Validation Report

Texas, SPS-1
Task Order 22, CLIN 2
November 6 to 7, 2007

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# 1 Executive Summary

A visit was made to the Texas 0100 on November 6 to 7, 2007 for the purposes of conducting a validation of the WIM system located on US 281, approximately 9.1 miles north of State Route 186, near Edinburg, Texas. The SPS-1 is located in the righthand, southbound lane of a four-lane divided facility. The posted speed limit at this location is 70 mph. The LTPP lane is one of four lanes instrumented at this site. The validation procedures were in accordance with LTPP's SPS WIM Data Collection Guide dated August 21, 2001.

The site was installed on February 2005 by the agency as a relocation of the site and installation of new sensors and controller. This is the third validation visit to this location.

**This site meets all LTPP precision requirements except speed, which is not considered sufficient to disqualify the site as having research quality data. The classification algorithm is not currently providing research quality classification information.**

The site is instrumented with a PAT bending plate and DAW 190 electronics. It is installed in portland cement concrete, on a 400 foot long slab.

The validation used the following trucks:

1) 5-axle tractor-trailer with a tractor having an air suspension and a trailer with a standard rear tandem and an air suspension loaded to 75,950 lbs., the "Golden" truck.
2) 5-axle tractor semi-trailer combination with a tractor having an air suspension and a trailer with a standard rear tandem and a 3 tapered steel leaf suspension loaded to 68,860 lbs., the "Partial" truck.
3) 5-axle tractor semi-trailer combination with a tractor having a an air suspension and a trailer with a standard rear tandem and an air suspension loaded to 77,920 lbs., the "Golden 2" truck.

The validation speeds ranged from 42 to 70 miles per hour. The pavement temperatures ranged from 72 to 97 degrees Fahrenheit. The desired speed range was achieved during this validation. The desired 30 degree Fahrenheit temperature range was not achieved.

**Table 1-1 Post-Validation results – 480100 – 07-Nov-2007**

| SPS-1, -2, -5, -6 and -8 | 95 %Confidence Limit of Error | Site Values | Pass/Fail |
|---|---|---|---|
| Steering axles | ±20 percent | -1.2 ± 6.2% | Pass |
| Tandem axles | ±15 percent | 1.8 ± 5.6% | Pass |
| GVW | ±10 percent | 1.3 ± 3.6% | Pass |
| **Speed** | **±1 mph [2 km/hr]** | **0.2 ± 2.6 mph** | **Fail** |
| Axle spacing | ± 0.5 ft [150mm] | -0.1 ± 0.3 ft | Pass |

*Prepared: djw* *Checked: bko*

The pavement condition appeared to be satisfactory for conducting a performance evaluation. There were no distresses observed that would influence truck motions significantly. A visual survey determined that there is no discernable bouncing or avoidance by trucks in the sensor area. No profile data has been collected within a year of this validation. When profile data is provided WIMIndex values will be calculated and an amended report submitted.

If this site had been evaluated using ASTM E-1318-02 it would have met the conditions for a Type I site exclusive of wheel loads. LTPP does not validate WIM performance with respect to wheel loads.

**Table 1-2 Results Based on ASTM E-1318-02 Test Procedures**

| Characteristic | Limits for Allowable Error | Percent within Allowable Error | Pass/Fail |
|---|---|---|---|
| Single Axles | ± 20% | 100% | Pass |
| Axle Groups | ± 15% | 100% | Pass |
| GVW | ± 10% | 100% | Pass |

*Prepared: djw* *Checked: bko*

**This site needs four years of data to meet the goal of five years of research quality data.**

## 2 Corrective Actions Recommended

There are no corrective actions required at this site at this time.

## 3 Post Calibration Analysis

This final analysis is based on test runs conducted Novemeber 7, 2007 during the mid-morning to late afternoon hours at test site 480100 on US 281. This SPS-1 site is on the southbound, righthand of a four-lane divided facility. No auto-calibration was used during test runs. The three trucks used for the validation included:

1. 5-axle tractor-trailer with a tractor having an air suspension and trailer with a standard rear tandem and air suspension loaded to 75,950 lbs., the "Golden" truck.
2. 5-axle tractor semi-trailer combination with a tractor having an air suspension and a trailer with a standard rear tandem and a 3 tapered steel leaf suspension loaded to 68,860 lbs., the "Partial" truck.
3. 5-axle tractor semi-trailer combination with a tractor having an air suspension and a trailer with a standard rear tandem and an air suspension loaded to 77,920 lbs., the "Golden 2" truck.

Each truck made a total of 13 passes over the WIM scale at speeds ranging from approximately 42 to 70 miles per hour. The desired speed range was achieved during this validation. Pavement surface temperatures were recorded during the test runs ranging from about 72 to 97 degrees Fahrenheit. The desired 30 degree Fahrenheit temperature range was not achieved. 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, this site passed all of the performance criteria for weight and spacing. It did not meet the requirements for speed. This is not considered sufficient to preclude the site from producing research quality data.

**Table 3-1 Post-Validation Results – 480100 – 07-Nov-2007**

| SPS-1, -2, -5, -6 and -8 | 95 %Confidence Limit of Error | Site Values | Pass/Fail |
|---|---|---|---|
| Steering axles | ±20 percent | -1.2 ± 6.2% | Pass |
| Tandem axles | ±15 percent | 1.8 ± 5.6% | Pass |
| GVW | ±10 percent | 1.3 ± 3.6% | Pass |
| **Speed** | **±1 mph [2 km/hr]** | **0.2 ± 2.6 mph** | **Fail** |
| Axle spacing | ± 0.5 ft [150mm] | -0.1 ± 0.3 ft | Pass |

*Prepared: djw* *Checked: bko*

The test runs were conducted primarily during the mid-morning to late afternoon hours under mostly cloudy weather conditions, resulting in a arrow 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 three temperature groups. The distribution of runs by speed and temperature is illustrated in Figure 3-1. The figure indicates that the desired distribution of speed and temperature combinations was not achieved for this set of validation runs.

The three speed groups were divided as follows: Low speed – 42 to 53 mph, Medium speed – 54 to 63 mph and High speed – 64 + mph. The three temperature groups were created by splitting the runs between those at 72 to 81 degrees Fahrenheit for Low temperature, 82 to 89 degrees Fahrenheit for Medium temperature and 90 to 97 degrees Fahrenheit for High temperature.

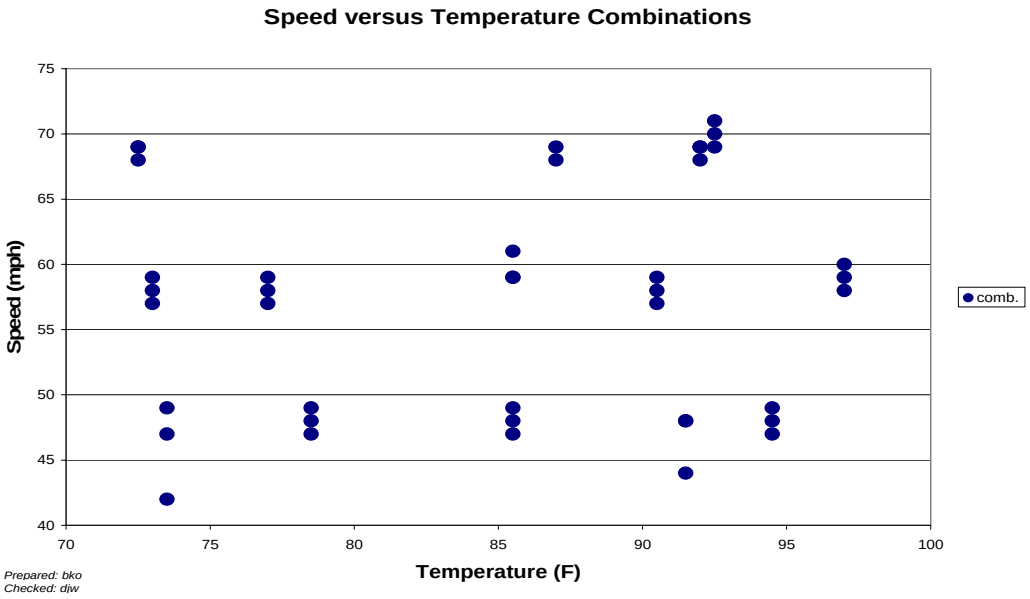



**Figure 3-1 Post-Validation Speed-Temperature Distribution – 480100 – 07-Nov-2007**

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

Figure 3-2 shows the GVW Percent Error vs. Speed graph for the population as a whole. This figure shows the GVW of the test trucks was overestimated at all speeds. Variability in error was generally consistent throughout the entire speed range. The outlier is real.

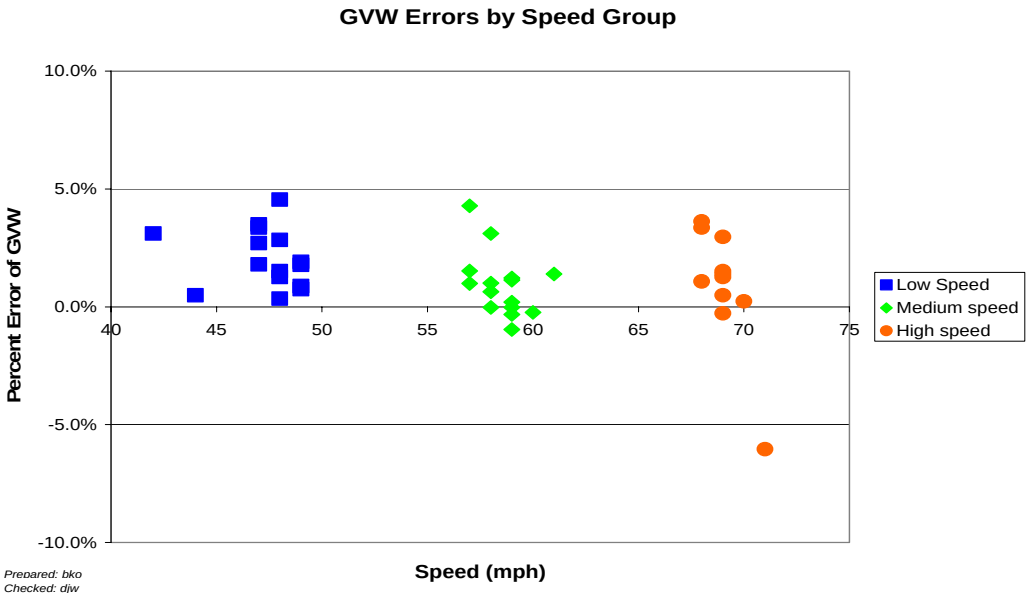



**Figure 3-2 Post-validation GVW Percent Error vs. Speed – 480100 – 07-Nov-2007**

Figure 3-3 shows the relationship between temperature and GVW percentage error. The overestimation of GVW appears to have slightly decreased as temperature increased. Variability in error remains consistent over the entire temperature range.

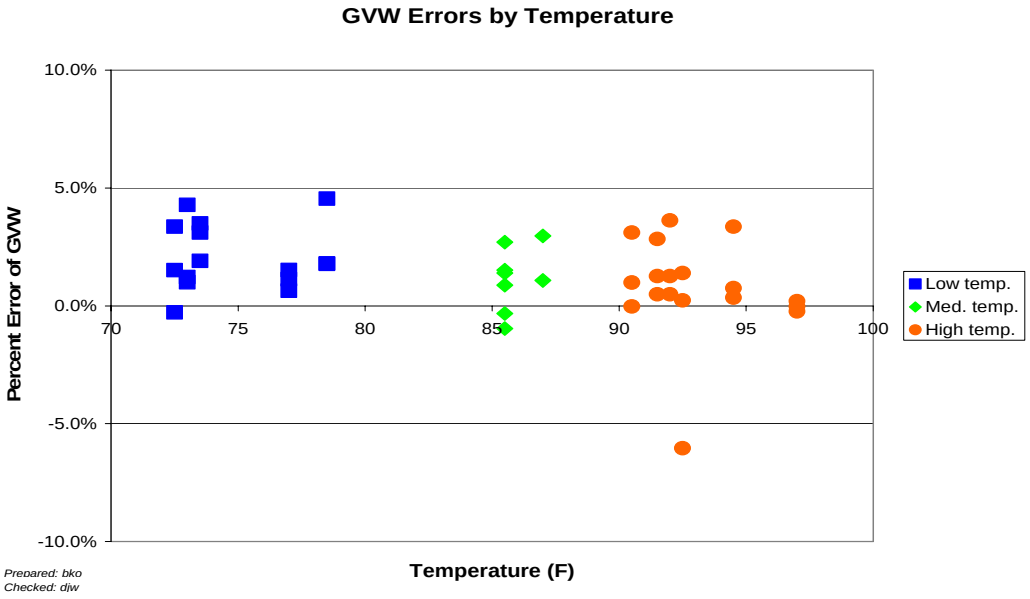



**Figure 3-3 Post-Validation GVW Percent Error vs. Temperature – 480100 – 07-Nov-2007**

Figure 3-4 shows the relationship between the drive tandem spacing errors in feet and speeds. This graph is used as a potential indicator of classification errors due to failure to correctly identify spacings on a vehicle. Since the most common reference value is the drive tandem on a Class 9 vehicle, this is the spacing evaluated and plotted for validations. Axle spacing errors appear to be fairly consistent over the speed range and are limited to maximums of about 5 inches (0.4 feet). Vehicle speed has no apparent influence on the error of measured axle spacing.

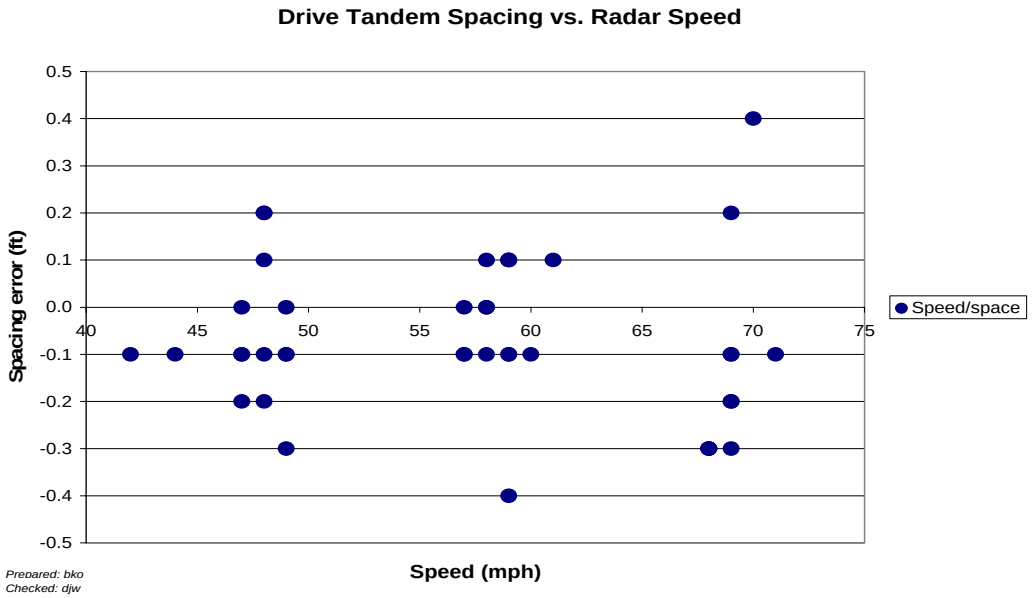



**Figure 3-4 Post-Validation Spacing vs. Speed – 480100 – 07-Nov-2007**

### *3.1 Temperature-based Analysis*

The three temperature groups were created by splitting the runs between those at 72 to 81 degrees Fahrenheit for Low temperature, 82 to 89 degrees Fahrenheit for Medium temperature and 90 to 97 degrees Fahrenheit for High temperature.

**Table 3-2 Post-Validation Results by Temperature Bin – 480100 – 07-Nov-2007**

| Element | 95% Limit | Low Temperature 72 to 81 °F | Medium Temperature 82 to 89 °F | High Temperature 90 to 97 °F |
|---|---|---|---|---|
| Steering axles | ±20 % | -0.7 ± 7.3% | -1.3 ± 8.0% | -1.5 ± 5.9% |
| Tandem axles | ±15 % | 2.7 ± 4.7% | 1.7 ± 5.9% | 1.2 ± 6.4% |
| GVW | ±10 % | 2.1 ± 3.0% | 1.2 ± 3.2% | 0.8 ± 4.4% |
| Speed | ±1 mph | 0.8 ± 2.5 mph | 0.0 ± 3.3 mph | -0.2 ± 2.6 mph |
| Axle spacing | ± 0.5 ft | -0.1 ± 0.4 ft | 0.0 ± 0.4 ft | -0.1 ± 0.3 ft |

*Prepared: djw* *Checked: bko*

Table 3-2 illustrates the tendency of the equipment to underestimate steering axle weights and overestimate all other weights at all temperatures. Changes in temperature had little effect on mean error or variability in error.

Figure 3-5 is the distribution of GVW Errors versus Temperature by Truck graph. All trucks appear to have exhibited the same tendency to decrease in overestimation as the temperature increased. Variability in error was consistent over the entire temperature range for all trucks.

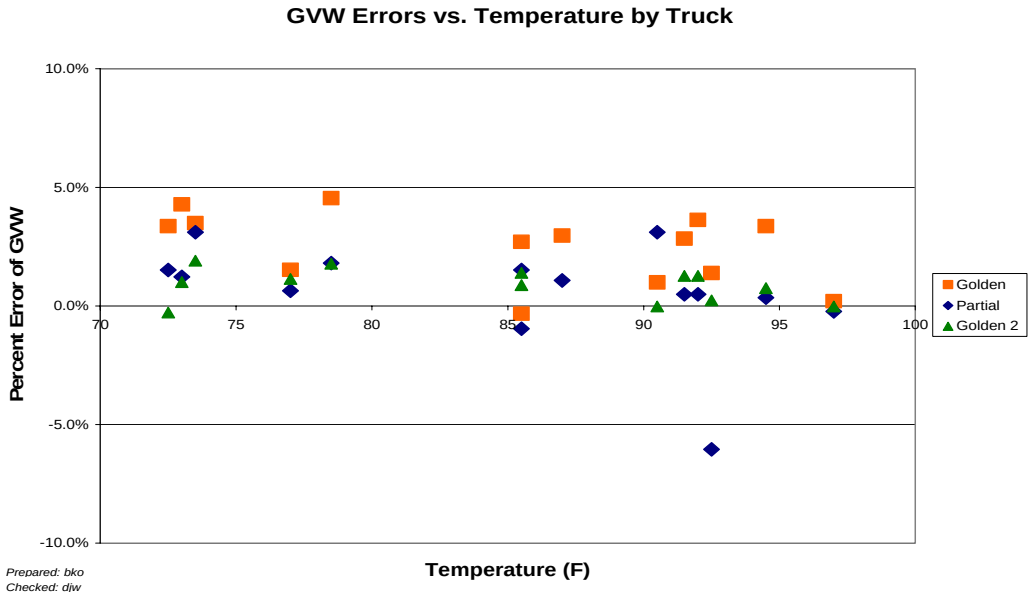



**Figure 3-5 Post-Validation GVW Percent Error vs. Temperature by Truck – 480100 – 07-Nov-2007**

Figure 3-6 shows the relation between steering axle errors and temperature. This graph is included due to the frequent use of steering axle weights of Class 9 vehicles for calibration. This site *does not* use auto-calibration. The steering axles in this graph are associated only with Class 9 vehicles. Steering axle errors tend to be underestimated throughout the range of temperatures and the variability in error is reasonably consistent throughout the temperature range.

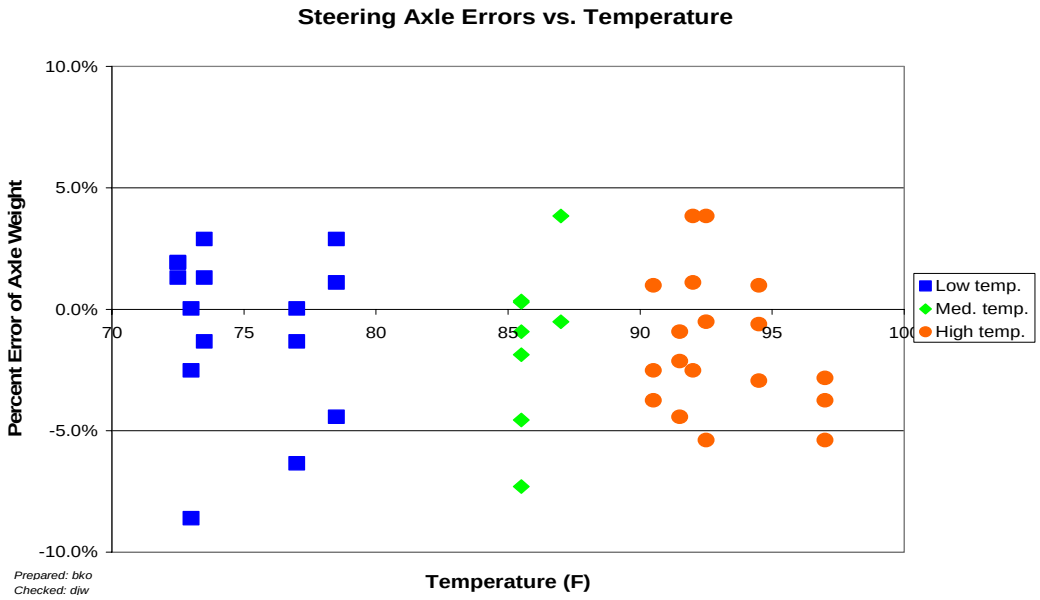



**Figure 3-6 Post-Validation Steering Axle Error vs. Temperature by Group – 480100 – 07-Nov-2007**

### *3.2 Speed-based Analysis*

The three speed groups were divided using 42 to 53 mph for Low speed, 54 to 63 mph for Medium speed and 64+ mph for High speed.

**Table 3-3 Post-Validation Results by Speed Bin – 480100 – 07-Nov-2007**

| Element | 95% Limit | Low Speed 42 to 53 mph | Medium Speed 54 to 63 mph | High Speed 64+ mph |
|---|---|---|---|---|
| Steering axles | ±20 % | -0.6 ± 4.9% | -3.2 ± 6.0% | 0.8 ± 6.4% |
| Tandem axles | ±15 % | 2.6 ± 4.6% | 1.8 ± 4.7% | 0.9 ± 7.9% |
| GVW | ±10 % | 2.1 ± 2.7% | 0.9 ± 2.9% | 0.9 ± 5.8% |
| Speed | ±1 mph | 0.1 ± 2.4 mph | 0.4 ± 2.8 mph | 0.1 ± 3.5 mph |
| Axle spacing | ± 0.5 ft | -0.1 ± 0.3 ft | 0.0 ± 0.3 ft | -0.1 ± 0.5 ft |

*Prepared: djw* *Checked: bko*

From Table 3-3 it appears that the WIM equipment at this site underestimates steering axle weights at medium speeds and estimates them with reasonable accuracy at low and high speeds. All other weights are overestimated at low speeds and estimated essentially without bias at medium and high speeds. There is an increase in variability of all weights as speed increases.

Figure 3-7 illustrates the effect of speed on the GVW estimates for each of the individual trucks. GVW for the Golden truck (squares) is overestimated at all speeds. GVW errors for the Partial truck (diamonds) and Golden 2 truck (triangles) are somewhat lower but

still show a tendency to overestimation. Variability in error is consistent over the entire speed range for each truck and the truck population as a whole.

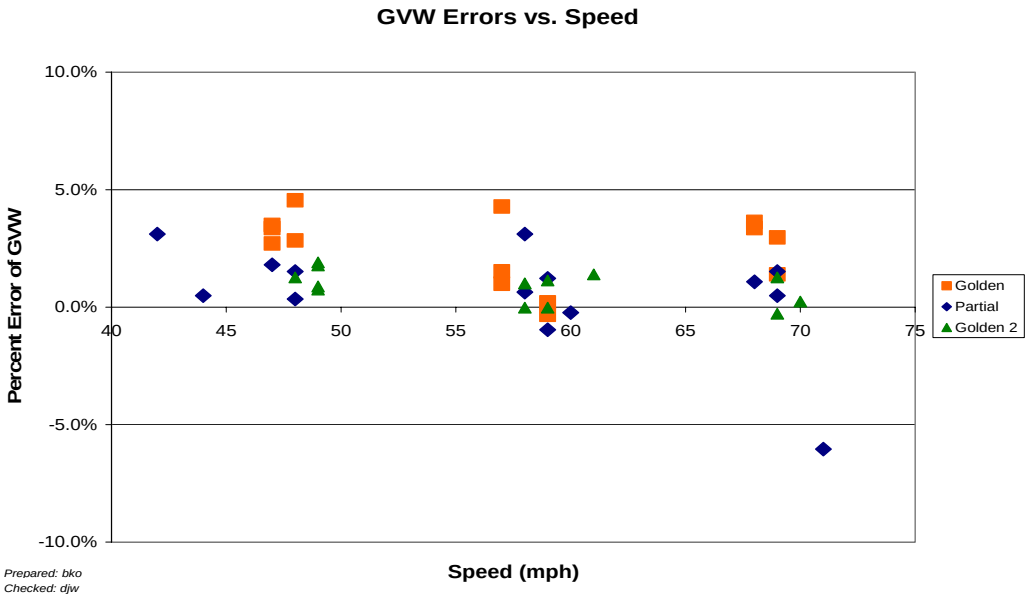



**Figure 3-7 Post-Validation GVW Percent Error vs. Speed by Truck – 480100 – 07-Nov-2007**

Figure 3-8 shows the relationship between steering axle errors and speed. This graph is included due to the frequent use of steering axle weights of Class 9 vehicles for auto-calibration. This site does not use auto-calibration. The steering axles in this graph are associated only with Class 9 vehicles. This figure shows that there is a greater underestimation of steering axle weights at the medium speeds. Variability in error is reasonably consistent throughout the entire speed range.

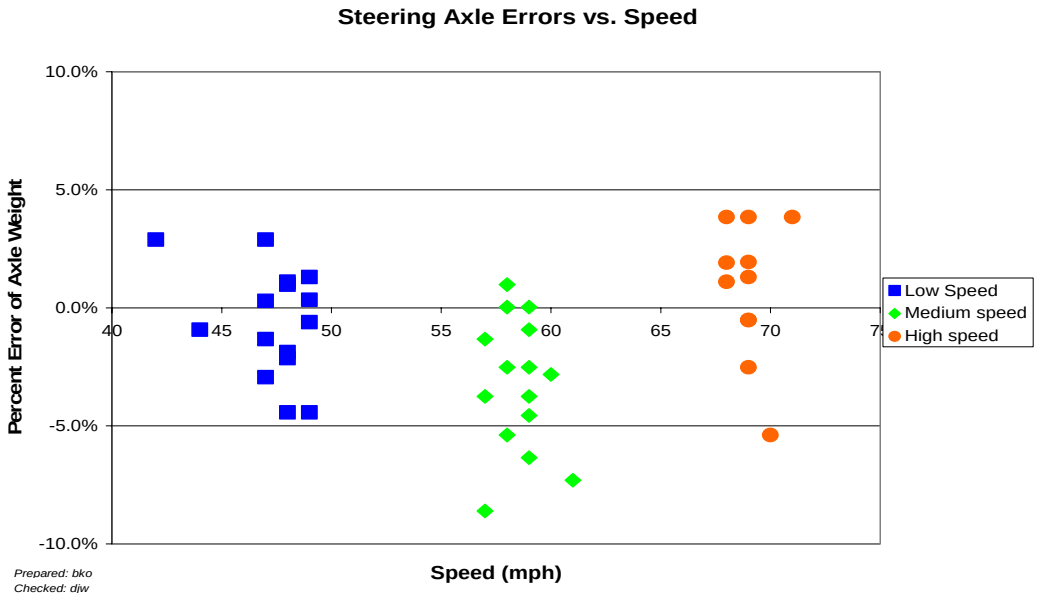



**Figure 3-8 Post-Validation Steering Axle Percent Error vs. Speed by Group – 480100 – 07-Nov-2007**

### *3.3 Classification Validation*

The agency uses the FHWA 13 class scheme at this site. Classification 15 has been added to define unclassified vehicles. A copy of the algorithm used has not yet been provided.

The classification validation is intended to find gross errors in vehicle classification, not to validate the installed algorithm. 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 are zero percent unknown vehicles and 2.8 percent unclassified vehicles. The unclassified vehicles are typically Class 5 utility trucks towing 2 and 3 axle unloaded 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. Table 3-4 has the classification error rates by class. The overall misclassification rate is 8.7 percent. The misclassification for Class 10 is the result of a single vehicle identified as a Class 13 by the system.

**Table 3-4 Truck Misclassification Percentages for 480100 – 07-Nov-2007**

| Class | Percent Error | Class | Percent Error | Class | Percent Error |
|---|---|---|---|---|---|
| 4 | 0 | 5 | - 15 | 6 | 0 |
| 7 | N/A | | | | |
| 8 | | 9 | - 1 | 10 | -100 |
| 11 | N/A | 12 | N/A | 13 | UNK |

*Prepared: djw* *Checked: bko*

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 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 480100 – 07-Nov-2007**

| Class | Mean Difference | Class | Mean Difference | Class | Mean Difference |
|---|---|---|---|---|---|
| 4 | 0 | 5 | 15 | 6 | 0 |
| 7 | N/A | | | | |
| 8 | 67 | 9 | 1 | 10 | 100 |
| 11 | N/A | 12 | N/A | 13 | UNK |

*Prepared: djw* *Checked: bko*

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 (UNK) 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 vehicles of that type might actually exist. N/A means no vehicles of the class were recorded by either the equipment or the observer.

### *3.4 Evaluation by ASTM E-1318 Criteria*

The ASTM E-1318 criteria for a successful validation of Type I sites is 95% of the observed errors within the limits for allowable errors for each of the relevant statistics. If this site had been evaluated using ASTM E-1318-02 it would have met the conditions for a Type I site exclusive of wheel loads. LTPP does not validate WIM performance with respect to wheel loads.

**Table 3-6 Results of Validation Using ASTM E-1318-02 Criteria**

| Characteristic | Limits for Allowable Error | Percent within Allowable Error | Pass/Fail |
|---|---|---|---|
| Single Axles | ± 20% | 100% | Pass |
| Axle Groups | ± 15% | 100% | Pass |
| GVW | ± 10% | 100% | Pass |

*Prepared: djw* *Checked: bko*

## 4 Pavement Discussion

The pavement condition did not appear to influence truck movement across the sensors.

### *4.1 Profile Analysis*

Profile data collected in the year prior to the site visit do not exist. A site visit to collect profile data has not been scheduled yet. An amended report will be submitted when the data is available.
Table 4-2 shows the computed index values for the prior site validation. The profile data was collected nearly a year prior to that validation. As of the current validation it has been 30 months since profile data was collected at this site. All of the values computed for the prior visit were between the upper and lower threshold values.

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.

For this Texas SPS-1 WIM site, the WIM scale is comprised of two staggered bending plates. The leading plate was installed on the right half of the lane and the tailing plate was installed on the left. The distance between these two plates is about 4.8 meters (16 feet). As the midpoint of these two bending plates is 274.5 meters from the beginning of the test section, the leading and trailing plates are located at 272.1 and 276.9 meters, respectively, from the starting point of the profiling.

Profile data collected at the SPS WIM location by Furgo-BRE, Inc. on May 27, 2005 were processed through the LTPP SPS WIM Index software, version 1.0. This WIM scale is installed on a portland cement concrete pavement.

A total of 11 profiler passes were conducted over the WIM site. Since the issuance of the LTPP directive on collection of longitudinal profile data for SPS WIM sections, 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 Region Support Contractor has completed 5 passes at the center of the lane, 3 passes shifted to the left side of the lane, and 3 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).

The SPS WIM Index software, version 1.0 was developed with four different indices: LRI, SRI, Peak LRI and Peak SRI. The 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 SRI incorporates a shorter section of pavement profile beginning 2.74 m prior to the WIM scale and ending 0.46 m after the scale. The LRI and SRI are the index values for the actual location of the WIM scale. Peak LRI is the highest value of LRI, within 30 m prior to the scale. Peak SRI indicates the highest value of SRI that is located between 2.45 m prior to the scale and 1.5 m after the scale. Also, a range for each of the indices was developed to provide the smoothness criteria. The ranges are shown in Table 4-1. When all of the values are below the lower thresholds, it is presumed unlikely that pavement smoothness will significantly influence sensor output. When one or more values exceed an upper threshold there is a reasonable expectation that the pavement

smoothness will influence the outcome of the validation. When all values are below the upper threshold but not all below the lower threshold, the pavement smoothness may or may not influence the validation outcome.

**Table 4-1 Thresholds for WIM Index Values**

| Index | Lower Threshold (m/km) | Upper Threshold (m/km) |
|---|---|---|
| LRI | 0.50 | 2.1 |
| SRI | 0.50 | 2.1 |
| Peak LRI | 0.50 | 2.1 |
| Peak SRI | 0.75 | 2.9 |

*Prepared: djw* *Checked: bko*

Table 4-2 shows the computed index values for all 11 profiler passes for this WIM site. The index values for the left wheel path were calculated at 276.9 m from the beginning of the test section while the index values on the right wheel path were calculated at 272.1 m from the beginning of the test section. The average values of the passes in each path were also calculated when three or more passes were completed. These are shown in the right most column of the table. Values below the index lower limits are presented in *italics*. Values above the upper limits are in **bold**.

**Table 4-2 WIM Index Values - 480100 –27-May-2005**

| Profiler Passes | | | Pass 1 | Pass 2 | Pass 3 | Pass 4 | Pass 5 | Ave. |
|---|---|---|---|---|---|---|---|---|
| Center | LWP | LRI (m/km) | 0.860 | 0.913 | 0.917 | 0.870 | 0.960 | 0.904 |
| | | SRI (m/km) | 0.799 | 0.712 | 0.775 | 0.686 | 0.901 | 0.775 |
| | | Peak LRI (m/km) | 0.899 | 0.961 | 1.052 | 0.964 | 0.989 | 0.973 |
| | | Peak SRI (m/km) | 0.926 | 0.927 | 1.004 | 0.918 | 1.066 | 0.968 |
| | RWP | LRI (m/km) | 1.124 | 1.076 | 1.132 | 0.785 | 1.106 | 1.045 |
| | | SRI (m/km) | 1.180 | 1.355 | 1.982 | 0.683 | 0.967 | 1.233 |
| | | Peak LRI (m/km) | 1.150 | 1.078 | 1.142 | 1.054 | 1.196 | 1.124 |
| | | Peak SRI (m/km) | 1.283 | 1.474 | 2.136 | 0.782 | 1.026 | 1.340 |
| Left Shift | LWP | LRI (m/km) | 1.029 | 0.827 | 1.013 | | | 0.956 |
| | | SRI (m/km) | 1.166 | 0.963 | 1.088 | | | 1.072 |
| | | Peak LRI (m/km) | 1.089 | 0.867 | 1.021 | | | 0.992 |
| | | Peak SRI (m/km) | 1.366 | 1.091 | 1.088 | | | 1.182 |
| | RWP | LRI (m/km) | 1.103 | 1.221 | 1.181 | | | 1.168 |
| | | SRI (m/km) | 1.133 | 1.220 | 1.416 | | | 1.256 |
| | | Peak LRI (m/km) | 1.202 | 1.306 | 1.224 | | | 1.244 |
| | | Peak SRI (m/km) | 1.420 | 1.483 | 1.519 | | | 1.474 |
| Right Shift | LWP | LRI (m/km) | 1.087 | 0.874 | 1.092 | | | 1.018 |
| | | SRI (m/km) | 1.012 | 0.850 | 1.013 | | | 0.958 |
| | | Peak LRI (m/km) | 1.313 | 0.913 | 1.277 | | | 1.168 |
| | | Peak SRI (m/km) | 1.033 | 0.894 | 1.143 | | | 1.023 |
| | RWP | LRI (m/km) | 1.191 | 0.925 | 1.249 | | | 1.122 |
| | | SRI (m/km) | 1.342 | 1.363 | 1.457 | | | 1.387 |
| | | Peak LRI (m/km) | 1.279 | 1.026 | 1.290 | | | 1.198 |

| Profiler Passes | | | Pass 1 | Pass 2 | Pass 3 | Pass 4 | Pass 5 | Ave. |
|---|---|---|---|---|---|---|---|---|
| | | Peak SRI (m/km) | 1.342 | 1.374 | 1.479 | | | 1.398 |

*Prepared: djw* *Checked: bko*

In Table 4-2 it can be seen that all indices computed from the profiles are between the upper and the lower threshold values. When all values are below the upper threshold but not all below the lower threshold, the pavement smoothness may or may not influence the validation outcome. Based on the profile data analysis, the Texas SPS-1 WIM site does not meet the requirements for WIM site locations. No remedial action is suggested since this site has met the performance criteria for loading and grinding was performed (April 2005) on this site. It should be noted that the grinding makes it less likely that the resulting profile index values will be below the performance threshold (lower index limit.)

### *4.2 Distress Survey and Any Applicable Photos*

During a visual survey of the pavement no distresses that would influence truck movement across the WIM scales were noted.

### *4.3 Vehicle-pavement Interaction Discussion*

A visual observation of the trucks as they approach, traverse and leave the sensor area did not indicate any visible motion of the trucks that would affect the performance of the WIM scales. Trucks appear to track down the wheel path and daylight cannot be seen between the tires of any of the sensors for the equipment.

## 5 Equipment Discussion

The traffic monitoring equipment at this location includes PAT bending plate sensors and DAW 190 electronics. These sensors are installed in a portland cement concrete pavement about 400 ft in length.

Since the last validation on May 10, 2006, the agency changed the WIM controller classification scheme from the Texas 6 to the FHWA 13 class scheme with Class 15 added to define unclassified vehicles. A copy of the specific classification algorithm has not yet been provided.

### *5.1 Pre-Evaluation Diagnostics*

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

A 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 no iterations of the calibration process between the initial 40 runs and the final 40 runs.

### *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. Table 5-1 has the information for TRF_CALIBRATION_AVC for Sheet 16s submitted prior to this validation as well as the information for the current visit.

**Table 5-1 Classification Validation History – 480100 – 07-Nov-2007**

| Date | Method | Mean Difference | | | | Percent Unclassified |
|---|---|---|---|---|---|---|
| | | Class 9 | Class 8 | Class 5 | Class 10 | |
| 11/7/2007 | Manual | -1.4 | 0 | | | 2.8 |
| 11/6/2007 | Manual | 0 | -20 | | | 1.9 |
| 5/09/2006 | Manual | -3.0 | | | 0 | 2 |
| 4/27/2005 | Manual | 0 | | -13.0 | | 0 |
| 4/26/2005 | Manual | -5.0 | | | | 0 |

*Prepared: djw* *Checked: bko*

Table 5-2 has the information for TRF_CALIBRATION_WIM for Sheet 16s submitted prior to this validation as well as the information for the current visit.

**Table 5-2 Weight Validation History – 480100 – 07-Nov-2007**

| Date | Method | Mean Error and (SD) | | |
|---|---|---|---|---|
| | | GVW | Single Axles | Tandem Axles |
| 11/7/2007 | Test Trucks | 1.3% (1.8) | -1.2% (3.1) | 1.8% (2.8) |
| 11/6/2007 | Test Trucks | 1.0% (1.6) | -1.5% (3.1) | 1.5% (2.8) |
| 5/10/2006 | Test Trucks | -0.5% (1.8) | -2.6% (2.8) | -0.1% (4.4) |
| 5/09/2006 | Test Trucks | 0.5% (2.4) | -2.4% (2.2) | 1.2% (6.1) |
| 4/27/2005 | Test Trucks | 1.4% (1.3) | -4.9% (3.1) | 1.8% (3.3) |
| 4/26/2005 | Test Trucks | 0.5% (2.0) | -2.5% (2.5) | 0.5% (3.4) |

*Prepared: djw* *Checked: bko*

From the table, it appears that mean error and variability in error have remained reasonably consistent with the exception of Single axle error during the April 27, 2005 validation.

### *5.4 Projected Maintenance/Replacement Requirements*

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

## 6 Pre-Validation Analysis

This pre-validation analysis is based on test runs conducted November 6, 2007 from the mid-morning to late afternoon hours at test site 480100 on US 281. This SPS-1 site located on the southbound, righthand of a four-lane divided facility. No auto-calibration was used during test runs. The three trucks used for initial validation included:

1. 5-axle tractor semi-trailer combination with a tractor having an air suspension and trailer with standard rear tandem and an air suspension loaded to 75,840 lbs., the “Golden” truck.

2. 5-axle tractor semi-trailer combination with a tractor having an air suspension and a trailer with a standard rear tandem and a 3 tapered steel leaf suspension loaded to 69,140 lbs., the "Partial" truck.
3. 5-axle tractor semi-trailer combination with a tractor having a an air suspension and a trailer with a standard rear tandem and an air suspension loaded to 77,840 lbs., the "Golden 2" truck.

For the initial validation each truck made a total of 13 passes over the WIM scale at speeds ranging from approximately 45 to 70 miles per hour. The desired speed range was achieved during this validation. Pavement surface temperatures were recorded during the test runs ranging from about 79 to 94 degrees Fahrenheit. The desired 30 degree Fahrenheit temperature range was not achieved. The computed values of 95% confidence limits of each statistic for the total population are in Table 6-1.

As shown in Table 6-1 this site meets all precision requirements except speed which is not considered sufficient to preclude the site from producing research quality data.

**Table 6-1 Pre-Validation Results – 480100 – 06-Nov-2007**

| SPS-1, -2, -5, -6 and -8 | 95 %Confidence Limit of Error | Site Values | Pass/Fail |
|---|---|---|---|
| Steering axles | ±20 percent | -1.5 ± 6.2% | Pass |
| Tandem axles | ±15 percent | 1.5 ± 5.6% | Pass |
| GVW | ±10 percent | 1.0 ± 3.3% | Pass |
| **Speed** | **±1 mph [2 km/hr]** | **0.0 ± 1.9 mph** | **Fail** |
| Axle spacing | ± 0.5 ft [150mm] | 0.0 ± 0.4 ft | Pass |

*Prepared: djw* *Checked: bko*

The test runs were conducted primarily during the mid-morning to late afternoon hours, under mostly cloudy weather conditions, resulting in a 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 figure indicates that the desired distribution of speed and temperature combinations was not achieved for this set of validation runs.

The three speed groups were divided into 45 to 53 mph for Low speed, 54 to 63 mph for Medium speed and 64+ mph for High speed. The two temperature groups were created by splitting the runs between those at 79 to 88 degrees Fahrenheit for Low temperature and 89 to 94 degrees Fahrenheit for High temperature.

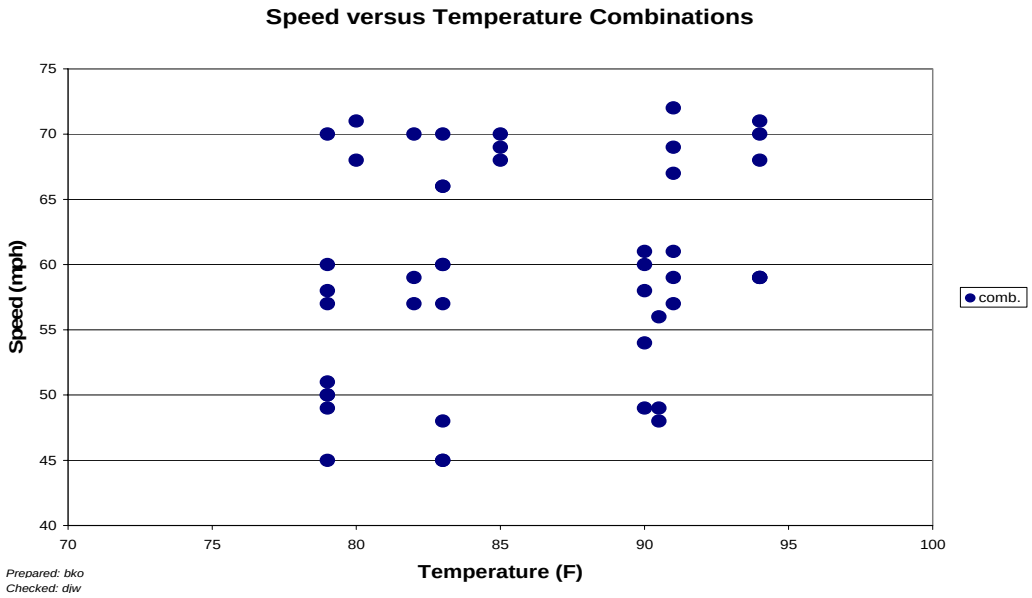



**Figure 6-1 Pre-Validation Speed-Temperature Distribution – 480100 – 06-Nov-2007**

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

Figure 6-2 shows the GVW Percent Error vs. Speed graph for the population as a whole. GVW appears to be measured with reasonable accuracy at the medium and high speeds and overestimated at the low speeds. Variability in error is consistent over the entire speed range.

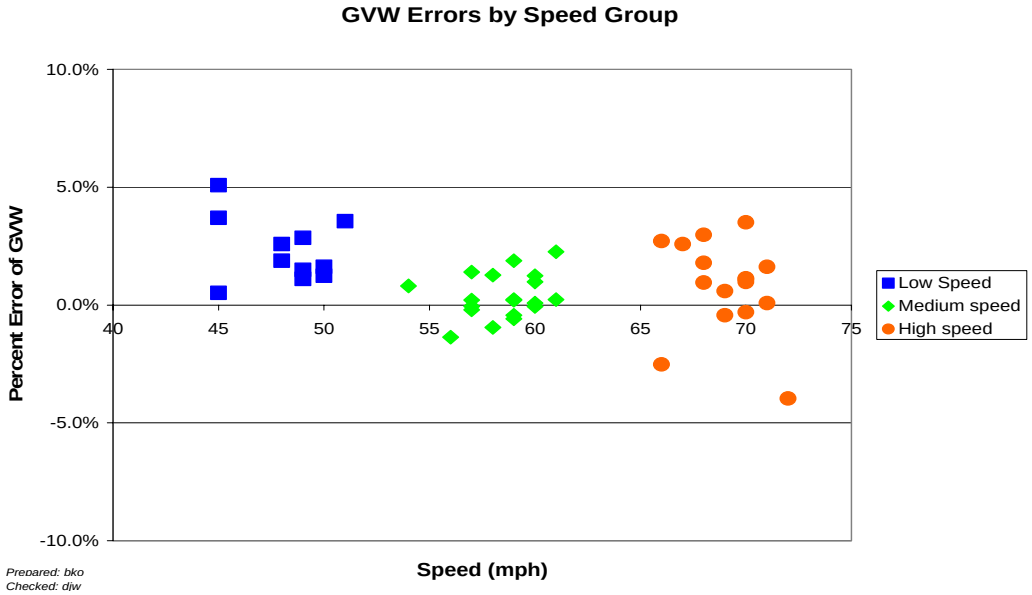



**Figure 6-2 Pre-validation GVW Percent Error vs. Speed – 480100 – 06-Nov-2007**

Figure 6-3 shows the relationship between temperature and GVW percentage error. There appears to no temperature effects on the accuracy of this WIM equipment.

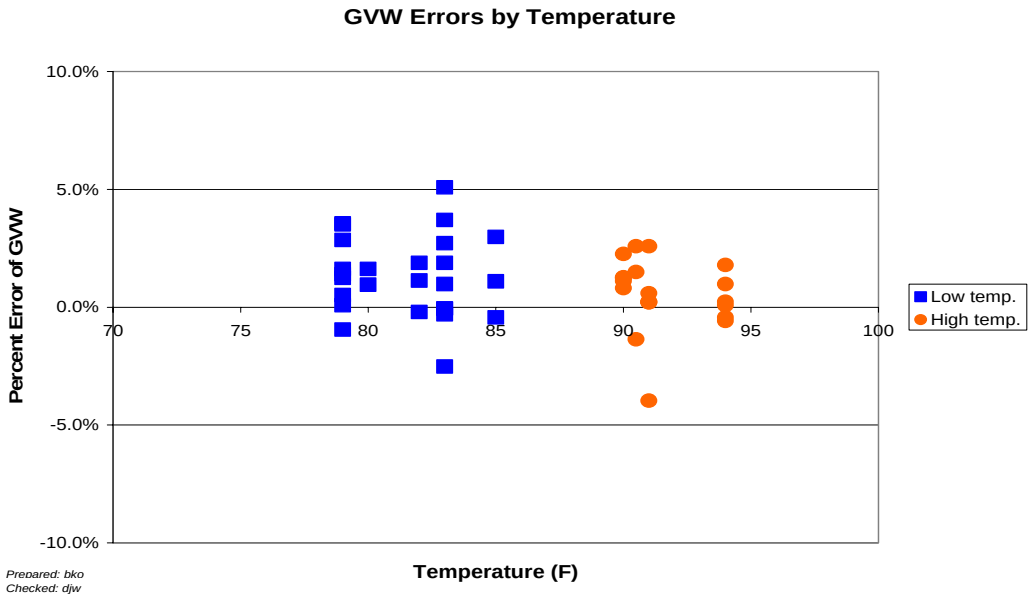



**Figure 6-3 Pre-Validation GVW Percent Error vs. Temperature – 480100 – 06-Nov-2007**

Figure 6-4 shows the relationship between the drive tandem spacing errors in feet and speeds. This graph is used as a potential indicator of classification errors due to failure to correctly identify spacings on a vehicle. Since the most common reference value is the drive tandem on a Class 9 vehicle, this is the spacing evaluated and plotted for validations. Axle spacing errors appear to be fairly consistent over the speed range and are limited to maximums of about 5 inches (0.4 feet). Vehicle speed has no apparent influence on the error of measured axle spacing.

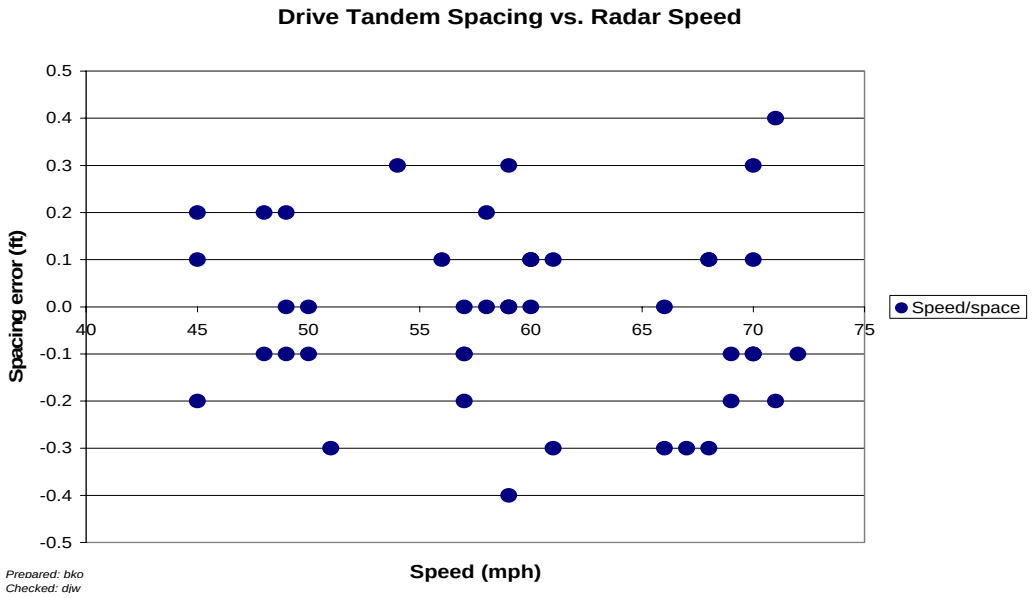



**Figure 6-4 Pre-Validation Spacing vs. Speed - 480100 – 06-Nov-2007**

### *6.1 Temperature-based Analysis*

The two temperature groups were created by splitting the runs between those at 79 to 88 degrees Fahrenheit for Low temperature and 89 to 94 degrees Fahrenheit for High temperature.

**Table 6-2 Pre-Validation Results by Temperature Bin – 480100 – 06-Nov-2007**

| Element | 95% Limit | Low Temperature 79 to 88 °F | High Temperature 89 to 94 °F |
|---|---|---|---|
| Steering axles | ±20 % | -1.4 ± 5.9% | -1.7 ± 7.2% |
| Tandem axles | ±15 % | 1.9 ± 5.5% | 1.0 ± 5.7% |
| GVW | ±10 % | 1.3 ± 3.5% | 0.6 ± 3.1% |
| Speed | ±1 mph | 0.0 ± 2.5 mph | 0.0 ± 0.7 mph |
| Axle spacing | ± 0.5 ft | 0.0 ± 0.4 ft | 0.0 ± 0.4 ft |

*Prepared: djw* *Checked: bko*

From Table 6-2, it can be seen that mean error for all weights is consistent over the entire temperature range. Only Steering axle weights demonstrate an increase in variability as temperature increases.

Figure 6-5 shows the distribution of GVW Errors versus Temperature by Truck. The equipment demonstrates a tendency to overestimate GVW at the lower temperatures for all trucks and measure GVW without bias at the higher temperatures. Individually, the Golden truck (squares) appears to have slightly greater overestimates than the other trucks at all temperatures. Variability appears to be consistent over the entire temperature range for the trucks as a whole and individually.

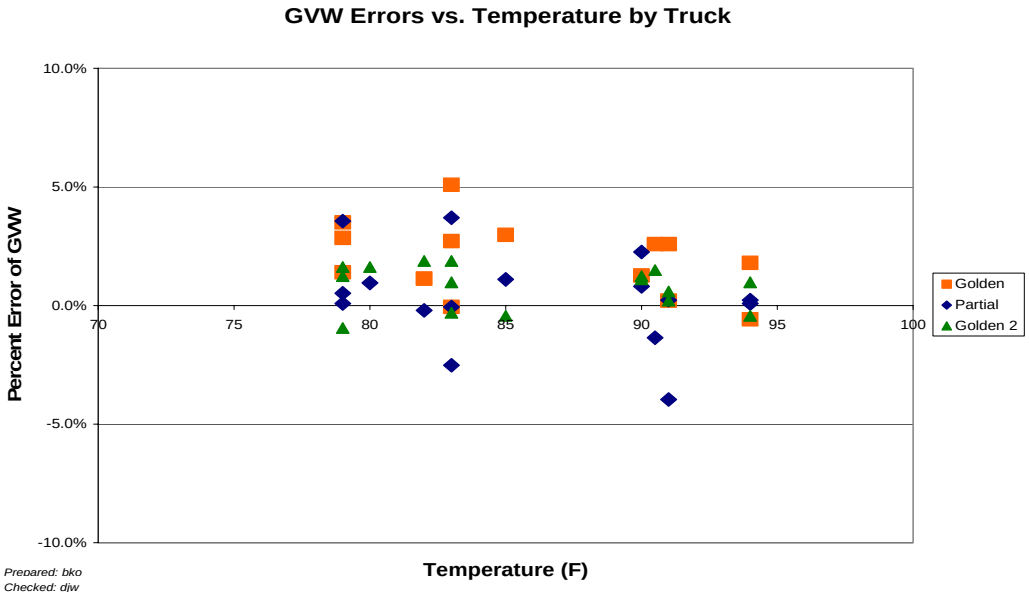



**Figure 6-5 Pre-Validation GVW Percent Error vs. Temperature by Truck – 480100 – 06-Nov-2007**

Figure 6-6 shows the relation between steering axle errors and temperature. This graph is included due to the frequent use of steering axle weights of Class 9 vehicles for auto-calibration. This site does not use auto-calibration. The steering axles in this graph are associated only with Class 9 vehicles. Steering axle weights are underestimated by the equipment at all temperatures. Variability in Steering axle error is consistent throughout the temperature range.

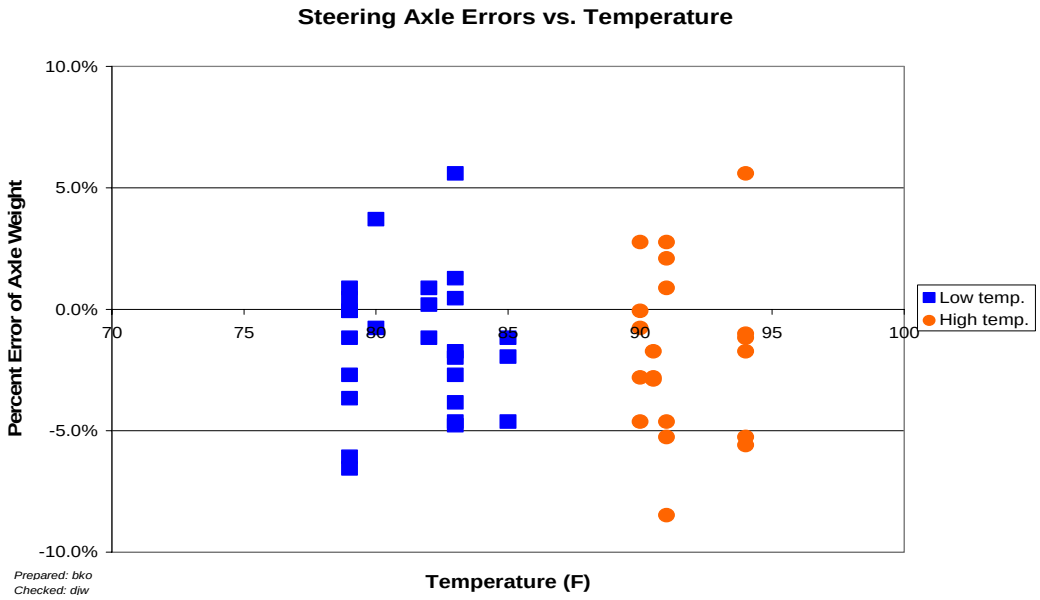



**Figure 6-6 Pre-Validation Steering Axle Error vs. Temperature by Group – 480100 – 06-Nov-2007**

### *6.2 Speed-based Analysis*

The speed groups were divided as follows: Low speed – 45 to 53 mph, Medium speed – 54 to 63 mph and High speed – 64+ mph.

**Table 6-3 Pre-Validation Results by Speed Bin – 480100 – 06-Nov-2007**

| Element | 95% Limit | Low Speed 45 to 53 mph | Medium Speed 54 to 63 mph | High Speed 64+ mph |
|---|---|---|---|---|
| Steering axles | ±20 % | -0.7 ± 5.9% | -2.5 ± 6.3% | -1.0 ± 7.1% |
| Tandem axles | ±15 % | 3.0 ± 4.8% | 0.9 ± 4.8% | 1.2 ± 6.7% |
| GVW | ±10 % | 2.3 ± 3.0% | 0.4 ± 2.0% | 0.8 ± 4.2% |
| Speed | ±1 mph | 0.1 ± 2.3 mph | 0.2 ± 2.3 mph | -0.3 ± 1.2 mph |
| Axle spacing | ± 0.5 ft | 0.0 ± 0.4 ft | 0.0 ± 0.4 ft | 0.0 ± 0.4 ft |

*Prepared: djw* *Checked: bko*

Table 6-3 illustrates the tendency of the equipment to underestimate steering axle weights. For other weights, the equipment overestimates at the lower speeds. Variability is higher at the higher speeds when compared with low and medium speeds.

From Figure 6-7, it can be seen that GVW is overestimated by the equipment for all trucks at the low speeds and measured accurately at the medium speeds. At the higher speeds, GVW for the Golden truck is overestimated and GVW for the other two trucks is measured accurately. With the exception of a few verified outliers at the high speeds, variability appears to be reasonably consistent throughout the entire speed range.

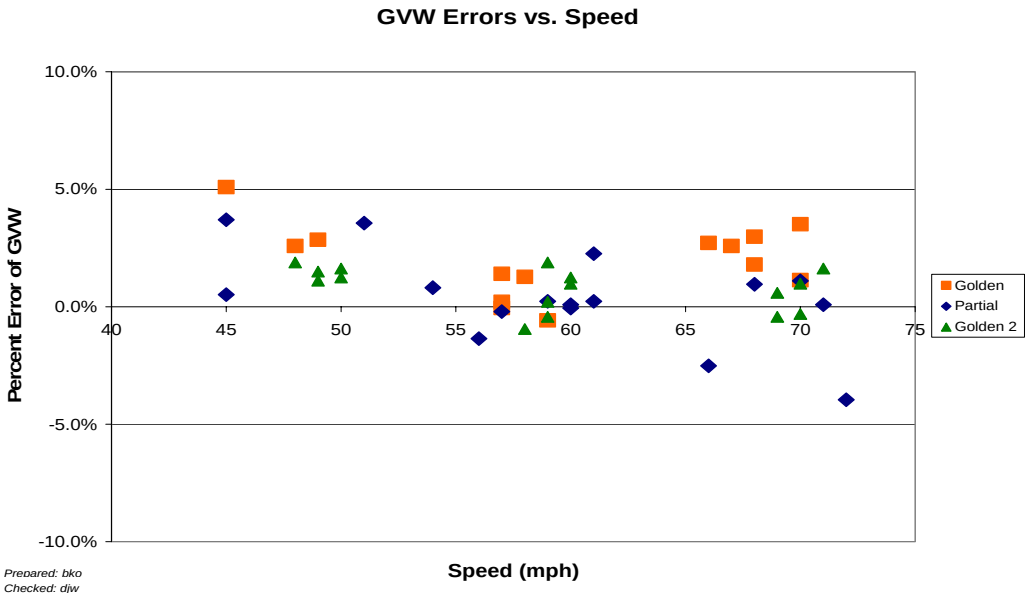



**Figure 6-7 Pre-Validation GVW Percent Error vs. Speed Group - 480100 –06-Nov-2007**

Figure 6-8 shows the relation between steering axle errors and speed. This graph is included due to the frequent use of steering axle weights of Class 9 vehicles for calibration. This site does not use auto-calibration. The steering axles in this graph are associated only with Class 9 vehicles. From the graph, it can be seen that steering axle weights are overestimated for the Golden truck (squares) at the low and high speeds. For the Partial truck (diamonds) and the Golden 2 truck (triangles) Steering axle weights are overestimated at the low speeds and measured accurately at the medium and high speeds. With the exception of a couple outliers at the high speeds, variability in error appears to be consistent over the entire speed range.

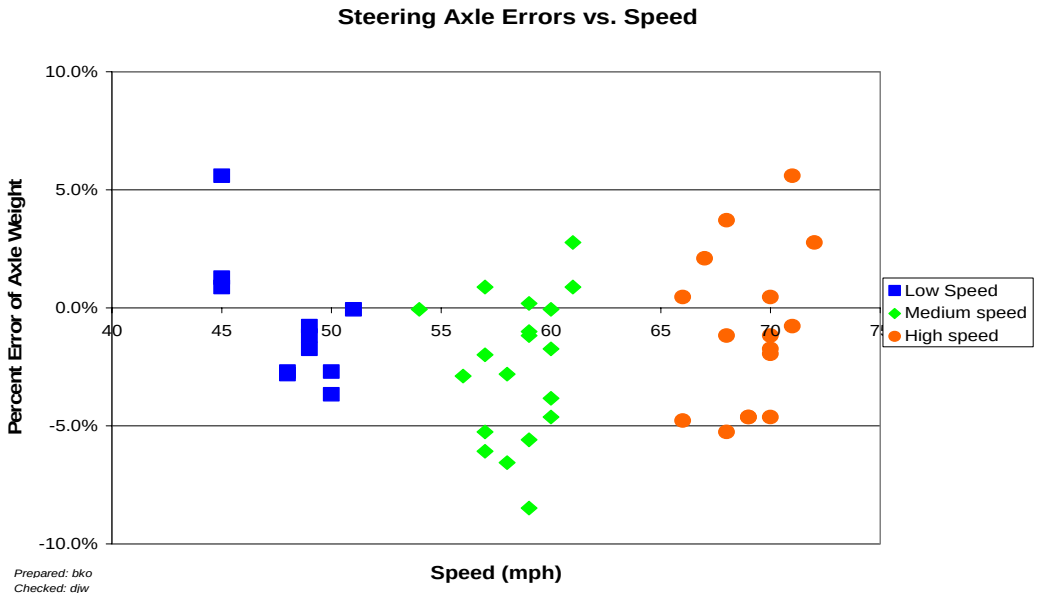



**Figure 6-8 Pre-Validation Steering Axle Percent Error vs. Speed Group - 480100 – 06-Nov-2007**

### *6.3 Classification Validation*

The agency uses the FHWA 13 class scheme at this site. Classification 15 has been added to define unclassified vehicles. A copy of the classification algorithm has not yet been provided.

The classification validation is intended to find gross errors in vehicle classification, not to validate the installed algorithm. A sample of 100 trucks was collected at the site. The classification identification is to identify gross errors in classification, not validate the classification algorithm. Video was taken at the site to provide ground truth for the evaluation. Based on a 100 percent sample it was determined that there are zero percent unknown vehicles and 1.9 percent unclassified vehicles. The unclassified vehicles are typically Class 5 utility trucks towing unloaded 2 and 3 axle 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. Table 6-4 has the classification error rates by class. The overall misclassification rate is 4 percent.

**Table 6-4 Truck Misclassification Percentages for 480100 – 06-Nov-2007**

| Class | Percent Error | Class | Percent Error | Class | Percent Error |
|---|---|---|---|---|---|
| 4 | 0 | 5 | 0 | 6 | 0 |
| 7 | N/A | | | | |
| 8 | 20 | 9 | 3 | 10 | 50 |
| 11 | N/A | 12 | N/A | 13 | N/A |

*Prepared: djw* *Checked: bko*

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 a re matches, the error rate is 25 percent. The percent error 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 480100 – 06-Nov-2007**

| Class | Mean Difference | Class | Mean Difference | Class | Mean Difference |
|---|---|---|---|---|---|
| 4 | 0 | 5 | 0 | 6 | 0 |
| 7 | N/A | | | | |
| 8 | - 20 | 9 | | 10 | - 50 |
| 11 | N/A | 12 | N/A | 13 | N/A |

*Prepared: djw* *Checked: bko*

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 vehicles of that type might actually exist. N/A means no vehicles of the class were recorded by either the equipment or the observer.

### *6.4 Evaluation by ASTM E-1318 Criteria*

The ASTM E-1318 criteria for a successful validation of Type I sites is 95% of the observed errors within the limits for allowable errors for each of the relevant statistics. If this site had been evaluated using ASTM E-1318-02 it would have met the conditions for a Type I site exclusive of wheel loads. LTPP does not validate WIM performance with respect to wheel loads.

**Table 6-6 Results of Validation Using ASTM E-1318-02 Criteria**

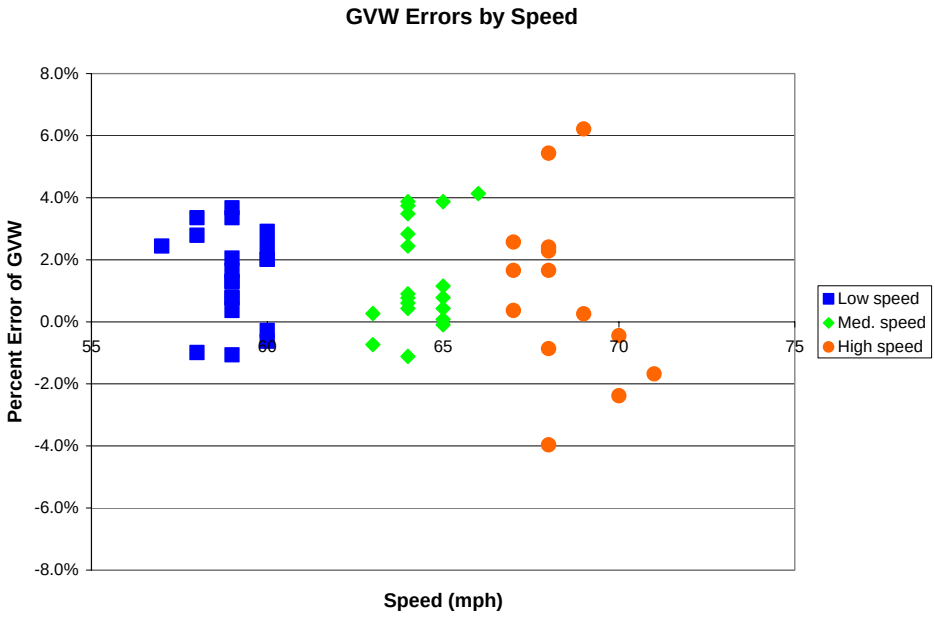
| Characteristic | Limits for Allowable Error | Percent within Allowable Error | Pass/Fail |
|---|---|---|---|
| Single Axles | ± 20% | 100% | Pass |
| Axle Groups | ± 15% | 100% | Pass |
| GVW | ± 10% | 100% | Pass |

*Prepared: djw* *Checked: bko*

### *6.5 Prior Validations*

The last validation for this site was done May 11, 2006. It was the second validation of the site. The site was producing research quality data. Figure 6-9 shows the GVW Percent Error vs. Speed for the post validation runs. The site was validated with three

trucks. The "Golden" truck was loaded to 72,800 lbs. The "Loaded 3S3" truck which had a walking beam-spring suspension on the tractor and an air suspension trailer was loaded to 75,900 lbs. The "Partial 3S2" truck which had an air suspension on the tractor and a leaf spring suspension on the trailer tandem was loaded to 56,500 lbs. At that time the variability observed was distinctly different for the highest of the three weight bins.




*Prepared: djw* *Checked: bko*

**Figure 6-9 Last Validation GVW Percent Error vs. Speed – 480100 – 10-May-2006**

Table 6-7 shows the overall results from the last validation.

**Table 6-7 Last Validation Final Results – 480100 – 10-May-2006**

| SPS-1, -2, -5, -6 and -8 | 95 %Confidence Limit of Error | Site Values | Pass/Fail |
|---|---|---|---|
| Steering axles | ±20 percent | -2.6% ± 5.7% | Pass |
| Tandem axles | ±15 percent | -0.1% ± 8.7% | Pass |
| Tridem Axles | ±15 percent | 2.4% ± 2.8% | Pass |
| Axle Groups | ±15 percent | 0.2% ± 8.4% | Pass |
| GVW | ±10 percent | -0.5% ± - 3.6% | Pass |
| **Speed** | **±1 mph [2 km/hr]** | **1.1 ± 2.2 mph** | **Fail** |
| Axle spacing | ± 0.5 ft [150mm] | 0.0 ± 0.1 ft | Pass |

*Prepared: djw* *Checked: bko*

Table 6-8 has the results at the end of the last validation by temperature. Sunny weather conditions resulted in a wide range of temperatures, predominately above 100 degrees Fahrenheit. Through this validation the equipment has been observed at temperature from 72 to 142 degrees Fahrenheit.

**Table 6-8 Last Validation Results by Temperature Bin – 480100 – 10-May-2006**

| Element | 95% Limit | Low Temperature 97-105 °F | Medium Temperature 106-130 °F | High Temperature 131-142 °F |
|---|---|---|---|---|
| Steering axles | ±20 % | -3.2 ± 3.9% | -2.3 ± 6.8% | -2.5 ± 6.8% |
| Tandem axles | ±15 % | -0.8 ± 6.4% | -0.7 ± 10.0% | 1.0 ± 9.8% |
| Tridem axles | ±15 % | n/a | 2.2 ± 3.9% | 2.5 ± 3.6% |
| Axle Groups | ±15 % | -0.8 ± 6.4% | -0.4 ± 9.5% | 1.3 ± 8.9% |
| GVW | ±10 % | -1.2 ± 2.5% | -0.7 ± 4.6% | 0.1 ± 3.6% |
| **Speed** | **±1 mph** | **0.4 +1.1 mph** | **1.6 + 2.6 mph** | **1.2 + 2.2 mph** |
| Axle spacing | ± 0.5 ft | 0.0 + 0.0 ft | 0.0 + 0.1 ft | 0.0 + 0.1 ft |

*Prepared: djw* *Checked: bko*

Table 6-9 has the results of the prior post validation by speed groups.

**Table 6-9 Last Validation Results by Speed Bin – 480100 – 10-May-2006**

| Element | 95% Limit | Low Speed 47 to 52 mph | Medium Speed 53 to 64 mph | High Speed 65+ mph |
|---|---|---|---|---|
| Steering axles | ±20 % | -2.5 ± 3.4% | -3.5 ± 5.9% | -1.6 ± 8.9% |
| Tandem axles | ±15 % | 0.7 ± 6.6% | -0.5 ± 5.4% | -0.6 ± 14.8% |
| Tridem axles | ±15 % | 2.4 ± 1.8% | 1.5 ± 16.4% | 2.9 ± 7.9% |
| Axle Groups | ±15 % | 0.9 ± 6.3% | -0.4 ± 5.3% | - 0.1 ± 13.9% |
| GVW | ±10 % | -0.3 ± 2.5% | -1.0 ± 2.6% | - 0.2 ± 6.4% |
| **Speed** | **±1 mph** | **1.2 +2.1 mph** | **0.9 +2.1 mph** | **1.3 +3.0 mph** |
| Axle spacing | ± 0.5 ft | 0.0 + 0.4 ft | 0.0 + 0.5 ft | 0.0 + 0.4 ft |

*Prepared: djw* *Checked: bko*

# 7 Data Availability and Quality

As of November 6, 2007 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 the table, years 2000 through 2003, 2005 and 2006 have a sufficient quantity to be

considered complete years of loading data. Together with the previously gathered calibration information it can be seen that at least four additional years of research quality data are needed to meet the goal of a minimum of five years of research weight data.

**Table 7-1 Amount of Traffic Data Available 480100 – 06-Nov-2007**

| Year | Classification Days | Months | Coverage | Weight Days | Months | Coverage |
|---|---|---|---|---|---|---|
| 2000 | 362 | 12 | Full Week | n/a | | Full Week |
| 2001 | 275 | 10 | Full Week | 122 | 4 | Full Week |
| 2002 | 213 | 8 | Full Week | 898 | 3 | Full Week |
| 2003 | 55 | 2 | Full Week | 61 | 2 | Full Week |
| 2004 | 44 | 2 | Full Week | 49 | 2 | Full Week |
| 2005 | 290 | 11 | Full Week | 30 | 1 | Full Week |
| 2006 | 232 | 9 | Full Week | 241 | 9 | Full Week |

*Prepared: djw* *Checked: bko*

## 8 Data Sheets

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

Sheet 19 – Truck 1 – 3S2 loaded air suspension (3 pages)
Sheet 19 – Truck 2 – 3S2 partially loaded air suspension (3 pages)
Sheet 19 – Truck 3 – 3S2 loaded air suspension (3 pages)

Sheet 20 – Speed and Classification verification Pre-Validation (2 pages)
Sheet 20 – Speed and Classification verification Post-Validation (2 pages)

Sheet 21 – Pre-Validation (4 pages)
Sheet 21 – Post-Validation (3 pages)

Test Truck Photographs (10 pages)

FHWA 13 Classification Scheme (1 page) – not present

Final System Parameters (1 page)

## 9 Updated Handout Guide and Sheet 17

A copy of the handout guide has been included following page 29. It includes a current Sheet 17 with all applicable maps and 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 following the current Sheet 18 information at the very end of the report.

# POST-VISIT HANDOUT GUIDE FOR SPS WIM VALIDATION

## STATE: Texas

## SHRP ID: 480100
## Additional Lane ID: 480199

Figures



Photos

## 1. General Information

SITE ID: *480100 and 480199*

LOCATION: *US 281 South, 9.1 Miles North of State Route 186*

VISIT DATE: *November 6, 2007*

VISIT TYPE: *Validation*

## 2. Contact Information

POINTS OF CONTACT:

**Validation Team Leader:** *Dean J. Wolf, 301-210-5105, djwolf@mactec.com*

**Highway Agency:** *Dar Hao Chen, 512-467-3963, dchen@dot.state.tx.us*

*James Neidigh, 512-465-7657, JNeidigh@dot.state.tx.us*

*Mike Murphy, 512-465-3686, mmurphy@dot.state.tx.us*

*Luis (Carlos) Peralez, 956-702-6162, lperalez@dot.state.tx.us*

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

**FHWA Division Office Liaison:** *Darrin Grenfell, 512-536-5922, darrin.grenfell@fhwa.dot.gov*

LTPP SPS WIM WEB PAGE: *http://www.tfhrc.gov/pavement/ltpp/spstraffic/index.htm*

## 3. Agenda

BRIEFING DATE: *No briefing requested for this visit.*

ON-SITE PERIOD: *Beginning November 6, and continuing through November 8, 2007.*

TRUCK ROUTE CHECK: *Completed on previous visit to site.*

## 4. Site Location/ Directions

NEAREST AIRPORT: *McAllen International Airport, McAllen, Texas.*

DIRECTIONS TO THE SITE: *9.1 Miles North of SR -186, approximately 30 miles north of Pharr, Texas.*

MEETING LOCATION: *Beginning at 9 a.m., November 6, 2007.*

WIM SITE LOCATION: *US 281 South, 9.1 Miles North of State Route 186 (Latitude: 26.6860; Longitude: -98.1147)*

WIM SITE LOCATION MAP:

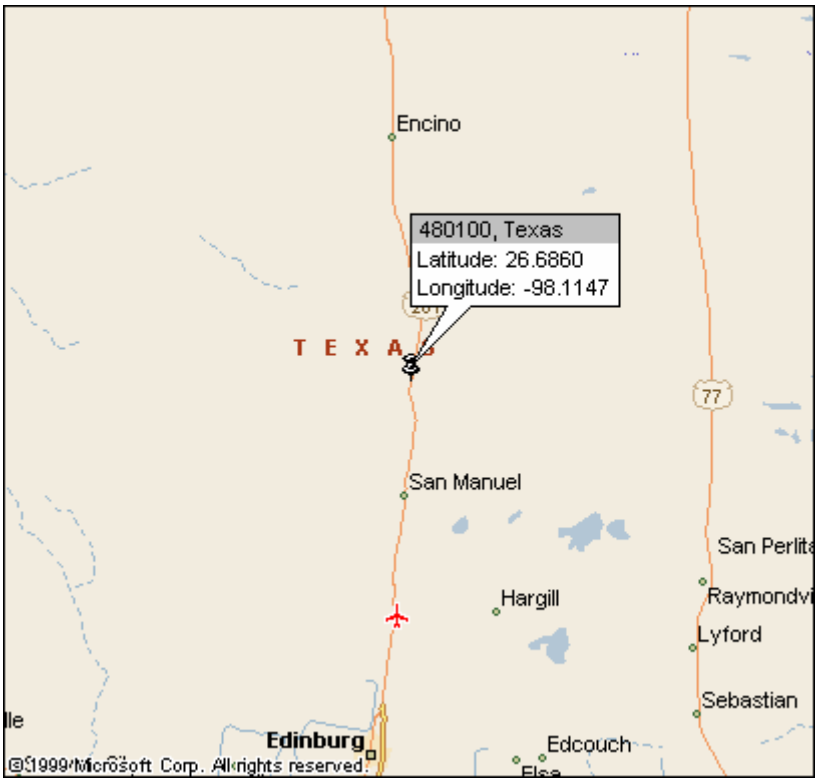



**Figure 4-1 - Site 480100 and 480199 in Texas**

## 5. Truck Route Information

ROUTE RESTRICTIONS: *None.*

SCALE LOCATION: *Travel Centers of America (aka Edinburg 76 Truck Stop), 8301 N Hwy 281, Edinburg, Texas; Phone – (956) 383-0788; Lat: 26.45269, Long: -98.13128*

TRUCK ROUTE: *See Figure 5-1.*

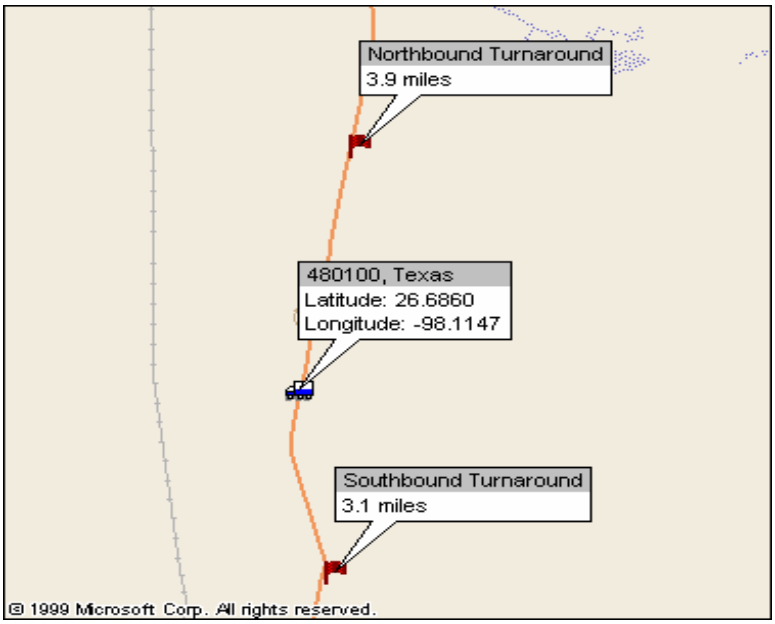



**Figure 5-1 - Truck Route at 480100 and 480199 in Texas**

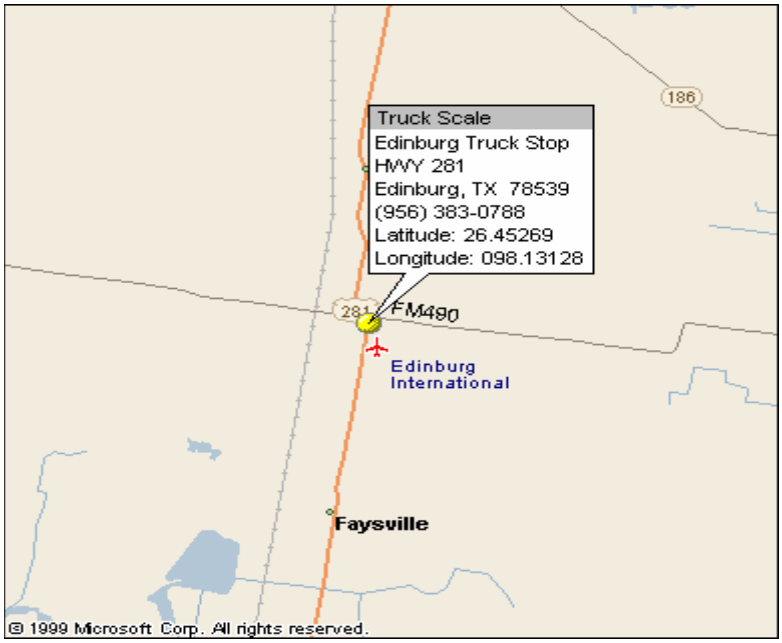



**Figure 5-2 - Truck Scale Location for 480100 and 480199 in Texas**

## 6. Sheet 17 – Texas (480100)

1.* ROUTE ___US 281____ 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 __4_8_0_1_6_6__
Distance from sensor to nearest upstream SPS Section ____1_6_5_3_____ 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 _1_0_ ft

4.* PAVEMENT TYPE ___Portland Concrete Cement_____

5.* PAVEMENT SURFACE CONDITION – Distress Survey
Date 11/6/2007_____ Photo 48_0100_Upstream_11_06_07.jpg_____
Date _11/6/2007_____ Photo 48_0100_Downstream_11_06_07.jpg_____
Date _____ Photo_____

6. * SENSOR SEQUENCE _____Loop – Bending Plate – Loop – Bending Plate_____

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 ___ __6_._0__ 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 __8_0__ ft

TYPE _____M_____

CABINET ACCESS controlled by LTPP / STATE / JOINT

Contact - name and phone number _Jim Neidigh_512-465-7657_____

Alternate - name and phone number _Mike Lloyd_____

11. * POWER

Distance to cabinet from drop __8_5_5____ ft Overhead / underground / solar / AC in cabinet?

Service provider _____ Phone number _____

12. * TELEPHONE

Distance to cabinet from drop ___1___ ___ ft overhead / under ground / cell?

Service provider ___ Valley Telephone __ Phone Number __800-292-7596___

13.* SYSTEM (software & version no.)- ____DAW-190_____

Computer connection – RS232 / Parallel port / USB / Other_____

14. * TEST TRUCK TURNAROUND time __1_0__ minutes DISTANCE _6_._0_ mi.

15. PHOTOS FILENAME

Power source 48_0100_Power_Box_11_06_07.jpg

48_0100_Power_Meter_11_06_07.jpg

Phone source 48_0100_Telephone_Service_11_06_07.jpg

48_0100_Telephone_Pedestal_11_06_07.jpg

Cabinet exterior 48_0100_Cabinet_Exterior_11_06_07.jpg

Cabinet interior 48_0100_Cabinet_Interior_11_06_07.jpg

Weight sensors 48_0100_Leading_WIM_Sensor_11_06_07.jpg

48_0100_Trailing_WIM_Sensor_11_06_07.jpg

Classification sensors _____

Other sensors 48_0100_Leading_Loop_11_06_07 016.jpg

48_0100_Trailing_Loop_11_06_07.jpg _____

Description __Loops_____

Downstream direction at sensors on LTPP lane

48_0100_Upstream_11_06_07.jpg

Upstream direction at sensors on LTPP lane

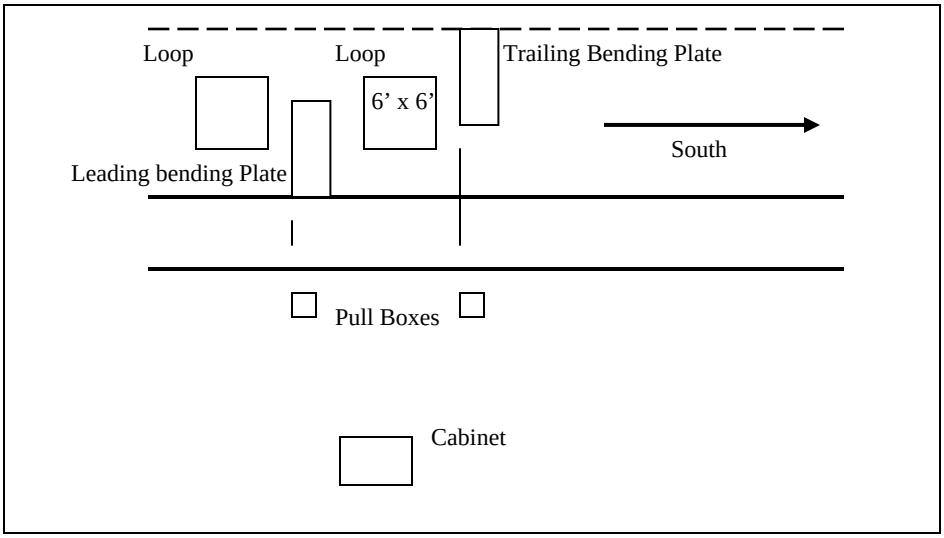
48_0100_Downstream_11_06_07.jpg _____

COMMENTS GPS Coordinates: Latitude: 26.6860; Longitude -98.1147
Posted speed limit – 70 mph
Amenities:

COMPLETED BY Dean J. Wolf

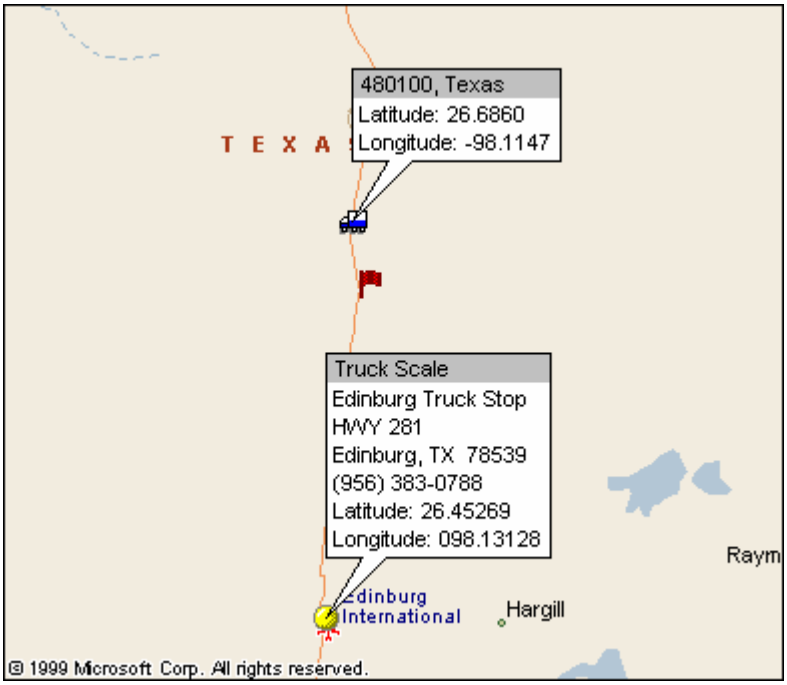
PHONE (301) 210-5105 DATE COMPLETED 11/06/2007

Sketch of equipment layout




**Sketch of Equipment Layout - 480100 in Texas**

Site Map




**Site Map 480100 and 480199 in Texas**

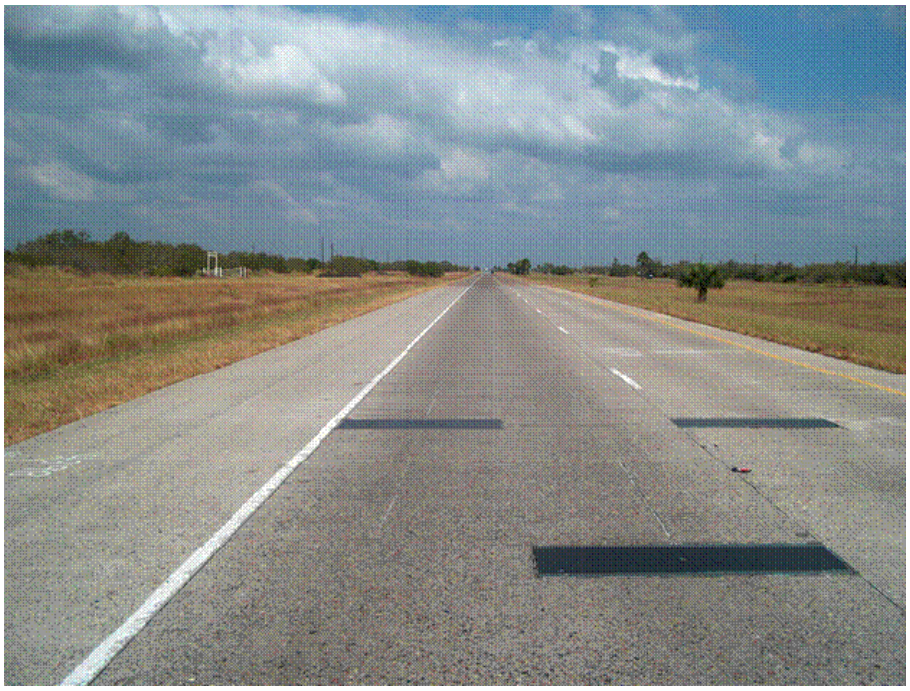


**Photo 6-1 48_0100_Upstream_11_06_07.jpg**

**Photo 6-2 48_0100_Downstream_11_06_07.jpg**


**Photo 6-3 48_0100_Power_Box_11_06_07.jpg**


**Photo 6-4 48_0100_Power_Meter_11_06_07.jpg**

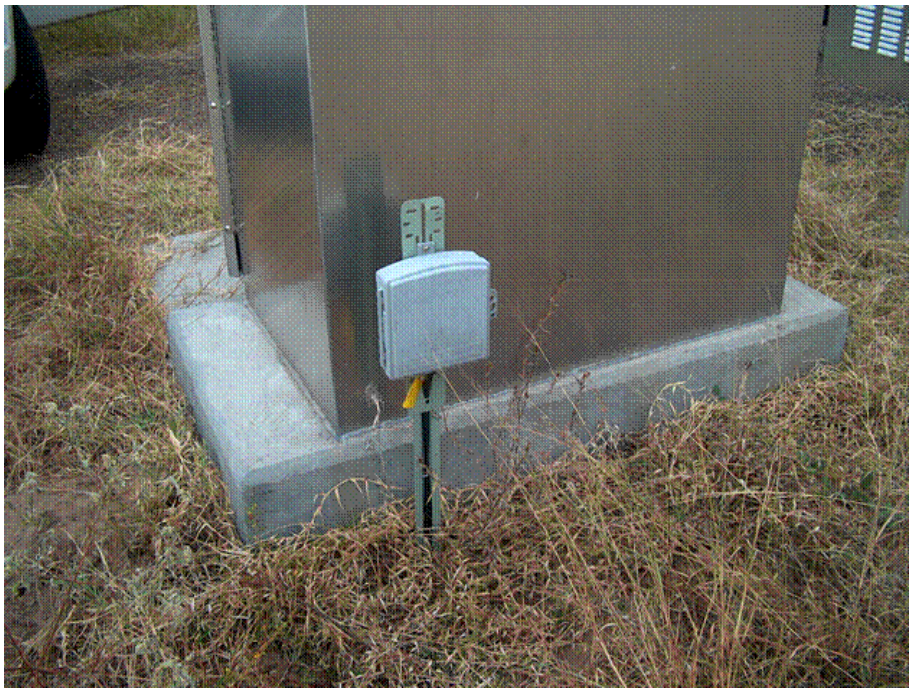


**Photo 6-5 48_0100_Telephone_Service_11_06_07.jpg**


**Photo 6-6 48_0100_Telephone_Pedestal_11_06_07.jpg**

**Photo 6-7 48_0100_Cabinet_Exterior_11_06_07.jpg**

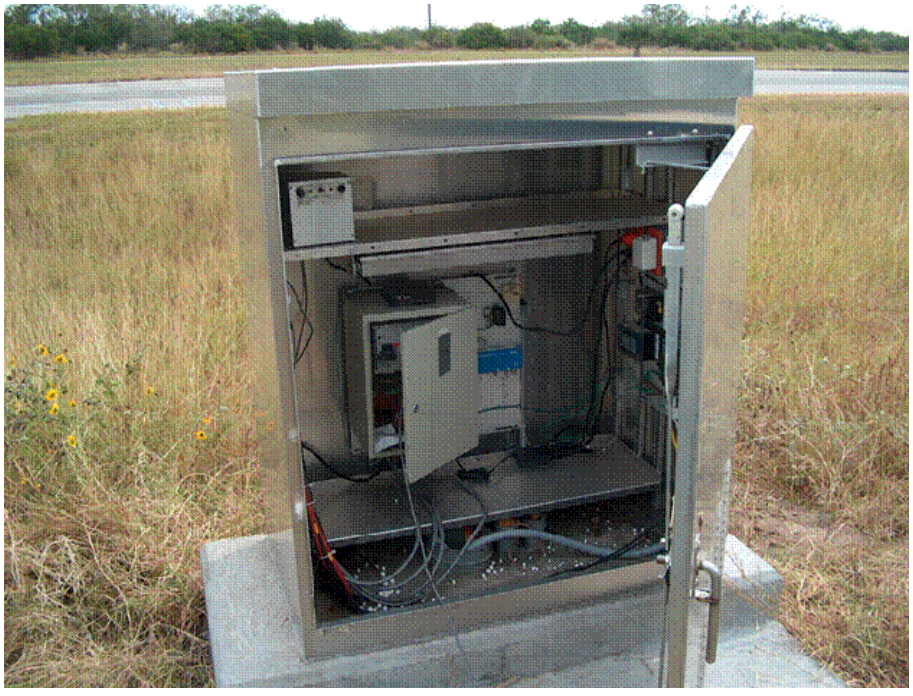


**Photo 6-8 48_0100_Cabinet_Interior_11_06_07.jpg**

**Photo 6-9 48_0100_Leading_WIM_Sensor_11_06_07.jpg**

**Photo 6-10 48_0100_Trailing_WIM_Sensor_11_06_07.jpg**

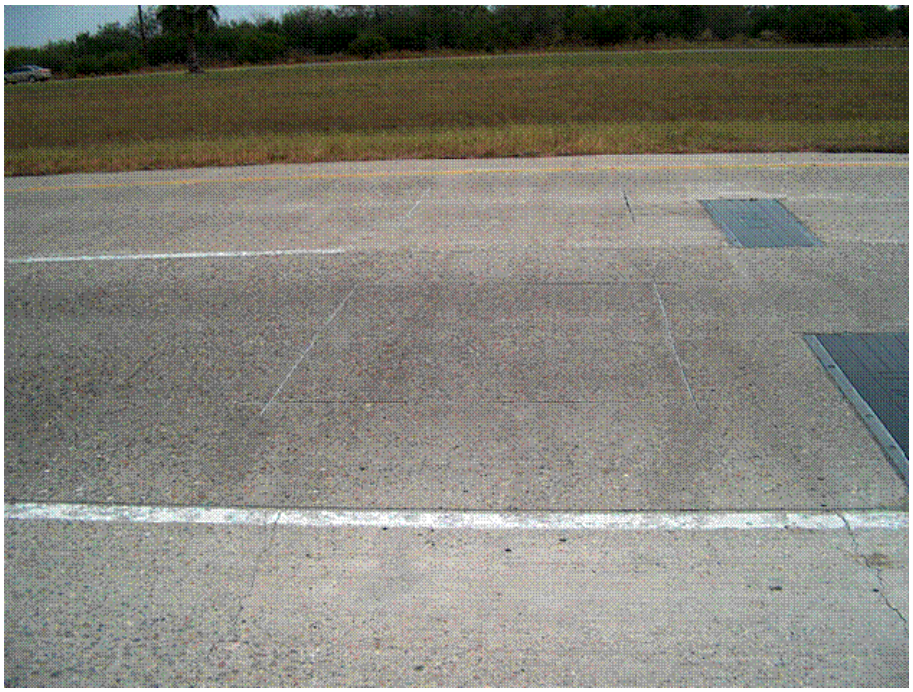


**Photo 6-11 48_0100_Leading_Loop_11_06_07.jpg**

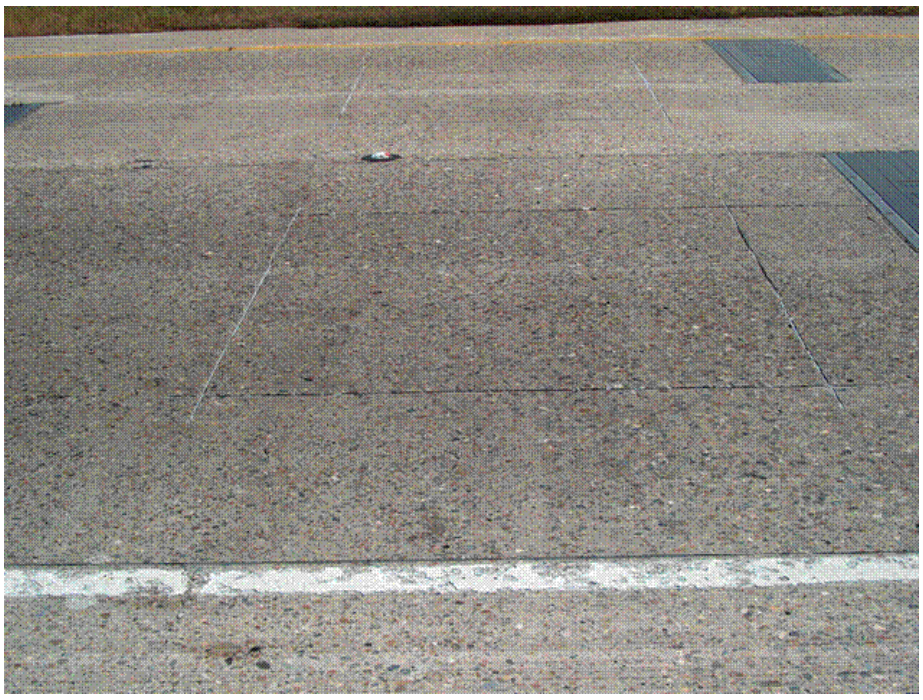


**Photo 6-12 48_0100_Trailing_Loop_11_06_07.jpg**

| SHEET 18 | STATE CODE [ 48] |
|---|---|
| LTPP MONITORED TRAFFIC DATA | SPS PROJECT ID [ 0100] |
| WIM SITE COORDINATION | DATE: (mm/dd/yyyy) 11/6/2007 |

Rev. 05/15/07

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

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 _6__ ☐ days ☒ weeks

b. Notice for straightedge and grinding check - __6_ ☐ days ☒ weeks

i. On site lead –
- ☒ State
- ☐ LTPP

ii. Accept grinding –
- ☒ State
- ☐ LTPP

c. Authorization to calibrate site –
- ☒ State only
- ☐ LTPP

d. Calibration Routine –
- ☐ LTPP – ☐ Semi-annually ☐ Annually
- ☐ State per LTPP protocol – ☐ Semi-annually ☐ Annually
- ☒ State other – _4 times per year_____

e. Test Vehicles
   i. Trucks –
      1st – Air suspension 3S2 ☐ State ☒ LTPP
      2nd – 3S2 different weight/suspension ☒ 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:

   IRD

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 – State and Pooled Fund
   b. Reports –
   c. Other –
   d. Special Conditions –

6. CONTACTS –
   a. Equipment (operational status, access, etc.) –

      Name: Jim Neidigh Phone:(512)-465-7657

      Agency: TXDOT

b. Maintenance (equipment) –

Name: Jim Neidigh Phone:((512)-465-7657

Agency: TXDOT

c. Data Processing and Pre-Visit Data –

Name: Jim Neidigh Phone:(512)-465-7657

Agency: TXDOT

d. Construction schedule and verification –

Name: Jim Neidigh Phone:(512)-465-7657

Agency: TXDOT

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

Name: Jim Neidigh Phone:(512)-465-7657

Agency: TXDOT

f. Traffic Control –

Name: Jim Neidigh Phone:(512)-465-7657

Agency: TXDOT

g. Enforcement Coordination –

Name: _____ Phone:_____

Agency: _____

h. Nearest Static Scale

Name: TA Location:22 mi south, Edinburg

Phone: 956-383-0788

| **SHEET 16**<br>**LTPP MONITORED TRAFFIC DATA**<br>**SITE CALIBRATION SUMMARY** | *STATE ASSIGNED ID [ __ __ __ __ ]<br>*STATE CODE [ TX ]<br>*SHRP SECTION ID [ 0100] |
|---|---|

SITE CALIBRATION INFORMATION

1. * DATE OF CALIBRATION (MONTH/DAY/YEAR) [ 11/6/2007]

2. * TYPE OF EQUIPMENT CALIBRATED ____ WIM ____ CLASSIFIER _X_ BOTH

3. * REASON FOR CALIBRATION
   - ____ REGULARLY SCHEDULED SITE VISIT
   - ____ EQUIPMENT REPLACEMENT
   - ____ DATA TRIGGERED SYSTEM REVISION
   - ____ RESEARCH
   - ____ TRAINING
   - ____ NEW EQUIPMENT INSTALLATION
   - _X__ OTHER (SPECIFY) ___LTPP Validation_____

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

5. EQUIPMENT MANUFACTURER ___IRD/ PAT Traffic_____

WIM SYSTEM CALIBRATION SPECIFICS**

6.**CALIBRATION TECHNIQUE USED:

____ TRAFFIC STREAM -- ____STATIC SCALE (Y/N) _X__ TEST TRUCKS

___ NUMBER OF TRUCKS COMPARED __ 3__ NUMBER OF TEST TRUCKS USED

__ 13__ PASSES PER TRUCK

TYPE PER FHWA 13 BIN SYSTEM
SUSPENSION: 1 - AIR; 2 - LEAF SPRING
3 - OTHER (DESCRIBE)

| TRUCK | TYPE | SUSPENSION |
|---|---|---|
| 1 | ___9____ | ___1_____ |
| 2 | ___9____ | ___2_____ |
| 3 | ___9____ | ___1_____ |

7. SUMMARY CALIBRATION RESULTS (EXPRESSED AS A PERCENT)

MEAN DIFFERENCE BETWEEN ---

| | | | |
|---|---|---|---|
| DYNAMIC AND STATIC GVW | ___1.0 | STANDARD DEVIATION | ___1.6 |
| DYNAMIC AND STATIC SINGLE AXLES | ___-1.5 | STANDARD DEVIATION | ___3.1 |
| DYNAMIC AND STATIC DOUBLE AXLES | ___1.5 | STANDARD DEVIATION | ___2.8 |

8. 3 ____ NUMBER OF SPEEDS AT WHICH CALIBRATION WAS PERFORMED

9. DEFINE THE SPEED RANGES USED (MPH) _____ _45-55__ __56-65_ __66-70__ _____ _____
_____ _____ _____ _____ _____ _____ _____ _____ _____ _____

10. CALIBRATION FACTOR (AT EXPECTED FREE FLOW SPEED) ___1015___

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 ____ 0.0 | FHWA CLASS ____ | ____ ____ | _____ |
| *** FHWA CLASS 8 ____ -20.0 | FHWA CLASS ____ | ____ ____ | _____ |
| | FHWA CLASS ____ | ____ ____ | _____ |
| | FHWA CLASS ____ | ____ ____ | _____ |

*** PERCENT "UNCLASSIFIED" VEHICLES: ____ 1.9

PERSON LEADING CALIBRATION EFFORT: __Dean J. Wolf, MACTEC_____
CONTACT INFORMATION: _____301-210-5105_____ rev. November 9, 1999

| **SHEET 16**<br>**LTPP MONITORED TRAFFIC DATA**<br>**SITE CALIBRATION SUMMARY** | *STATE ASSIGNED ID [ __ __ __ __ ]<br>*STATE CODE [ TX ]<br>*SHRP SECTION ID [ 0100] |
|---|---|

SITE CALIBRATION INFORMATION

1. * DATE OF CALIBRATION (MONTH/DAY/YEAR) [ 11/6/2007]

2. * TYPE OF EQUIPMENT CALIBRATED ____ WIM ____ CLASSIFIER _X_ BOTH

3. * REASON FOR CALIBRATION
   - ____ REGULARLY SCHEDULED SITE VISIT
   - ____ EQUIPMENT REPLACEMENT
   - ____ DATA TRIGGERED SYSTEM REVISION
   - ____ RESEARCH
   - ____ TRAINING
   - ____ NEW EQUIPMENT INSTALLATION
   - _X__ OTHER (SPECIFY) ___LTPP Validation_____

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

5. EQUIPMENT MANUFACTURER ___IRD/ PAT Traffic_____

WIM SYSTEM CALIBRATION SPECIFICS**

6.**CALIBRATION TECHNIQUE USED:

____ TRAFFIC STREAM -- ____STATIC SCALE (Y/N) _X__ TEST TRUCKS

___ NUMBER OF TRUCKS COMPARED __ 3__ NUMBER OF TEST TRUCKS USED

__ 13__ PASSES PER TRUCK

TYPE PER FHWA 13 BIN SYSTEM
SUSPENSION: 1 - AIR; 2 - LEAF SPRING
3 - OTHER (DESCRIBE)

| TRUCK | TYPE | SUSPENSION |
|---|---|---|
| 1 | ___9____ | ___1_____ |
| 2 | ___9____ | ___2_____ |
| 3 | ___9____ | ___1_____ |

7. SUMMARY CALIBRATION RESULTS (EXPRESSED AS A PERCENT)

MEAN DIFFERENCE BETWEEN ---

| | | | |
|---|---|---|---|
| DYNAMIC AND STATIC GVW | ___1.0 | STANDARD DEVIATION | ___1.6 |
| DYNAMIC AND STATIC SINGLE AXLES | ___-1.5 | STANDARD DEVIATION | ___3.1 |
| DYNAMIC AND STATIC DOUBLE AXLES | ___1.5 | STANDARD DEVIATION | ___2.8 |

8. 3 ____ NUMBER OF SPEEDS AT WHICH CALIBRATION WAS PERFORMED

9. DEFINE THE SPEED RANGES USED (MPH) _____ _45-55__ __56-65_ __66-70__ _____ _____
_____ _____ _____ _____ _____ _____ _____ _____ _____ _____

10. CALIBRATION FACTOR (AT EXPECTED FREE FLOW SPEED) ___1015___

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 ____ 0.0 | FHWA CLASS ____ | ____ ____ | _____ |
| *** FHWA CLASS 8 ____ -20.0 | FHWA CLASS ____ | ____ ____ | _____ |
| | FHWA CLASS ____ | ____ ____ | _____ |
| | FHWA CLASS ____ | ____ ____ | _____ |

*** PERCENT "UNCLASSIFIED" VEHICLES: ____ 1.9

PERSON LEADING CALIBRATION EFFORT: __Dean J. Wolf, MACTEC_____
CONTACT INFORMATION: _____301-210-5105_____ rev. November 9, 1999

# APPENDIX A

| Sheet 19 | * STATE_CODE 48 |
|---|---|
| LTPP Traffic Data | * SPS PROJECT ID 0100 |
| *CALIBRATION TEST TRUCK # 1 | * DATE 11/6/07 |

Rev. 08/31/01

PART I.

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

**AXLES** - units - lbs / 100s lbs / kg

~~truck 37~~ truck 102
trailer 212
~~loaded~~ tare

**GEOMETRY**

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

9. a) * Make: PETERBILT b) * Model: _____

10.* Trailer Load Distribution Description:

3 concrete blocks located mid-trailer

1 concrete block over trailer tandem

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

b). Trailer Tare Weight (units): _____

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

A to B ~~PAT~~ 16.3 B to C ~~PAT~~ 4.3 C to D ~~PAT~~ 29.5

D to E 4.2 E to F _____

Wheelbase (measured A to last) _____ Computed 54.3

13. *Kingpin Offset From Axle B (units) + 1.1 ( _____ )
( + is to the rear)

**SUSPENSION**

| Axle | 14. Tire Size | 15.* Suspension Description (leaf, air, no. of leaves, taper or flat leaf, etc.) |
|---|---|---|
| A | 11R24.5 | 2 full leaf |
| B | 11R24.5 | AIR |
| C | 11R24.5 | AIR |
| D | ~~PAT 11R24.5~~ 295/75R17.5 | AIR |
| E | ~~PAT 11R24.5~~ 295/75R17.5 | AIR |
| F | | |

| Sheet 19 | * STATE CODE | 48 |
|---|---|---|
| LTPP Traffic Data | * SPS PROJECT ID | 0100 |
| *CALIBRATION TEST TRUCK # 1 | * DATE | 11/6/07 |

Rev. 08/31/01

PART II

Day 1

truck 108
water 212
Jamie

*b) Average Pre-Test Loaded weight 76000
*c) Post Test Loaded Weight 75680
*d) Difference Post Test – Pre-test -320

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

| Pass | Axle A | Axle B | Axle C | Axle D | Axle E | Axle F | GVW |
|---|---|---|---|---|---|---|---|
| 1 | 12360 | 16300 | 16300 | 15520 | 15520 | | 76000 |
| 2 | 12300 | 16340 | 16340 | 15510 | 15510 | | 76000 |
| 3 | 12320 | 16320 | 16320 | 15530 | 15530 | | 76000 |
| Average | ~~12330~~ 12327 | ~~16320~~ 16317 | ~~16325~~ 16317 | 15520 | 15520 | | 76000 |

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 | 12160 | 16240 | 16240 | 15520 | 15520 | | 75680 |
| 2 | | | | | | | |
| 3 | | | | | | | |
| Average | 12160 | 16240 | 16240 | 15520 | 15520 | | 75680 |

Measured By DW Verified By [signature] Weight date 11/6/07

| Sheet 19 | * STATE_CODE | 48 |
|---|---|---|
| LTPP Traffic Data | * SPS PROJECT ID | 0100 |
| *CALIBRATION TEST TRUCK # 1 | * DATE | 11/7/07 |

Rev. 08/31/01

Day 2

7.2 *b) Average Pre-Test Loaded weight 16053 ~~16050~~

*c) Post Test Loaded Weight 75840

*d) Difference Post Test – Pre-test ~~210~~ 213

Table 5.2. Raw data – Axle scales – pre-test

| Pass | Axle A | Axle B | Axle C | Axle D | Axle E | Axle F | GVW |
|---|---|---|---|---|---|---|---|
| 1 | 12400 | 16320 | 16320 | 15510 | 15510 | | 76060 |
| 2 | 12420 | 16300 | 16300 | 15520 | 15520 | | 76060 |
| 3 | 12400 | 16310 | 16310 | 15510 | 15510 | | 76040 |
| Average | ~~12410~~ 12407 | 16310 | 16310 | ~~15510~~ 15513 | ~~15510~~ 15513 | | ~~76050~~ 76053 |

Table 6.2. Raw data – Axle scales –

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

Table 7.2 Raw data – Axle scales – post-test

| Pass | Axle A | Axle B | Axle C | Axle D | Axle E | Axle F | GVW |
|---|---|---|---|---|---|---|---|
| 1 | 12320 | 16240 | 16240 | 15520 | 15520 | | 75840 |
| 2 | | | | | | | |
| 3 | | | | | | | |
| Average | 12320 | 16240 | 16240 | 15520 | 15520 | | 75840 |

Measured By DW Verified By MO Weight date 11/7/07

| Sheet 19 | * STATE_CODE | 48 |
|---|---|---|
| LTPP Traffic Data | * SPS PROJECT ID | 0100 |
| *CALIBRATION TEST TRUCK # 2 | * DATE | 11/6/07 |

Rev. 08/31/01

PART I.

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

truck 3706
folder 219
Jesse

**AXLES** - units - lbs / 100s lbs / kg

**GEOMETRY**

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

9. a) * Make: Peterbilt b) * Model: _____

10.* Trailer Load Distribution Description:

forklift counter weight over tractor tandem ; concrete blocks over rear tandem

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

b). Trailer Tare Weight (units): _____

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

A to B 19.9 B to C 4.4 C to D 32.4

D to E 4.1 E to F _____

Wheelbase (measured A to last) _____ Computed 60.8

13. *Kingpin Offset From Axle B (units) +2.5' ( _____ )
( + is to the rear)

**SUSPENSION**

| Axle | 14. Tire Size | 15.* Suspension Description (leaf, air, no. of leaves, taper or flat leaf, etc.) |
|---|---|---|
| A | 11R24.5 | 2 FULL LEAF |
| B | 11R24.5 | AIR |
| C | 11R24.5 | AIR |
| D | 11R24.5 | 3 TAPERED LEAF |
| E | 11R24.5 | 3 TAPERED LEAF |
| F | | |

| Sheet 19 | * STATE_CODE | 48 |
|---|---|---|
| LTPP Traffic Data | * SPS PROJECT ID | 0100 |
| *CALIBRATION TEST TRUCK # 2 | * DATE | 11/6/07 |

Rev. 08/31/01

PART II

truck 3906
trailer 219
Jesse

Day 1

*b) Average Pre-Test Loaded weight 69300
*c) Post Test Loaded Weight 68980
*d) Difference Post Test – Pre-test -320

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

| Pass | Axle A | Axle B | Axle C | Axle D | Axle E | Axle F | GVW |
|---|---|---|---|---|---|---|---|
| 1 | 10680 | 16220 | 16220 | 13100 | 13100 | | 69320 |
| 2 | 10680 | 16130 | 16130 | 13180 | 13180 | | 69300 |
| 3 | 10660 | 16110 | 16110 | 13200 | 13200 | | 69280 |
| Average | ~~10670~~ 10673 | ~~16150~~ 16153 | ~~16150~~ 16153 | 13160 | 13160 | | 69300 |

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 | 10540 | 16030 | 16030 | 13190 | 13190 | | 68980 |
| 2 | | | | | | | |
| 3 | | | | | | | |
| Average | 10540 | 16030 | 16030 | 13190 | 13190 | | 68980 |

Measured By DW Verified By MA Weight date 11/6/07

| Sheet 19 | * STATE CODE | 48 |
|---|---|---|
| LTPP Traffic Data | * SPS PROJECT ID | 0100 |
| *CALIBRATION TEST TRUCK # 2 | * DATE | 11/7/07 |

Rev. 08/31/01

Day 2

7.2 *b) Average Pre-Test Loaded weight 68960

*c) Post Test Loaded Weight 68760

*d) Difference Post Test – Pre-test -200

Table 5.2. Raw data – Axle scales – pre-test

| Pass | Axle A | Axle B | Axle C | Axle D | Axle E | Axle F | GVW |
|---|---|---|---|---|---|---|---|
| 1 | 10520 | 16070 | 16070 | 13160 | 13160 | | 68980 |
| 2 | 10540 | 16040 | 16040 | 13160 | 13160 | | 68940 |
| 3 | 10540 | 16030 | 16030 | 13180 | 13180 | | 68960 |
| Average | ~~10530~~ 10533 | ~~16050~~ 16047 | ~~16050~~ 16047 | ~~13170~~ 13167 | ~~13170~~ 13167 | | 68960 |

Table 6.2. Raw data – Axle scales –

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

Table 7.2 Raw data – Axle scales – post-test

| Pass | Axle A | Axle B | Axle C | Axle D | Axle E | Axle F | GVW |
|---|---|---|---|---|---|---|---|
| 1 | 10460 | 15980 | 15980 | 13170 | 13170 | | 68760 |
| 2 | | | | | | | |
| 3 | | | | | | | |
| Average | 10460 | 15980 | 15980 | 13170 | 13170 | | 68760 |

Measured By DJW Verified By [signature] Weight date 11/7/07

| Sheet 19 | * STATE_CODE | 48 |
|---|---|---|
| LTPP Traffic Data | * SPS PROJECT ID | 0100 |
| *CALIBRATION TEST TRUCK # 3 | * DATE | 11/6/07 |

Rev. 08/31/01

PART I.

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

**AXLES** - units - lbs / 100s lbs / kg

**GEOMETRY**

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

9. a) * Make: Freightliner b) * Model: FL 112

10.* Trailer Load Distribution Description:

Concrete blocks loaded over length of truck

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

b). Trailer Tare Weight (units): _____

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

A to B 12.1 B to C 4.3 C to D 31.4

D to E 4.1 E to F _____

Wheelbase (measured A to last) _____ Computed 51.9

13. *Kingpin Offset From Axle B (units) +1.4 (_____)

( + is to the rear)

**SUSPENSION**

| Axle | 14. Tire Size | 15.* Suspension Description (leaf, air, no. of leaves, taper or flat leaf, etc.) |
|---|---|---|
| A | 11R22.5 | 2 full leaf |
| B | 11R22.5 | AIR |
| C | 11R22.5 | AIR |
| D | 11R22.5 | AIR |
| E | 11R22.5 | AIR |
| F | | |

| Sheet 19 | * STATE CODE | 48 |
|---|---|---|
| LTPP Traffic Data | * SPS PROJECT ID | 0100 |
| *CALIBRATION TEST TRUCK # 3 | * DATE | 11/6/07 |

Rev. 08/31/01

PART II

truck 3481H
tr/w 29
Junior

Day 1

*b) Average Pre-Test Loaded weight 20~~0100~~ 77993
*c) Post Test Loaded Weight 77680
*d) Difference Post Test – Pre-test -~~320~~ 313

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

| Pass | Axle A | Axle B | Axle C | Axle D | Axle E | Axle F | GVW |
|---|---|---|---|---|---|---|---|
| 1 | 10520 | 16770 | 16770 | 16980 | 16980 | | 78020 |
| 2 | 10660 | ~~16680~~ 16810 | ~~16680~~ 16810 | 16990 | 16990 | | 77960 |
| 3 | 10320 | 16910 | 16910 | ~~16930~~ 16940 | ~~16930~~ 16940 | | 78000 |
| Average | 10500 | ~~16890~~ 16780 | ~~16890~~ 16780 | ~~16990~~ 16967 | ~~16970~~ 16967 | | ~~78100~~ 77993 |

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 | 10260 | 16750 | 16750 | 16960 | 16960 | | 77680 |
| 2 | | | | | | | |
| 3 | | | | | | | |
| Average | 10260 | 16750 | 16750 | 16960 | 16960 | | 77680 |

Measured By DW Verified By MK Weight date 11/6/07

| Sheet 19 | * STATE CODE | 48 |
|---|---|---|
| LTPP Traffic Data | * SPS PROJECT ID | 0100 |
| *CALIBRATION TEST TRUCK # 3 | * DATE | 11/7/07 |

Rev. 08/31/01

Day 2

7.2 *b) Average Pre-Test Loaded weight 78013 ~~78010~~

*c) Post Test Loaded Weight 77820

*d) Difference Post Test – Pre-test ~~190~~ 193

Table 5.2. Raw data – Axle scales – pre-test

| Pass | Axle A | Axle B | Axle C | Axle D | Axle E | Axle F | GVW |
|---|---|---|---|---|---|---|---|
| 1 | 10420 | 16850 | 16850 | 16940 | 16940 | | ~~78000~~ |
| 2 | 10500 | 16800 | 16800 | 16960 | 16960 | | 78020 |
| 3 | 10480 | 16810 | 16810 | 16960 | 16960 | | 78020 |
| Average | ~~10470~~ 10467 | 16820 | 16820 | ~~16958~~ 16957 | ~~16958~~ 16953 | | ~~78010~~ 78013 |

Table 6.2. Raw data – Axle scales –

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

Table 7.2 Raw data – Axle scales – post-test

| Pass | Axle A | Axle B | Axle C | Axle D | Axle E | Axle F | GVW |
|---|---|---|---|---|---|---|---|
| 1 | 10460 | 16720 | 16720 | 16960 | 16960 | | 77820 |
| 2 | | | | | | | |
| 3 | | | | | | | |
| Average | 10460 | 16720 | 16720 | 16960 | 16960 | | 77820 |

Measured By DJW Verified By [signature] Weight date 11/7/07

| Sheet 20 | * STATE_CODE | 48 |
|---|---|---|
| LTPP Traffic Data | *SPS PROJECT_ID | 0100 |
| Speed and Classification Checks * 1 of* 2 | * DATE | 11/6/07 |

Rev. 08/31/2001....

| WIM speed | WIM class | WIM Record | Obs. Speed | Obs Class | WIM speed | WIM class | WIM Record | Obs. Speed | Obs Class |
|---|---|---|---|---|---|---|---|---|---|
| 65 | 9 | 6328 | 65 | 9 | 69 | 9 | 6506 | 69 | 9 |
| 54 | 5 | 6331 | 54 | 5 | 75 | 9 | 6510 | 75 | 9 |
| 75 | 9 | 6337 | 75 | 9 | 72 | 9 | 6521 | 70 | 9 |
| 75 | 9 | 6340 | 75 | 9 | 70 | 9 | 6529 | 70 | 9 |
| 74 | 9 | 6341 | 74 | 9 | 64 | 9 | 6533 | 64 | 9 |
| 68 | 9 | 6347 | 67 | 9 | 72 | 9 | 6535 | 71 | 9 |
| 68 | 9 | 6348 | 68 | 9 | 75 | 9 | 6539 | 73 | 9 |
| 69 | 9 | 6354 | 68 | 9 | 77 | 9 | 6542 | 74 | 9 |
| 70 | 9 | 6377 | 70 | 9 | 65 | 9 | 6552 | 65 | 9 |
| 66 | 9 | 6387 | 67 | 9 | 66 | 9 | 6557 | 66 | 9 |
| 70 | 9 | 6397 | 70 | 9 | 69 | 9 | 6560 | 68 | 9 |
| 71 | 9 | 6400 | 71 | 9 | 49 | 9 | 6567 | 47 | 9 |
| 73 | 5 | 6402 | 72 | 5 | 70 | 9 | 6571 | 69 | 9 |
| 71 | 9 | 6406 | 70 | 9 | 75 | 9 | 6588 | 75 | 9 |
| 70 | 5 | 6409 | 69 | 5 | 70 | 9 | 6602 | 70 | 9 |
| 74 | 9 | 6411 | 73 | 9 | 66 | 9 | 6604 | 66 | 9 |
| 66 | 5 | 6414 | 65 | 5 | 68 | 8 | 6619 | 69 | 8 |
| 58 | 9 | 6434 | 56 | 9 | 69 | 9 | 6634 | 68 | 9 |
| 71 | 9 | 6443 | 70 | 9 | 69 | 9 | 6635 | 68 | 9 |
| 60 | 9 | 6456 | 60 | 9 | 63 | 9 | 6636 | 64 | 10 |
| 69 | 9 | 6470 | 69 | 9 | 73 | 15 | 6639 | 70 | 9 |
| 73 | 9 | 6476 | 73 | 9 | 66 | 9 | 6646 | 65 | 9 |
| 67 | 5 | 6482 | 67 | 5 | 70 | 9 | 6652 | 73 | 9 |
| 64 | 9 | 6499 | 64 | 9 | 67 | 9 | 6662 | 67 | 9 |
| 69 | 9 | 6501 | 68 | 9 | 66 | 9 | 6664 | 65 | 9 |

Recorded by MARK Direction S Lane 1 Time from 3:10 to 3:45

| Sheet 20 | * STATE_CODE | 4 8 |
|---|---|---|
| LTPP Traffic Data | *SPS PROJECT_ID | 0 1 0 0 |
| Speed and Classification Checks * 2 of* 2 | * DATE | 11 / 6 / 07 |

Rev. 08/31/2001....

| WIM speed | WIM class | WIM Record | Obs. Speed | Obs Class | WIM speed | WIM class | WIM Record | Obs. Speed | Obs Class |
|---|---|---|---|---|---|---|---|---|---|
| 64 | 5 | 6672 | 65 | 5 | 72 | 9 | 6904 | 72 | 9 |
| 60 | 5 | 6677 | 60 | 5 | 66 | 9 | 6913 | 65 | 9 |
| 63 | 9 | 6696 | ~~64~~ | ~~9~~ 9 | 68 | 5 | 6921 | 68 | 5 |
| 65 | 9 | 6715 | 65 | 9 | 72 | 9 | 6925 | 71 | 9 |
| 73 | 9 | 6719 | 72 | 9 | 60 | 9 | 6937 | 59 | 9 |
| 68 | 9 | 6723 | 68 | 9 | 69 | 9 | 6942 | 69 | 9 |
| 64 | ~~15~~ | 6732 | 66 | ~~8~~ | 66 | 9 | 6956 | 65 | 9 |
| 68 | 9 | 6735 | 69 | 9 | 69 | 10 | 6958 | 68 | 10 |
| 73 | 9 | 6737 | 70 | 9 | 71 | 9 | 6959 | 71 | 9 |
| 70 | 9 | 6741 | 69 | 9 | 69 | 9 | 6970 | 69 | 9 |
| 69 | 9 | 6743 | 68 | 9 | ~~64~~ | ~~9~~ 9 | 6994 | ~~64~~ | ~~9~~ 9 |
| 71 | 9 | 6760 | 70 | 9 | 63 | 9 | 6981 | 65 | 9 |
| 73 | 9 | 6762 | 71 | 9 | 69 | 9 | 6983 | 68 | 9 |
| 66 | 9 | 6768 | 65 | 9 | 69 | 5 | 6986 | 69 | 8 |
| 60 | 5 | 6769 | 64 | 5 | 70 | 6 | 7006 | 69 | 6 |
| 66 | 8 | 6777 | 65 | 8 | 69 | 9 | 7011 | 68 | 9 |
| 65 | 9 | 6783 | 65 | 9 | 67 | 5 | 7012 | 67 | 5 |
| 68 | 5 | 6802 | 68 | 5 | 73 | 4 | 7016 | 72 | 4 |
| 71 | 9 | 6805 | 70 | 9 | 68 | 9 | 7042 | 67 | 9 |
| 64 | 9 | 6806 | 67 | 9 | 65 | 9 | 7043 | 64 | 9 |
| 70 | 9 | 6814 | 70 | 9 | 69 | 9 | 7061 | 69 | 9 |
| 69 | 9 | 6817 | 70 | 9 | 69 | 9 | 7069 | 68 | 9 |
| 64 | 9 | 6834 | 64 | 9 | 68 | 9 | 7071 | 67 | 9 |
| 65 | ~~8~~ | 6837 | 66 | ~~8~~ | 72 | 9 | 7091 | 71 | 9 |
| 66 | 8 | 6858 | 66 | 8 | 73 | 9 | 7093 | 71 | 9 |

Recorded by MARK Direction S Lane 1 Time from 345 to 415

| Sheet 20 | * STATE_CODE 48 |
|---|---|
| LTPP Traffic Data | *SPS PROJECT_ID 0100 |
| Speed and Classification Checks * 1 of* 2 | * DATE 11/07/07 |

Rev. 08/31/2001....

| WIM speed | WIM class | WIM Record | Obs. Speed | Obs Class | WIM speed | WIM class | WIM Record | Obs. Speed | Obs Class |
|---|---|---|---|---|---|---|---|---|---|
| 71 | 9 | 5682 | 69 | 9 | 71 | 9 | 5853 | 70 | 9 |
| 57 | 15 | 5687 | 56 | 9 | 63 | 15 | 5864 | 66 | 8 |
| 67 | 9 | 5712 | 66 | 9 | 55 | 5 | 5867 | 53 | 5 |
| 66 | 9 | 5714 | 65 | 9 | 68 | 9 | 5871 | 68 | 9 |
| 66 | 5 | 5715 | 66 | 5 | 70 | 5 | 5874 | 69 | 5 |
| 66 | 9 | 5731 | 65 | 9 | 71 | 9 | 5877 | 69 | 9 |
| 69 | 9 | 5738 | 69 | 9 | 69 | 9 | 5879 | 68 | 9 |
| 73 | 9 | 5741 | 72 | 9 | 67 | 9 | 5880 | 66 | 9 |
| 72 | 4 | 5742 | 71 | 4 | 70 | 9 | 5881 | 67 | 9 |
| 63 | 8 | 5743 | 63 | 8 | 65 | 5 | 5885 | 65 | 5 |
| 65 | 9 | 5761 | 64 | 9 | 72 | 9 | 5894 | 71 | 9 |
| 65 | 6 | 5788 | 66 | 6 | 71 | 8 | 5898 | 70 | 5 |
| 67 | 9 | 5793 | 65 | 9 | 63 | 5 | 5904 | 64 | 5 |
| 72 | 9 | 5798 | 72 | 9 | 62 | 9 | 5917 | 62 | 9 |
| 65 | 6 | 5806 | 64 | 6 | 68 | 9 | 5924 | 68 | 9 |
| 75 | 6 | 5812 | 71 | 6 | 52 | 5 | 5925 | 51 | 5 |
| 78 | 5 | 5824 | 73 | 5 | 65 | 9 | 5933 | 63 | 9 |
| 71 | 9 | 5827 | 70 | 9 | 65 | 9 | 5934 | 65 | 9 |
| 61 | 9 | 5832 | 60 | 9 | 67 | 9 | 5935 | 66 | 9 |
| 65 | 9 | 5833 | 64 | 9 | 76 | 8 | 5940 | 74 | 8 |
| 55 | 5 | 5837 | 54 | 5 | 66 | 9 | 5951 | 64 | 9 |
| 67 | 9 | 5839 | 67 | 9 | 71 | 9 | 5962 | 70 | 9 |
| 69 | 9 | 5840 | 68 | 9 | 72 | 9 | 5966 | 71 | 9 |
| 66 | 4 | 5847 | 67 | 4 | 71 | 9 | 5975 | 70 | 9 |
| 69 | 15 | 5848 | 69 | 8 | 66 | 5 | 5976 | 66 | 5 |

Recorded by MARK Direction S Lane 4 Time from 2:35 to 3:5

| Sheet 20 | * STATE_CODE 48 |
|---|---|
| LTPP Traffic Data | *SPS PROJECT_ID 0100 |
| Speed and Classification Checks * 3 of* 7 | * DATE 11/07/07 |

Rev. 08/31/2001....

| WIM speed | WIM class | WIM Record | Obs. Speed | Obs Class | WIM speed | WIM class | WIM Record | Obs. Speed | Obs Class |
|---|---|---|---|---|---|---|---|---|---|
| 74 | 9 | 5978 | 70 | 9 | 60 | 4 | 6130 | 59 | 5 |
| 67 | 9 | 5979 | 66 | 9 | 72 | 9 | 6140 | 71 | 9 |
| 66 | 5 | 5983 | 64 | 5 | 72 | 9 | 6144 | 70 | 9 |
| 75 | 9 | 5988 | 72 | 9 | 69 | 9 | 6146 | 68 | 9 |
| 71 | 9 | 6000 | 70 | 9 | 65 | 9 | 6150 | 63 | 9 |
| 70 | 9 | 6005 | 69 | 9 | 68 | 9 | 6155 | 69 | 9 |
| 74 | 9 | 6015 | 74 | 9 | 69 | 9 | 6156 | 68 | 9 |
| 67 | 9 | 6028 | 67 | 9 | 69 | 9 | 6159 | 69 | 9 |
| 70 | 9 | 6030 | 69 | 9 | 68 | 9 | 6161 | 67 | 9 |
| 65 | 9 | 6037 | 64 | 9 | 66 | 9 | 6164 | 66 | 9 |
| 68 | 9 | 6051 | 67 | 9 | 65 | 9 | 6166 | 65 | 9 |
| 64 | 9 | 6056 | 62 | 9 | 66 | 9 | 6167 | 65 | 9 |
| 75 | 9 | 6060 | 74 | 9 | 68 | 6 | 6169 | 67 | 6 |
| 70 | 9 | 6062 | 71 | 9 | 69 | 9 | 6171 | 66 | 9 |
| 72 | 9 | 6063 | 72 | 9 | 52 | 5 | 6190 | 52 | 5 |
| 67 | 9 | 6065 | 67 | 9 | 70 | 13 | 6191 | 70 | 10 |
| 69 | 9 | 6067 | 69 | 9 | 63 | 9 | 6195 | 64 | 9 |
| 65 | 9 | 6072 | 64 | 9 | 68 | 6 | 6197 | 68 | 6 |
| 70 | 9 | 6074 | 71 | 9 | 58 | 6 | 6220 | 57 | 6 |
| 66 | 9 | 6084 | 65 | 9 | 69 | 9 | 6227 | 70 | 9 |
| 67 | 9 | 6089 | 65 | 9 | 67 | 9 | 6229 | 66 | 9 |
| 67 | 9 | 6094 | 67 | 9 | 65 | 9 | 6231 | 65 | 9 |
| 71 | 9 | 6112 | 70 | 9 | 72 | 9 | 6233 | 70 | 9 |
| 61 | 8 | 6127 | 61 | 5 | 71 | 9 | 6234 | 71 | 9 |
| 66 | 9 | 6129 | 65 | 9 | 68 | 9 | 6235 | 67 | 9 |

Recorded by MARK Direction S Lane 4 Time from 305 to 330

Lane 4

| Sheet 21 | * STATE_CODE | 48 |
|---|---|---|
| LTPP Traffic Data | *SPS PROJECT_ID | 0100 |
| WIM System Test Truck Records 1 of 4 | * DATE | 11/06/02 |

Rev. 08/31/2001

| Pvmt temp | Radar Speed | Truck | Pass | Time | Record No. | WIM Speed | Axle A weight. | Axle B weight. | Axle C weight. | Axle D weight. | Axle E weight. | Axle F weight | GVW | A-B space | B-C space | C-D space | D-E space | E-F space |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83 | 45 | 1 | 1 | 9:22 | 2224 | 48 | 60/60 | 88/86 | 83/85 | 85/85 | 78/87 | | 68.4 | 16.0 | 4.5 | 29.1 | 4.2 | |
| 83 | 45 | 2 | 1 | 9:22 | 2227 | 45 | 52/60 | 91/88 | 92/89 | 66/25 | 70/64 | | 72.7 | 19.6 | 4.2 | 32.1 | 3.9 | |
| 83 | 48 | 3 | 1 | 9:22 | 2230 | 48 | 52/49 | 85/86 | 86/88 | 91/81 | 89/87 | | 79.3 | 12.2 | 4.2 | 31.2 | 4.2 | |
| 82 | 70 | 1 | 2 | 9:32 | 2833 | 70 | 61/60 | 91/85 | 79/80 | 91/90 | 74/78 | | 76.7 | 16.0 | 4.6 | 25.0 | 4.2 | |
| 82 | 57 | 2 | 2 | 9:33 | 2835 | 61 | 53/54 | 79/79 | 79/75 | 68/76 | 65/61 | | 69.0 | 20.1 | 4.4 | 32.2 | 4.0 | |
| 82 | 50 | 3 | 2 | 9:33 | 2840 | 59 | 52/52 | 85/89 | 80/86 | 86/80 | 86/88 | | 79.3 | 11.8 | 4.3 | 30.8 | 4.3 | |
| 86 | 60 | 1 | 3 | 9:37 | 2879 | 60 | 62/65 | 86/91 | 87/90 | 88/92 | 84/82 | | 77.8 | 16.1 | 4.2 | 29.2 | 4.2 | |
| 86 | 62 | 2 | 3 | 9:37 | 2884 | 62 | 53/52 | 81/87 | 90/90 | 78/83 | 54/45 | | 66.1 | 19.7 | 4.1 | 32.5 | 3.7 | |
| 86 | 61 | 3 | 3 | 9:38 | 2887 | 60 | 50/51 | 80/84 | 90/85 | 94/80 | 87/89 | | 79.8 | 12.0 | 4.4 | 31.5 | 4.0 | |
| 80 | | 1 | 3 | | | | | | | | | | | | | | | |
| 80 | 68 | 2 | 3 | 9:42 | 2915 | 68 | 51/59 | 79/80 | 93/94 | 71/69 | 77/55 | | 69.8 | 19.9 | 4.5 | 32.1 | 3.6 | |
| 80 | 71 | 3 | 3 | 9:43 | 2920 | 71 | 52/51 | 85/82 | 82/83 | 82/86 | 86/88 | | 79.1 | 11.7 | 4.7 | 31.0 | 4.2 | |
| 78.5 | 67 | 1 | 5 | 9:46 | 2969 | 67 | 60/55 | 85/80 | 80/76 | 88/89 | 78/88 | | 72.8 | 16.0 | 4.4 | 29.3 | 4.0 | |
| 78.5 | 71 | 2 | 5 | 9:47 | 2974 | 71 | 51/49 | 91/90 | 88/91 | 75/72 | 55/72 | | 62.7 | 19.4 | 4.7 | 31.7 | 3.8 | |
| 78.5 | 70 | 3 | 5 | 9:47 | 2984 | 70 | 51/49 | 78/83 | 88/90 | 80/83 | 88/85 | | 75.3 | 12.1 | 4.2 | 31.1 | 4.2 | |
| 79 | 70 | 1 | 4 | 9:51 | 3026 | 66 | 84/82 | 83/84 | 81/80 | 82/83 | | | 78.5 | 16.0 | 4.2 | 29.5 | 4.2 | |

Recorded by Mark Checked by



1/4

LANE 4

| Sheet 21 | * STATE_CODE 48 |
|---|---|
| LTPP Traffic Data | *SPS PROJECT_ID 0100 |
| WIM System Test Truck Records 2 of 4 | * DATE 11/06/07 |

Rev. 08/31/2001

| Pvmt temp | Radar Speed | Truck | Pass | Time | Record No. | WIM Speed | Axle A weight | Axle B weight | Axle C weight | Axle D weight | Axle E weight | Axle F weight | GVW | A-B space | B-C space | C-D space | D-E space | E-F space |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 79 | 51 | 2 | 4 | 9:51 | 3030 | 51 | 52/53 | 87/80 | 93/72 | 66/66 | 79/67 | | 71.6 | 10.8 | 4.1 | 32.1 | 4.1 | |
| 79 | 50 | 3 | 4 | 9:52 | 3039 | 49 | 52/42 | 87/80 | 83/84 | 86/80 | 85/80 | | 78.8 | 12.0 | 4.2 | 31.1 | 3.3 | |
| 79 | 49 | 1 | 7 | 9:56 | 3085 | 49 | 71/61 | 87/80 | 87/82 | 81/81 | 79/81 | | 78.6 | 11.2 | 4.2 | 29.5 | 3.9 | |
| 79 | 57 | 2 | 7 | 9:57 | 3088 | 59 | 55/53 | 81/82 | 85/80 | 82/85 | 75/80 | | 62.0 | 10.4 | 4.6 | 31.8 | 4.3 | |
| 79 | 49 | 3 | 7 | 9:55 | 3091 | 49 | 55/51 | 87/84 | 88/81 | 92/85 | 92/85 | | 80.3 | 11.8 | 4.3 | 31.2 | 3.5 | |
| 79 | 57 | 1 | 5 | 9:59 | 3113 | 56 | 60/55 | 83/80 | 81/85 | 77/77 | 77/85 | | 75.9 | 16.1 | 4.1 | 29.6 | 4.1 | |
| 79 | 60 | 2 | 5 | 9:59 | 3116 | 60 | 51/55 | 83/80 | 87/83 | 82/75 | 68/58 | | 69.2 | 12.9 | 4.4 | 31.9 | 4.0 | |
| 79 | 58 | 3 | 5 | 10:00 | 3122 | 57 | 59/47 | 81/84 | 83/85 | 88/82 | 87/80 | | 77.1 | 11.7 | 4.5 | 30.6 | 4.2 | |
| 79 | 59 | 1 | 9 | 10:03 | 3155 | 58 | 64/61 | 80/82 | 77/79 | 82/77 | 74/77 | | 75.6 | 15.0 | 4.3 | 29.4 | 3.9 | |
| 79 | 63 | 2 | 9 | 10:04 | 3152 | 63 | 53/55 | 86/77 | 85/80 | 56/80 | 72/63 | | 64.6 | 10.7 | 4.6 | 31.0 | 4.2 | |
| 79 | 60 | 3 | 9 | 10:04 | 3160 | 59 | 53/48 | 87/80 | 85/79 | 88/77 | 86/82 | | 70.3 | 12.1 | 4.5 | 30.5 | 3.9 | |
| 85 | 68 | 1 | 6 | 10:07 | 3207 | 67 | 62/59 | 84/80 | 82/83 | 83/80 | 77/80 | | 78.1 | 16.0 | 4.4 | 28.8 | 4.1 | |
| 85 | 70 | 2 | 6 | 10:09 | 3220 | 68 | 49/55 | 84/77 | 81/79 | 76/75 | 76/80 | | 69.9 | 12.5 | 4.5 | 31.8 | 4.1 | |
| 85 | 69 | 3 | 6 | 10:09 | 3230 | 68 | 51/48 | 83/78 | 82/84 | 91/77 | 91/85 | | 77.5 | 11.8 | 4.1 | 30.9 | 4.1 | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

Recorded by MARK

Checked by

Lane 4

| Sheet 21 | * STATE_CODE | 48 |
|---|---|---|
| LTPP Traffic Data | *SPS PROJECT_ID | 0100 |
| WIM System Test Truck Records 3 of 4 | * DATE | 11/06/97 |

Rev. 08/31/2001

| Pvmt temp | Radar Speed | Truck | Pass | Time | Record No. | WIM Speed | Axle A weight. | Axle B weight. | Axle C weight. | Axle D weight. | Axle E weight. | Axle F weight | GVW | A-B space | B-C space | C-D space | D-E space | E-F space |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 79 | 49 | 1 | 7 | 10:18 | 3323 | 48 | 62/50 | 82/80 | 82/84 | 82/80 | 80/81 | | 78.0 | 16.0 | 4.5 | 29.2 | 4.2 | |
| 79 | 45 | 2 | 7 | 10:18 | 3324 | 45 | 57/55 | 82/75 | 87/80 | 67/75 | 68/66 | | 69.5 | 18.4 | 4.5 | 32.0 | 3.9 | |
| 79 | 50 | 3 | 7 | 10:19 | 3325 | 50 | 52/48 | 85/82 | 91/83 | 91/80 | 90/86 | | 79.1 | 12.2 | 4.3 | 30.8 | 4.3 | |
| 83 | 57 | 1 | 8 | 10:25 | 3418 | 58 | 59/61 | 79/85 | 79/83 | 76/80 | 73/84 | | 75.8 | 16.5 | 4.2 | 29.2 | 4.2 | |
| 83 | 60 | 2 | 8 | 10:26 | 3424 | 61 | 51/51 | 86/82 | 79/73 | 66/75 | 70/70 | | 69.1 | 19.6 | 4.5 | 31.8 | 4.1 | |
| 83 | 60 | 3 | 8 | 10:27 | 3446 | 60 | 51/51 | 85/80 | 85/87 | 89/82 | 82/82 | | 78.6 | 12.0 | 4.4 | 31.1 | 4.0 | |
| 83 | 66 | 1 | 9 | 10:34 | 3527 | 66 | 59/64 | 79/86 | 78/85 | 81/85 | 78/79 | | 77.9 | 16.3 | 4.0 | 29.4 | 4.0 | |
| 83 | 66 | 2 | 9 | 10:34 | 3532 | 66 | 59/51 | 85/84 | 95/68 | 64/67 | 74/67 | | 67.4 | 19.4 | 4.4 | 31.8 | 4.0 | |
| 83 | 70 | 3 | 9 | 10:36 | 3550 | 70 | 51/48 | 86/81 | 80/83 | 88/79 | 82/89 | | 77.6 | 12.1 | 4.2 | 30.6 | 4.2 | |
| | | 1 | | | | | | | | | | | | | | | | |
| 90 | 54 | 2 | 10 | 10:42 | 3612 | 54 | 54/52 | 87/86 | 89/90 | 61/72 | 71/56 | | 69.7 | 19.5 | 4.7 | 32.2 | 4.0 | |
| 90 | 49 | 3 | 10 | 10:43 | 3626 | 49 | 53/50 | 84/89 | 90/85 | 87/80 | 85/85 | | 78.7 | 12.1 | 4.3 | 30.9 | 4.3 | |
| 90 | 58 | 1 | 10 | 10:49 | 3693 | 58 | 62/57 | 86/86 | 85/84 | 78/76 | 74/80 | | 76.8 | 16.0 | 4.3 | 29.8 | 4.3 | |
| 90 | 61 | 2 | 10 | 10:49 | 3707 | 61 | 55/54 | 86/82 | 85/71 | 68/78 | 68/68 | | 70.7 | 20.0 | 4.5 | 32.3 | 4.1 | |
| 90 | 60 | 3 | 10 | 10:51 | 3715 | 60 | 52/50 | 82/89 | 85/85 | 90/82 | 86/90 | | 78.0 | 12.8 | 4.4 | 31.1 | 4.0 | |
| 94 | 59 | 1 | 11 | 11:12 | 3805 | 58 | 53/58 | 81/84 | 79/82 | 76/76 | 72/82 | | 75.4 | 16.3 | 4.3 | 29.4 | 3.9 | |

Recorded by MARK Checked by

LANE 4

| Sheet 21 | * STATE_CODE | 48 |
|---|---|---|
| LTPP Traffic Data | *SPS PROJECT_ID | 0100 |
| WIM System Test Truck Records 4 of 4 | * DATE | 11/06/07 |

Rev. 08/31/2001

| Pvmt temp | Radar Speed | Truck | Pass | Time | Record No. | WIM Speed | Axle A weight | Axle B weight | Axle C weight | Axle D weight | Axle E weight | Axle F weight | GVW | A-B space | B-C space | C-D space | D-E space | E-F space |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 94 | 59 | 2 | 12 | 11:13 | 3897 | 59 | 53/52 | 81/81 | 75/78 | 72/73 | 68/62 | | 69.3 | 19.6 | 4.7 | 31.7 | 3.9 | |
| 94 | 59 | 3 | 12 | 11:13 | 3898 | 59 | 50/48 | 84/88 | 85/84 | 91/96 | 83/80 | | 77.5 | 11.8 | 4.3 | 30.8 | 3.9 | |
| 94 | 68 | 1 | 12 | 11:22 | 3990 | 68 | 55/61 | 78/88 | 88/77 | 77/89 | 75/66 | | 77.2 | 16.2 | 4.0 | 29.6 | 4.0 | |
| 94 | 71 | 2 | 13 | 11:22 | 3992 | 71 | 54/58 | 82/77 | 83/68 | 68/77 | 72/82 | | 69.2 | 19.7 | 4.2 | 32.4 | 3.8 | |
| 94 | 70 | 3 | 13 | 11:22 | 3994 | 70 | 53/49 | 81/89 | 88/86 | 89/84 | 85/83 | | 78.6 | 12.1 | 4.2 | 31.3 | 4.2 | |
| 90.5 | 48 | 1 | 13 | 11:30 | 4084 | 48 | 62/59 | 82/80 | 82/85 | 80/82 | 79/85 | | 77.8 | 16.1 | 4.5 | 29.8 | 4.2 | |
| 90.5 | 56 | 2 | 14 | 11:30 | 4085 | 56 | 52/51 | 81/84 | 79/74 | 60/74 | 62/53 | | 68.2 | 19.8 | 4.5 | 32.5 | 3.7 | |
| 90.5 | 49 | 3 | 14 | 11:30 | 4086 | 49 | 51/51 | 84/87 | 88/81 | 88/81 | 88/90 | | 79.0 | 11.8 | 4.2 | 31.1 | 4.2 | |
| 91 | 57 | 1 | 14 | 11:38 | 4164 | 58 | 60/56 | 83/88 | 85/84 | 77/74 | 72/81 | | 75.0 | 16.2 | 4.2 | 28.9 | 4.2 | |
| 91 | 61 | 2 | 15 | 11:39 | 4166 | 61 | 52/54 | 76/80 | 87/71 | 66/79 | 67/58 | | 69.3 | 19.5 | 4.1 | 32.1 | 4.1 | |
| 91 | 59 | 3 | 15 | 11:39 | 4171 | 59 | 50/45 | 83/89 | 82/81 | 95/80 | 90/85 | | 78.0 | 12.2 | 3.9 | 31.2 | 3.9 | |
| 91 | 67 | 1 | 15 | 11:47 | 4244 | 67 | 62/63 | 78/86 | 83/82 | 81/79 | 73/90 | | 77.8 | 16.4 | 4.0 | 29.3 | 4.0 | |
| 91 | 72 | 2 | 16 | 11:48 | 4249 | 72 | 52/51 | 85/68 | 86/69 | 62/67 | 74/48 | | 66.4 | 19.6 | 4.3 | 32.0 | 3.8 | |
| 91 | 69 | 3 | 16 | 11:48 | 4259 | 69 | 52/49 | 79/89 | 86/84 | 90/81 | 94/80 | | 78.3 | 12.0 | 4.2 | 31.4 | 3.7 | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

Recorded by MRK

Checked by

6420070022_SPSWIM_TRF_sheet_21.doc

TO_22_48_2.97_0100_PK_VKL_SHEET_21

LANE 4

| Sheet 21 | * STATE_CODE | 48 |
|---|---|---|
| LTPP Traffic Data | *SPS PROJECT_ID | 0100 |
| WIM System Test Truck Records 1 of 3 | * DATE | 11/02/07 |

Rev. 08/31/2001

| Pvmt temp | Radar Speed | Truck | Pass | Time | Record No. | WIM Speed | Axle A weight. | Axle B weight. | Axle C weight. | Axle D weight. | Axle E weight. | Axle F weight | GVW | A-B space | B-C space | C-D space | D-E space | E-F space |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73.5 | 47 | 1 | 1 | 9:12 | 2512 | 48 | 62/60 | 86/88 | 81/83 | 81/80 | 82/85 | | 78.6 | 16.4 | 4.2 | 29.5 | 4.2 | |
| 73.5 | 48 | 2 | 1 | 9:12 | 2514 | 43 | 55/53 | 85/86 | 90/71 | 65/78 | 66/65 | | 71.0 | 19.6 | 4.3 | 31.9 | 4.0 | |
| 73.5 | 49 | 3 | 1 | 9:12 | 2516 | 50 | 54/52 | 86/87 | 88/85 | 68/83 | 86/80 | | 79.4 | 12.0 | 4.3 | 31.0 | 4.0 | |
| 73 | 57 | 1 | 2 | 9:22 | 2609 | 57 | 59/54 | 84/90 | 84/80 | 88/80 | 76/89 | | 79.2 | 16.4 | 4.2 | 29.3 | 4.2 | |
| 73 | 59 | 2 | 2 | 9:22 | 2610 | 61 | 51/54 | 80/79 | 86/73 | 72/75 | 74/55 | | 69.7 | 19.7 | 4.0 | 32.2 | 4.0 | |
| 73 | 58 | 3 | 2 | 9:22 | 2611 | 60 | 49/53 | 87/89 | 82/86 | 88/83 | 83/86 | | 78.7 | 12.0 | 4.4 | 31.1 | 4.0 | |
| 78.5 | 48 | 1 | 4 | 9:41 | 2802 | 48 | 66/59 | 84/80 | 82/84 | 81/80 | 83/85 | | 79.4 | 16.0 | 4.5 | 29.4 | 4.2 | |
| 78.5 | 47 | 2 | 4 | 9:41 | 2804 | 47 | 55/53 | 87/78 | 91/64 | 77/73 | 64/64 | | 70.1 | 19.8 | 4.4 | 32.1 | 4.1 | |
| 78.5 | 49 | 3 | 4 | 9:41 | 2806 | 50 | 52/48 | 91/88 | 89/87 | 80/84 | 85/87 | | 79.3 | 12.3 | 4.0 | 31.2 | 4.0 | |
| 77 | 57 | 1 | 5 | 9:49 | 2874 | 57 | 61/61 | 79/91 | 78/86 | 84/72 | 77/84 | | 77.1 | 16.0 | 4.2 | 29.4 | 4.2 | |
| 77 | 58 | 2 | 5 | 9:49 | 2875 | 60 | 52/53 | 81/70 | 88/72 | 67/76 | 67/59 | | 69.3 | 19.5 | 4.4 | 31.9 | 4.0 | |
| 77 | 59 | 3 | 5 | 9:49 | 2876 | 60 | 48/50 | 87/88 | 82/84 | 87/85 | 82/88 | | 78.8 | 12.0 | 4.4 | 31.1 | 4.0 | |
| 72.5 | 68 | 1 | 3 | 9:32 | 2707 | 67 | 62/64 | 84/78 | 87/87 | 81/81 | 75/87 | | 78.5 | 14.0 | 4.0 | 29.3 | 4.0 | |
| 72.5 | 69 | 2 | 3 | 9:32 | 2709 | 72 | 50/57 | 87/78 | 91/74 | 72/72 | 73/46 | | 69.9 | 19.6 | 4.3 | 32.0 | 4.3 | |
| 72.5 | 69 | 3 | 3 | 9:32 | 2710 | 68 | 55/51 | 81/84 | 88/86 | 86/75 | 95/84 | | 77.7 | 12.2 | 4.1 | 31.2 | 3.6 | |
| | | | | | | | | | | | | | | | | | | |

Recorded by MARK

Checked by

| Sheet 21 | * STATE_CODE 48 |
|---|---|
| LTPP Traffic Data | *SPS PROJECT_ID 0100 |
| WIM System Test Truck Records 2 of 3 | * DATE 11/2/97 |

Rev. 08/31/2001

| Pvmt temp | Radar Speed | Truck | Pass | Time | Record No. | WIM Speed | Axle A weight. | Axle B weight. | Axle C weight. | Axle D weight. | Axle E weight. | Axle F weight | GVW | A-B space | B-C space | C-D space | D-E space | E-F space |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 85.5 | 50 | 1 | 6 | 11:12 | 3637 | 58 | 61/57 | 82/84 | 87/88 | 79/75 | 74/82 | | 75.7 | 16.1 | 4.2 | 29.6 | 3.8 | |
| 85.5 | 59 | 2 | 6 | 11:12 | 3638 | 61 | 51/53 | 81/73 | 89/84 | 65/76 | 67/68 | | 68.2 | 19.9 | 4.5 | 32.5 | 4.1 | |
| 85.5 | 61 | 3 | 6 | 11:12 | 3639 | 60 | 50/47 | 89/87 | 87/80 | 93/81 | 89/82 | | 79.0 | 12.3 | 4.4 | 30.9 | 4.0 | |
| 87 | 69 | 1 | 7 | 11:21 | 3741 | 67 | 65/58 | 87/80 | 77/84 | 85/80 | 76/90 | | 78.2 | 16.1 | 4.5 | 29.0 | 4.5 | |
| 87 | 68 | 2 | 7 | 11:21 | 3742 | 69 | 52/57 | 89/75 | 92/70 | 74/69 | 63/54 | | 69.6 | 19.6 | 4.1 | 32.0 | 4.1 | |
| 87 | 69 | 3 | 7 | 11:21 | | | | | | | | | | | | | | |
| MISSED | | | | | | | | | | | | | | | | | | |
| 85.5 | 47 | 1 | 8 | 11:28 | 3829 | 48 | 65/59 | 82/89 | 81/84 | 82/78 | 77/83 | | 78.0 | 16.1 | 4.1 | 29.1 | 4.1 | |
| 85.5 | 48 | 2 | 8 | 11:28 | 3831 | 49 | 59/53 | 86/75 | 91/63 | 75/76 | 60/63 | | 69.9 | 19.4 | 4.6 | 32.3 | 4.0 | |
| 85.5 | 49 | 3 | 7 | 11:28 | 3832 | 48 | 53/52 | 87/87 | 87/84 | 89/78 | 95/86 | | 78.6 | 11.9 | 4.2 | 31.0 | 3.9 | |
| 90.5 | 57 | 1 | 9 | 11:40 | 3954 | 58 | 61/58 | 84/89 | 92/87 | 80/76 | 79/81 | | 76.7 | 16.3 | 4.3 | 29.4 | 3.9 | |
| 90.5 | 58 | 2 | 9 | 11:40 | 3955 | 58 | 52/54 | 87/81 | 89/84 | 66/76 | 71/61 | | 71.0 | 19.9 | 4.3 | 32.3 | 3.9 | |
| 90.5 | 59 | 3 | 9 | 11:40 | 3956 | 60 | 54/48 | 85/82 | 88/82 | 86/83 | 85/87 | | 77.9 | 11.9 | 4.4 | 31.4 | 4.0 | |
| 92.5 | 69 | 1 | 5 10 | 11:50 | 4074 | 67 | 60/63 | 77/83 | 80/80 | 77/80 | 77/85 | | 77.0 | 16.1 | 4.0 | 29.5 | 4.0 | |
| 92.5 | 71 | 2 | 5 10 | 11:50 | 4075 | 72 | 52/57 | 84/69 | 84/63 | 65/62 | 63/49 | | 64.7 | 19.7 | 4.3 | 32.2 | 3.8 | |
| 92.5 | 70 | 3 | 9 | 11:50 | 4076 | 71 | 52/47 | 80/80 | 87/85 | 86/69 | 89/88 | | 78.1 | 11.8 | 4.7 | 31.2 | 4.2 | |
| 94.5 | 47 | 1 | 6 11 | 1:38 | 5119 | 48 | 62/58 | 82/88 | 87/85 | 78/79 | 80/86 | | 78.5 | 16.1 | 4.2 | 29.7 | 4.2 | |

Recorded by MARK

Checked by

| Sheet 21 | * STATE_CODE | 48 |
|---|---|---|
| LTPP Traffic Data | *SPS PROJECT_ID | 0100 |
| WIM System Test Truck Records 3 of 3 | * DATE | 11/07/07 |

Rev. 08/31/2001

| Pvmt temp | Radar Speed | Truck | Pass | Time | Record No. | WIM Speed | Axle A weight. | Axle B weight. | Axle C weight. | Axle D weight. | Axle E weight. | Axle F weight | GVW | A-B space | B-C space | C-D space | D-E space | E-F space |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 94.5 | 48 | 2 | 6 11 | 1:38 | 5121 | 45 | 50/56 | 86/78 | 89/66 | 66/76 | 66/64 | | 69.1 | 19.5 | 4.5 | 32.0 | 3.9 | |
| 94.5 | 49 | 3 | 6 10 | 1:38 | 5122 | 49 | 51/53 | 85/88 | 84/87 | 84/83 | 83/87 | | 78.5 | 12.1 | 4.2 | 31.4 | 3.9 | |
| 97 | 59 | 1 | 7 12 | 1:48 | 5233 | 57 | 62/57 | 80/86 | 79/85 | 82/76 | 74/81 | | 76.1 | 16.0 | 4.2 | 29.3 | 4.2 | |
| 97 | 60 | 2 | 7 12 | 1:49 | 5226 | 59 | 49/53 | 83/79 | 83/82 | 61/69 | 79/58 | | 68.7 | 19.7 | 4.3 | 32.0 | 3.9 | |
| 97 | 58 | 3 | 7 11 | 1:49 | 5239 | 58 | 51/48 | 79/87 | 82/87 | 90/81 | 93/92 | | 77.9 | 11.7 | 4.3 | 31.1 | 3.9 | |
| 92 | 67 | 1 | 13 | 2:00 | 5348 | 67 | 63/62 | 80/87 | 80/82 | 81/86 | 73/91 | | 78.7 | 16.5 | 4.0 | 29.5 | 4.5 | |
| 92 | 69 | 2 | 13 | 2:00 | 5349 | 70 | 52/57 | 80/75 | 88/71 | 69/71 | 74/54 | | 69.2 | 20.0 | 4.2 | 32.5 | 3.7 | |
| 92 | 69 | 3 | 12 | 2:00 | 5352 | 70 | 52/50 | 82/88 | 88/83 | 96/78 | 84/89 | | 78.9 | 12.1 | 4.2 | 31.3 | 4.2 | |
| 91.5 | 48 | 1 | 14 | 2:08 | 5431 | 48 | 62/59 | 82/85 | 87/83 | 82/77 | 80/83 | | 78.1 | 16.1 | 4.1 | 29.1 | 4.1 | |
| 91.5 | 44 | 2 | 14 | 2:08 | 5434 | 43 | 53/51 | 81/69 | 94/73 | 64/75 | 68/63 | | 69.2 | 19.9 | 4.3 | 31.9 | 4.0 | |
| 91.5 | 48 | 3 | 13 | 2:08 | 5435 | 48 | 48/52 | 86/85 | 84/83 | 99/83 | 85/91 | | 78.9 | 12.1 | 4.2 | 31.0 | 4.2 | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
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Recorded by MARK

Checked by

# TEST VEHICLE PHOTOGRAPHS FOR SPS WIM VALIDATION

**November 6-7, 2007**

**STATE: Texas**

**SHRP ID: 0100**


**Photo 1 - Truck_1_Tractor_ 48_0100_11_06_07.JPG**

**Photo 2 - Truck_1_Trailer_Load_1_48_0100_11_06_07.JPG**

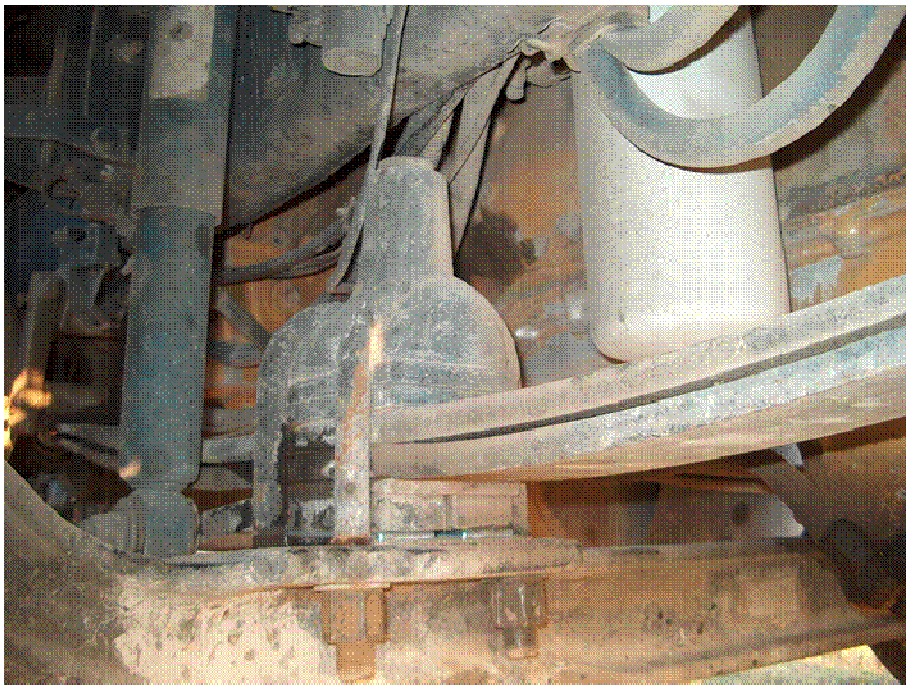

**Photo 3 - Truck_1_Suspension_1_48_0100_11_06_07.JPG**

**Photo 4 - Truck_1_Suspension_2_48_0100_11_06_07.JPG**

**Photo 5 - Truck_1_Suspension_3_48_0100_11_06_07.JPG**

**Photo 6 - Truck_2_Tractor_48_0100_11_06_07.JPG**

**Photo 7 - Truck_2_Trailer_48_0100_11_06_07.JPG**

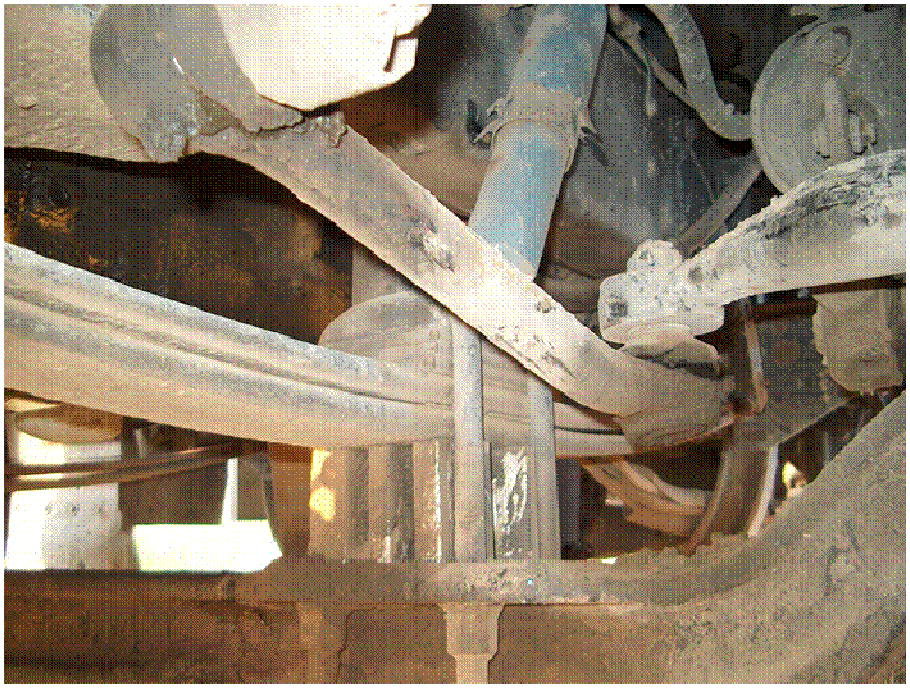

**Photo 8 - Truck_2_Suspension_1_48_0100_11_06_07.JPG**

**Photo 9 - Truck_2_Suspension_2_48_0100_11_06_07.JPG**

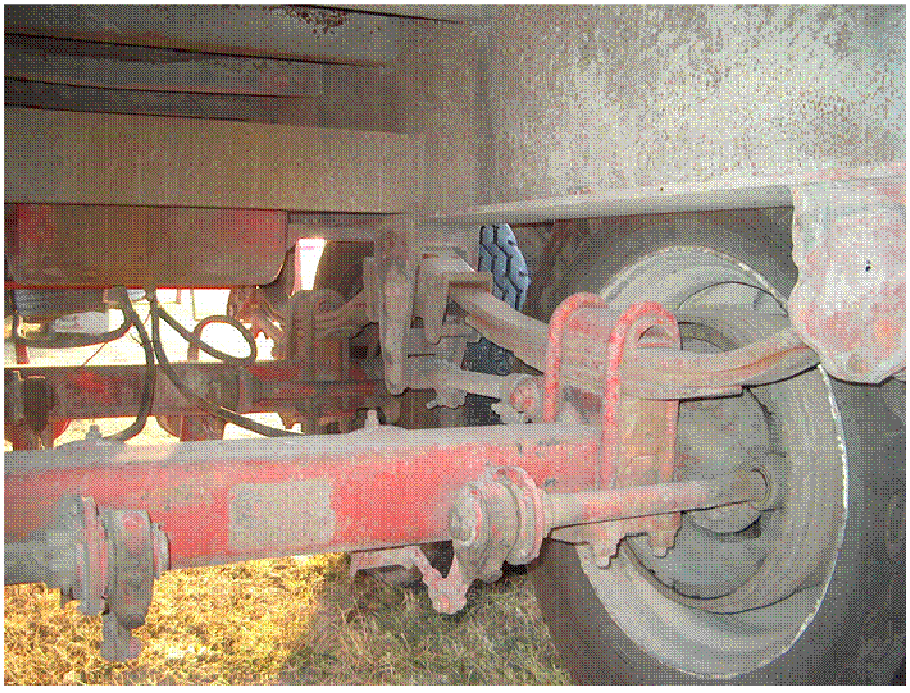

**Photo 10 - Truck_2_Suspension_3_48_0100_11_06_07.JPG**

**Photo 11 - Truck_3_Tractor_48_0100_11_06_07.JPG**

**Photo 12 - Truck_3_Trailer_48_0100_11_06_07.JPG**

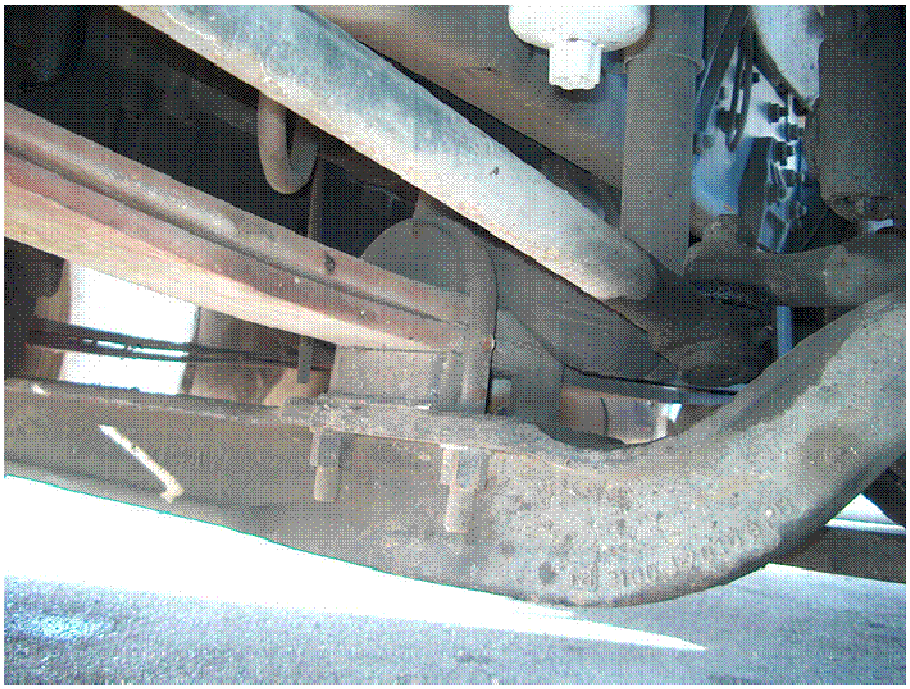

**Photo 13 - Truck_3_Suspension_1_48_0100_11_06_07.JPG**

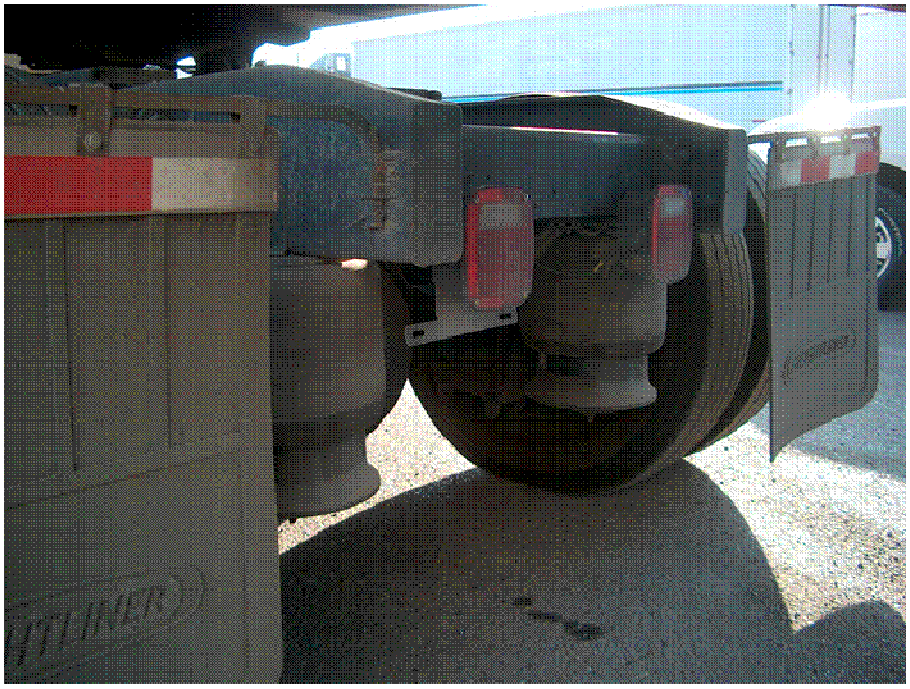

**Photo 14 - Truck_3_Suspension_2_48_0100_11_06_07.JPG**

**Photo 15 - Truck_3_Suspension_3_48_0100_11_06_07.JPG**

**System Parameters – 480100 Bending Plate sensors**

| Factor | May 10, 2006 | November 7, 2007 |
|---|---|---|
| Cf 1 | 985 | 985 |
| Cf 2 | 985 | 985 |
| Cf 3 | 1015 | 1015 |