensors are installed in a staggered array, twelve feet apart in asphalt concrete pavement.

Since the last Validation visit on December 16, 2003, the agency has instituted a new classification scheme that is a modified FHWA 13-bin scheme. Axle spacings for Class 3 and Class 5 vehicles were adjusted in an attempt to prevent cross-classification of these vehicle types. The agency also ground the leading WIM sensor and surrounding pavement to be flush with the pavement surface and provide a smooth transition leading up to and following after the WIM sensor

In June 2003, when the new equipment was installed and the controller was upgraded, the LTPP lane was incorrectly designated as Lane 4 in the controller. After the validation visit of December 16, 2003, the State had the controller rewired to correct the LTPP lane in the controller from Lane 4 to Lane 1. Only data collected during the period of June 23, 2003 to December 16, 2003 had the LTPP Lane coded as Lane 4. All data collected before June 23, 2003 and since December 16, 2003 has been designated as Lane 1.

5.1 Pre-Evaluation Diagnostics

A complete electronic and electrical check of all system components including in-road sensors, electrical power, and telephone service were performed immediately prior to the validation. All sensors and system components were found to be within operating parameters.

A complete visual inspection of all WIM system and support components was also performed. All components appeared to be in good physical condition.

5.2 Calibration Process

The equipment required three iterations of the calibration process between the initial 42 runs and the final 40 runs. All calibration adjustments were made by the agency representative.

5.2.1 Calibration Iteration 1

The results of the 40 pre-calibration runs performed by the two test trucks produced a range of -8.5% to +9.0% for the average GVW error. The factors to be adjusted were the front axle and overall compensation factors, which are modified so that if weights are underestimated they are increased. If weights are overestimated they are decreased. The adjustment increment used was the absolute value of the percent errors. The value of the front axle compensation factor was decreased by 4.0 % from 1000 to 960 to reduce the size of the overestimate for steering axles. The value of the overall compensation factor was decreased by 1.8% from 784 to 770 to reduce the size of the overestimate for GVW.

The first 20 calibration runs were performed by the two test trucks and produced an average error of -3.5% for GVW. Based on this result and the values for the single and tandem axles it was determined that further adjustments were needed.

Table 5-1 shows the results of Calibration 1 adjustment. The runs were conducted at the predetermined test speeds. It appears that although the mean errors were generally consistent over the entire range of speeds, the variability of GVW error was higher at the middle speed range.

Table 5-1 Calibration Iteration 1 Results - 120100 – 28 Feb 2005 (beginning 4:49 PM)

SPS-1, -2, -5, -6 and -8	95 %Confidence Limit of Error	Site Values	Pass/Fail
Loaded single axles	± 20 percent	-3.5% $\pm$ 7.3%	Pass
Loaded tandem axles	± 15 percent	-1.9% $\pm$ 12.0%	Pass
Gross vehicle weights	± 10 percent	-2.9% $\pm$ 9.5%	Fail
Vehicle speed	± 1 mph [2 km/hr]	N/A	Pass
Axle spacing length	± 0.5 ft [150 mm]	-0.1 $\pm$ 0.2	Pass

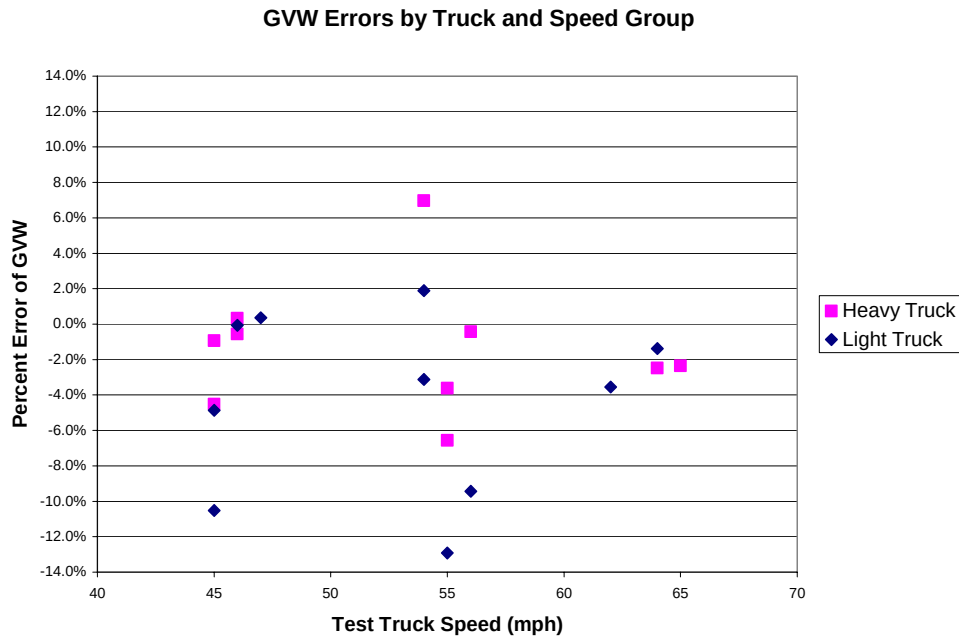


Figure 5-1 Calibration Iteration 1 GVW Percent Error vs. Speed Group - 120100 – 28 Feb 2005 (beginning 4:49 PM)

5.2.2 Calibration Iteration 2

The results of the first calibration runs performed by the two test trucks produced a range of -13% to 9.0% for the average GVW error. The factor to be adjusted was the front axle compensation factor to bring the steering axle error in line with the GVW error and to reduce the overall GVW underestimation. The front axle compensation factor is modified so that if steering axle weights are underestimated it is increased. If steering axle weights are overestimated it is decreased. The adjustment increment used was the absolute value of the percent error. The value of the front axle compensation factor was increased by 2.0 % from 960 to 980 to reduce the size of the underestimate for GVW.

The second 14 calibration runs were performed by the two trucks and produced an average error of -2.6% for GVW. Based on this result and the values for the single and tandem axles it was determined that further adjustments were needed.

Table 5-2 shows the results of Calibration 2 adjustment. The runs were conducted at the predetermined test speeds. It appears that although the mean errors were generally consistent over the entire range of speeds, the variability of GVW error was higher at the middle speed range.

Table 5-2 Calibration Iteration 2 Results - 120100 – 01 Mar 2005 (beginning 10:20 AM)

SPS-1, -2, -5, -6 and -8	95 %Confidence Limit of Error	Site Values	Pass/Fail
Loaded single axles	± 20 percent	-0.8% $\pm$ 9.2%	Pass
Loaded tandem axles	± 15 percent	-2.8% $\pm$ 10.7%	Pass
Gross vehicle weights	± 10 percent	-2.6% $\pm$ 8.2%	Fail
Vehicle speed	± 1 mph [2 km/hr]	N/A	Pass
Axle spacing length	± 0.5 ft [150 mm]	-0.1 $\pm$ 0.2 ft	Pass

GVW Errors by Truck and Speed Group

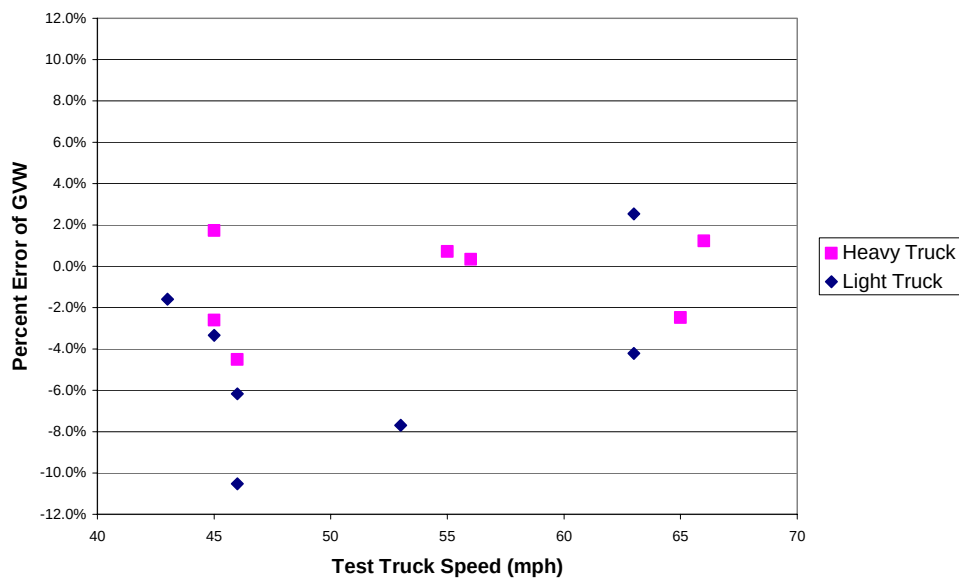


Figure 5-2 Calibration Iteration 2 GVW Percent Error vs. Speed Group - 120100 – 01 Mar 2005 (beginning 10:20 AM)

5.2.3 Calibration Iteration 3

The results of the third calibration runs performed by the two test trucks produced a range of -10.5% to +2.5% for the average GVW error. The factors to be adjusted were the front axle and overall compensation factors, which are modified so that if steering axle and GVW weights are underestimated they are increased. If these weights are overestimated they are decreased. The adjustment increment used was the absolute value of the percent errors. The value of the front axle compensation factor was increased by 1.2 % from 770 to 780 to reduce the size of the steering axle underestimate. The value of the overall compensation factor was decreased by 1.1 % from 980 to 970 to reduce the size of the GVW overestimate.

The third calibration was checked after 10 runs to get a sense of the final validation results. They showed an average error of 0.7% for GVW. An additional 32 runs were performed to complete the required minimum 40 post calibration runs.

Table 5-3 shows the results of the Calibration 3 adjustment. The runs were conducted at the predetermined test speeds.

Table 5-3 Calibration Iteration 3 Results – 120100 – 01 Mar 2005 (beginning 11:26 AM)

SPS-1, -2, -5, -6 and -8	95 %Confidence Limit of Error	Site Values	Pass/Fail
Loaded single axles	± 20 percent	3.6% $\pm$ 10.0%	Pass
Loaded tandem axles	± 15 percent	0.7% $\pm$ 10.3%	Pass
Gross vehicle weights	± 10 percent	1.1% $\pm$ 8.7%	Pass
Vehicle speed	± 1 mph [2 km/hr]	N/A	Pass
Axle spacing length	± 0.5 ft [150 mm]	-0.1 $\pm$ 0.2 ft	Pass

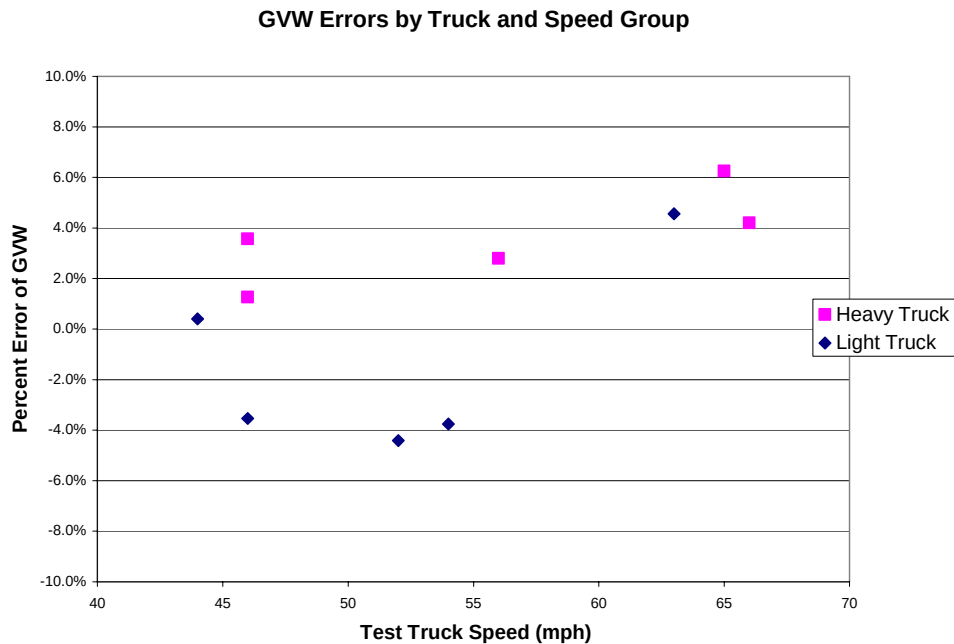


Figure 5-3 Calibration Iteration 3 GVW Percent Error vs. Speed Group - 120100 – 01 Mar 2005 (beginning 11:26 AM)

5.3 Summary of Traffic Sheet 16s

This site has validation information from previous visits as well as the current one in the tables below. Shaded blocks indicate the dates when a research quality data determination was made.

Table 5-4 Classification Validation History - 120100

Date	Method	Mean Difference				Percent Unclassified
		Class 9	Class 8	Other 1	Other 2	
3/1/05	No. of Trucks	0	0			3
2/28/05	No. of Trucks	0	0			1
12/16/03	No. of Trucks	-10	-3	-25		2
12/03/03	No. of Trucks	1	0	25		1
7/9/03	No. of Trucks					

Table 5-5 Weight Validation History - 120100

Date	Method	Mean Error and SD		
		GVW	Single Axles	Tandem Axles
3/1/05	Test trucks	0.2 (4.1)	1.2 (5.0)	0.0 (5.1)
2/28/05	Test Trucks	1.5 (3.7)	4.4 (4.1)	0.8 (5.2)
12/17/03	Test Trucks	1.0 (7.2)	3.5 (12.7)	-2.1 (10.7)
12/16/03	Test Trucks	-15 (9.0)	-9.3 (9.0)	-17.8 (10.7)
7/9/03	Test Trucks	1.6 (3.9)	-2.9 (2.9)	2.2 (4.9)

Since the initial installation of the site the WIM system has utilized an IRD/PAT Traffic controller. The in-road sensors in the LTPP lane were changed from BL piezo sensor to Kistler quartz sensors in the summer of 2003. At this time the WIM controller was also upgraded.

Calibrations of the equipment at this site have been performed by the vendor or a state contractor since the installation of the equipment.

5.4 Projected Maintenance/Replacement Requirements

No corrective measures need to be performed at this time for the equipment.

6 Pre-Validation Analysis

This initial analysis is based on test runs conducted mid-day on February 28, 2005 at test site 120100 on US Route 27, 13.8 miles south of SR80.

For the initial validation each truck made a total of 20 passes over the WIM scale at speeds ranging from approximately 45 to 65 miles per hour. Pavement surface temperatures were recorded during the test runs ranging from about 84 to 95 degrees Fahrenheit. The computed values of 95% confidence limits of each statistic for the total population are within Table 6-1.

As seen in Table 6-1 the site passed all of the performance criteria for research quality data. A positive 4.0% bias was observed for steering axle weights, and it was determined that additional adjustment could further improve the overall quality of the data.

Table 6-1 Pre-Validation Results - 120100 – 28 Feb 2005

SPS-1, -2, -5, -6 and -8	95 %Confidence Limit of Error	Site Values	Pass/Fail
Loaded single axles	± 20 percent	5.3% $\pm$ 8.3%	Pass
Loaded tandem axles	± 15 percent	0.8% $\pm$ 10.4%	Pass
Gross vehicle weights	± 10 percent	1.5% $\pm$ 7.5%	Pass
Vehicle speed	± 1 mph [2 km/hr]	-0.1 $\pm$ 0.6 mph	Pass
Axle spacing length	± 0.5 ft [150 mm]	-0.1 $\pm$ 0.2 ft	Pass

The test runs were conducted primarily during the mid-day to early evening hours, resulting in a fairly narrow range of pavement temperatures. The runs were also conducted at various speeds to determine the effects of these variables on the performance of the WIM scale. To investigate these effects, the dataset was split into three speed groups and two temperature groups. The distribution of runs within these groupings is illustrated in Figure 6-1. The speed groups were divided as follows: Low speed = 42-50 mph, Medium speed = 51-59 mph and High speed = 60+ mph. The two temperature groups were created by splitting the runs between those at 84 to 89 degrees Fahrenheit for Low temperature and 90 to 95 degrees Fahrenheit for High temperature.

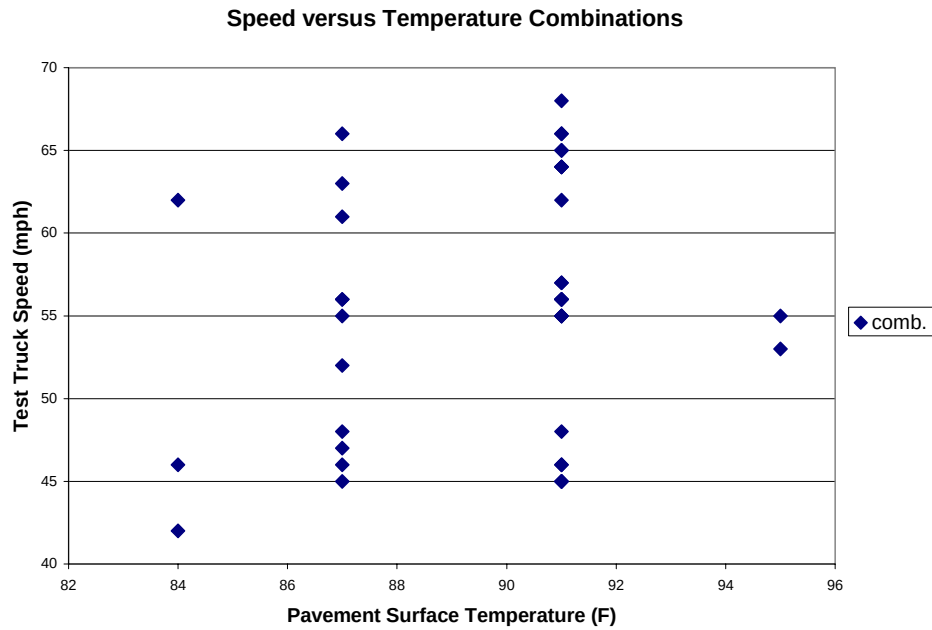


Figure 6-1 Pre-Validation Speed-Temperature Distribution – 120100 – 28 Feb 2005

A series of graphs was developed to check graphically for any sign of a relationship between speed or temperature and the scale performance.

Figure 6-2 shows the by truck GVW percent error vs. speed graph for the population as a whole. From the figure it appears that the error did not vary significantly by truck. The GVW was overestimated at the lower speeds. Only a slight overestimation of GVW was produced for both trucks at the medium and high speed ranges.

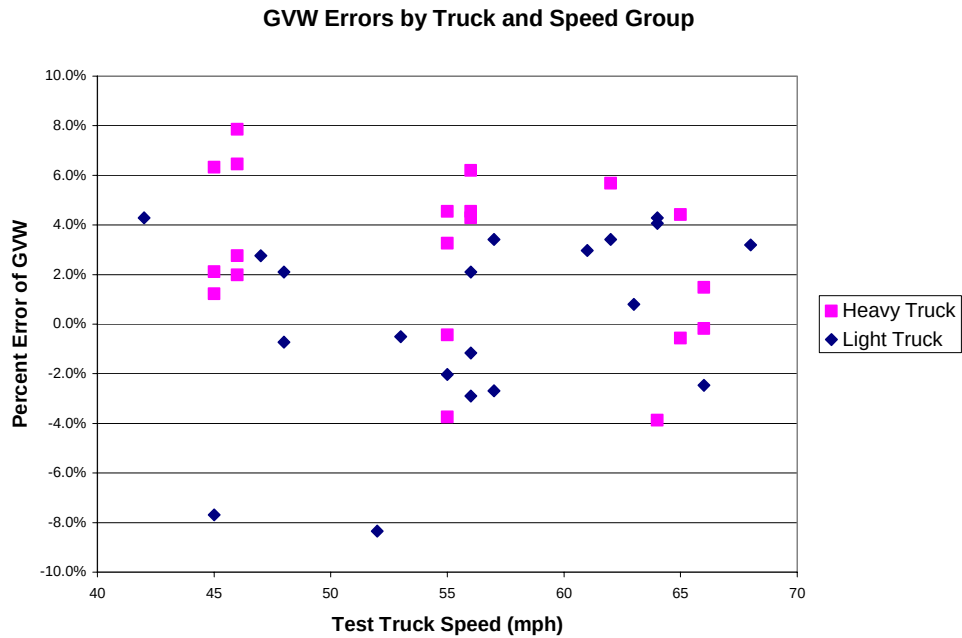


Figure 6-2 Pre-validation GVW Percent Error vs. Speed by Truck – 12100 – 28 Feb 2005

Figure 6-3 shows the relationship between temperature and GVW percentage error. Combined, the test trucks exhibited approximately the same percentage of error throughout the temperature range. The temperature range is not large enough for any more specific interpretations.

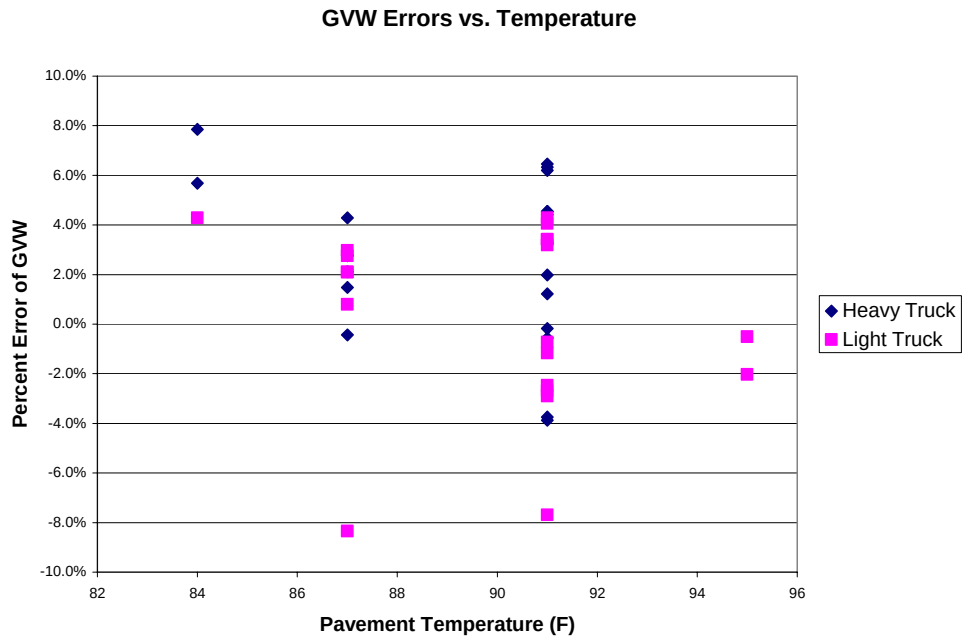


Figure 6-3 Pre-Validation GVW Percent Error vs. Temperature by Truck – 120100 – 28 Feb 2005

Figure 6-4 shows the relationship between the spacing errors in feet and speeds. From the figure it appears that errors in tandem spacings for the test trucks were generally not affected by changes in speed.

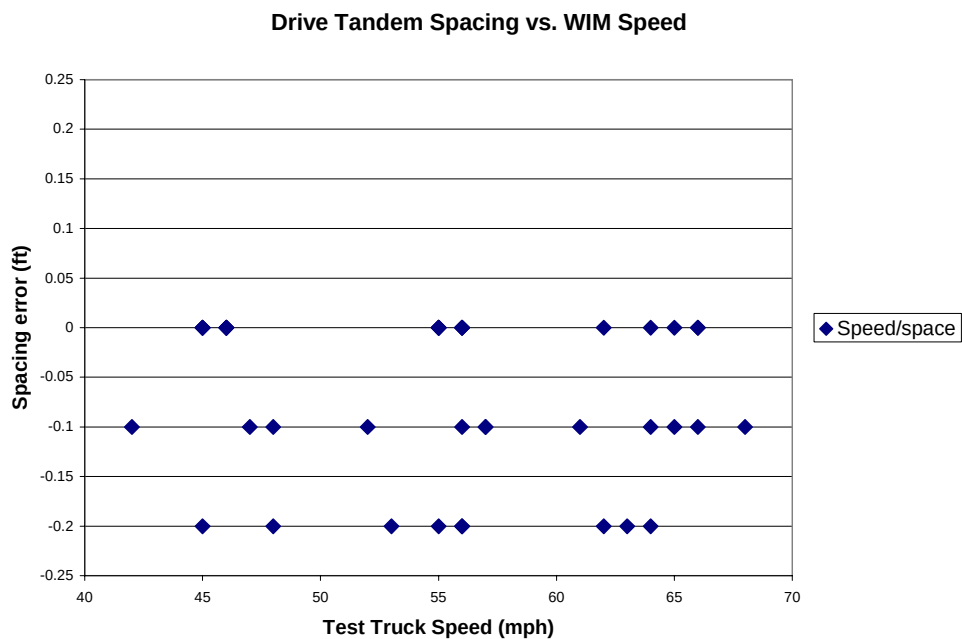


Figure 6-4 Pre-Validation Speed vs. Spacing – 120100 – 28 Feb 2005

6.1 Temperature-based Analysis

The two temperature groups were created by splitting the runs between those at 84 to 89 for Low temperature and 90 to 95 for High temperature.

Table 6-2 Pre-Validation Results by Temperature Bin - 120100 – 28 Feb 2005

Element	95% Limit	Low Temp. 84-89F	High Temp. 90-95F
Single axles	$\pm 20\%$	5.3% $\pm$ 10.9%	5.3% $\pm$ 7.4%
Tandem axles	$\pm 15\%$	1.9% $\pm$ 11.5%	0.3% $\pm$ 9.9%
GVW	$\pm 10\%$	2.2% $\pm$ 7.9%	1.1% $\pm$ 7.7%
Speed	± 1 mph	N/A	N/A
Axle spacing	± 0.5 ft	-0.1 $\pm$ 0.2	-0.1 $\pm$ 0.2

Table 6-2 shows no particular relation between GVW errors and temperature. Figure 6-5 and Figure 6-6 show the scatter for weight errors for GVW and steering axles respectively.

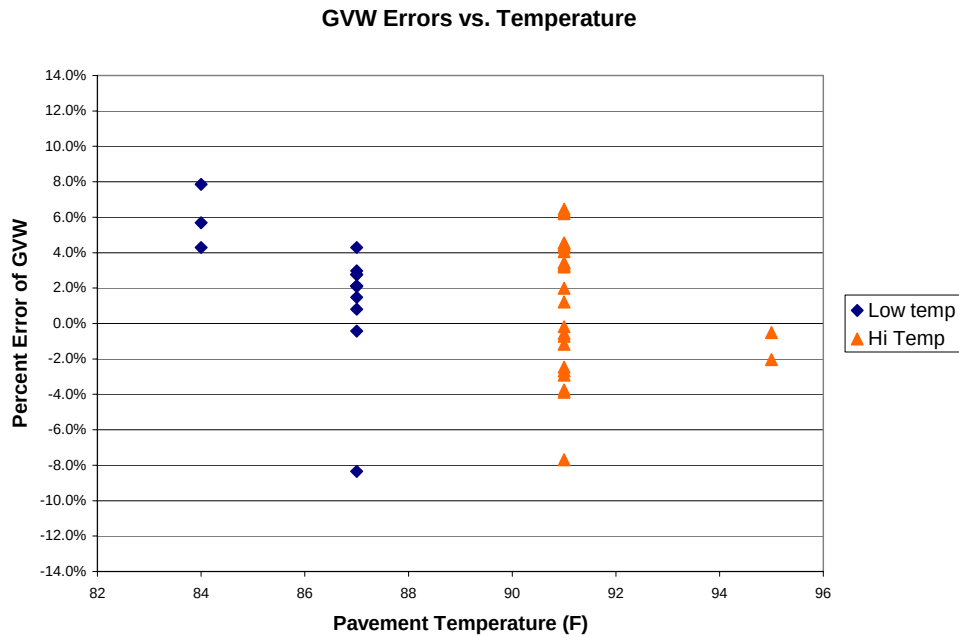


Figure 6-5 Pre-Validation GVW Percent Error vs. Temperature by Group – 120100 – 28 Feb 2005

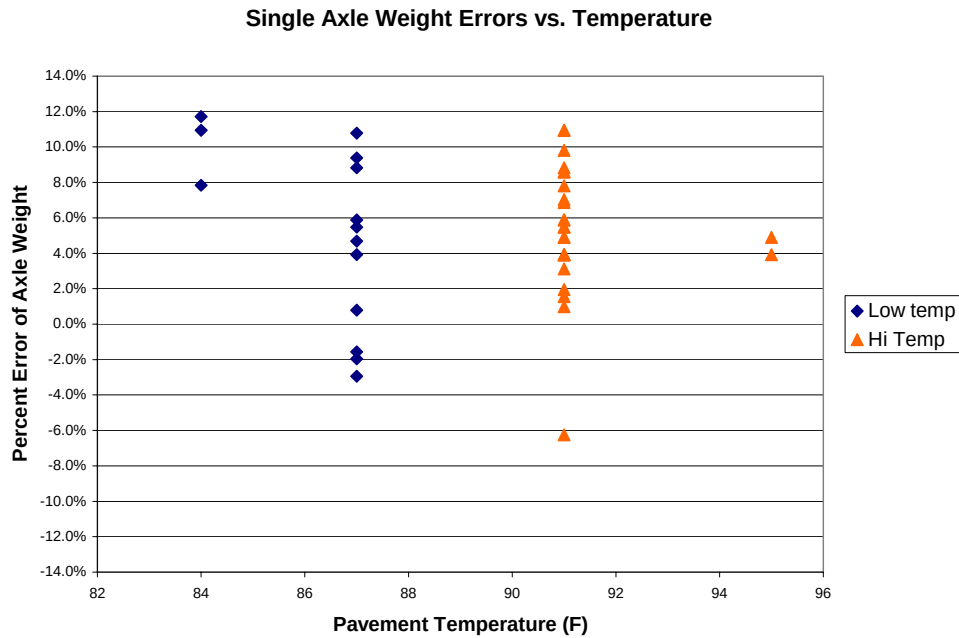


Figure 6-6 Pre-Validation Single Axle Error vs. Temperature by Group – 120100 – 28 Feb 2005

6.2 Speed-based Analysis

The speed groups were divided as follows: Low speed = 42-50 mph, Medium speed = 51-59 mph and High speed = 60+ mph.

Table 6-3 shows the error statistics by speed group. The table indicates that the mean error for all weights is fairly consistent over the entire speed range. However the variability for single axles is increasing as speed increases while the variability for tandems and GVW are decreasing as the speed increases.

Table 6-3 Pre-Validation Results by Speed Bin - 120100 – 28 Feb 2005

Element	95% Limit	Low Speed 42-50mph	Med. Speed 51-59mph	High Speed 60+mph
Single axles	+20 %	6.3%+6.9%	5.2%+7.4%	4.5%+11.9%
Tandem axles	+15 %	1.9%+13.3%	-.5%+10.0%	1.3%+8.4%
GVW	+10 %	2.5%+8.9%	0.4%+8.6%	1.8%+6.3%
Speed	+1 mph	N/A	N/A	N/A
Axle spacing	+ 0.5 ft	0.2+0.2 ft	-0.1+0.2 ft	-0.1+0.2 ft

As shown in Figure 6-7, it appears that the overestimation of GVW is slightly decreasing as the speed increases while the error scatter remains fairly constant.

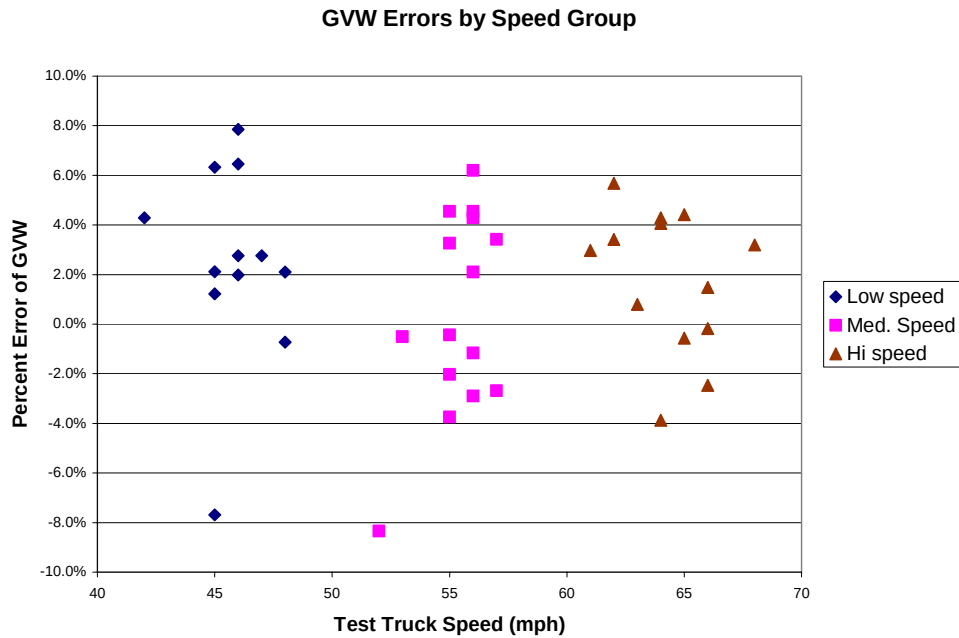


Figure 6-7 Pre-Validation GVW Percent Error vs. Speed Group – 120100 – 28 Feb 2005

From Figure 6-8 it appears that the GVW error and variability trends illustrated in Figure 6-7 remain consistent when the GVW errors of the test trucks are evaluated separately. This is an indicator that the population variability is not significantly influenced by between truck variability.

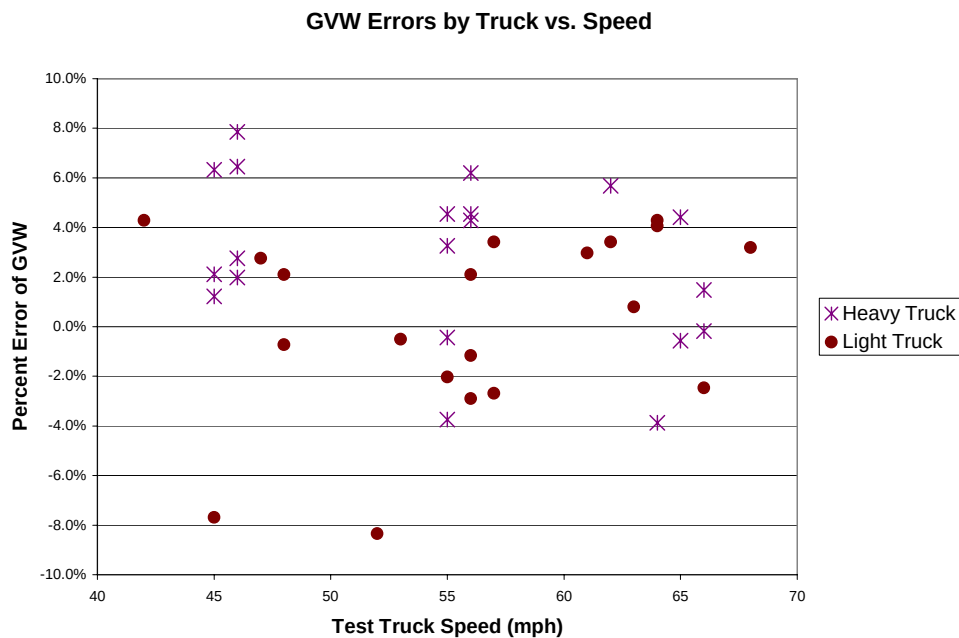


Figure 6-8 Pre-Validation GVW Percent Error vs. Speed by Truck – 120100 – 28 Feb 2005

From Figure 6-9, it appears that the single axle weights are overestimated at the low speed range and that the overestimation progressively decreases as the speeds of the test trucks increase. The scatter of the single axle weight errors is relatively constant at the low and medium speed ranges, and increases at the high speed range.



Figure 6-9 Pre-Validation Single Axle Percent Error vs. Speed Group - 120100 – 28 Feb 2005

From Figure 6-10, it appears that the single axle weight overestimation for both trucks decreased slightly with increasing speeds while the scatter of the errors increased as the speed increased.



Figure 6-10 Pre-Validation Single Axle Percent Error vs. Speed by Truck - 120100 – 28 Feb 2005

6.3 Classification Validation

The agency utilizes a modified FHWA 13 bin classification scheme. The modification utilizes a Class 15 for unknown vehicles.

A sample of 100 trucks was collected at the site. Video was taken at the site to provide ground truth for the evaluation. Based on a 100 percent sample it was determined that there were zero percent unknown vehicles and one percent unclassified vehicles. The unclassified vehicle was a recreational vehicle towing a trailer.

The second check is the ability of the algorithm to correctly distinguish between truck classes with no more than 2% errors in such classifications. The vehicles misclassified as Class 5 vehicles were heavy 2 axle, 4 wheel vehicles. These vehicles are typically classified as Class 3 vehicles; however the State classification algorithm has been modified to intentionally classify these vehicles as Class 5s. The following are the classification error rates by class:

Table 6-4 Truck Misclassification Percentages for 120100 – 28 Feb 2005

Class	Percent Error	Class	Percent Error	Class	Percent Error
4	N/A	5	14.3	6	N/A
7	0				
8	0	9	0	10	N/A
11	N/A	12	N/A	13	N/A

The misclassification percentage is computed as the probability that a pair containing the class of interest does NOT include a match. Thus if there are eight pairs of observations with at least one Class 9 and only six of them are matches, the error rate is 25 percent. The percent error represented above and the mean differences reported below do not represent the same statistic. It is possible to have error rates greater than 0 with a mean difference of zero.

Table 6-5 Truck Classification Mean Differences for 120100 – 28 Feb 2005

Class	Mean Difference	Class	Mean Difference	Class	Mean Difference
4	N/A	5	0	6	N/A
7	0				
8	0	9	0	10	N/A
11	N/A	12	N/A	13	N/A

These error rates are normalized to represent how many vehicles of the class are expected to be over or under-counted for every hundred of that class observed by the equipment. Thus a value of 0 means the class is identified correctly on average. A number between –1 and –100 indicates at least that number of vehicles either missed or not assigned to the class by the equipment. It is not possible to miss more than all of them or one hundred out of one hundred. Numbers 1 or larger indicate at least how many more vehicles are assigned to the class than the actual “hundred observed”. Classes marked Unknown are those identified by the equipment but no vehicles of the type were seen the observer. There is no way to tell how many more than those that might actually present exist. N/A means no vehicles of the class recorded by either the equipment or the observer.

7 Data Availability and Quality

As of March 1, 2005 this site does not have at least 5 years of research quality data. Research quality data is defined to be at least 210 days in a year of data of known calibration meeting LTPP’s precision requirements.

Data that has validation information available has been reviewed in light of the patterns present in the two weeks immediately following a validation/calibration activity. A determination of research quality data is based on the consistency with the validation pattern. Data that follows consistent and rational patterns in the absence of calibration information may be considered nominally of research quality pending validation information with which to compare it. Data that is inconsistent with expected patterns and has no supporting validation information is not considered research quality.

The amount and coverage for the site is shown in Table 7-1. The value for months is a measure of the seasonal variation in the data. The indicator of coverage indicates whether day of week variation has been accounted for on an annual basis.

As can be seen from Table 5-4 and Table 5-5, we can only use the data since the sensor change in 2003 as a basis for research quality data. As of this time, no data has been submitted from this site for 2004. Upon submission of that data, we will still need at least 5 additional years to meet the goal of a minimum of 5 years of research quality data, as the site validation in December 2003 did not determine that research quality WIM data was being produced.

Table 7-1 Amount of Traffic Data Available 120100 – 01 Mar 2005

Year	Classification Days	Months	Coverage	Weight Days	Months	Coverage
1996	215	11	Full Week	319	12	Full Week
1997	219	10	Full Week	249	10	Full Week
1998	208	12	Full Week	232	12	Full Week
1999	145	6	Full Week	193	8	Full Week
2000	263	11	Full Week	276	11	Full Week
2001	325	12	Full Week	226	8	Full Week
2002	223	10	Full Week	247	11	Full Week
2003	229	10	Full Week	248	10	Full Week

GVW graphs and characteristics associated with them are used as data screening tools. As a result classes constituting more than ten percent of the truck population are considered major sub-groups whose evaluation characteristics should be identified for use in screening. The typical values to be used for reviewing incoming data after a validation are determined starting with data from the day after the completion of a validation.

Only Class 9s constitute more than 10 percent of the truck population. Based on the data collected from the end of the last calibration iteration the following are the expected values for these populations. The precise values to be used in data review will need to be determined by the Regional Support Contractor on receipt of the first 14 days of data after the successful validation. For sites that do not meet LTPP precision requirements, this period may still be used as a starting point from which to track scale changes.

Table 7-2 GVW Characteristics of Major sub-groups of Trucks - 120100 – 01 Mar 2005

	Class 9
Percentage Overweights	0
Percentage Underweights	0
Unloaded Peak (lbs.)	32,000
Loaded Peak (lbs.)	72,000, 76,000, or 80,000

The expected percentage of unclassified vehicles is 1.0%.

The graphical screening comparisons are found in Figure 7-1 through Figure 7-3.



Figure 7-1 Expected GVW Distribution Class 9 – 120100 – 01 Mar 2005

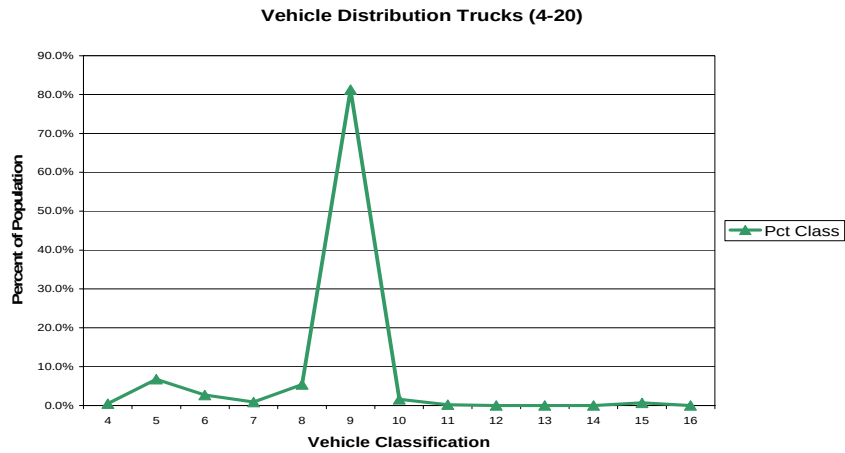


Figure 7-2 Expected vehicle distribution – 120100 – 01 Mar 2005

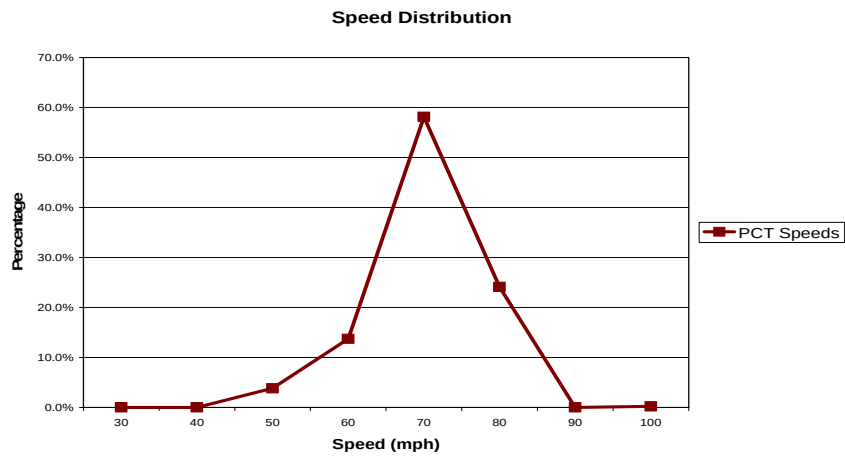


Figure 7-3 Expected Speed Distribution - 120100 – 01 Mar 2005

8 Data Sheets

The following is a listing of data sheets incorporated in Appendix A.

Sheet 19 – Truck 1 – 3S2 fully-loaded with air suspension (4 pages)
Sheet 19 – Truck 2 – 3S2 partially loaded with spring suspension on tractor, air suspension on trailer (4 pages)

Sheet 20 – Speed and Classification verification pre-validation (2 pages)
Sheet 20 – Classification verification – post-validation (2 pages)

Sheet 21 – Pre-validation (5 pages)
Sheet 21 – Calibration Iteration 1 – (4 pages)
Sheet 21 – Calibration Iteration 2 – (2 pages)
Sheet 21 – Calibration Iteration 3 and Post-validation (6 pages)*

* Calibration Iteration 3 are hatched blocks

Calibration Iteration 1 Worksheet – (1 page)
Calibration Iteration 2 Worksheet – (1 page)
Calibration Iteration 3 Worksheet – (1 page)

9 Updated handout guide and Sheet 17

A copy of the post visit handout has been included following page 32. It includes a current Sheet 17 with all applicable maps and updated photographs. There are no significant changes in the information provided.

10 Updated Sheet 18

A current Sheet 18 indicating the contacts, conditions for assessments and evaluations has been attached following the updated handout guide.

11 Traffic Sheet 16(s)

Sheet 16s for the pre-validation and post-validation conditions are attached at the very end of the report.

POST-VISIT HANDOUT GUIDE FOR SPS WIM VALIDATION

STATE: Florida

SHRP ID: 0100

1. General Information.....	1
2. Contact Information.....	1
3. Agenda	1
4. Site Location/ Directions	2
5. Truck Route Information	3
6. Sheet 17 – Florida (120100)	4

Figures

Figure 4-1 - Site 120100 in Florida.....	2
Figure 5-1 - Truck Route Map at 120100	3
Figure 6-1 - Site Map at 120100	8

1. General Information

SITE ID: 120100

LOCATION: US 27 South, 13.8 miles south of SR 80, South Bay

VISIT DATE: February 28 – March 1, 2005

VISIT TYPE: Validation

2. Contact Information

POINTS OF CONTACT:

Validation Team: Dean J. Wolf, 301-210-5105, djwolf@mactec.com
Sam Wah, 301-210-5105, swah@mactec.com

Highway Agency: Walton Jones, 850-414-4726, walton.jones@dot.state.fl.us
Mike Leggett, 850-414-4727, Michael.Leggett@dot.state.fl.us

FHWA COTR: Debbie Walker, 202-493-3068, deborah.walker@fhwa.dot.gov

FHWA Division Office Liaison: Norbert Munoz, 850-942-9650, ext. 3036,
norbert.munoz@fhwa.dot.gov

LTPP SPS WIM WEB PAGE: <http://www.tfhr.gov/pavement/ltp/spstraffic/index.htm>

3. Agenda

BRIEFING DATE: None requested.

ONSITE PERIOD: February 28 and March 1, 2005

TRUCK ROUTE CHECK: N/A

4. Site Location/ Directions

NEAREST AIRPORT: *Palm Beach International Airport, West Palm Beach, Florida or Fort Lauderdale/Hollywood International Airport, Fort Lauderdale, Florida.*

DIRECTIONS TO THE SITE: *13.8 miles south of SR 80, south of South Bay.*

MEETING LOCATION: *On site 8 a.m., February 28, 2005.*

WIM SITE LOCATION: *US 27, milepost 12.03 (Latitude: 26.48096; Longitude: -80.65128)*

WIM SITE LOCATION MAP: *See Figure 4.1*

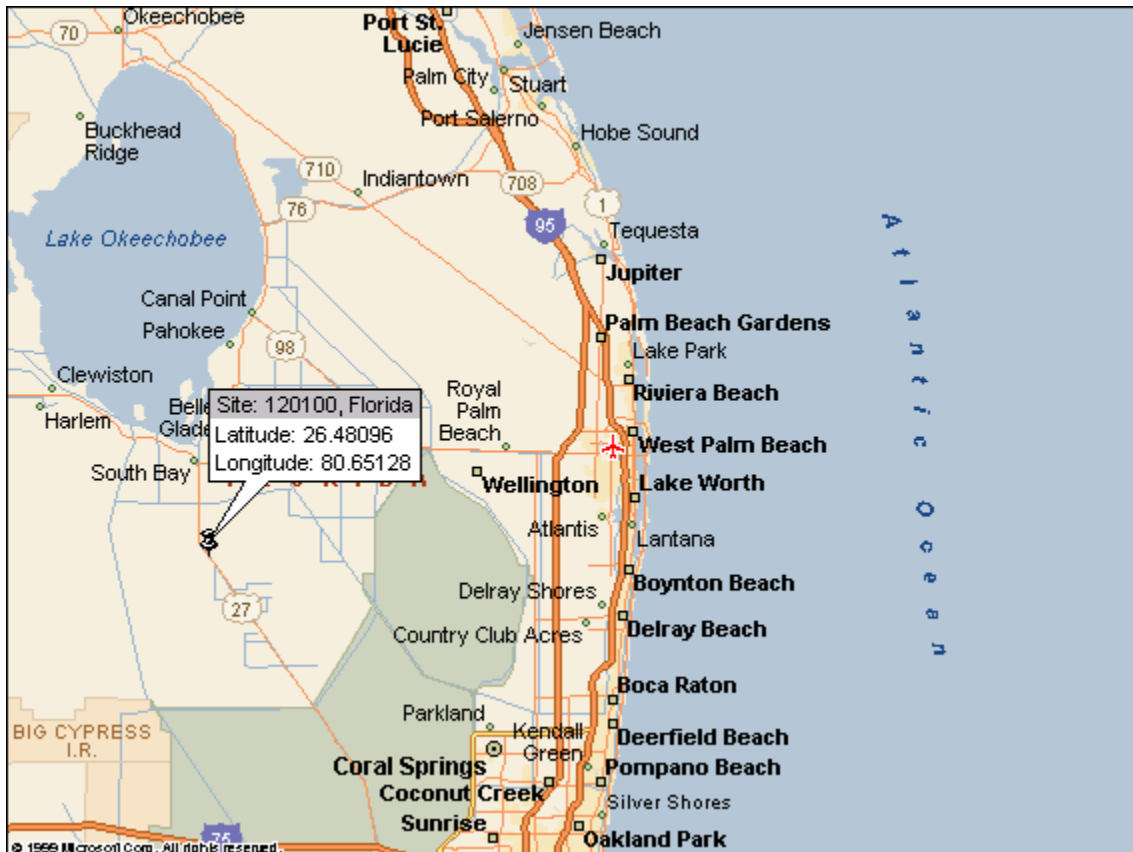


Figure 4-1 - Site 120100 in Florida

5. Truck Route Information

ROUTE RESTRICTIONS: *None*

SCALE LOCATION: *Glades Truck Ice, 1501 S. Main Street, Belle Glade, FL 33430. \$5 per truck (includes all axles and gross). Open from 8.00 a.m. to 8.00 p.m. – weekdays. Phone No: (561) 996-7710.*

TRUCK ROUTE:

- *Northbound: Truck Crossing at 0.746 miles from site ($26^{\circ} 29.396'$ North and $80^{\circ} 39.474'$ West)(For low speeds).*
- *Northbound: Truck Crossing at 1.372 miles from site ($26^{\circ} 29.840'$ North and $80^{\circ} 34.817'$ West)*
- *Southbound: Truck Crossing at 0.848 miles from site ($26^{\circ} 28.267'$ North and $80^{\circ} 38.599'$ West).*

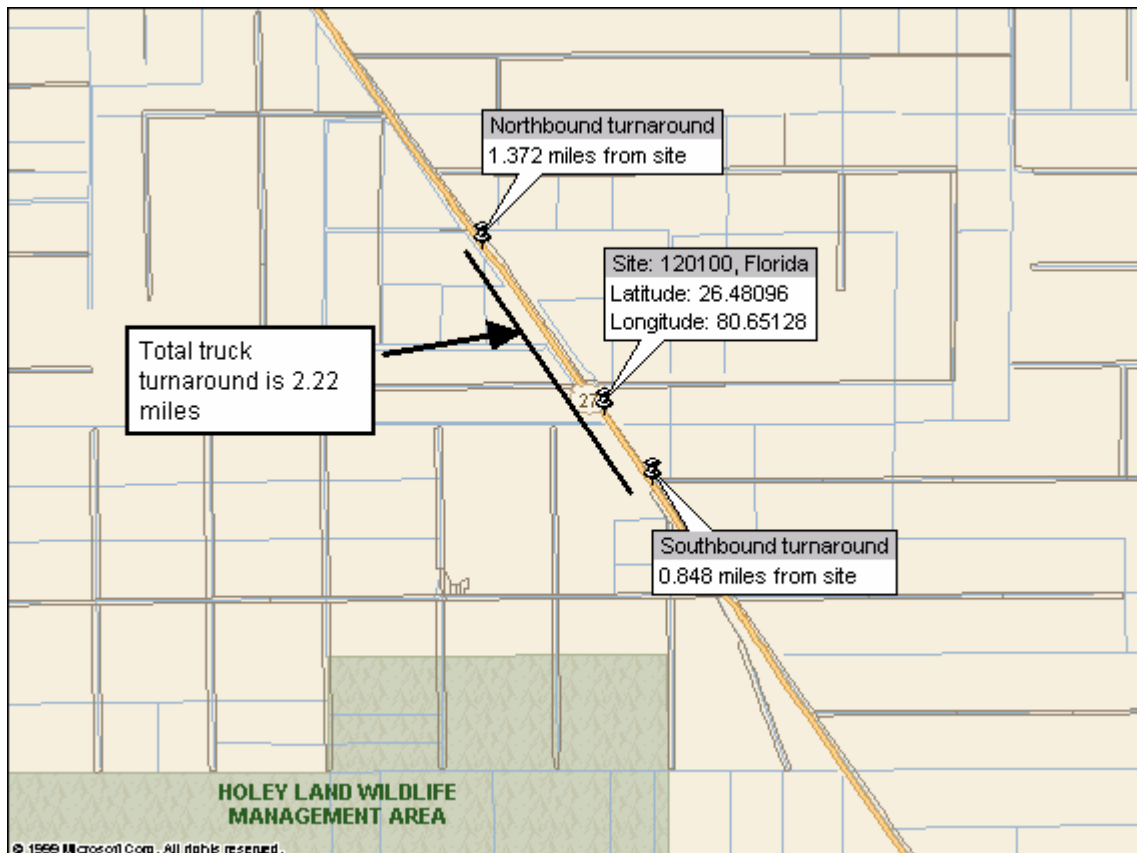


Figure 5-1 - Truck Route Map at 120100

6. Sheet 17 – Florida (120100)

1.* ROUTE US 27 MILEPOST N/A LTPP DIRECTION - N S E W

2.* WIM SITE DESCRIPTION - Grade <_1 % Sag vertical Y / N
Nearest SPS section upstream of the site _0_ _1_ _0_ _8_
Distance from sensor to nearest upstream SPS Section _ _7_ _2_ _8_ ft

3.* LANE CONFIGURATION

Lanes in LTPP direction _2_

Lane width _1_ _2_ ft

Median - 1 – painted
2 – physical barrier
3 – grass
4 – none

Shoulder - 1 – curb and gutter
2 – paved AC
3 – paved PCC
4 – unpaved
5 – none

Shoulder width _4*_ ft * 12' Merge Lane between LTPP Lane and Shoulder

4.* PAVEMENT TYPE Asphalt Concrete

5.* PAVEMENT SURFACE CONDITION – Distress Survey

Date _12-03-03_ Photo Filename Downstream _TO_2_12_12A_0100_12_03_03.JPG_

Date _12-03-03_ Photo Filename Upstream _TO_2_12_12A_0100_12_03_03.JPG_

Date _____ Distress Map Filename _____

6.* SENSOR SEQUENCE _____ Quartz Sensor – Loop – Quartz Sensor _____

7.* REPLACEMENT AND/OR GRINDING _____ / _____ / _____
REPLACEMENT AND/OR GRINDING _____ / _____ / _____
REPLACEMENT AND/OR GRINDING _____ / _____ / _____

8. RAMPS OR INTERSECTIONS

Intersection/driveway within 300 m upstream of sensor location Y / N
distance _____

Intersection/driveway within 300 m downstream of sensor location Y / N
distance _____

Is shoulder routinely used for turns or passing? Y / N

9. DRAINAGE (*Bending plate and load cell systems only*)

1 – Open to ground
2 – Pipe to culvert
3 – None

Clearance under plate _____ . _____ in

Clearance/access to flush fines from under system Y / N

10. * CABINET LOCATION

Same side of road as LTPP lane Y / N Median Y/ N Behind barrier Y / N

Distance from edge of traveled lane 6 8 ft

Distance from system 7 5 ft

TYPE 334B

CABINET ACCESS controlled by LTPP / STATE / JOINT ?

Contact - name and phone number Kip Jones (850) 414-4726

Alternate - name and phone number Michael Leggett (850) 414-4727

11. * POWER

Distance to cabinet from drop 1 5 ft Overhead / underground / solar /
AC in cabinet?

Service provider _____ Phone number

12. * TELEPHONE

Distance to cabinet from drop 4 5 ft Overhead / under ground / cell?

Service provider _____ Phone Number

13.* SYSTEM (software & version no.)- _____ DAW – 190 Ver. 3.18 4/2/03____
Computer connection – RS232 / Parallel port / USB / Other

14. * TEST TRUCK TURNAROUND time 6 minutes DISTANCE 4 4 mi.

15. PHOTOS

FILENAME

Power source Solar_Panels_TO_2_12_12A_0100_12_03_03.JPG

Phone source Telephone_Drop_TO_2_12_12A_0100_12_03_03.JPG

Cabinet exterior Cabinet_Exterior_1_TO_2_12_12A_0100_12_03_03.JPG

Cabinet interior Cabinet_Interior_1_TO_2_12_12A_0100_12_03_03.JPG

Weight sensors Leading Quartz Sensor_TO_8_12_2.45A_0100_02_28_05.JPG

Classification sensors Loop_Sensor_TO_2_12_12A_0100_12_03_03.JPG

Other sensors _____

Description

Pavement_Damage_Left_Wheelpath_TO_8_12_2.45A_0100_02_28_05.JPG _____

Pavement_Damage_Right_Edge_TO_8_12_2.45A_0100_02_28_05.JPG

Downstream direction at sensors on LTPP lane _____

Downstream_TO_2_12_12A_0100_12_03_03.JPG_____

Upstream direction at sensors on LTPP lane _____

Upstream_TO_2_12_12A_0100_12_03_03.JPG_____

COMMENTS _____ GPS Coordinates: Latitude: 26.48096; Longitude -80.65128

_ Posted speed limit – 65 mph. _____

_____ Amenities: _____

_____ Cleniston (30 miles, Best Western) _____

_____ South Bay (13.5 miles) _____

_____ Chevron, Shell (Mini-Mart) _____

_____ Belle Glade (17.0) miles) _____

_____ Various Fast Food _____

_____ Bank Of America _____

_____ Various Gas Stations _____

_____ Budget Inn _____

_____ Radio Shack _____

_____ Winn Dixie _____

_____ West Palm Beach (55 miles) _____

_____ Various Amenities _____

_____ Predominant Trucks – Empty Sugar Cane Haulers, Loaded 500 Haulers _____

_____ Types of Trucks: Two Class 9s _____

_____ Expected Weight Ranges: Truck 1 – 72,000 to 80,000 legal limit on gross and axles, air suspension; Truck 2 – partially loaded 40,000 – 46,000 lbs no suspension requirements _____

_____ Speeds to be run: 45 to 65 mph _____

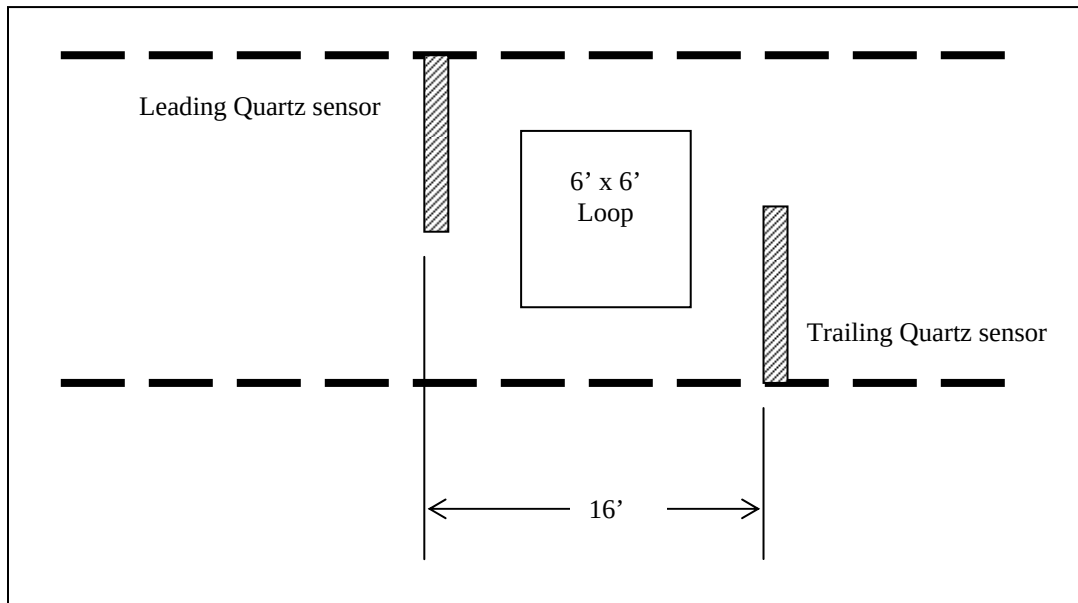
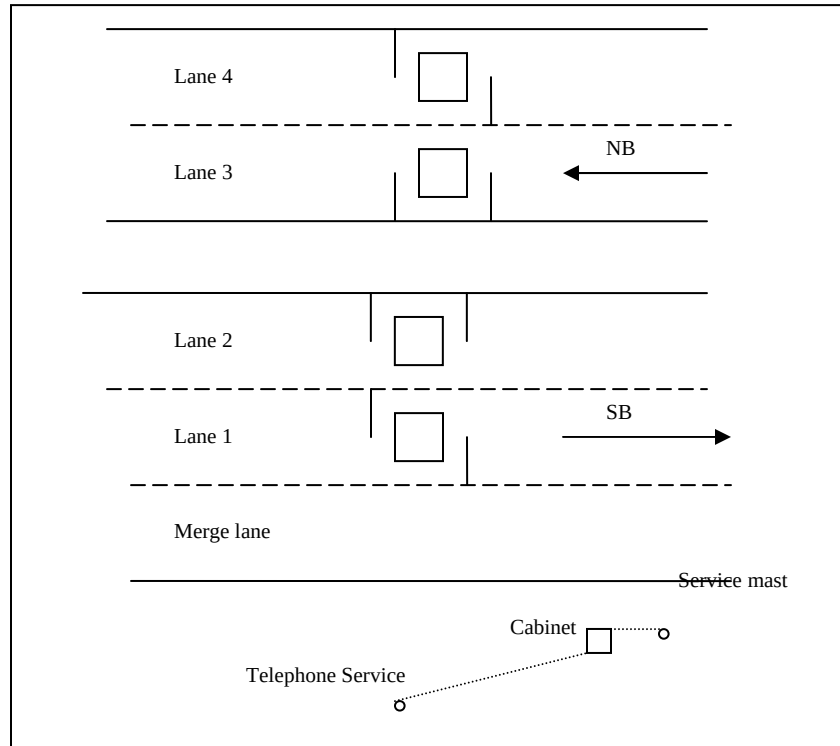
_____ Speed Bias is 0.12 mph and Standard Deviation is 0.7 mph. _____

_____ Pavement damage in left wheelpath and right edge of lane (02/28/05) _____

COMPLETED BY _____ Dean J. Wolf _____

PHONE _301-210-5105 _____ DATE COMPLETED _0_2_/_2_8_/_2_0_0_5

Sketch of equipment layout



Site Map

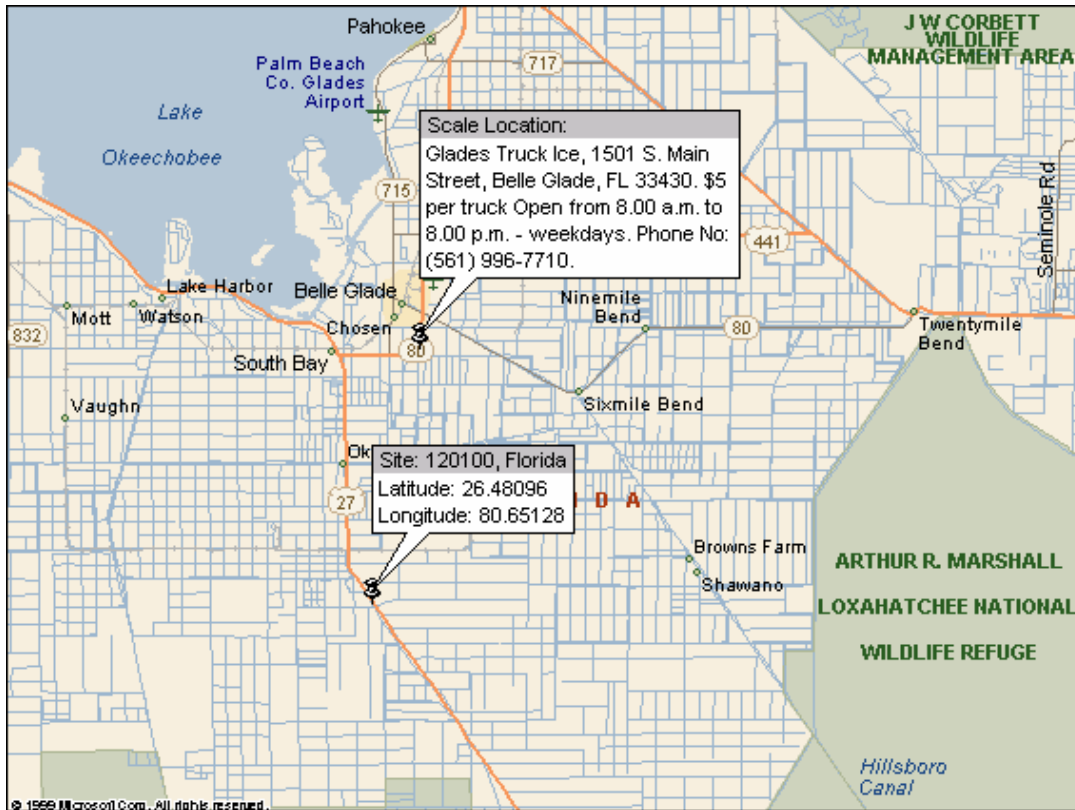


Figure 6-1 - Site Map at 120100



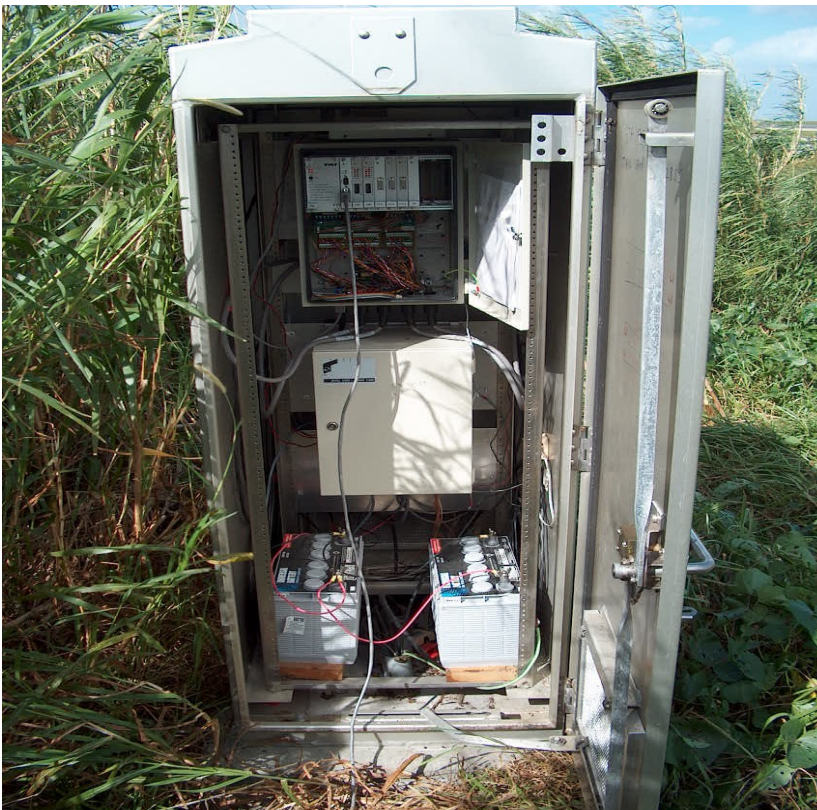
Downstream_TO_2_12_12A_0100_12_03_03.JPG (Distress Photo 1)



Upstream_TO_2_12_12A_0100_12_03_03.JPG (Distress Photo 2)



Cabinet_Exterior_TO_2_12_12A_0100_12_03_03.JPG



Cabinet_Interior_TO_2_12_12A_0100_12_03_03.JPG



Leading_Quartz_Sensor_TO_8_12_2.45A_0100_02_28_05.JPG



Loop_Sensor_TO_2_12_12A_0100_12_03_03.JPG



Pavement_Damage_Left_Wheelpath_TO_8_12_2.45A_0100_02_28_05.JPG



Pavement_Damage_Right_Edge_TO_8_12_2.45A_0100_02_28_05.JPG

SHEET 18	STATE CODE [_12_]
LTPP MONITORED TRAFFIC DATA	SPS PROJECT ID [_0_1_0_0]
WIM SITE COORDINATION	DATE: (mm/dd/yyyy) _0_3 / _01_ / _2_0_0_5

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1 DATA PROCESSING –

a. Down load –

- ☒ State only
- ☐ LTPP read only
- ☐ LTPP download
- ☐ LTPP download and copy to state

b. Data Review –

- ☒ State per LTPP guidelines
- ☐ State – ☐ Weekly ☐ Twice a Month ☐ Monthly ☐ Quarterly
- ☐ LTPP

c. Data submission –

- ☐ State – ☐ Weekly ☐ Twice a month ☒ Monthly ☐ Quarterly
- ☒ LTPP

2. EQUIPMENT –

a. Purchase –

- ☒ State
- ☐ LTPP

b. Installation –

- ☒ Included with purchase
- ☐ Separate contract by State
- ☐ State personnel
- ☐ LTPP contract

c. Maintenance –

- ☐ Contract with purchase – Expiration Date
- ☐ Separate contract LTPP – Expiration Date
- ☒ Separate contract State – Expiration Date
- ☐ State personnel

d. Calibration –

- ☒ Vendor
- ☐ State
- ☐ LTPP

e. Manuals and software control –

- ☒ State
- ☐ LTPP

f. Power –

i. Type –

- ☐ Overhead
- ☐ Underground
- ☒ Solar

ii. Payment –

- ☐ State
- ☐ LTPP
- ☐ N/A

SHEET 18	STATE CODE [_ 12 _]
LTPP MONITORED TRAFFIC DATA	SPS PROJECT ID [_ 0 _ 1 _ 0 _ 0]
WIM SITE COORDINATION	DATE: (mm/dd/yyyy) _ 0 _ 3 / _ 01 _ / _ 2 _ 0 _ 0 _ 5

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- g. Communication –
- i. Type –
- ☒ Landline
 - ☐ Cellular
 - ☐ Other
- ii. Payment –
- ☒ State
 - ☐ LTPP
 - ☐ N/A
3. PAVEMENT –
- a. Type –
- ☐ Portland Concrete Cement
 - ☒ Asphalt Concrete
- b. Allowable rehabilitation activities –
- ☐ Always new
 - ☒ Replacement as needed
 - ☐ Grinding and maintenance as needed
 - ☐ Maintenance only
 - ☐ No remediation
- c. Profiling Site Markings –
- ☐ Permanent
 - ☒ Temporary
4. ON SITE ACTIVITIES –
- a. WIM Validation Check - advance notice required _ 14 _ ☐ days ☐ weeks
- b. Notice for straightedge and grinding check - _ 4 _ ☐ days ☐ weeks
- i. On site lead –
- ☒ State
 - ☐ LTPP
- ii. Accept grinding –
- ☒ State
 - ☐ LTPP
- Authorization to calibrate site –
- ☒ State only
 - ☐ LTPP
- d. Calibration Routine –
- ☒ LTPP – ☐ Semi-annually ☒ Annually
 - ☐ State per LTPP protocol – ☐ Semi-annually ☐ Annually
 - ☒ State other – _____

SHEET 18	STATE CODE [_12_]
LTPP MONITORED TRAFFIC DATA	SPS PROJECT ID [_0_1_0_0]
WIM SITE COORDINATION	DATE: (mm/dd/yyyy) _0_3 / _01_ / _2_0_0_5

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- e. Test Vehicles
- i. Trucks –
- 1st – Air suspension 3S2 ☐ State ☒ LTPP
- 2nd – 3S2 Partially Loaded ☐ State ☒ LTPP
- 3rd – _____ ☐ State ☐ LTPP
- 4th – _____ ☐ State ☐ LTPP
- ii. Loads – ☐ State ☒ LTPP
- iii. Drivers – ☐ State ☒ LTPP
- f. Contractor(s) with prior successful experience in WIM calibration in state:
- _____ FTE, DTS, MACTEC Engineering and Consulting, Inc. _____
- g. Access to cabinet
- i. Personnel Access –
- ☒ State only
- ☐ Joint
- ☐ LTPP
- ii. Physical Access –
- ☒ Key
- ☐ Combination
- h. State personnel required on site – ☒ Yes ☐ No
- i. Traffic Control Required – ☐ Yes ☒ No
- j. Enforcement Coordination Required – ☐ Yes ☒ No
5. SITE SPECIFIC CONDITIONS –
- a. Funds and accountability – _____
- b. Reports – _____
- c. Other – _____
- d. Special Conditions – _____
6. CONTACTS –
- a. Equipment (operational status, access, etc.) –
- Name: Michael Leggett Phone: (850) 414-4727
- Agency: _____

SHEET 18	STATE CODE [_12_]
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WIM SITE COORDINATION	DATE: (mm/dd/yyyy) _0_3 / _01_ / _2_0_0_5

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b. Maintenance (equipment) –

Name: Kip Jones Phone: (850) 414-4726

Agency: _____

Data Processing and Pre-Visit Data –

Name: _____ Phone: _____

Agency: _____

d. Construction schedule and verification –

Name: _____ Phone: _____

Agency: _____

e. Test Vehicles (trucks, loads, drivers) –

Name: Billy Graham Phone: (352) 210-5032

Agency: Graham Trucking

f. Traffic Control –

Name: _____ Phone: _____

Agency: _____

g. Enforcement Coordination –

Name: _____ Phone: _____

Agency: _____

h. Nearest Static Scale

Name: Glades Ice Location: 1501 S. Main Street Belle Glade, FL

Phone: (561) 996-7710

SHEET 16 LTPP MONITORED TRAFFIC DATA SITE CALIBRATION SUMMARY	*STATE ASSIGNED ID [9 9 3 5] *STATE CODE [1 2] *SHRP SECTION ID [0 1 0 0]
--	--

SITE CALIBRATION INFORMATION

1. * DATE OF CALIBRATION (MONTH/DAY/YEAR) [0 2 / 2 8 / 2 0 0 5]

2. * TYPE OF EQUIPMENT CALIBRATED X WIM CLASSIFIER BOTH

3. * REASON FOR CALIBRATION
REGULARLY SCHEDULED SITE VISIT RESEARCH
EQUIPMENT REPLACEMENT TRAINING
DATA TRIGGERED SYSTEM REVISION NEW EQUIPMENT INSTALLATION
X OTHER (SPECIFY) SPSWIM Validation

4. * SENSORS INSTALLED IN LTPP LANE AT THIS SITE (CHECK ALL THAT APPLY):
BARE ROUND PIEZO CERAMIC BARE FLAT PIEZO BENDING PLATES
CHANNELIZED ROUND PIEZO LOAD CELLS X QUARTZ PIEZO
CHANNELIZED FLAT PIEZO X INDUCTANCE LOOPS CAPACITANCE PADS
OTHER (SPECIFY)

5. EQUIPMENT MANUFACTURER Controller – IRD/PAT Traffic

WIM SYSTEM CALIBRATION SPECIFICS**

6.**CALIBRATION TECHNIQUE USED:
TRAFFIC STREAM -- STATIC SCALE (Y/N) X TEST TRUCKS
NUMBER OF TRUCKS COMPARED 2 NUMBER OF TEST TRUCKS USED
2 0 PASSES PER TRUCK
TRUCK TYPE SUSPENSION
TYPE PER FHWA 13 BIN SYSTEM 1 9 1
SUSPENSION: 1 - AIR; 2 - LEAF SPRING 2 9 2
3 - OTHER (DESCRIBE) 3
7. SUMMARY CALIBRATION RESULTS (EXPRESSED AS A PERCENT)
MEAN DIFFERENCE BETWEEN ---
DYNAMIC AND STATIC GVW 1 . 5 STANDARD DEVIATION 3 . 7
DYNAMIC AND STATIC SINGLE AXLES 5 . 3 STANDARD DEVIATION 4 . 1
DYNAMIC AND STATIC DOUBLE AXLES 0 . 8 STANDARD DEVIATION 5 . 2
8. 3 NUMBER OF SPEEDS AT WHICH CALIBRATION WAS PERFORMED
9. DEFINE THE SPEED RANGES USED (MPH) 45-51, 52-58, 59-65
10. CALIBRATION FACTOR (AT EXPECTED FREE FLOW SPEED) 7 8 4 .
11.** IS AUTO-CALIBRATION USED AT THIS SITE? (Y/N) N
IF YES, LIST AND DEFINE AUTO-CALIBRATION VALUE:

CLASSIFIER TEST SPECIFICS***

12.*** METHOD FOR COLLECTING INDEPENDENT VOLUME MEASUREMENT BY VEHICLE CLASS:
VIDEO X MANUAL PARALLEL CLASSIFIERS

13. METHOD TO DETERMINE LENGTH OF COUNT TIME X NUMBER OF TRUCKS

14. MEAN DIFFERENCE IN VOLUMES BY VEHICLES CLASSIFICATION:
*** FHWA CLASS 9 0 FHWA CLASS
*** FHWA CLASS 8 0 FHWA CLASS
FHWA CLASS
FHWA CLASS
*** PERCENT “UNCLASSIFIED” VEHICLES: 1 . 0

PERSON LEADING CALIBRATION EFFORT: Dean J. Wolf
CONTACT INFORMATION: (301) 210-5105 rev. November 9, 1999

SHEET 16 LTPP MONITORED TRAFFIC DATA SITE CALIBRATION SUMMARY	*STATE ASSIGNED ID [9 9 3 5] *STATE CODE [1 2] *SHRP SECTION ID [0 1 0 0]
--	--

SITE CALIBRATION INFORMATION

1. * DATE OF CALIBRATION (MONTH/DAY/YEAR) [0 3 / 0 1 / 2 0 0 5]

2. * TYPE OF EQUIPMENT CALIBRATED X WIM CLASSIFIER BOTH

3. * REASON FOR CALIBRATION
REGULARLY SCHEDULED SITE VISIT RESEARCH
EQUIPMENT REPLACEMENT TRAINING
DATA TRIGGERED SYSTEM REVISION NEW EQUIPMENT INSTALLATION
X OTHER (SPECIFY) SPSWIM Validation

4. * SENSORS INSTALLED IN LTPP LANE AT THIS SITE (CHECK ALL THAT APPLY):
BARE ROUND PIEZO CERAMIC BARE FLAT PIEZO BENDING PLATES
CHANNELIZED ROUND PIEZO LOAD CELLS X QUARTZ PIEZO
CHANNELIZED FLAT PIEZO X INDUCTANCE LOOPS CAPACITANCE PADS
OTHER (SPECIFY)

5. EQUIPMENT MANUFACTURER Controller – IRD/PAT Traffic

WIM SYSTEM CALIBRATION SPECIFICS**

6.**CALIBRATION TECHNIQUE USED:
TRAFFIC STREAM -- STATIC SCALE (Y/N) X TEST TRUCKS
NUMBER OF TRUCKS COMPARED 2 NUMBER OF TEST TRUCKS USED
PASSES PER TRUCK
TRUCK TYPE SUSPENSION
TYPE PER FHWA 13 BIN SYSTEM
SUSPENSION: 1 - AIR; 2 - LEAF SPRING
3 - OTHER (DESCRIBE)
1 9 1
2 9 2
3 3

7. SUMMARY CALIBRATION RESULTS (EXPRESSED AS A PERCENT)
MEAN DIFFERENCE BETWEEN ---
DYNAMIC AND STATIC GVW 0 . 5 STANDARD DEVIATION 4 . 1
DYNAMIC AND STATIC SINGLE AXLES 2 . 3 STANDARD DEVIATION 5 . 1
DYNAMIC AND STATIC DOUBLE AXLES 0 . 2 STANDARD DEVIATION 5 . 1

8. 3 NUMBER OF SPEEDS AT WHICH CALIBRATION WAS PERFORMED

9. DEFINE THE SPEED RANGES USED (MPH) 44-51, 52-58, 59-65

10. CALIBRATION FACTOR (AT EXPECTED FREE FLOW SPEED) 7 7 0 .

11.** IS AUTO-CALIBRATION USED AT THIS SITE? (Y/N) N
IF YES, LIST AND DEFINE AUTO-CALIBRATION VALUE:

CLASSIFIER TEST SPECIFICS***

12.*** METHOD FOR COLLECTING INDEPENDENT VOLUME MEASUREMENT BY VEHICLE CLASS:
VIDEO X MANUAL PARALLEL CLASSIFIERS

13. METHOD TO DETERMINE LENGTH OF COUNT TIME X NUMBER OF TRUCKS

14. MEAN DIFFERENCE IN VOLUMES BY VEHICLES CLASSIFICATION:
*** FHWA CLASS 9 0 FHWA CLASS
*** FHWA CLASS 8 0 FHWA CLASS
FHWA CLASS
FHWA CLASS
*** PERCENT “UNCLASSIFIED” VEHICLES: 3 . 0

PERSON LEADING CALIBRATION EFFORT: Dean J. Wolf
CONTACT INFORMATION: (301) 210-5105 rev. November 9, 1999

APPENDIX A

Rev. 08/31/01

PART I.

TRUCK # 1

1.* FHWA Class 9 2.* Number of Axles 5

AXLES - units - lbs / 100s lbs / kg

	3. Empty Truck Axle Weight	4.* Pre-Test Average Loaded Axle Weight	5.* Post-Test Average Loaded Axle Weight	6.* Measured D)irectly or C)alculated?
A	_____	<u>12840</u>	<u>12680</u>	D / <u>C</u>
B	_____	<u>15000</u>	<u>15200</u>	D / <u>C</u>
C	_____	<u>15620</u>	<u>15200</u>	D / <u>C</u>
D	_____	<u>17340</u>	<u>17460</u>	D / <u>C</u>
E	_____	<u>17620 (17800)</u>	<u>17460 (17500)</u>	D / <u>C</u>
F	_____	_____	_____	D / <u>C</u>

GVW (same units as axles)

7. a) Empty GVW _____	*b) Average Pre-Test Loaded weight	<u>77900</u>
	*c) Post Test Loaded Weight	<u>77980</u>
	*d) Difference Post Test – Pre-test	<u>460</u>

GEOMETRY

8 a) * Tractor Cab Style - Cab Over Engine / Conventional b) * Sleeper Cab? Y / N

9. a) * Make: MACK b) * Model: CL 733

10.* Trailer Load Distribution Description:

CONCRETE BLOCKS DISTRIBUTED EVENLY OVER LENGTH OF TRAILER

11. a) Tractor Tare Weight (units): _____

b). Trailer Tare Weight (units): _____

Rev. 08/31/01

12.* Axle Spacing – units m / feet and inches / feet and tenths

A to B 17.3'

B to C 4.3'

C to D 32.1'

D to E 4.1'

E to F _____

Wheelbased (measured A to last) _____ Computed 57.8

13. *Kingpin Offset From Axle B (units) + 2' 2" (_____)
(+ is to the rear)

SUSPENSION

Axle	14. Tire Size	15.* Suspension Description (leaf, air, no. of leaves, taper or flat leaf, etc.)
A	<u>11R24.5</u>	<u>Air</u>
B	<u>11R24.5</u>	<u>Air</u>
C	<u>11R24.5</u>	<u>Air</u>
D	<u>11R24.5</u>	<u>Air</u>
E	<u>11R24.5</u>	<u>Air</u>
F	_____	_____

16. Cold Tire Pressures (psi) – from right to left

Steering Axle	Axle B	Axle C	Axle D	Axle E
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

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*CALIBRATION TEST TRUCK # 1	* DATE	02/28/2005

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PART II

Table 1. Axle and GVW computations - pre-test

Axle A		Axle B		Axle C		Axle D		Axle E		GVW	
I	13120	II -I	14600	III -II	15840	IV -III	17280	V -IV	17620	V	78440
V -VI	12560	VI- VII	15400	VII- VIII	15400	VIII- IX	17400	IX	17620	X	78420
										XI	78460
Avg.	12840	15000		15620		17340		17620		78440	

Table 2. Raw Axle and GVW measurements

Axles	Meas.	Pre-test Weight			Post-test Weight
A	I	13120			12680
A + B	II	27720			27880
A + B + C	III	43560			43080
A + B + C + D	IV	60840			60540
A + B + C + D + E (1)	V	78440			77980
B + C + D + E	VI	65880			65300
C + D + E	VII	50420			50120
D + E	VIII	35020			34920
E	IX	17620			17460
A + B + C + D + E (2)	X	78420			77980
A + B + C + D + E (3)	XI	78460			

Table 3. Axle and GVW computations - post -test

Axle A		Axle B		Axle C		Axle D		Axle E		GVW	
I	12680	II -I	15200	III -II	15200	IV -III	17460	V -IV	17460	V	77980
V -VI	12680	VI- VII	15200	VII- VIII	15200	VIII- IX	17460	IX	17460	X	77980
										XI	
Avg.	12680	15200		15200		17460		17460		77980	

Rev. 08/31/01

Table 4 . Axle and GVW computations -

Axle A		Axle B		Axle C		Axle D		Axle E		GVW	
I		II		III		IV		V		V	
		-I		-II		-III		-IV			
V		VI-		VII-		VIII-		IX'		X	
-VI		VII		VIII		IX					
										XI	
Avg.											

Table 5. Raw data – Axle scales – pre-test

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1							
2							
3							
Average							

Table 6. Raw data – Axle scales –

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1							
2							
3							
Average							

Table 7. Raw data – Axle scales – post-test

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1							
2							
3							
Average							

Measured By DJW Verified By _____

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Rev. 08/31/01

12.* Axle Spacing – units m / feet and inches / feet and tenths

A to B 16.3' B to C 4.3' C to D 38.7'

D to E 3.9' E to F _____

Wheelbased (measured A to last) _____ Computed _____

13. *Kingpin Offset From Axle B (units) + 2' 4" (_____)
(+ is to the rear)

SUSPENSION

Axle	14. Tire Size	15.* Suspension Description (leaf, air, no. of leaves, taper or flat leaf, etc.)
A	<u>11R24.5</u>	<u>LEAF SPRING, 9 LEAFS, TAPERED 3 LEAFS, FLAT</u>
B	<u>11R24.5</u>	<u>LEAF SPRINGS, 9 LEAFS, TAPERED</u>
C	<u>11R24.5</u>	<u>LEAF SPRINGS, 9 LEAFS, TAPERED</u>
D	<u>255/70R22.5</u>	<u>AIR</u>
E	<u>255/70R22.5</u>	<u>AIR</u>
F	_____	_____

16. Cold Tire Pressures (psi) – from right to left

Steering Axle	Axle B	Axle C	Axle D	Axle E
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

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Rev. 08/31/01

PART II

Table 1. Axle and GVW computations - pre-test

Axle A		Axle B		Axle C		Axle D		Axle E		GVW	
I	10220	II -I	9990	III -II	9660	IV -III	7660	V -IV	8200	V	45420
V -VI	10220	VI -VII	9990	VII -VIII	9660	VIII -IX	7660	IX	8200	X	45420
										XI	45440
Avg.	10220	9990		9660		7660		8200		45433	

Table 2. Raw Axle and GVW measurements

Axles	Meas.	Pre-test Weight			Post-test Weight
A	I	10220			10220
A + B	II	20210			20210
A + B + C	III	30470			30200
A + B + C + D	IV	37860			37860
A + B + C + D + E (1)	V	45920			45500
B + C + D + E	VI	35700			35280
C + D + E	VII	25520			25540
D + E	VIII	15370			15370
E	IX	8200			7660
A + B + C + D + E (2)	X	45400			45500
A + B + C + D + E (3)	XI	45940			

10220
9990
9990
7660
7660

Table 3. Axle and GVW computations - post -test

Axle A		Axle B		Axle C		Axle D		Axle E		GVW	
I	10220	II -I	9990	III -II	9990	IV -III	7660	V -IV	7660	V	45500
V -VI	10220	VI -VII	9990	VII -VIII	9990	VIII -IX	7660	IX	7660	X	45500
										XI	
Avg.	10220	9990		9990		7660		7660		45500	

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Table 4 . Axle and GVW computations -

Axle A		Axle B		Axle C		Axle D		Axle E		GVW	
I		II		III		IV		V		V	
		-I		-II		-III		-IV			
V		VI-		VII-		VIII-		IX		X	
-VI		VII		VIII		IX					
										XI	
Avg.											

Table 5. Raw data – Axle scales – pre-test

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1							
2							
3							
Average							

Table 6. Raw data – Axle scales –

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1							
2							
3							
Average							

Table 7. Raw data – Axle scales – post-test

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1							
2							
3							
Average							

Measured By DW Verified By _____

Sheet 20

* STATE CODE

LTPP Traffic Data

*SPS PROJECT ID

010

Speed and Classification Checks * 1 of* 2

* DATE

02/28/2008

Rev. 08/31/2001....

WIM speed	WIM class	WIM Record	Obs. Speed	Obs Class	WIM speed	WIM class	WIM Record	Obs. Speed	Obs. Class
73	9		72	9	69	9		69	9
68	9		68	9	71	3		71	3
65	9		65	9	63	7		63	7
69	9		69	9	63	3		63	3
65	9		65	9	67	5		66	5
X 67	3		67	5 small 02/28/08	74	9		74	9
63	5		63	5	76	9		76	9
84	3		84	3	48	8		48	8
63	9		63	9	69	4		69	4
72	9		72	9	69	10		69	10
68	9		68	9	78	9		77	9
68	3		68	3	70	3		69	3
59	3		59	3	72	5		72	5
68	3		68	3	67	9		67	9
X 63	5		63	3 van	73	3		73	3
65	9		65	9	74	3		74	3
58	9		57	9	80	3		80	3
67	9		67	9	76	8		76	8
62	3		62	3	76	3		76	3
68	3		68	3	68	9		68	9
75	5		74	5	59	3		59	3
61	3		61	3	65	3		64	3
61	9		61	9	70	5		70	5
60	6		60	6	73	3		72	3
66	3		66	3	59	5		59	5

Recorded by NSWDirection S Lane 1 Time from 9:05 to 9:35

Rev. 08/31/2001....

WIM speed	WIM class	WIM Record	Obs. Speed	Obs Class	WIM speed	WIM class	WIM Record	Obs. Speed	Obs Class
70	15		70	15	56	3		56	3
73	3		73	3	69	3		69	3
68	9		68	9	72	9		72	9
68	9		68	9	68	3		68	3
73	5		73	5	68	9		68	9
75	3		75	3	68	3		68	3
70	9		70	9	67	8		67	8
71	5		71	5	67	9		67	9
59	3		59	3	72	3		72	3
74	9		74	9	71	3		71	3
68	4		67	4	63	3		63	3
68	9		68	9	71	3		71	3
66	5		66	5	74	3		74	3
70	9		70	9	79	3		79	3
61	5		61	5	66	9		66	9
69	9		69	9	59	3		59	3
70	10		70	10	74	10		74	10
67	10		67	10	71	9		71	9
111	10		110	10	71	3		70	3
68	9		68	9	70	3		70	3
72	9		72	9	70	3		70	3
72	5		72	5	76	5		76	5
67	3		66	3	62	3		62	3
76	9		76	9	69	9		70	9
68	3		67	3	66	9		66	9

Recorded by QJW Direction S Lane 1 Time from 9:35 to 9:50

V102

68.08 mph
 100% 68.08 mph
 100% 68.08 mph

100%

100%

100% 68.08 mph

100% 68.08 mph

Class Study 2 (POST-VALIDATION)

Sheet 20

* STATE CODE

1

LTPP Traffic Data

*SPS PROJECT ID

010

Speed and Classification Checks * 1 of* 2

* DATE

03 / 01 / 200

Rev. 08/31/2001....

WIM speed	WIM class	WIM Record	Obs. Speed	Obs Class	WIM speed	WIM class	WIM Record	Obs. Speed	Obs Class
	9			9	10	10		9	10
	9			9		9		9	9
	9			9		3		3	3
	9			9		9		9	9
	3			3		3		3	3
	9			9		9		9	9
	9			9		9		9	9
	8			8		X 15		15	15
	9			9		9		9	9
	9			9		8		8	8
	9			9		9		9	9
	8			8		3		3	3
	3			3		9		9	9
	9			9		9		9	9
	9			9		3		3	3
	9			9		X 15		15	15
	9			9		5		5	5
	9			9		9		9	9
	9			9		5		5	5
	9			9		3		3	3
	9			9		8		8	8
	9			9		9		9	9
	3			3		9		9	9
	3			3		3		3	3
	3			3		5			5

Recorded by 1) JW

Direction S Lane 1 Time from _____ to _____

Rev. 08/31/2001....

WIM speed	WIM class	WIM Record	Obs. Speed	Obs Class	WIM speed	WIM class	WIM Record	Obs. Speed	Obs Class
	9			9		9			9
	5			5		9			9
	9			9		3			3
	3			3		3			3
	3			3		9			9
	3			3		7			7
	3			3		9			9
	9			9		9			9
	9			9		5			5
	9			9		3			3
	10			10		3			3
	9			9		9			9
	9			9		9			9
	6			6		9			9
	9			9		9			9
	3			3		3			3
	3			3		8			8
	9			9		9			9
	3			3		9			9
	9			9		X 15			15
	9			9		9			9
	3			3		9			9
	9			9		9			9
	9			9		9			9
	9			9		9			9

Recorded by 0111 Direction S Lane 1 Time from to

0 errors

undress = 3%

Rev. 08/31/2001	WIM System Test Truck Records	1 of 5	* STATE CODE	12
	LTPP Traffic Data		* SPS PROJECT ID	0100
			* DATE	02/28/2005

Rev. 08/31/2001

FLIST RUNS (40)

Pvmt temp	Radar Speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A right / left weight.	Axle B right / left weight.	Axle C right / left weight.	Axle D right / left weight.	Axle E right / left weight.	Axle F right / left weight.	GW	A-B space	B-C space	C-D space	D-E space	E-F space
84		1	1	11:55:27	4213	46	7.1 / 7.2	7.5 / 8.2	8.2 / 7.5	9.8 / 10.8	8.8 / 9.4		84.6	17.4	4.3	31.9	4.1	65.5
84		2	1	11:57:07	4231	42	5.3 / 5.7	5.5 / 4.5	5.3 / 4.4	3.5 / 4.9	3.8 / 5.1		47.9	16.4	4.2	38.5	3.8	64.3
84		1	2	12:02:47	4294	62	7.2 / 7.0	7.2 / 7.8	7.8 / 7.6	9.1 / 10.7	8.4 / 10.2		82.9	17.4	4.3	32.0	4.1	70.2
87		2	2	12:11:03	4382	61	5.3 / 6.0	5.6 / 4.6	5.6 / 4.6	3.8 / 3.9	3.9 / 4.1		47.3	16.4	4.2	38.5	3.8	68.8
87		1	3	12:17:55	4444	45	7.1 / 6.3	7.3 / 7.8	7.9 / 7.1	10.1 / 8.3	9.1 / 9.1		80.1	17.4	4.3	31.9	4.1	70.2
87		2	3	12:23:39	4504	52	5.2 / 4.7	5.1 / 3.7	5.6 / 3.6	3.4 / 3.8	3.4 / 3.7		42.1	16.3	4.2	38.5	3.8	68.8
87		1	4	12:26:14	4537	55	6.7 / 6.2	7.4 / 7.4	8.1 / 6.8	9.4 / 8.6	8.3 / 9.3		78.1	17.4	4.3	31.9	4.1	70.1
87		2	4	12:29:01	4568	63	5.4 / 4.6	6.5 / 4.3	6.4 / 3.5	3.8 / 3.8	4.4 / 3.5		46.3	16.3	4.1	38.4	3.7	68.6

Recorded by QAW

Checked by _____

x

Sheet 21																		
LTTP Traffic Data																		
WIM System Test Truck Records 2 of 5																		
Rev. 08/31/2001																		
* STATE CODE 12																		
* SPS PROJECT ID 0100																		
* DATE 02/26/2005																		
Pvmt temp	Radar Speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A right / left weight.	Axle B right / left weight.	Axle C right / left weight.	Axle D right / left weight.	Axle E right / left weight.	Axle F right / left weight.	GVW	A-B space	B-C space	C-D space	D-E space	E-F space
87		1	5	12:33:29	4621	66	6.8 / 5.8	8.1 / 7.9	8.7 / 7.0	9.3 / 8.1	8.7 / 9.1		79.6	17.4	4.3	32.0	4.0	0/A 70.5
87		2	5	12:36:29	4650	48	5.2 / 5.6	5.5 / 4.5	5.4 / 4.3	3.7 / 4.2	3.6 / 4.9		46.9	16.3	4.1	38.4	3.8	68.9
87		1	6	12:39:46	4681	46	6.9 / 7.1	7.4 / 8.4	7.6 / 7.6	8.5 / 8.6	8.8 / 9.8		80.6	17.4	4.3	32.0	4.1	70.4
87		2	6	12:41:05	4688	56	5.6 / 5.5	5.8 / 4.2	5.8 / 4.4	3.9 / 4.0	3.6 / 4.1		46.9	16.4	4.1	38.5	3.8	68.8
87		1	7	12:46:59	4754	56	7.0 / 6.5	7.2 / 7.4	7.7 / 7.3	9.6 / 10.7	8.9 / 9.5		81.8	17.4	4.3	31.9	4.1	70.0
91		1	8	12:53:49	4832	66	7.0 / 6.3	7.4 / 7.1	8.1 / 7.3	9.3 / 8.0	8.1 / 9.8		78.3	17.4	4.3	31.9	4.0	70.1
91		2	7	12:54:45	4843	47	5.1 / 5.5	5.5 / 4.5	5.0 / 4.5	3.7 / 4.5	4.1 / 4.6		47.2	16.4	4.2	38.5	3.8	69.0
91		1	9	12:59:05	4880	45	6.7 / 6.6	7.5 / 7.8	8.0 / 7.3	9.1 / 8.4	8.7 / 9.3		79.4	17.3	4.3	31.9	4.0	69.9
Recorded by		02W		Checked by														

Sheet 21

* STATE CODE

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LTPP Traffic Data

*SPS PROJECT ID

3100

WIM System Test Truck Records

3 of 5

Rev. 08/31/2001

* DATE

62 / 28 / 2005

Pvmt temp	Radar Speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A right / left weight.	Axle B right / left weight.	Axle C right / left weight.	Axle D right / left weight.	Axle E right / left weight.	Axle F right / left weight.	GW	A-B space	B-C space	C-D space	D-E space	E-F space
91		2	8	12:49:51	4889	56	5.5 / 5.4	5.7 / 4.3	5.8 / 3.8	3.7 / 3.5	3.5 / 4.2		45.4	16.3	4.2	38.5	3.8	69.3
91		1	10	13:04:12	4927	55	6.9 / 6.6	7.4 / 8.4	7.9 / 7.8	8.8 / 9.3	8.7 / 10.1		82.0	17.5	4.3	32.0	4.0	70.1
91		2	9	13:07:12	4955	66	5.4 / 5.4	5.5 / 4.6	5.9 / 3.7	3.4 / 3.3	4.0 / 3.7		44.8	16.3	4.2	38.5	3.7	68.9
91		1	11	13:10:49	4998	65	7.0 / 7.2	7.3 / 7.7	8.4 / 7.9	8.2 / 9.6	8.8 / 8.8		91.9	17.5	4.2	32.0	4.1	70.7
91		2	10	13:12:07	5010	45	5.3 / 5.1	5.3 / 4.3	5.4 / 3.8	3.4 / 4.4	3.1 / 2.3		42.4	16.3	4.1	38.5	3.8	68.8
91		1	12	14:28:47	5780	46	6.9 / 6.8	7.5 / 7.8	7.8 / 6.8	8.3 / 9.5	9.3 / 9.3		80.0	17.4	4.3	31.9	4.1	69.5
91		2	11	14:31:26	5829	48	5.1 / 5.6	5.5 / 4.5	5.3 / 4.5	3.5 / 3.9	3.4 / 4.2		45.6	16.4	4.2	38.5	3.8	69.2
91		1	13	14:33:05	5850	55	6.5 / 7.4	7.0 / 8.2	7.7 / 8.3	8.5 / 8.7	8.6 / 10.1		81.0	17.5	4.3	32.1	4.1	70.2

Recorded by

QAW

Checked by

LTPP Traffic Data

*STATE CODE

0100

WIM System Test Truck Records

*SPS PROJECT ID

02/28/2005

U of 5

*DATE

Rev. 08/31/2001

Pvmt temp	Radar Speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A right / left weight.	Axle B right / left weight.	Axle C right / left weight.	Axle D right / left weight.	Axle E right / left weight.	Axle F right / left weight.	GW	A-B space	B-C space	C-D space	D-E space	E-F space
91		2	12	14:38:55	5881	56	5.2 / 5.4	5.3 / 4.4	5.7 / 3.8	3.3 / 3.6	3.8 / 4.2		44.6	16.4	4.1	38.6	3.8	0/A
91		1	14	14:39:39	5921	65	6.8 / 6.2	8.0 / 7.4	8.2 / 7.4	8.8 / 7.0	8.2 / 10.2		78.0	17.4	4.3	32.0	4.0	69.0
91		1	15	14:44:09	5962	46	6.6 / 6.6	7.3 / 8.0	7.9 / 8.0	9.7 / 11.2	8.5 / 9.4		83.5	17.4	4.3	31.9	4.0	69.6
91		2	13	14:49:40	6028	62	5.8 / 5.4	6.3 / 4.3	6.1 / 3.9	3.7 / 4.4	3.6 / 4.0		47.5	16.4	4.1	38.5	3.8	68.9
91		1	16	14:50:05	6034	56	6.3 / 7.5	7.0 / 9.1	8.1 / 8.3	8.4 / 8.9	8.1 / 10.3		82.0	17.4	4.3	32.0	4.1	70.3
91		2	14	14:55:40	6085	57	5.4 / 4.9	6.2 / 3.8	5.9 / 3.2	3.7 / 3.6	3.4 / 4.1		44.7	16.3	4.2	38.4	3.7	68.8
91		1	17	14:56:37	6099	64	6.5 / 5.5	7.9 / 7.3	8.1 / 6.6	8.6 / 7.1	8.5 / 9.4		75.4	17.4	4.3	31.9	4.0	70.2
91		2	15	15:02:22	6153	68	5.1 / 5.6	5.3 / 4.5	4.8 / 5.0	3.3 / 4.1	4.3 / 5.0		47.4	16.4	4.2	38.6	3.8	67.7

Recorded by

DAW

Checked by

Sheet 21		* STATE CODE		12	
LTPP Traffic Data		*SPS PROJECT ID		0100	
WIM System Test Truck Records		* DATE		02 / 28 / 2005	
Rev. 08/31/2001		5 of 5			

Pvmt temp	Truck	Pass	Time	Record No.	WIM Speed	Axle A right / left weight.	Axle B right / left weight.	Axle C right / left weight.	Axle D right / left weight.	Axle E right / left weight.	Axle F right / left weight.	GVW	A-B space	B-C space	C-D space	D-E space	E-F space
91	2	16	15:07:41	6211	57	$\frac{5.4}{5.7}$	$\frac{6.1}{4.6}$	$\frac{5.9}{4.0}$	$\frac{3.9}{4.0}$	$\frac{7.7}{4.7}$		47.5	16.4	4.2	38.5	3.7	68.8
91	1	18	15:08:16	6221	55	$\frac{6.4}{6.7}$	$\frac{6.8}{7.6}$	$\frac{7.8}{7.2}$	$\frac{8.7}{1.3}$	$\frac{8.6}{5.7}$		95.5	17.4	4.3	32.0	4.1	70.3
91	2	17	15:15:39	6289	64	$\frac{5.7}{5.1}$	$\frac{6.2}{4.3}$	$\frac{6.3}{4.5}$	$\frac{3.5}{3.9}$	$\frac{4.2}{4.2}$		47.9	16.4	4.1	38.6	3.8	68.9
95	2	20	16:21:11	6961	55	$\frac{5.3}{5.4}$	$\frac{5.9}{4.3}$	$\frac{5.5}{4.3}$	$\frac{3.4}{4.6}$	$\frac{3.1}{4.0}$		45.0	16.3	4.1	38.5	4.1	
95	2	18	15:19:55	6349	53	$\frac{5.0}{5.6}$	$\frac{5.6}{4.4}$	$\frac{5.8}{4.5}$	$\frac{3.4}{4.0}$	$\frac{3.4}{3.9}$		47.1	16.4	4.1	38.5	3.8	68.9
91	1	20	15:20:55	6353	45	$\frac{6.7}{1.5}$	$\frac{7.1}{7.8}$	$\frac{7.1}{7.6}$	$\frac{2.4}{4.5}$	$\frac{4.1}{10.2}$		93.4	17.4	4.3	32.0	4.1	70.4
91	2	19	15:25:22	6401	64	$\frac{5.4}{5.2}$	$\frac{6.6}{4.7}$	$\frac{6.5}{4.0}$	$\frac{3.4}{4.5}$	$\frac{4.0}{5.3}$		47.8	16.3	4.2	38.5	3.8	68.7
91	1	21	15:26:34	6413	56	$\frac{6.6}{7.3}$	$\frac{7.1}{9.0}$	$\frac{7.5}{8.6}$	$\frac{4.0}{9.2}$	$\frac{8.6}{11.2}$		93.3	17.4	4.3	32.0	4.1	70.2

Recorded by DW

Checked by _____

Sheet 21		* STATE CODE	12
LTPP Traffic Data		*SPS PROJECT ID	0100
WIM System Test Truck Records		* DATE	02/28/2005
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Rev. 08/31/2001

CALIBRATION 1 RWS

Pvmt temp	Radar Speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A right / left weight.	Axle B right / left weight.	Axle C right / left weight.	Axle D right / left weight.	Axle E right / left weight.	Axle F right / left weight.	GW	A-B space	B-C space	C-D space	D-E space	E-F space
95		1	1	16:48:50	72666	46	5.8 / 6.8	7.2 / 7.5	7.7 / 7.1	9.4 / 8.5	9.2 / 9.3		78.7	17.4	4.3	36.9	4.1	70.2
95		2	1	16:49:26	7274	47	4.6 / 5.3	5.4 / 6.9	5.4 / 4.5	4.0 / 5.0	2.0 / 6.0		16.1	16.4	4.1	34.4	3.8	69.5
91		1	2	16:53:31	7315	54	6.1 / 6.8	7.0 / 9.3	7.0 / 8.6	8.5 / 10.1	9.1 / 10.7		83.9	17.5	4.3	32	4.1	69.9
91		2	2	16:54:40	7325	54	5.0 / 5.2	5.7 / 4.1	5.3 / 4.1	3.4 / 4.2	2.5 / 4.1		44.5	16.3	4.1	34.5	3.8	69.3
91		1	3	16:55:33	7367	65	6.4 / 5.3	7.2 / 7.4	8.0 / 7.1	8.1 / 9.6	7.9 / 9.4		76.6	17.4	4.2	31.9	4.1	69.8
91		2	3	17:01:19	7382	64	5.0 / 4.8	6.0 / 6.0	6.0 / 4.2	3.6 / 3.2	3.6 / 3.5		45.3	16.3	4.1	34.5	3.8	68.7
91		1	4	17:04:29	7418	46	6.2 / 6.6	7.1 / 7.7	8.0 / 7.2	9.1 / 7.5	8.7 / 9.8		78.0	17.4	4.3	32	4.0	70.1
91		2	4	17:05:55	7438	45	4.7 / 5.0	5.0 / 5.7	4.9 / 5.2	3.6 / 6.8	2.0 / 5.9		43.7	16.4	4.2	34.5	3.8	69.2

Recorded by QJW

Checked by _____

Rev. 08/31/2001

CAL 1 (2)

Pvmt temp	Radar Speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A right / left weight.	Axle B right / left weight.	Axle C right / left weight.	Axle D right / left weight.	Axle E right / left weight.	Axle F right / left weight.	GW	A-B space	B-C space	C-D space	D-E space	E-F space
73		1	5	9:31.45	2802	55	$\frac{6.2}{5.5}$	$\frac{4.8}{7.2}$	$\frac{8.0}{7.1}$	$\frac{8.5}{6.5}$	$\frac{1.9}{9.0}$		73.3	17.4	4.2	32	4.0	69.7
73		2	5	9:31.50	2804	55	$\frac{4.9}{4.6}$	$\frac{5.2}{3.1}$	$\frac{5.4}{2.5}$	$\frac{3.7}{3.8}$	$\frac{5.2}{3.7}$		40	16.4	4.1	38.5	3.8	69.4
		1	6															
		2	6															
		1	7															
		2	7															
		1	8															
		2	8															

Recorded by QAW Checked by _____

* STATE CODE		* SPS PROJECT ID	
* DATE		* DATE	

Second CALIBRATION 2 (2)

Pvmt temp	Radar Speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A right / left weight.	Axle B right / left weight.	Axle C right / left weight.	Axle D right / left weight.	Axle E right / left weight.	Axle F right / left weight.	GW	A-B space	B-C space	C-D space	D-E space	E-F space
73		1	1	10:20:10	3372	46	6.0 3.9	7.4 7.3	7.4 7.0	8.3 8.6	7.8 8.8		74.9	17.4	4.3	32	4.0	
73		2	1	10:20:16	3380	46	4.8 4.9	4.6 4.5	5.4 4.1	3.5 4.2	3.5 3.6		43.1	16.4	4.1	38.6	3.8	
73		1	2	10:30:57	3497	65	6.6 5.7	7.8 7.2	8.6 6.5	8.5 8.4	8.6 8.7		76.5	17.4	4.3	31.9	4.1	
73		2	2	10:32:18	3516	63	5.2 5.1	5.1 4.9	5.8 4.0	3.8 3.1	3.8 3.4		44	16.3	4.1	38.5	3.8	
73		1	3	10:35:37	3559	45	6.5 6.6	7.2 7.5	7.1 7.1	9.3 7.2	8.6 7.1		76.4	17.4	4.3	32.0	4.1	
73		2	3	10:37:07	3587	46	4.8 4.6	4.9 3.9	5.3 3.8	3.8 3.7	2.1 4.0		41.1	16.4	4.2	38.5	3.8	
73		1	4	10:40:10	3609	56	6.6 6.5	6.5 7.9	7.6 7.7	9.8 9.1	8.2 9.6		78.1	17.4	4.3	32.0	4.0	
77		1	5	10:56:15	3788	45	6.3 6.7	7.4 7.9	7.6 7.3	9.7 9.0	8.8 9.0		79.8	17.4	4.3	31.9	4.1	

Recorded by QW Checked by _____

Pvmt temp	Radar Speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A right / left weight.	Axle B right / left weight.	Axle C right / left weight.	Axle D right / left weight.	Axle E right / left weight.	Axle F right / left weight.	GW	A-B space	B-C space	C-D space	D-E space	E-F space
77		2	4	10:56:25	3709	45	4.9 4.7	5.1 4.1	5.0 4.0	5.0 4.0	5.0 4.0	5.0 4.0	44.4	15.0	4.2	38.5	3.0	
77		2	5	11:09:27	3930	63	5.2 5.6	6.3 5.0	5.8 4.4	3.7 3.4	5.0 4.0		47.1	16.3	4.2	38.6	3.7	
77		1	6	11:02:41	3864	55	6.5 6.8	6.7 7.8	7.7 7.3	8.5 9.8	8.7 9.1		79	17.4	4.3	32	4.1	
77		2	6	11:15:11	3991	43	5.0 4.9	5.2 4.3	5.2 4.0	3.3 4.3	3.6 5.3		45.2	16.3	4.1	38.5	3.8	
77		1	7	11:09:11	3927	66	6.5 7.0	7.4 7.9	7.4 7.7	8.1 8.7	7.6 10.0		79.4	17.4	4.3	32	4.1	
77		2	7	11:20:10	4055	53	6.9 5.0	5.5 5.4	5.5 5.1	3.1 4.0	3.5 4.3		42.4	16.4	4.2	30.5	3.8	

Recorded by QW

Checked by _____

* STATE CODE	12
* SPS PROJECT ID	0100
* DATE	03/01/2005

LTPP Traffic Data

WIM System Test Truck Records 1 of 6

Rev. 08/31/2001

CALIBRATION 3 / FNAH RWS

Pvmt temp	Radar Speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A right / left weight.	Axle B right / left weight.	Axle C right / left weight.	Axle D right / left weight.	Axle E right / left weight.	Axle F right / left weight.	GW	A-B space	B-C space	C-D space	D-E space	E-F space
77		1	1	11:26:25	4128	66	6.8 / 7.0	7.2 / 8.4	8.0 / 7.9	8.5 / 9.5	8.5 / 10.1		81.5	10.5	4.3	75.1	4.0	
77		2	1	11:27:21	4146	63	5.2 / 5.6	5.9 / 4.7	5.9 / 5.7	5.6 / 5.7	4.1 / 5.7		43.8	16.4	4.2	38.6	3.7	
77		1	2	11:31:01	4198	46	5.8 / 7.6	7.6 / 8.8	8.7 / 8.8	8.7 / 8.8	9.1 / 9.1		91	17.4	4.3	73.0	4.1	
77		2	2	11:32:08	4213	48	4.4 / 5.4	5.1 / 6.2	5.2 / 4.3	5.1 / 5.5	7.7 / 7.7		44.1	16.4	4.2	39.5	3.8	
77		1	3	11:32:10	4214	50	6.7 / 6.7	6.6 / 8.0	7.1 / 7.2	9.2 / 9.1	0.1 / 10.3		80.4	15.4	4.0	71.9	4.0	
77		2	3	11:37:00	4273	54	5.0 / 5.2	5.1 / 6.2	5.1 / 5.2	5.0 / 5.8	3.5 / 5.3		44.0	16.4	4.1	39.5	3.8	
77		1	4	11:40:29	4560	65	4.8 / 6.1	7.2 / 7.9	8.0 / 7.1	8.9 / 10.2	8.0 / 10.5		91	17.4	4.3	31.9	4.1	
77		1	5	11:48:10	4425	46	6.6 / 6.0	7.3 / 8.2	7.8 / 7.3	8.2 / 8.8	8.6 / 8.4		79.2	17.4	4.3	32.1	4.0	

Recorded by 01W

Checked by

Rev. 08/31/2001

Pvmt temp	Radar Speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A right / left weight.	Axle B right / left weight.	Axle C right / left weight.	Axle D right / left weight.	Axle E right / left weight.	Axle F right / left weight.	GVW	A-B space	B-C space	C-D space	D-E space	E-F space
77		2	4	11:50:04	4447	44	$\frac{5.0}{5.6}$	$\frac{4.6}{4.7}$	$\frac{5.0}{4.5}$	$\frac{3.5}{4.1}$	$\frac{3.1}{4.6}$		45.9	12.1	4.2	38.6	3.8	
80		2	5	11:50:27	4491	52	$\frac{5.2}{5.2}$	$\frac{5.1}{4.4}$	$\frac{5.5}{4.6}$	$\frac{4.0}{4.1}$	$\frac{3.4}{4.2}$		43.7	16.3	4.2	38.5	3.7	
80		1	6	11:53:06	4479	55	$\frac{6.4}{7.0}$	$\frac{7.2}{9.4}$	$\frac{4.7}{8.9}$	$\frac{9.5}{4.8}$	$\frac{4.7}{11.1}$		85.1	17.4	4.3	32.1	4.1	
80		1	7	11:54:31	4555	65	$\frac{6.8}{7.2}$	$\frac{7.1}{9.1}$	$\frac{9.1}{7.8}$	$\frac{8.5}{11.5}$	$\frac{9.1}{9.9}$		82.1	17.5	4.3	32.0	4.1	
80		2	6	12:00:59	4573	64	$\frac{5.2}{5.6}$	$\frac{5.0}{5.0}$	$\frac{6.2}{4.5}$	$\frac{4.1}{4.0}$	$\frac{7.5}{4.1}$		42.3	16.4	4.2	38.5	3.8	
80		1	8	12:04:52	4611	47	$\frac{6.2}{6.5}$	$\frac{7.8}{9.0}$	$\frac{7.9}{8.7}$	$\frac{8.3}{9.1}$	$\frac{8.7}{10.7}$		82.8	17.7	4.3	32.1	4.1	
80		2	7	12:05:45	4616	53	$\frac{5.1}{5.2}$	$\frac{5.8}{4.4}$	$\frac{5.5}{4.6}$	$\frac{7.0}{3.9}$	$\frac{7.2}{3.9}$		43.5	16.4	4.2	38.5	3.8	
80		1	9	12:10:14	4622	52	$\frac{6.1}{5.8}$	$\frac{7.2}{7.8}$	$\frac{7.1}{4.2}$	$\frac{9.3}{9.5}$	$\frac{8.2}{9.7}$		77.9	17.4	4.3	32.0	4.1	

Fuel runs
↓

Recorded by 01W

Checked by

Sheet 21			* STATE CODE		12
LTPP Traffic Data			* SPS PROJECT ID		0100
WIM System Test Truck Records 3 of 6			* DATE		03/01/2005
Rev. 08/31/2001					

Pvmt temp	Radar Speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A right / left weight.	Axle B right / left weight.	Axle C right / left weight.	Axle D right / left weight.	Axle E right / left weight.	Axle F right / left weight.	GW	A-B space	B-C space	C-D space	D-E space	E-F space
80		1	8	12:17:24	4739	65	6.7 / 7.2	8.0 / 8.3	7.7 / 7.5	9.0 / 9.3	8.6 / 10.3		82.6	17.4	4.4	32.0	4.0	
80		2	8	12:17:56	4743	63	5.0 / 5.6	5.9 / 5.0	6.2 / 4.5	3.5 / 3.4	4.5 / 4.2		47.8	16.4	4.2	38.6	3.7	
80		1	9	12:22:45	4817	46	5.8 / 5.7	7.8 / 7.0	8.0 / 6.0	9.6 / 6.4	8.6 / 8.1		72.9	17.4	4.3	31.9	4.1	
80		2	9	12:23:02	4820	45	4.8 / 5.1	5.4 / 4.6	4.8 / 4.7	3.7 / 4.9	3.7 / 4.8		46.5	16.4	4.2	38.5	3.8	
80		1	10	12:27:11	4863	56	6.8 / 7.5	6.8 / 8.0	7.3 / 8.0	8.2 / 9.8	8.2 / 9.9		80.7	17.5	4.3	32.0	4.1	
80		2	10	12:27:25	4866	54	5.0 / 4.8	5.8 / 4.0	5.6 / 2.9	3.5 / 3.9	3.3 / 3.4		42.1	16.3	4.2	38.5	3.8	
91		1	11	14:33:52	6175	46	6.7 / 5.9	7.3 / 7.6	8.0 / 7.2	9.6 / 10.4	8.4 / 9.2		80.2	17.4	4.3	31.9	4.1	
95		2	11	14:34:50	6188	47	5.0 / 5.1	5.3 / 4.3	5.4 / 4.2	3.8 / 4.6	3.6 / 4.9		46.3	16.4	4.2	38.5	3.8	

Recorded by 01W Checked by _____

Sheet 21		* STATE CODE		12
LTPP Traffic Data		*SPS PROJECT ID		0100
WIM System Test Truck Records		* DATE		03/01/2005
Rev. 08/31/2001		4 of 6		

Pvmt temp	Radar Speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A right / left weight.	Axle B right / left weight.	Axle C right / left weight.	Axle D right / left weight.	Axle E right / left weight.	Axle F right / left weight.	GVW	A-B space	B-C space	C-D space	D-E space	E-F space
95		1	12	14:37:21	6216	55	4.5 / 6.5	7.2 / 8.0	7.7 / 7.3	8.7 / 9.7	8.7 / 9.5		79.8	17.4	4.3	31.9	4.1	
95		2	12	14:38:31	6223	57	5.3 / 4.3	5.9 / 3.7	5.8 / 3.5	4.1 / 3.0	4.0 / 3.1		42.5	16.3	4.2	38.5	3.8	
95		1	13	14:41:36	6261	66	6.2 / 6.6	7.5 / 8.0	8.5 / 7.6	8.5 / 8.2	8.3 / 10.0		79.6	17.4	4.3	32.1	4.0	
95		2	13	14:43:22	6283	64	5.2 / 5.5	5.8 / 4.8	6.3 / 4.2	3.9 / 3.2	3.9 / 4.3		47.1	16.4	4.1	38.5	3.8	
95		1	14	14:45:30	6306	46	6.1 / 6.5	7.1 / 7.9	7.7 / 7.2	8.5 / 8.5	8.6 / 9.5		77.6	17.4	4.3	32.0	4.0	
95		2	14	14:47:59	6386	45	5.0 / 5.3	5.5 / 4.5	5.0 / 4.1	3.5 / 4.3	2.7 / 3.6		43.4	16.4	4.2	38.5	3.8	
95		1	15	14:49:08	6346	56	6.7 / 6.5	7.2 / 8.2	7.5 / 7.2	9.3 / 7.1	8.1 / 9.8		77.7	17.4	4.3	32.0	4.0	
95		2	15	14:51:41	6378	57	5.0 / 4.9	5.7 / 4.1	5.7 / 3.6	3.9 / 3.5	3.9 / 3.0		43.2	16.3	4.2	38.5	3.8	

Recorded by DJW Checked by _____

Pvmt temp	Radar Speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A right / left weight.	Axle B right / left weight.	Axle C right / left weight.	Axle D right / left weight.	Axle E right / left weight.	Axle F right / left weight.	GW	A-B space	B-C space	C-D space	D-E space	E-F space
95		1	16	14:53:42	6393	65	6.8 / 6.0	7.1 / 7.3	8.2 / 6.9	8.8 / 7.9	8.9 / 9.4		77.3	17.4	4.3	32.0	4.0	
95		2	16	14:55:55	6422	65	5.2 / 5.3	6.0 / 4.8	6.2 / 4.1	3.2 / 3.8	4.6 / 4.0		47.1	16.4	4.1	38.5	3.7	
95		1	17	14:58:42	6458	45	6.0 / 7.7	7.2 / 8.9	8.3 / 8.2	8.4 / 6.8	8.9 / 10.2		81.1	17.4	4.3	32.0	4.0	
95		2	17	15:00:21	6475	46	5.0 / 5.1	4.9 / 4.2	5.0 / 4.5	3.6 / 4.6	3.2 / 4.6		44.8	16.4	4.1	38.5	3.8	
95		1	18	15:01:54	6491	55	6.4 / 7.1	7.2 / 8.5	7.8 / 8.3	9.6 / 7.0	8.9 / 10.0		81.5	17.4	4.3	32.0	4.0	
95		2	18	15:03:42	6512	57	5.2 / 4.6	5.8 / 3.6	5.9 / 3.7	3.4 / 3.3	4.1 / 3.9 4.0		43.3	16.4	4.1	38.5	3.8	
95		1	19	15:07:18	6560	65	6.9 / 7.5	7.2 / 8.0	8.4 / 7.7	8.8 / 9.4	8.9 / 9.9		82.5	17.4	4.3	31.9	4.1	
95		2	19	15:08:00	6567	65	5.3 / 5.5	5.6 / 4.6	6.2 / 4.7	4.2 / 3.2	4.1 / 3.9		47.2	16.4	4.1	38.5	3.8	

Recorded by

Checked by

* STATE CODE	12
*SPS PROJECT ID	0100
* DATE	6/3/01/2005

LTPP Traffic Data
WIM System Test Truck Records 4 of 6

Rev. 08/31/2001

Pvmt temp	Radar Speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A right / left weight.	Axle B right / left weight.	Axle C right / left weight.	Axle D right / left weight.	Axle E right / left weight.	Axle F right / left weight.	GWV	A-B space	B-C space	C-D space	D-E space	E-F space
95		1	20	15:10:44	6592	46	6.9 / 7.0	7.2 / 8.0	7.7 / 7.5	10.3 / 9.1	8.9 / 9.2		81.8	17.4	4.3	31.9	4.1	
95		2	20	15:10:56	6597	46	4.9 / 5.5	5.0 / 4.5	5.4 / 4.1	3.7 / 4.3	3.2 / 3.9		44.5	16.4	4.1	38.5	3.8	
95		1	21	15:13:54	6632	55	6.8 / 6.7	7.2 / 8.4	7.7 / 7.5	8.4 / 8.2	8.6 / 9.9		79.5	17.4	4.3	32.0	4.1	
95		2	21	15:15:03	6640	56	5.1 / 5.3	5.7 / 4.7	5.3 / 4.4	3.8 / 4.4	2.2 / 4.2		45.1	16.4	4.2	38.5	3.8	

Recorded by QJW Checked by _____

Calibration 1

Start - front axle compensation factor - 1000

overall compensation factor - 784

Errors - GVW - +1.5%

Axle - +4.4%

reduce F/A factor 4.0% $1000 \times .96 = 960$

reduce GVW factor 1.8% $784 \times .982 = 770$

New Factors - front axle compensation factor - 960

overall compensation factor - 770

Calibration 2

Start - front axle compensation factor - 960
overall compensation factor - 770

Errors - GVW - -2.9%
Axle - -4.4%

increase front axle factor 2% - $960 \times 1.02 = 980$

New factors - front axle compensation factor - 980
overall compensation factor - 770

Calibration 3

Start - front axle compensation factor - 980

overall compensation factor - 770

Errors - GVW - -2.6%

Axle - -1.7%

~~increase~~ ^{decrease} front axle compensation factor 1.1% $980 \times .989 = 970$

increase overall compensation factor 1.28% $770 \times 1.028 = 780$

New factors - front axle compensation factor - 970

overall compensation factor - 780