WIM System Field Calibration and Validation Handout Guide

Pennsylvania, SPS-6
SHRP ID – 420600

Validation Date: November 24, 2010

Table of Contents

1 Site Information

Site ID:	420600	**State:**	Pennsylvania
LTPP Region:	North Atlantic	**Configuration:**	Loop- quartz-quartz-loop
Controller Type:	iSINC	**Sensor Type:**	Quartz- Piezo
Power:	AC	**Communication:**	Cellular
Class Scheme:	LTPP Mar 06	**CPU type/setup:**	

2 Contact Information

Agency	Contact	Position	Phone	E-mail
FHWA	Debbie Walker	COTR	202-493-3068	deborah.walker@dot.gov
FHWA	Zahur Siddiqui	Division Office	717-221-3410	zahur.siddiqui@dot.gov
RSC	Frank Meyer	Project Manager	716-632-0804	fmeyer@stantec.com
PennDOT	Pat Gardiner	LTPP Coord.	717-787-1199	pgardiner@state.pa.us
PennDOT	Lydia Peddicord	LTPP Contact	717-787-4246	lpeddicord@state.pa.us
PennDOT	Todd Rottet	Traffic Contact	717-787-4574	trottet@state.pa.us
ARA	Dean Wolf	Task Leader	717-512-6638	dwolf@ara.com
ARA	Olga Selezneva	Project Manager	410-540-9949	oselezneva@ara.com
Dig. & Rig.	Todd Edgerton	Truck Vendor	204-313-3950	

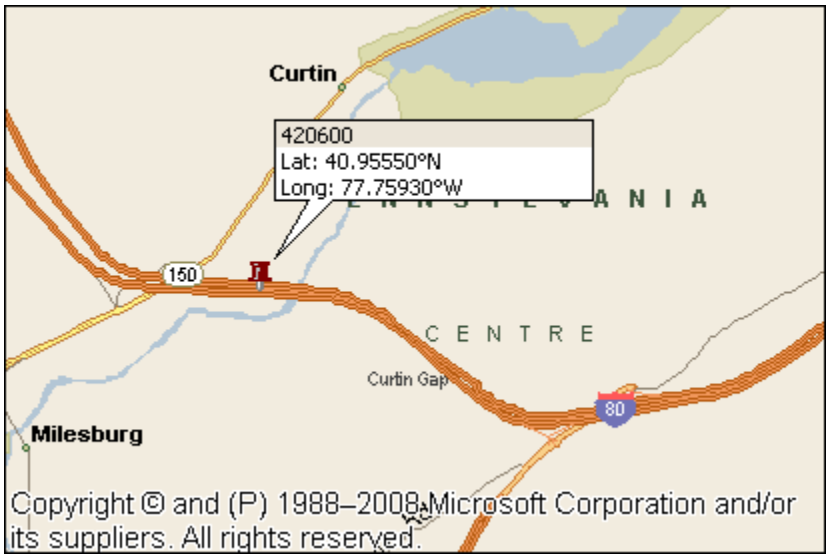
3 Schedule of Events

Date	Event	Location	Start Time
11/22/10	Travel	Milesburg, PA	TBD
11/22/10	Equipment Assessment	WIM Site	TBD
11/23/10	Test Truck Weigh/Measure/Inspection	TA Milesburg	6:30 am
11/23/10	Initial Performance Evaluation	WIM Site	7:00 am
11/23/10	System Test/Class and Speed Study	WIM Site	TBD
11/24/10	Validation	WIM Site	TBD
11/24/10	Travel	Camp Hill, PA	TBD

4 Maps

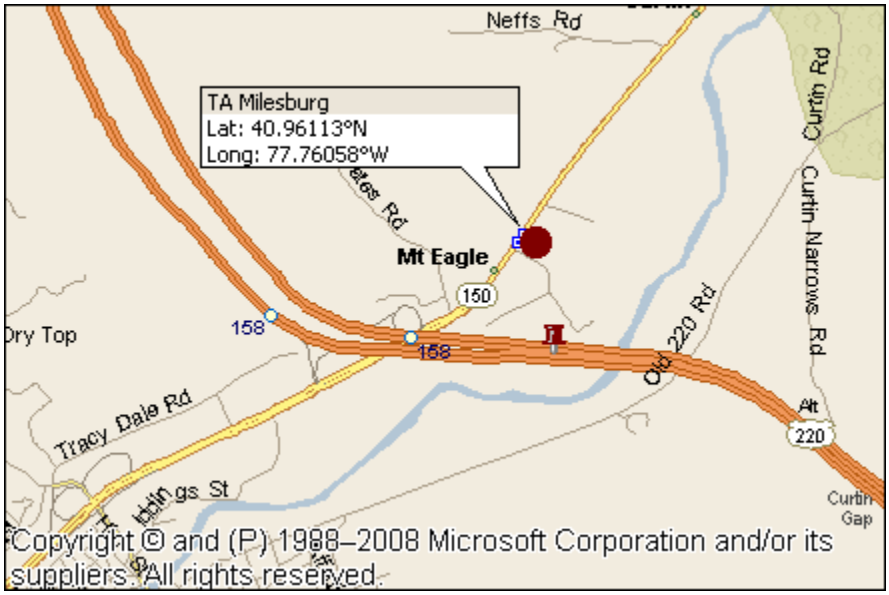
4.1 Site Location

Location:	I-80 at milepost 158.2			**Direction:**	WB
Latitude:	40.9555°	**Longitude:**	-77.7593°		



4.2 Truck Scale Location

Name:	TA, Milesburg	**Location:**	I-80, Exit 158
Latitude:	40.96113	**Longitude:**	-77.76058

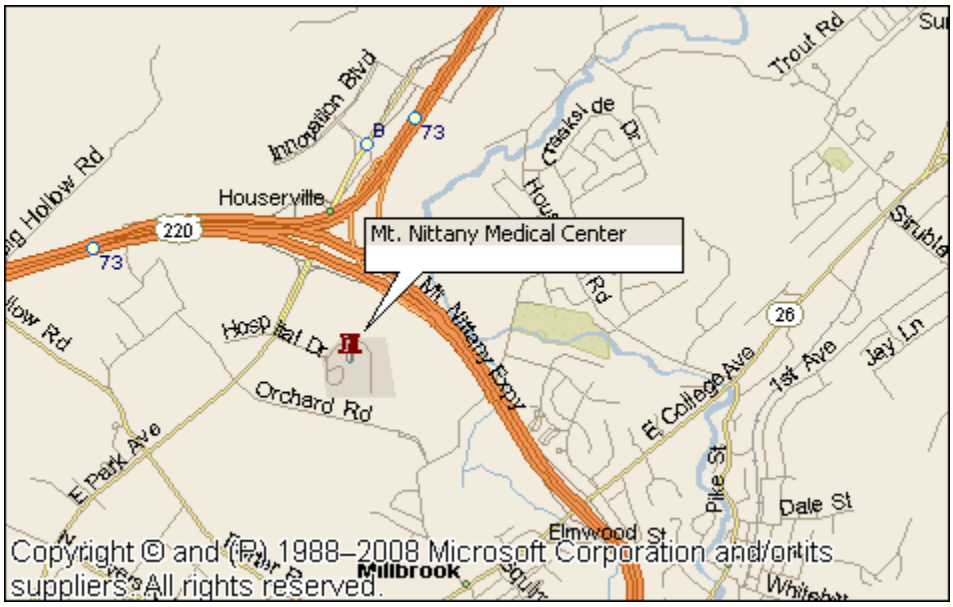


4.3 Airport Location

Name:	University Park Airport	**Location:**	State College, PA
Latitude:	40.85104	**Longitude:**	-77.84974

4.4 Hospital Location

Name:	Mt. Nittany Medical Center - ER		
Phone:	814-231-7000	**Location:**	1800 E. Park Ave, State College, PA



5 Occupational Health and Safety Plan

All fieldwork in the right-of-way will be carried out when the ground visibility is more than 3 km, and when there is no accumulation of water, snow, or ice is on the pavement.

To the extent possible, inspection work during extremely high and low temperatures will be avoided. If the work becomes necessary, workers will be reminded to make appropriate precautions (wear protective clothing, drink fluids, and avoid prolonged exposure to severe weather conditions).

All personnel present on the right-of-way will wear approved safety gear (boots, reflective safety vest, and helmet).

The following items will be available at the site: a standard first-aid kit, a cell phone, and the location of nearby hospital(s).

6 Contingency Plan

If inclement weather is forecasted prior to mobilizing to the site, the Project Manager will make the final decision to postpone the Validation visit. The Task Leader is responsible for contacting all parties involved to inform them of the postponement. He is also responsible for rearranging travel.

Once the Validation team is on-site, the On-Site Task Leader is responsible for making decisions to delay or postpone the Validation. He will contact the Project Manager to make recommendations for completing the Validation, and the Project Manager will make the final decision to cancel or postpone. The On-Site Task Leader is responsible for contacting the COTR and all other participating parties to inform them of the delay or postponement.

Traffic Sheet 17 LTPP MONITORED TRAFFIC DATA WIM SITE INVENTORY	STATE CODE: 42 SPS WIM ID: 420600 DATE (mm/dd/yyyy) 11/23/2010

1. ROUTE: I-80 **MILEPOST:** 158.2 **LTPP DIRECTION:** west

2. WIM SITE DESCRIPTION

Grade: <1% Sag Vertical: N
Nearest Upstream SPS Section:
Distance from sensors to SPS Section: ft

3. LANE CONFIGURATION

Lanes in LTPP direction: 2 Median: 3 - grass
Lane width: 12' Shoulder: 2 - paved AC
Shoulder width: 12'

4. PAVEMENT TYPE AC

5. PAVEMENT SURFACE CONDITION - Distress Survey

Date: 11/23/10 Photo Filename: 420600_Upstream_11_23_10.jpg
Date: 11/23/10 Photo Filename: 420600_Downstream_11_23_10.jpg
Date: Photo Filename:

6. SENSOR SEQUENCE

Loop - Quartz - Quartz - Loop

7. REPLACEMENT AND/OR GRINDING

Date:
Date:
Date:

8. RAMPS OR INTERSECTIONS

Intersection within 300' upstream of site: N
Intersection within 300' downstream of site: N
Is shoulder routinely used for turning? N

9. DRAINAGE

Drainage *(bending plate and load cell)* :
Clearance under plate (in.):
Clearance /access to flush fines from under system:

Traffic Sheet 17	STATE CODE:	42
LTPP MONITORED TRAFFIC DATA	SPS WIM ID:	420600
WIM SITE INVENTORY	DATE (mm/dd/yyyy)	11/23/2010

10. CABINET LOCATION

Same side of road as LTPP lane: N
Distance from edge of traveled lane: 91 ft
distance from system: 108 ft
type: 3B

Cabinet access controlled by: Agency and LTPP
Contact name: Roy Czinku Phone # 306-653-6627
Alternate name: Todd Rottet Phone # 717-787-5983

11. POWER

Distance to cabinet from drop: 3 ft
Type: Solar
AC in cabinet? N
Service provider: Phone #

12. TELEPHONE

Distance to cabinet from drop: 0 ft
Type: cellular
Service provider: Phone #

13. SYSTEM

Software and version no.
Computer connection: RJ-45

14. TEST TRUCK TURNAROUND TIME

Duration: 12 minutes Distance: 4.5 miles

15. PHOTOS

	Filename
Power source:	420600_Solar_Panel_11_23_10.jpg
Phone source:	420600_Cell_Modem_11_23_10.jpg
Cabinet exterior:	420600_Cabinet_Exterior_11_23_10.jpg
Cabinet interior:	420600_Cabinet_Interior_Front_11_23_10.jpg
Weight sensors:	420600_Leading_WIM_Sensor_11_23_10.jpg
	420600_Trailing_WIM_Sensor_11_23_10.jpg
Other sensors:	420600_Leading_Loop_11_23_10.jpg
	420600_Trailing_Loop_11_23_10.jpg
Downstream from sensors on LTPP lane:	420600_Downstream_11_23_10.jpg
Upstream from sensors on LTPP lane:	420600_Upstream_11_23_10.jpg

Traffic Sheet 18 LTPP MONITORED TRAFFIC DATA WIM SITE COORDINATION	STATE CODE: 42 SPS WIM ID: 420600 DATE (mm/dd/yyyy) 11/23/2010

1. DATA PROCESSING

a. Download: LTPP download

b. Data review: LTPP
If state, how often?

c. Data submission LTPP
If state how often?

2. EQUIPMENT

a. Purchase LTPP

b. Installation LTPP contract

c. Maintenance Contract with purchase
Expiration Date

d. Calibration LTPP

e. Manuals and software control: LTPP

f. Power
i. Type Solar ii. Payment N/A

g. Communication
i. Type Cellular ii. Payment State

3. PAVEMENT

a. Type Asphalt Concrete

b. Allowable Rehabilitation activities Replacement as needed

c. Profile Site Markings Temporary

Traffic Sheet 18 LTPP MONITORED TRAFFIC DATA WIM SITE COORDINATION	STATE CODE: 42 SPS WIM ID: 420600 DATE (mm/dd/yyyy) 11/23/2010

4. Onsite Activities

a. WIM Validation Check advance notice required

_____ Days 2 Weeks

b. Notice for straightedge and grinding check

_____ Days 2 Weeks

i. On site lead LTPP

ii. Accept grinding LTPP

c. Authorization to calibrate site LTPP

d. Calibration routine LTPP annually

Other: _____

e. Test Vehicle Responsibilities

i. Trucks

1st-	Air suspension 3S2	LTPP
2nd-	Air Suspension 3S2	LTPP
3rd-		
4th-		

ii. Loads LTPP

iii. Drivers LTPP

f. Contractor(s) with prior experience in wim calibration in state:
IRD

g. Access to cabinet Joint

h. State personel required on site No

i. Traffic control required No

J. Enforcement coordination required No

Traffic Sheet 18 LTPP MONITORED TRAFFIC DATA WIM SITE COORDINATION	STATE CODE: 42 SPS WIM ID: 420600 DATE (mm/dd/yyyy) 11/23/2010

5. SITE SPECIFIC CONDITIONS

a. Funds and accountability: _____
b. Reports: _____
c. Other: _____
c. Special Conditions _____

6. CONTACTS

a. Equipment (operational status, access, etc.)
Name Roy Czinku Phone # 306-653-6627
Agency IRD

b. Maintenance (equipment)
Name Roy Czinku Phone # 306-653-6627
Agency IRD

c. Data Processing and pre-visit data
Name Roy Czinku Phone # 306-653-6627
Agency IRD

d. Construction schedule and verification
Name _____ Phone # _____
Agency _____

e. Test Vehicles (trucks, loads, drivers)
Name _____ Phone # 814-827-1875
Agency J. Schroeder Trucking

f. Traffic control
Name _____ Phone # _____
Agency _____

g. Enforcement coordination
Name _____ Phone # _____
Agency _____

h. Nearest static scale
Name TA Milesburg Location: I-80, Exit 158
Phone: 814-355-7561

Traffic Sheet 19 LTPP MONITORED TRAFFIC DATA CALIBRATION TEST TRUCK # 1	STATE CODE: 42 SPS WIM ID: 420600 DATE (mm/dd/yyyy) 11/23/2010

CALIBRATION TEST TRUCK - Primary

PART A

1. FHWA CLASS: 9 **2. Number of axles:** 5

3. AXLE WEIGHTS (1000s lbs)

	a. Empty Truck Avg. Axle Weight	b. Pre-test Average Axle Weight	c. Post-Test Avg. Axle Weight	d. Direct or Calculated?
A		10920	10940	Direct
B		16490	16500	Direct
C		16490	16500	Direct
D		15965	15960	Direct
E		15965	15960	Direct
F		0	0	

4. GVW (same units as axles)

a. Empty GVW:
b. Average Pre-Test Loaded weight: 75830
c. Post Test Loaded Weight: 75860
d. Difference Post Test - Pre-Tests: -30

5. TRUCK DESCRIPTION

a. Tractor Cab Style: Conventional Sleeper Cab: No
photo: ☑

b. Make: International
c. Model: Unknown

d. Trailer Load Distribution Description:
crane counter weights loaded on the trailer
photo: ☑

e. Tractor Tare weight - _____ - _____
f. Trailer Tare weight - _____ - _____
g. Axle Spacing - (feet and tenths)

A to B 11.8 B to C 4.3 C to D 34.6 D to E 4.1 E to F 0.0

h. Wheelbase - ☐ Measured _____ ☑ Computed 54.8
i. Kingpin offset from Axle B (units) 3'2" photo: ☐

Traffic Sheet 19	STATE CODE:	42
LTPP MONITORED TRAFFIC DATA	SPS WIM ID:	420600
CALIBRATION TEST TRUCK # 1	DATE (mm/dd/yyyy)	11/23/2010

CALIBRATION TEST TRUCK - Primary

6. SUSPENSION

	a. Tire size	b.Suspension description (leaf, air # of leaves, taper or flat leaf, etc.)	c. photo
A	11R22.5	steel spring	☑
B	295/75R22.5	air	☑
C	295/75R22.5	air	☑
D	295/75R22.5	air	☑
E	295/75R22.5	air	☑
F			☐

d. Cold Tire Pressures (psi)- from right to left

Steering Axle	Axle B	Axle C	AxleD	AxleE	Axle F
111.2	118.5	117.8	111.3	114.3	
121.8	118.2	115.2	105.4	112.6	
	115.2	115.7	110.7	117.1	
	116.1	115.9	107	113.6	

PART B

Table 1 - Raw Measurements -Platform Scale

Axles	Meas.	Pre-test Weight	Instance	Instance	Post-test weight
A	I	10900	10890	11040	10940
A+B	II	27400	27350	27550	27440
A+B+C	III	43900	43810	44060	43940
A+B+C+D	IV	59860	59770	60030	59900
A+B+C+D+E(1)	V	75820	75730	76000	75860
A+B+C+D+E+(F)(1)	VI	75820	75730	76000	75860
B+C+D+E+(F)	VII	64900	64780	64920	64920
C+D+E+(F)	VIII	48420	48350	48430	48420
D+E+(F)	IX	31940	31920	31940	31920
E+(F)	X	15970	15960	15970	15960
(F)	XI	0	0	0	0
A+B+C+D+E+(F)(2)	XII	75840	75720	76000	75860

Traffic Sheet 19	STATE CODE:	42
LTPP MONITORED TRAFFIC DATA	SPS WIM ID:	420600
CALIBRATION TEST TRUCK # 1	DATE (mm/dd/yyyy)	11/23/2010

CALIBRATION TEST TRUCK - Primary

Table 2 - Axle and GVW Computations -Platform Scale Pre-test

	1		2		Avg.
Axle A	I	10900	VI-VII	10920	10910
Axle B	II-I	16500	VII-VIII	16480	16490
Axle C	III-II	16500	VIII-IX	16480	16490
Axle D	IV-III	15960	IX-X	15970	15965
Axle E	V-IV	15960	X-XI	15970	15965
Axle F	VI-V	0	XI	0	0
GVW	VI	75820	XII	75840	75830

Table 3- Axle and GVW Computations - Platform Scale - Instance - _____

	1		2		Avg.
Axle A	I	10890	VI-VII	10950	10920
Axle B	II-I	16460	VII-VIII	16430	16445
Axle C	III-II	16460	VIII-IX	16430	16445
Axle D	IV-III	15960	IX-X	15960	15960
Axle E	V-IV	15960	X-XI	15960	15960
Axle F	VI-V	0	XI	0	0
GVW	VI	75730	XII	75720	75725

Table 4- Axle and GVW Computations - Platform Scale - Instance - _____

	1		2		Avg.
Axle A	I	11040	VI-VII	11080	11060
Axle B	II-I	16510	VII-VIII	16490	16500
Axle C	III-II	16510	VIII-IX	16490	16500
Axle D	IV-III	15970	IX-X	15970	15970
Axle E	V-IV	15970	X-XI	15970	15970
Axle F	VI-V	0	XI	0	0
GVW	VI	76000	XII	76000	76000

Table 5- Axle and GVW Computations - Platform Scale Post-Test

	1		2		Avg.
Axle A	I	10940	VI-VII	10940	10940
Axle B	II-I	16500	VII-VIII	16500	16500
Axle C	III-II	16500	VIII-IX	16500	16500
Axle D	IV-III	15960	IX-X	15960	15960
Axle E	V-IV	15960	X-XI	15960	15960
Axle F	VI-V	0	XI	0	0
GVW	VI	75860	XII	75860	75860

Traffic Sheet 19	STATE CODE:	42
LTPP MONITORED TRAFFIC DATA	SPS WIM ID:	420600
CALIBRATION TEST TRUCK # 1	DATE (mm/dd/yyyy)	11/23/2010

CALIBRATION TEST TRUCK - Primary

Table 6 - Raw Data -Axle Scales - Pre-test

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1	10900	16500	16500	15960	15960	0	75820
2	10940	16480	16480	15970	15970	0	75840
Avg.	10920	16490	16490	15965	15965	0	75830

Table 7- Raw Data- Axle scales -

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1	10890	16460	16460	15960	15960	0	75700
2	10930	16430	16430	15960	15960	0	75720
Avg.	10910	16445	16445	15960	15960	0	75710

Table 8- Raw Data- Axle scales -

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1	11040	16510	16510	15970	15970	0	76000
2	11080	16490	16490	15970	15970	0	76000
Avg.	11060	16500	16500	15970	15970	0	76000

Table 9 - Raw Data -Axle Scales - Post-test

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1	10940	16500	16500	15960	15960	0	75860
2	10940	16500	16500	15960	15960	0	75860
Avg.	10940	16500	16500	15960	15960	0	75860

Validation Test Truck Run Set - Pre

Measured By: Kevin Trousdale

Verified By: Aditya Ramachandran

Traffic Sheet 19 LTPP MONITORED TRAFFIC DATA CALIBRATION TEST TRUCK # 2	STATE CODE: 42 SPS WIM ID: 420600 DATE (mm/dd/yyyy) 11/23/2010

CALIBRATION TEST TRUCK - Secondary

PART A

1. **FHWA CLASS:** 9 2. **Number of axles:** 5

3. **AXLE WEIGHTS** (1000s lbs)

	a. Empty Truck Avg. Axle Weight	b. Pre-test Average Axle Weight	c. Post-Test Avg. Axle Weight	d. Direct or Calculated?
A		9000	8980	Direct
B		16585	16625	Direct
C		16585	16625	Direct
D		12170	12160	Direct
E		12170	12160	Direct
F		0	0	

4. **GVW (same units as axles)**
   - a. Empty GVW:
   - b. Average Pre-Test Loaded weight: 66510
   - c. Post Test Loaded Weight: 66550
   - d. Difference Post Test - Pre-Tests: -40

5. **TRUCK DESCRIPTION**
   - a. Tractor Cab Style: Conventional Sleeper Cab: No
     photo: ☑
   - b. Make: International
   - c. Model: Unknown
   - d. Trailer Load Distribution Description:
     crane counter weights loaded on the trailer
     photo: ☑
   - e. Tractor Tare weight - -
   - f. Trailer Tare weight - -
   - g. Axle Spacing -

A to B 11.6 B to C 4.3 C to D 31.9 D to E 4.1 E to F 0.0

   - h. Wheelbase - ☐ Measured ☑ Computed 51.9
   - i. Kingpin offset from Axle B (units) 2'2" photo: ☐

Traffic Sheet 19	STATE CODE:	42
LTPP MONITORED TRAFFIC DATA	SPS WIM ID:	420600
CALIBRATION TEST TRUCK # 2	DATE (mm/dd/yyyy)	11/23/2010

CALIBRATION TEST TRUCK - Secondary

6. SUSPENSION

	a. Tire size	b.Suspension description (leaf, air # of leaves, taper or flat leaf, etc.)	c. photo
A	11R22.5	steel spring	☑
B	11R22.5	air	☑
C	11R22.5	air	☑
D	11R22.5	air	☑
E	11R22.5	air	☑
F			☐

d. Cold Tire Pressures (psi)- from right to left

Steering Axle	Axle B	Axle C	AxleD	AxleE	Axle F
119.4	122.9	122.4	110.2	111.2	
118.3	125.8	125.9	113.7	114.8	
	123.6	123.6	104.9	112.7	
	121.5	122.1	93.8	111.3	

PART B

Table 1 - Raw Measurements -Platform Scale

Axles	Meas.	Pre-test Weight	Instance	Instance	Post-test weight
A	I	9000	8990	9080	9080
A+B	II	25590	25530	25710	25640
A+B+C	III	42180	42070	42340	42200
A+B+C+D	IV	54350	54240	54500	54370
A+B+C+D+E(1)	V	66520	66410	66660	66540
A+B+C+D+E+(F)(1)	VI	66520	66410	66660	66540
B+C+D+E+(F)	VII	57500	57400	57620	57680
C+D+E+(F)	VIII	40920	40860	40960	40990
D+E+(F)	IX	24340	24320	24300	24300
E+(F)	X	12170	12160	12150	12150
(F)	XI		0	0	0
A+B+C+D+E+(F)(2)	XII	66500	66380	66640	66560

Traffic Sheet 19	STATE CODE:	42
LTPP MONITORED TRAFFIC DATA	SPS WIM ID:	420600
CALIBRATION TEST TRUCK # 2	DATE (mm/dd/yyyy)	11/23/2010

CALIBRATION TEST TRUCK - Secondary

Table 2 - Axle and GVW Computations -Platform Scale Pre-test

	1		2		Avg.
Axle A	I	9000	VI-VII	9020	9010
Axle B	II-I	16590	VII-VIII	16580	16585
Axle C	III-II	16590	VIII-IX	16580	16585
Axle D	IV-III	12170	IX-X	12170	12170
Axle E	V-IV	12170	X-XI	12170	12170
Axle F	VI-V	0	XI	0	0
GVW	VI	66520	XII	66500	66510

Table 3- Axle and GVW Computations - Platform Scale - Instance - _____

	1		2		Avg.
Axle A	I	8990	VI-VII	9010	9000
Axle B	II-I	16540	VII-VIII	16540	16540
Axle C	III-II	16540	VIII-IX	16540	16540
Axle D	IV-III	12170	IX-X	12160	12165
Axle E	V-IV	12170	X-XI	12160	12165
Axle F	VI-V	0	XI	0	0
GVW	VI	66410	XII	66380	66395

Table 4- Axle and GVW Computations - Platform Scale - Instance - _____

	1		2		Avg.
Axle A	I	9080	VI-VII	9040	9060
Axle B	II-I	16630	VII-VIII	16660	16645
Axle C	III-II	16630	VIII-IX	16660	16645
Axle D	IV-III	12160	IX-X	12150	12155
Axle E	V-IV	12160	X-XI	12150	12155
Axle F	VI-V	0	XI	0	0
GVW	VI	66660	XII	66640	66650

Table 5- Axle and GVW Computations - Platform Scale Post-Test

	1		2		Avg.
Axle A	I	9080	VI-VII	8860	8970
Axle B	II-I	16560	VII-VIII	16690	16625
Axle C	III-II	16560	VIII-IX	16690	16625
Axle D	IV-III	12170	IX-X	12150	12160
Axle E	V-IV	12170	X-XI	12150	12160
Axle F	VI-V	0	XI	0	0
GVW	VI	66540	XII	66560	66550

Traffic Sheet 19	STATE CODE:	42
LTPP MONITORED TRAFFIC DATA	SPS WIM ID:	420600
CALIBRATION TEST TRUCK # 2	DATE (mm/dd/yyyy)	11/23/2010

CALIBRATION TEST TRUCK - Secondary

Table 6 - Raw Data -Axle Scales - Pre-test

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1	9000	16590	16590	12170	12170	0	66520
2	9000	16580	16580	12170	12170	0	66500
Avg.	9000	16585	16585	12170	12170	0	66510

Table 7- Raw Data- Axle scales -

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1	8990	16540	16540	12170	12170	0	66400
2	8980	16540	16540	12160	12160	0	66380
Avg.	8985	16540	16540	12165	12165	0	66390

Table 8- Raw Data- Axle scales -

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1	9080	16630	16630	12160	12160	0	66660
2	9020	16660	16660	12150	12150	0	66640
Avg.	9050	16645	16645	12155	12155	0	66650

Table 9 - Raw Data -Axle Scales - Post-test

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1	9080	16560	16560	12170	12170	0	66540
2	8880	16690	16690	12150	12150	0	66560
Avg.	8980	16625	16625	12160	12160	0	66550

Validation Test Truck Run Set - Pre

Measured By: _____

Verified By: _____

Traffic Sheet 21 (Wheel Load) LTPP MONITORED TRAFFIC DATA WIM SYSTEM TRUCK RECORDS	STATE CODE: 42 SPS WIM ID: 420600 DATE: (mm/dd/yyyy): 11/23/2010

Pvmt Temp	Radar speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW	A-B space	B-C space	C-D space	D - E space	E - F space	Axle Length	Overall Length
44.6	60	2	1	9:10:08	18622	60.0	9.0	17.5	16.3	12.4	12.4		67.6	11.7	4.4	31.8	4.1		52.0	63.0
44.6	58	1	1	9:10:21	18630	59.0	11.0	17.1	16.1	15.1	15.2		74.6	11.7	4.4	34.5	4.1		54.7	65.0
45.6	64	2	2	9:20:55	18895	65.0	9.1	17.3	15.9	12.6	12.1		67.0	11.7	4.4	31.9	4.1		52.1	62.0
45.6	63	1	2	9:21:03	18900	64.0	11.0	17.3	16.1	14.8	15.4		74.7	11.8	4.4	34.6	4.1		54.9	65.0
45.9	54	2	3	9:33:37	19210	55.0	9.3	16.9	15.2	11.8	11.0		64.1	11.7	4.4	32.1	4.2		52.4	62.0
45.9	54	1	3	9:33:34	19215	55.0	11.7	17.5	16.1	14.8	15.2		75.4	11.8	4.4	34.8	4.2		55.2	65.0
46.4	59	2	4	9:46:37	19582	59.0	9.3	17.3	15.4	12.6	11.6		66.2	11.7	4.4	31.8	4.1		52.0	62.0
46.4	59	1	4	9:46:43	19584	59.0	11.0	18.0	16.7	14.7	15.6		76.1	11.8	4.4	34.8	4.1		55.1	66.0
46.3	64	1	5	9:58:43	19928	64.0	11.0	17.9	16.7	14.8	15.5		75.9	11.8	4.4	34.6	4.1		54.9	66.0
46.3	55	2	5	10:09:36	20284	55.0	9.6	17.1	15.6	12.0	11.1		65.4	11.8	4.4	32.1	4.2		52.5	62.0
47.1	55	1	6	10:09:41	20286	55.0	10.8	17.3	16.1	15.0	15.3		74.5	11.8	4.4	34.5	4.1		54.8	65.0
47.1	59	1	7	10:22:07	20643	60.0	11.2	17.6	16.5	14.6	15.4		75.2	11.9	4.4	34.7	4.2		55.2	66.0
47.9	63	1	8	11:47:56	23232	63.0	11.1	17.3	16.4	15.0	15.3		75.1	11.8	4.4	34.8	4.1		55.1	66.0
47.9	58	2	6	11:58:09	23551	59.0	9.2	17.7	16.7	13.0	12.3		68.8	11.7	4.3	31.9	4.1		52.0	62.0
50.9	59	1	9	11:58:15	23554	59.0	11.1	17.7	16.7	15.1	14.9		75.5	11.8	4.4	34.6	4.1		54.9	65.0
50.9	54	2	7	12:09:05	23904	54.0	8.6	16.4	14.9	12.0	11.3		63.1	11.6	4.3	31.8	4.1		51.8	62.0
51.3	54	1	10	12:09:11	23906	54.0	11.1	17.3	16.0	15.0	15.3		74.7	11.8	4.3	34.5	4.1		54.7	65.0
51.3	63	1	11	12:21:23	24264	63.0	11.1	17.2	16.6	15.2	15.3		75.3	11.8	4.4	34.5	4.1		54.8	65.0
54.3	61	2	8	12:36:25	24766	61.0	9.1	17.8	16.5	13.0	12.5		68.8	11.7	4.4	31.9	4.1		52.1	62.0
54.3	57	1	12	12:36:30	24773	57.0	11.0	17.8	16.5	15.1	15.1		75.6	11.7	4.4	34.7	4.1		54.9	66.0
53.7	56	2	9	12:48:58	25196	56.0	9.2	17.7	16.6	13.0	12.4		69.0	11.7	4.4	31.9	4.1		52.1	63.0
61.1	53	1	13	12:49:04	25197	54.0	11.8	17.9	15.8	15.5	15.5		76.5	11.8	4.4	34.6	4.1		54.9	65.0
61.1	65	2	10	12:59:59	25601	65.0	8.7	17.1	16.3	13.1	11.9		67.2	11.7	4.4	31.9	4.1		52.1	62.0
57.3	62	1	14	13:00:05	25605	62.0	10.5	16.2	15.8	14.3	15.1		72.0	11.7	4.3	34.5	4.1		54.6	65.0

Recorded By: ar Verified By: djw Run Set Pre

Traffic Sheet 21 (Wheel Load) LTPP MONITORED TRAFFIC DATA WIM SYSTEM TRUCK RECORDS	STATE CODE: 42 SPS WIM ID: 420600 DATE: (mm/dd/yyyy): 11/23/2010

Pvmt Temp	Radar speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW	A-B space	B-C space	C-D space	D - E space	E - F space	Axle Length	Overall Length
57.3	60	2	11	13:10:37	25966	60.0	9.0	17.4	16.2	13.1	12.6		68.2	11.7	4.4	32.0	4.1		52.2	63.0
60.0	58	1	15	13:10:42	25970	58.0	10.0	16.4	15.6	14.5	15.0		71.6	11.7	4.4	34.3	4.1		54.5	65.0
35.9	54	2	12	7:31:00	51320	54.0	10.0	18.7	16.9	13.4	12.8		71.7	11.7	4.4	31.9	4.1		52.1	62.0
35.9	54	1	16	7:31:07	51322	54.0	12.3	18.1	16.8	16.1	16.1		79.3	11.8	4.4	34.6	4.1		54.9	65.0
37.1	57	2	13	7:45:54	51715	59.0	9.9	18.2	16.5	13.5	12.7		70.8	11.7	4.4	31.7	4.1		51.9	63.0
37.1	58	1	17	7:46:05	51719	58.0	11.4	17.9	16.5	15.6	15.7		77.0	11.7	4.4	34.6	4.1		54.8	65.0
35.3	65	2	14	7:57:22	52024	66.0	9.4	17.0	16.6	13.1	11.8		68.9	11.7	4.4	32.0	4.1		52.2	62.0
35.3	65	1	18	7:57:31	52030	62.0	11.4	17.7	16.7	15.6	15.5		77.0	11.7	4.4	34.6	4.1		54.8	66.0
37.5	55	2	15	8:07:50	52323	55.0	9.8	18.0	16.7	12.8	12.4		69.6	11.7	4.4	31.8	4.1		52.0	62.0
37.5	54	1	19	8:07:58	52329	54.0	11.9	18.2	16.5	15.7	15.8		78.1	11.8	4.4	34.6	4.1		54.9	65.0
37.1	60	2	16	8:20:19	52674	60.0	9.3	18.0	16.4	13.4	12.4		69.5	11.7	4.4	31.9	4.2		52.2	62.0
37.1	59	1	20	8:20:26	52682	59.0	11.2	17.2	16.2	15.2	15.2		74.9	11.8	4.4	34.6	4.1		54.9	65.0
34.1	66	2	17	8:31:13	52995	65.0	9.2	18.0	17.4	12.7	12.4		69.8	11.7	4.4	32.1	4.1		52.3	63.0
34.1	64	1	21	8:31:23	52997	63.0	11.2	18.0	16.9	15.2	15.8		77.2	11.7	4.4	34.8	4.1		55.0	65.0
39.1	65	2	18	8:41:01	53270	65.0	9.2	18.0	16.7	13.2	12.9		69.9	11.7	4.4	32.0	4.1		52.2	62.0
39.1	62	1	22	8:41:13	53286	62.0	11.6	18.0	16.2	15.6	15.3		76.8	11.8	4.4	34.5	4.1		54.8	65.0
39.9	65	2	19	8:51:29	53586	65.0	8.6	16.8	15.5	12.5	12.0		65.3	11.7	4.4	32.0	4.1		52.2	62.0
39.9	63	1	23	8:51:33	53590	63.0	11.2	17.7	16.8	15.5	15.5		76.8	11.8	4.4	34.7	4.1		55.0	66.0
41.8	62	2	20	9:02:09	53870	65.0	8.0	16.9	16.0	12.5	11.9		65.3	11.6	4.4	31.9	4.1		52.0	62.0
41.8	63	1	24	9:02:13	53872	62.0	11.6	18.0	17.0	15.3	15.7		77.6	11.7	4.4	34.6	4.1		54.8	64.0

Recorded By: ar Verified By: djw Run Set Pre

Traffic Sheet 21 (Wheel Load) LTPP MONITORED TRAFFIC DATA WIM SYSTEM TRUCK RECORDS	STATE CODE: 42 SPS WIM ID: 420600 DATE: (mm/dd/yyyy): 11/23/2010

Pvmt Temp	Radar speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW	A-B space	B-C space	C-D space	D - E space	E - F space	Axle Length	Overall Length

Recorded By: ar Verified By: djw Run Set Pre

Traffic Sheet 22	STATE CODE:	42
LTPP MONITORED TRAFFIC DATA	SPS WIM ID:	420600
SITE EQUIPMENT ASSESSSMENT	STATE ASSIGNED ID	136
LTPP LANE ONLY	DATE (mm/dd/yyy)	11/23/2010

SITE EQUIPMENT INFORMATION

1. **TYPE OF EQUIPMENT** BOTH

2. **LANE NUMBER ON SITE** 4 **3. DIRECTION ON SITE** east

4. **VENDOR** IRD **MODEL** iSINC **SERIAL#** 070305928

5. **WEIGHING SENSOR TYPE** quartz

6. **SYSTEM SOFTWARE VERSIONS:**

CPU

LOOP

PIEZO

WEIGHPAD/ LOADCELL

COMMUNICATIONS

7. **CLASSIFICATION VIDEO:**

TIME FROM: TO:
TIME FROM: TO:

SITE CONDITIONS

8. **PAVEMENT:**

Indicate any deficiencies that may affect the performance of the WIM sytem. List all photos on Sheet 24 that support the evaluation.

None

Traffic Sheet 22	STATE CODE:	42
LTPP MONITORED TRAFFIC DATA	SPS WIM ID:	420600
SITE EQUIPMENT ASSESSSMENT	STATE ASSIGNED ID	136
LTPP LANE ONLY	DATE (mm/dd/yyy)	11/23/2010

9. IN ROAD SENSORS:

Describe any deficiencies regarding the sensor installation. Indicate sensors that show any signs of being broken, severely worn, missing, removed, or loose. List photos on Sheet 24 for

None

TRUCK OBSERVATIONS

10. Indicate any irregular truck behaviors such as bouncing, swerving, or braking near the weighing area (within 40 meters). Note the distance from the weighing sensors.

None

Minimum 15 minute or 35 truck sample video sample for pavement interaction deficiencies:

Tape Filename: _____

Time: From: _____ To: _____

Traffic Sheet 22	STATE CODE:	42
LTPP MONITORED TRAFFIC DATA	SPS WIM ID:	420600
SITE EQUIPMENT ASSESSSMENT	STATE ASSIGNED ID	136
LTPP LANE ONLY	DATE (mm/dd/yyy)	11/23/2010

11. CLASSIFICATION VERIFICATION VIDEO:

TAPE 1- NAME: _____

Interval	Filename	From	To
1			
2			
3			
4			
5			
6			
7			
8			

TAPE 2- NAME: _____

Interval	Filename	From	To
1			
2			
3			
4			
5			
6			
7			
8			

TAPE 3- NAME: _____

Interval	Filename	From	To
1			
2			
3			
4			
5			
6			
7			
8			

Traffic Sheet 22	STATE CODE:	42
LTPP MONITORED TRAFFIC DATA	SPS WIM ID:	420600
SITE EQUIPMENT ASSESSSMENT	STATE ASSIGNED ID	136
LTPP LANE ONLY	DATE (mm/dd/yyy)	11/23/2010

SYSTEM ACCURACY TESTS

12. CONDUCT THE FOLLOWING SYSTEM ACCURACY TESTS EITHER ON- SITE OR IN OFFICE

Speed Accuracy - Complete Sheet 20 and attach.

Average radar speed 64.6 mph Average WIM Speed 65.4 mph
Mean Difference 0.7 mph SD of mean 1.5

Posted Speed Limit 65 mph
Speed Range 15th percentile - 63 mph 85th percentile- 70 mph

Spacing and Weight - Complete Sheet 21 and attach.

Average distance between axles of drive tandem feet
% error from 4.25 ft (industry average) OR 4.39 ft (WIM system average)
= 3.3 %

Average front axle weight for Class 9 vehicles lbs
% error from 10.3 kips (industry average) OR 10.3 lbs (known site value)
= -0.1 %

SUPPORT EQUIPMENT STRUCTURES

17. Indicate any deficiencies with any site equipment other than the in-road sensors. List all photos on the Sheet 24 for each occurance.

Cabinet/Foundation None ☑

Pull Boxes None ☑

Mast None ☑

Solar Panels None ☑

Traffic Sheet 22 LTPP MONITORED TRAFFIC DATA SITE EQUIPMENT ASSESSSMENT LTPP LANE ONLY	STATE CODE: 42 SPS WIM ID: 420600 STATE ASSIGNED ID 136 DATE (mm/dd/yyy) 11/23/2010

Telephone D-Mark Box None ☐

N/A

Power Service Box None ☐

N/A

Grounding None ☑

Conduit None ☑

STATIC AND DYNAMIC ELECTRONIC EQUIPMENT TESTS

18. Complete and attach a Sheet 22 addendum applicable to the installed road equipment.

ADDITIONAL COMMENTS

Assessor Dean J. Wolf

Traffic Sheet 22 Addendum - Kistler Quartz	STATE CODE:	42
LTPP MONITORED TRAFFIC DATA	SPS WIM ID:	420600
SITE EQUIPMENT ASSESSSMENT	STATE ASSIGNED ID	136
LTPP LANE ONLY	DATE (mm/dd/yyy)	11/23/2010

STATIC EQUIPMENT VALUES (SYSTEM OFF)

1. POWER

a. Solar Panel	160	WATTS	18.7	VDC
b. Equipment Power		VAC		VDC
c. Battery 1	12.5	VDC		
d. Battery 2	12.5	VDC		
e. Regulated	11.3	VDC		
f. Power Supply		VDC		VDC
g. System Input		VAC	11.3	VDC
h. Modem Power		VAC	11.3	VDC
i. Telephone		VDC		

2. LOOP SENSORS

	Resistance		Inductance		Shield	
a. Leading	1.1	Ω		µh	inf	MΩ
b. Trailing	2.1	Ω		µh	4.6	MΩ

3. KISTLER SENSORS

	Resistance		Capacitance	
a. K1 (lead/left)	10^9	Ω	6.9	ηf
b. K2 (lead/middle)	10^10	Ω	7.5	ηf
c. K3 (lead mid/right)	10^10	Ω	7.9	ηf
d. K4 (lead/right)	10^9	Ω	6.9	ηf
e. K5 (trail/left)	10^10	Ω	8.3	ηf
f. K6 (trail/mid left)	10^10	Ω	7.1	ηf
g. K7 (trail/mid right)	10^10	Ω	7.8	ηf
h. K8 (trail/right)	10^10	Ω	6.9	ηf

DYNAMIC EQUIPMENT VALUES (SYSTEM ON)

4. LOOP SENSORS

	Frequency	
a. Leading	10.3	KHz
b. Trailing	10.3	KHz

5. KISTLER SENSORS

Dynamic testing for the Kistler Quartz sensor is not recommended.

Assessor Dean J. Wolf

Traffic Sheet 24A LTPP MONITORED TRAFFIC DATA SITE PHOTO LOG - Equipment	STATE CODE: 42 SPS WIM ID: 420600 DATE (mm/dd/yyy) 11/23/2010

Item	Description	Filename
1	Power Source	420600_Solar_Panel_11_23_10.jpg
2	Telephone Source	420600_Cell_Modem_11_23_10.jpg
3	Cabinet Exterior	420600_Cabinet_Exterior_11_23_10.jpg
4	Cabinet Interior	420600_Cabinet_Interior_Front_11_23_10.jpg
5	Leading weight sensor	420600_Leading_WIM_Sensor_11_23_10.jpg
6	Trailing weight sensor	420600_Trailing_WIM_Sensor_11_23_10.jpg
7	Leading classification sensor	
8	Trailing classification sensor	
9	Leading loop sensor	420600_Leading_Loop_11_23_10.jpg
10	Trailing loop sensor	420600_Trailing_Loop_11_23_10.jpg
11	Downstream from site	420600_Downstream_11_23_10.jpg
12	Upstream from site	420600_Upstream_11_23_10.jpg
13	Cabinet Interior - Rear	420600_Cabinet_Interior_Rear_11_23_10.jpg
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		

RECORDED BY: Dean J. Wolf

Traffic Sheet 24B	STATE CODE:	42
LTPP MONITORED TRAFFIC DATA	SPS WIM ID:	420600
SITE PHOTO LOG - Test Trucks	DATE (mm/dd/yyy)	11/23/2010

Item	Description	Filename
1	Tractor, Truck #1	420600_Truck_1_Tractor_11_23_10.jpg
2	Trailer/Load, Truck #1	420600_Truck_1_Trailer_11_23_10.jpg
3	Kingpin Offset, Truck #1	
4	Suspension A, Truck #1	420600_Truck_1_Suspension_1_11_23_10.jpg
5	Suspension B, Truck #1	420600_Truck_1_Suspension_2_11_23_10.jpg
6	Suspension C, Truck #1	420600_Truck_1_Suspension_3_11_23_10.jpg
7	Suspension D, Truck #1	420600_Truck_1_Suspension_4_11_23_10.jpg
8	Suspension E, Truck #1	420600_Truck_1_Suspension_5_11_23_10.jpg
9	Suspension F, Truck #1	
10	Tractor, Truck #2	420600_Truck_2_Tractor_11_23_10.jpg
11	Trailer/Load, Truck #2	420600_Truck_2_Trailer_11_23_10.jpg
12	Kingpin Offset, Truck #2	
13	Suspension A, Truck #2	420600_Truck_2_Suspension_1_11_23_10.jpg
14	Suspension B, Truck #2	420600_Truck_2_Suspension_2_11_23_10.jpg
15	Suspension C, Truck #2	420600_Truck_2_Suspension_3_11_23_10.jpg
16	Suspension D, Truck #2	420600_Truck_2_Suspension_4_11_23_10.jpg
17	Suspension E, Truck #2	420600_Truck_2_Suspension_5_11_23_10.jpg
18	Suspension F, Truck #2	
19	Tractor, Truck #3	
20	Trailer/Load, Truck #3	
21	Kingpin Offset, Truck #3	
22	Suspension A, Truck #3	
23	Suspension B, Truck #3	
24	Suspension C, Truck #3	
25	Suspension D, Truck #3	
26	Suspension E, Truck #3	
27	Suspension F, Truck #3	
28	Scale	
29		
30		

RECORDED BY: Dean J Wolf