INTERNATIONAL ROAD DYNAMICS INC.

LTPP WIM DATA COLLECTION SYSTEMS

INSTALLATION AND CALIBRATION FOR ARKANSAS SPS-2 LTPP ID 050200

December 13, 2006

CLIN 2004A TASK ORDER # 15

CONTRACT NO. DTFH61-05-D-00001

U.S. Department of Transportation
Federal Highway Administration

LONG TERM Pavement PERFORMANCE

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY

This report details the installation and calibration of the Arkansas SPS-2 Weigh-in-Motion (WIM) site located on I-30 at mile post 101.8. The WIM site is instrumented with IRD's iSINC (Intelligent Sensor Interface Network Controller) WIM Electronic and the IRD/PAT 1.75 Meter Bending Plate. The west bound outside lane is instrumented for WIM data collection consisting of two inductive loops and two bending plates. The WIM system will use a landline phone for communication and 120V A.C. to power the equipment. The utilities service drop is located approximately 300' west of the WIM cabinet in the median.

The WIM equipment installation began on October 17, 2006 and was completed on October 19, 2006. The WIM system was calibrated on December 13, 2006.

The results demonstrate the WIM system meets the LTPP performance requirements for weight and axle spacing as detailed in the *Data Collection Guide for SPS WIM Sites*. The speed and classification tests demonstrate the classification algorithm still needs improvement on class 3, 4, and 5 vehicles. The classification test was carried out with the latest classification algorithm from LTPP's Expert Task Group installed in the ISINC WIM electronic.

2.0 POINT OF CONTACTS

- FHWA – LTPP Contracting Officer's Technical Representative (COTR)
  - Debbie Walker –
  - ph: (202) 493-3068
  - deborah.walker@fhwa.dot.gov

- Arkansas DOT
  - Mark Greenwood
  - ph: (501) 569-2552

- FHWA Division Office, Division Representative
  - Lester Frank
  - ph: (501) 324-6428

- International Road Dynamics, Phase 2 Contractor, Project Manager
  - Bruce Myers -
  - ph: (717) 264-2077
  - bruce.myers@irdinc.com

- McConnell Heavy Hauling Inc.
  - ph: (501) 490-1481

3.0 SHEET 16 – SITE CALIBRATION SUMMARY

SITE CALIBRATION INFORMATION

1. DATE OF CALIBRATION (MONTH/DAY/YEAR): **Dec 13, 2006**

2. TYPE OF EQUIPMENT CALIBRATED:
   - ☒ WIM
   - ☐ CLASSIFIER
   - ☐ BOTH

3. REASON FOR CALIBRATION
   - ☐ REGULARLY SCHEDULED SITE VISIT
   - ☐ RESEARCH
   - ☐ EQUIPMENT REPLACEMENT
   - ☐ TRAINING
   - ☐ DATA TRIGGERED SYSTEM REVISION
   - ☒ NEW EQUIPMENT INSTALLATION
   - ☐ OTHER (SPECIFY) _____

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

5. EQUIPMENT MANUFACTURER: **International Road Dynamics Inc.**

WIM SYSTEM CALIBRATION SPECIFICS

6. CALIBRATION TECHNIQUE USED:
   - ☐ TRAFFIC STREAM:
     - NUMBER OF TRUCKS _____
     - ☐ STATIC SCALE
   - ☒ TEST TRUCKS:
     - NUMBER OF TEST TRUCKS **2**
     - PASSES PER TRUCK **23**

TRUCK#	TYPE	SUSPENSION
1	**9**	**1 & 2**
2	**9**	**1 & 2**
3	**X**	**X**
4	**X**	**X**
5	**X**	**X**

TYPE PER FHWA 13 BIN SYSTEM
SUSPENSION TYPES:
1 – AIR
2 – LEAF SPRING
3 – OTHER

7. SUMMARY CALIBRATION RESULTS (EXPRESSED AS A PERCENT)

GVW MEAN DIFFERENCE	**-0.5%**	STANDARD DEVIATION	**3.4%**
SINGLE AXLE MEAN DIFFERENCE	-**5.8%**	STANDARD DEVIATION	**4.8%**
DOUBLE AXLES MEAN DIFFERENCE	**0.6%**	STANDARD DEVIATION	**4.2%**

8. NUMBER OF SPEEDS AT WHICH CALIBRATION WAS PERFORMED: **3**

9. DEFINE THE SPEED RANGES USED (MPH): **50 - 57, 58 - 65, 66 – 71**

10. CALIBRATION FACTOR (AT EXPECTED FREE FLOW SPEED) **See following sheets**

11. IS AUTO-CALIBRATION USED AT THIS SITE? ☐
    IF USED, LIST AND DEFINE AUTO-CALIBRATION VALUE _____

CLASSIFIER TEST SPECIFICS

12. METHOD FOR COLLECTING INDEPENDENT VOLUME MEASUREMENT BY VEHICLE CLASS:
    - ☐ VIDEO
    - ☒ MANUAL
    - ☐ PARALLEL CLASSIFIERS

13. METHOD TO DETERMINE LENGTH OF COUNT:
    TIME **1.5 hour**
    NUMBER OF VEHICLES **157**
    NUMBER OF TRUCKS **110**

14. MEAN DIFFERENCE IN VOLUMES BY VEHICLES CLASSIFICATION:

FHWA CLASS 2	**0%**
FHWA CLASS 3	**41%**
FHWA CLASS 4&5	**63%**
FHWA CLASS 8	**100%**
FHWA CLASS 9	**100%**
FHWA CLASS 12	**100%**
"UNCLASSIFIED" VEHICLES:	**0%**

15. PICTURES: _____

16. NOTES:
    _____

PERSON LEADING CALIBRATION EFFORT: **Bruce Myers**
CONTACT INFORMATION: **717-264-2077**

3.1.1 FINAL SITE CALIBRATION FACTORS ARKANSAS SPS-2 050200, I-30, MP 101.8

Time of Change : 12-13-2006 1:22pm

Site Parameters

Lane **1**

Upstream Loop
- Loop State **Enabled**
- Module ID **9**
- Channel ID **0**
- Polarity **Active Low**
- Width (cm) **285**

Downstream Loop
- Loop State **Enabled**
- Module ID **9**
- Channel ID **1**
- Polarity **Active Low**
- Width (cm) **285**
- Distance (cm) **720**

Axle Sensors

Axle **1**
- Axle State **Enabled**
- Module ID **5**
- Channel ID **0**
- Polarity Active **High**
- Type **Bending Plate**
- Distance (cm) **270**
- Temp Module UID **5**
- Temp Channel Num **0**

Axle **2**
- Axle State **Enabled**
- Module ID **5**
- Channel ID **1**
- Polarity **Active High**
- Type **Bending Plate**
- Distance (cm) **640**
- Temp Module UID **5**
- Temp Channel Num **0**

Processing
- Axle Sensor Width **50**
- Axle Sep **372**

Calibration

Lane **1**

Axle Sensor **1**
- Threshold **40**
- WIM Calib Factors
  - Speed Bin **1**
  - Max Speed **80 kph (50 mph)**
  - Calibration Factor **3475**
  - Speed Bin **2**
  - Max Speed **88 kph (55 mph)**
  - Calibration Factor **3530**
  - Speed Bin **3**
  - Max Speed **97 kph (60 mph)**
  - Calibration Factor **3655**
  - Speed Bin **4**
  - Max Speed **105 kph (65 mph)**
  - Calibration Factor **3600**
  - Speed Bin **5**
  - Max Speed **113 kph (70 mph)**
  - Calibration Factor **3670**

Axle Sensor **2**
- Threshold **40**
- WIM Calib Factors
  - Speed Bin **1**
  - Max Speed **80 kph (50 mph)**
  - Calibration Factor **3475**
  - Speed Bin **2**
  - Max Speed **88 kph (55 mph)**
  - Calibration Factor **3530**
  - Speed Bin **3**
  - Max Speed **97 kph (60 mph)**
  - Calibration Factor **3655**
  - Speed Bin **4**
  - Max Speed **105 kph (65 mph)**
  - Calibration Factor **3600**
  - Speed Bin **5**
  - Max Speed **113 kph (70 mph)**
  - Calibration Factor **3670**

3.1.2 INITIAL SITE CALIBRATION FACTORS ARKANSAS SPS-2 050200, I-30, MP 101.8

Time of Change : 12-13-2006 8:37 am

Site Parameters

Lane **1**

Upstream Loop
- Loop State **Enabled**
- Module ID **9**
- Channel ID **0**
- Polarity **Active Low**
- Width (cm) **250**

Downstream Loop
- Loop State **Enabled**
- Module ID **9**
- Channel ID **1**
- Polarity **Active Low**
- Width (cm) **250**
- Distance (cm) **720**

Axle Sensors

Axle **1**
- Axle State **Enabled**
- Module ID **5**
- Channel ID **0**
- Polarity Active **High**
- Type **Bending Plate**
- Distance (cm) **270**
- Temp Module UID **5**
- Temp Channel Num **0**

Axle **2**
- Axle State **Enabled**
- Module ID **5**
- Channel ID **1**
- Polarity **Active High**
- Type **Bending Plate**
- Distance (cm) **600**
- Temp Module UID **5**
- Temp Channel Num **0**

Processing
- Axle Sensor Width **50**
- Axle Sep **372**

Calibration

Lane **1**

Axle Sensor **1**
- Threshold **40**
- WIM Calib Factors
  - Speed Bin **1**
  - Max Speed **80 kph (50 mph)**
  - Calibration Factor **3405**
  - Speed Bin **2**
  - Max Speed **88 kph (55 mph)**
  - Calibration Factor **3405**
  - Speed Bin **3**
  - Max Speed **97 kph (60 mph)**
  - Calibration Factor **3460**
  - Speed Bin **4**
  - Max Speed **105 kph (65 mph)**
  - Calibration Factor **3590**
  - Speed Bin **5**
  - Max Speed **113 kph (70 mph)**
  - Calibration Factor **3625**

Axle Sensor **2**
- Threshold **40**
- WIM Calib Factors
  - Speed Bin **1**
  - Max Speed **80 kph (50 mph)**
  - Calibration Factor **3405**
  - Speed Bin **2**
  - Max Speed **88 kph (55 mph)**
  - Calibration Factor **3405**
  - Speed Bin **3**
  - Max Speed **97 kph (60 mph)**
  - Calibration Factor **3460**
  - Speed Bin **4**
  - Max Speed **105 kph (65 mph)**
  - Calibration Factor **3590**
  - Speed Bin **5**
  - Max Speed **113 kph (70 mph)**
  - Calibration Factor **3625**

4.0 WIM SITE INVENTORY

1. ROUTE I-30 MILEPOST:101.8 LTPP DIRECTION: N S E **W**

2. SITE DESCRIPTION
   GRADE: <1%
   ☐ Sag vertical
   Nearest SPS section upstream of the site: 050221
   Distance from sensor to nearest upstream SPS Section: 6 Miles

3. LANE CONFIGURATION
   Number of lanes in LTPP direction: 2 lanes
   Lane width: 12 ft.

☐ Median painted	☐ Shoulder curb and gutter
☐ Median physical barrier	☐ Shoulder paved AC
☒ Median grass	☒ Shoulder paved PCC
☐ Median none	☐ Shoulder unpaved

   Shoulder width: 10 ft.

4. PAVEMENT TYPE: 13 inch thick, plain jointed, joins perpendicular 15' oc dowelled

5. CONDITION: (Surface distresses by type / severity within WIM section)
   Excellent

6. SENSOR SEQUENCE: Loop - Bending Plate - Bending Plate - Loop

7. PAVEMENT REPLACEMENT AND/OR GRINDING:
   Straightedge check: Performed _____ Result: ☒ Pass / ☐ Marginal / ☐ Unsatisfactory
   Short wave check: Performed _____ Result: ☒ Pass / ☐ Marginal / ☐ Unsatisfactory
   Long wave check: Performed _____ Result: ☒ Pass / ☐ Marginal / ☐ Unsatisfactory

8. ANY EFFECTS FROM RAMPS OR LANE TRANSITIONS:
   ☐ Intersection/driveway within 300m upstream, distance: _____
   ☐ Intersection/driveway within 300m downstream, distance: _____
   ☐ LTPP lane used for passing by vehicles traveling in south bound lane

9. DRAINAGE:
   ☐ Open to ground
   ☐ Pipe to culvert or ditch
   ☐ None
   ☒ French drain
   Clearance under plates: 2.25 inches
   Clearance/access to flush fines from under system: Unbolt retaining rails and lift bending plate

10. CABINET LOCATION:
    - ☐ Same side of road as LTPP lane
    - ☒ Median
    - ☒ Behind guard rail

    Distance from edge of travel lane to cabinet: 50 ft
    Distance from sensors: 150 ft
    Type: 336
    Access controlled by: ☐ LTPP / ☒ State / ☐ Joint
    Primary contact: Mark Greenwood (501) 569-2552
    Alternate contact:

11. POWER:
    Power type: ☐ Overhead / ☒ Underground / ☐ Solar
    Distance from cabinet to drop: 300 ft
    Service provider: A.C.

12. TELEPHONE:
    Telephone type: ☐ Overhead / ☒ Underground / ☐ Cell
    Distance from cabinet to drop: 300 ft
    Service provider: _____

13. SYSTEM:
    Software: iSINC
    Version: _____
    Connection: ☒ RS232 / ☐ Parallel port / ☐ USB / ☐ Other

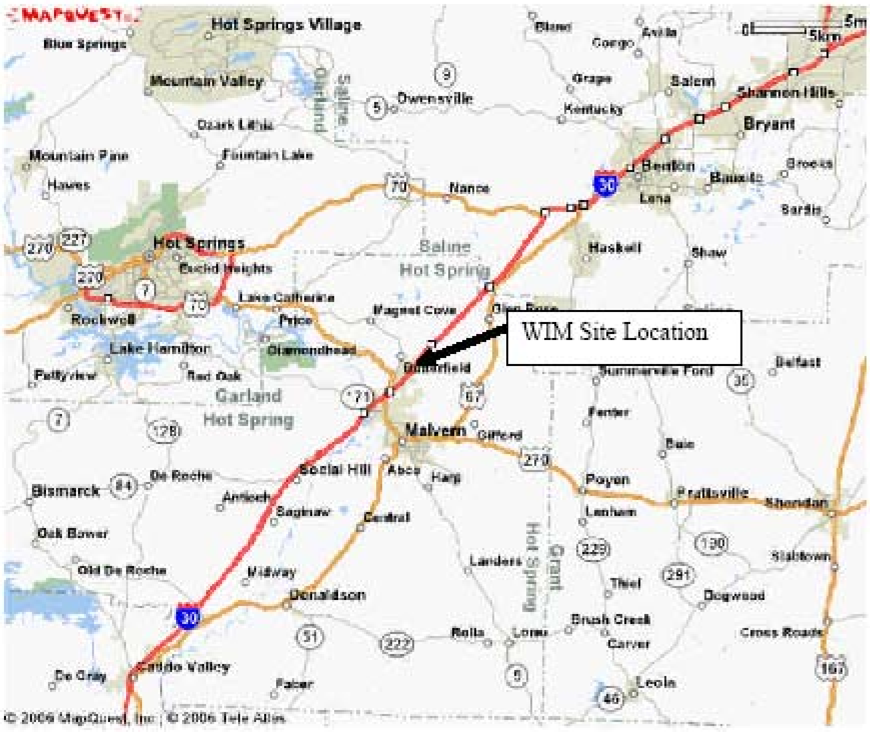
14. TEST TRUCK CYCLE:
    Turnaround time: 15 minutes
    Turnaround distance: 15 miles

15. PICTURES: See following pages, Site Map, WIM Site, Site layout drawings

16. NOTES:
    _____

COMPLETED BY: **Bruce Myers**
CONTACT INFORMATION: **717-264-2077**

4.1.1 SITE MAP


WIM Site Location
Hot Springs Village
Mountain Valley
Owensville
Salem
Shannon Hills
Bryant
Benton
Hot Springs
Lake Hamilton
Butterfield
Malvern
Social Hill
Bismarck
Donaldson
Caddo Valley
Haskell
Poyen
Prattsville
Sheridan
Leola
© 2006 MapQuest, Inc.; © 2006 Tele Atlas

4.1.2 PICTURES, WIM SITE


13 04:52 PM

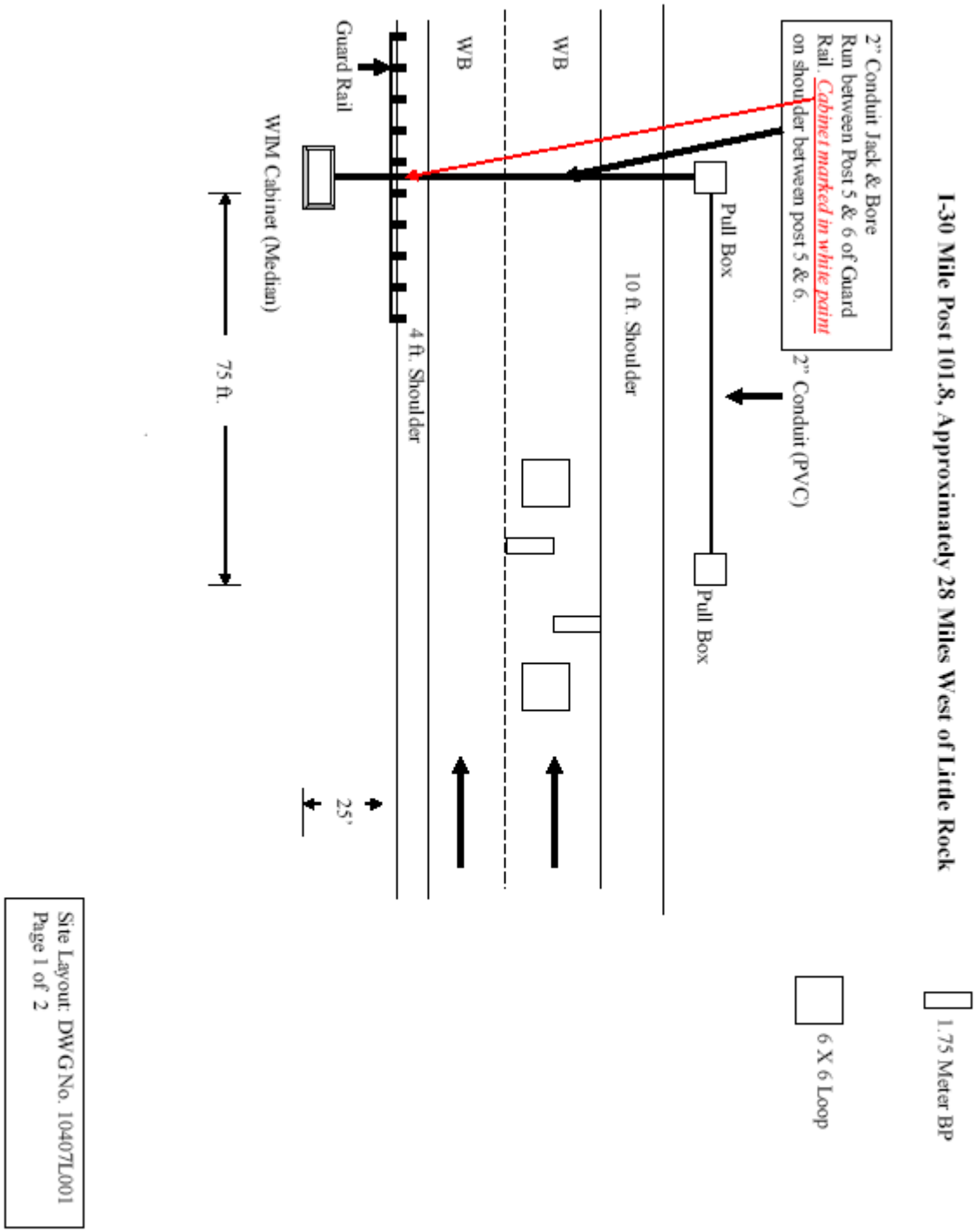

2006/10/19

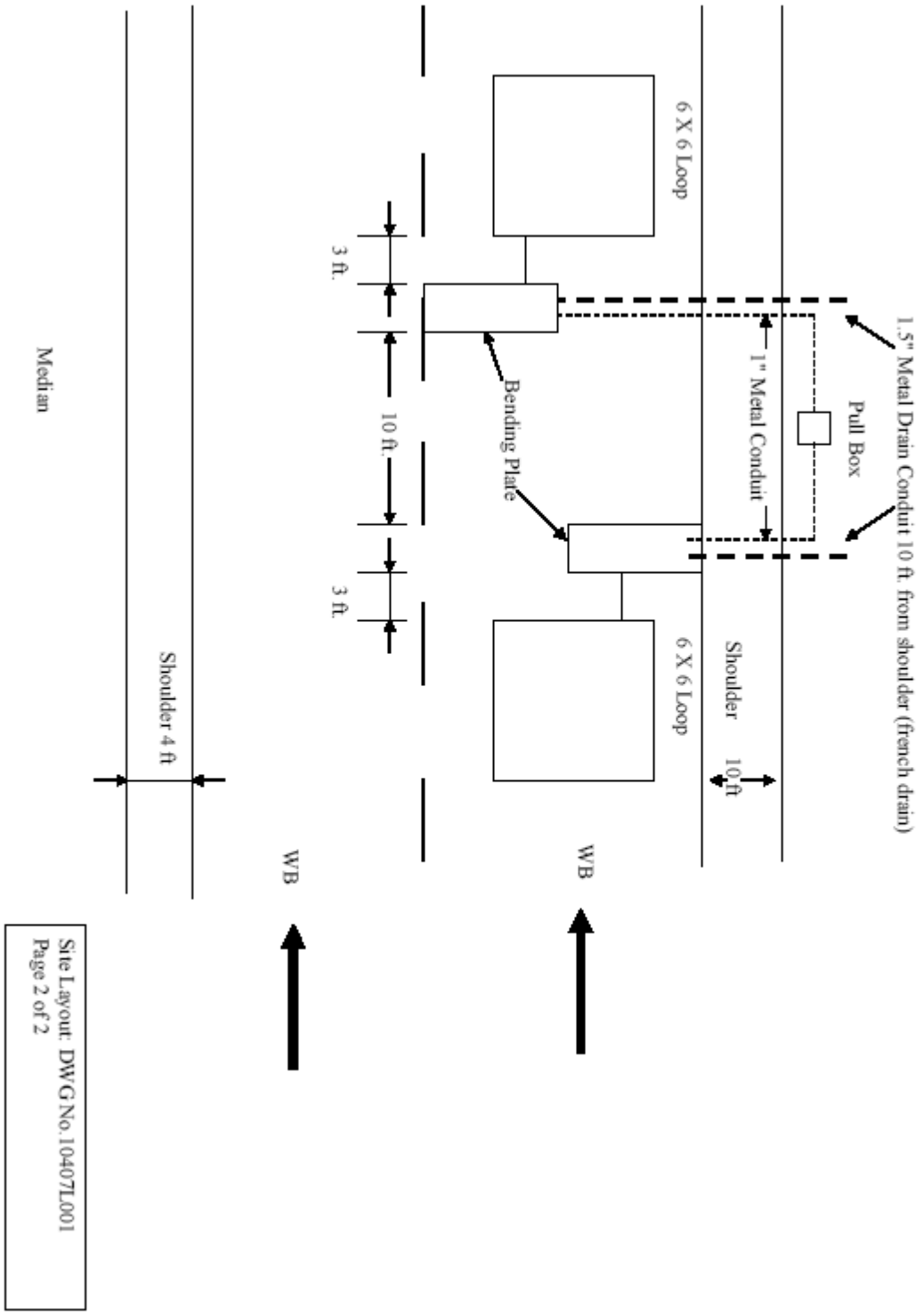

2006/10/19


1205-ET
2006/10/19

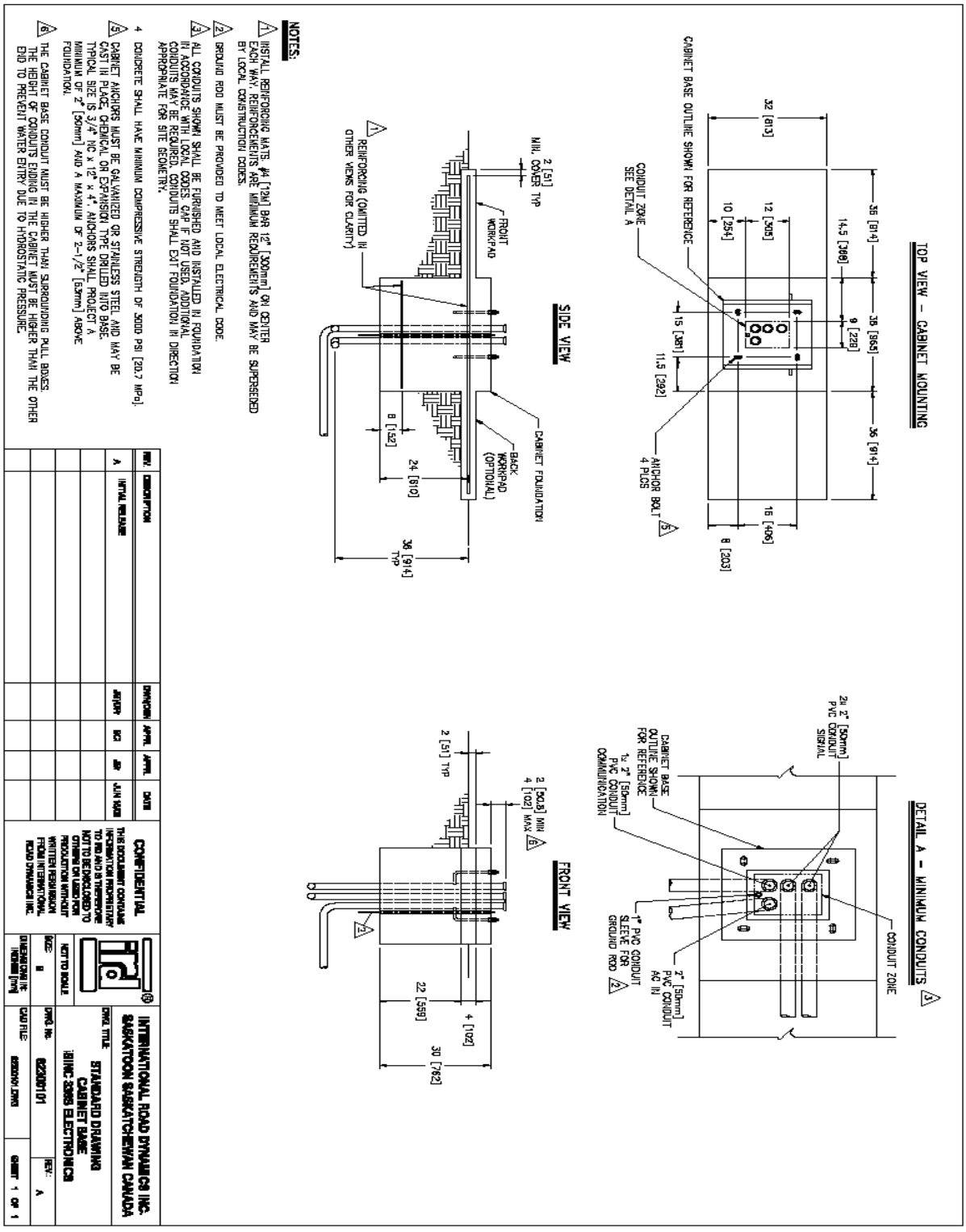

2006/10/19

4.1.3 SITE LAYOUT




1.5" Metal Drain Conduit 10 ft. from shoulder (french drain)
Pull Box
1" Metal Conduit
Bending Plate
6 X 6 Loop
6 X 6 Loop
3 ft.
10 ft.
3 ft.
Shoulder 10 ft
Median
Shoulder 4 ft
WB
WB
Site Layout: DWG No.10407L001
Page 2 of 2

4.1.4 WIM CABINET CONCRETE PEDESTAL



4.1.5 ELECTRICAL READINGS

International Road Dynamics Inc.

Site Service Sheet

Clear

Bending Plate **System Type: iSINC**

Date: 10/19/2006 **State: AR** **Location: I-30 Mile Post 101.8**
Job #: 10407L **Site #:** **Directions: ~Approx. 20 miles W of Little Rock**

	Lane - 1		Lane -		Lane -		Lane -	
Loops	**Lead**	**Trail**	**Lead**	**Trail**	**Lead**	**Trail**	**Lead**	**Trail**
Resistance	1.0	1.0						
Leakage	inf.	inf.						
Inductance								
Frequency	N/A	N/A						

	Lane - 1		Lane -		Lane -		Lane -	
Weighpads	**Lead**	**Trail**	**Lead**	**Trail**	**Lead**	**Trail**	**Lead**	**Trail**
Supply	979Ω	979Ω						
Signal	846Ω	846Ω						
Shield	inf.	inf.						
Zero Pt	0.1 mV	0.1 mV						
Serial #	7261	7255						

Piezos	Lane -		Lane -		Lane -		Lane -	
Amplitude								
Capacitance								
Resistance								

System

A/C Service	120 VAC
Power Supply	13.5
Solar Panel	N/A
Back-Up	13.5 VDC
System Input	N/A
Modem Power	13.5 VDC
Phone off hook	8 VDC
Phone on hook	48 VDC

Temp Sensor

Red to Blk	7 MΩ
Red to Wht	6.07MΩ
Wht to Blk	40KΩ

Technician: **Bruce Myers** **Date:** **10/19/2006**

5.0 WIM CALIBRATION

5.1.1 TEST TRUCK #1 INFORMATION

DATE OF CALIBRATION: **December 13, 2006**

1. TEST TRUCK NUMBER: 1 2. FHWA CLASS: 9 3. Number of axles: 5

Axle	Empty Truck Axle Weights (lb)	4. Pre-Test Loaded Axle Weights (lb)	5. Post-Test Loaded Axle Weights (lb)	6. Measured Directly or Calculated
A		10820		D
B		27020		D (B&C combined)
C				
D		26180		D (D&E combined)
E				

7. CALCULATIONS:

Empty Truck Gross Weight (lb)	Pre-Test Loaded Gross Weight (lb)	Post-Test Loaded Gross Weight (lb)	Pre to Post Difference (lb)
	64020		64020

8. TRACTOR CAB STYLE: ☐ Cab over engine / ☒ Conventional ☒ With sleeper

9. TRACTOR MANUFACTURER:
   Make: Kenworth
   Model: W900

10. TRAILER LOAD DESCRIPTION: Concrete Barriers

11. TRAILER TARE WEIGHT (lb): _____

12. AXLE SPACINGS

Axle	Spacing (feet & inches)
A-B	19.5'
B-C	4.2'
C-D	29.7’
D-E	10’

KINGPIN OFFSET FROM AXLE B (ft, + towards rear): +1.5 ft

SUSPENSSION:

Axle	17. Tire Size	18. Suspension description (leaf, air, # of leaves, taper or flat leaf, etc.)
A	11R24	Leaf spring – two leaves
B	11R24	air
C	11R24	air
D	11R24	air
E	11R24	air

5.1.2 PICTURES, TEST TRUCK 1


Great Dane
13 8:40 AM


Great Dane
13 8:39 AM

5.1.3 TEST TRUCK #2 INFORMATION

DATE OF CALIBRATION: **December 13, 2006**

1. TEST TRUCK NUMBER: 1 2. FHWA CLASS: 9 3. Number of axles: 5

Axle	Empty Truck Axle Weights (lb)	4. Pre-Test Loaded Axle Weights (lb)	5. Post-Test Loaded Axle Weights (lb)	6. Measured Directly or Calculated
A		11000		D
B		30280		D (B&C combined)
C				
D		34080		D (D&E combined)
E				

7. CALCULATIONS:

Empty Truck Gross Weight (lb)	Pre-Test Loaded Gross Weight (lb)	Post-Test Loaded Gross Weight (lb)	Pre to Post Difference (lb)
	75360		

Special Note! – Truck 2 filled up on gas with 5 passes to go

8. TRACTOR CAB STYLE: ☐ Cab over engine / ☒ Conventional ☒ With sleeper

9. TRACTOR MANUFACTURER:
   Make: Kenworth
   Model: W900

10. TRAILER LOAD DESCRIPTION: Concrete Barriers

11. TRAILER TARE WEIGHT (lb): _____

12. AXLE SPACINGS

Axle	Spacing (feet & inches)
A-B	17’
B-C	4.3’
C-D	26.8’
D-E	10’

KINGPIN OFFSET FROM AXLE B (ft, + towards rear): +1.5 ft

SUSPENSSION:

Axle	17. Tire Size	18. Suspension description (leaf, air, # of leaves, taper or flat leaf, etc.)
A	11R24	Leaf spring – two leaves
B	11R24	air
C	11R24	air
D	11R24	air
E	11R24	air

5.1.4 PICTURES, TEST TRUCK 2


13 8:41AM


GENERAL
13 8:41AM

6.0 SHEET 20 – SPEED AND CLASSIFICATION CHECKS

6.1.1 SHEET 20 PAGE 1

Sheet 20	* STATE_CODE Arkansas
LTPP Traffic Data	*SPS PROJECT_ID
Speed and Classification Checks * 1 of* 50	* DATE 10/20/2006

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	1389	65	9	71	2	2034	71	2
60	9	1391	61	9	65	9	2039	65	9
62	9	1474	62	9	72	5	2047	72	3
67	5		68	3	70	2	2054	70	2
56	2	1486	56	2	72	5	2062	72	5
66	9	1491	66	9	68	8	2069	68	8
68	5	1494	68	3	42	2	2074	43	2
64	8	1502	63	8	65	9	2082	65	9
63	9	1507	64	9	64	9	2094	64	9
61	9	1510	62	9	62	2	2098	63	2
64	11	1515	63	11	60	9	2104	60	9
64	2	1522	64	2	72	2	2110	72	2
66	9	1532	66	9	70	2	2115	70	2
66	5	1537	67	3	66	2	2127	66	2
65	9	1540	65	9	70	9	2134	70	9
61	9	1541	61	9	68	9	2135	68	9
60	3	1556	60	3	73	3	2143	74	3
65	9	1558	65	9	66	9	2145	67	9
67	9	1570	67	9	66	2	2148	66	2
66	9	1691	66	9	62	3	2157	62	3
60	11	1698	61	11	58	2	2168	58	2
68	2	1704	67	2	70	5	2179	70	3
71	2	1706	71	2	67	9	2185	67	9
66	9	2018	66	9	62	12	2192	62	12
64	9	2028	65	9	67	6	2202	67	6

Recorded by Bruce Mayes Direction WB Lane 1 Time from 11:21am to 12:39pm
Ray Pollow

6.1.2 SHEET 20 PAGE 2

Sheet 20	* STATE_CODE Arkansas
LTPP Traffic Data	*SPS PROJECT_ID
Speed and Classification Checks * 51 of* 100	* DATE 10/20/2006

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	2224	65	9	64	5	2403	64	5
73	2	2228	73	2	68	2	2408	68	2
62	3	2237	62	3	60	8	2418	60	8
70	2	2248	70	2	65	5	2421	65	3
68	3	2258	68	3	66	9	2425	65	9
75	2	2265	75	2	72	2	2430	72	2
80	5	2279	79	3	62	9	2435	62	9
64	8	2292	64	8	63	9	2438	63	9
63	9	2295	63	9	69	9	2445	69	9
77	3	2302	77	3	65	2	2447	65	2
64	3	2309	64	3	69	2	2450	69	2
73	5	2320	73	3	65	9	2452	65	9
64	9	2333	65	9	65	9	2469	65	9
67	5	2346	67	3	59	5	2474	59	3
66	9	2354	66	9	59	4	2477	59	5
73	2	2356	73	2	68	9	2499	68	9
61	4	2361	61	5	61	9	2505	61	9
64	9	2367	64	9	67	9	2510	67	9
63	9	2370	63	9	70	2	2513	71	2
68	9	2377	69	9	72	2	2730	72	2
73	5	2382	73	5	59	5	2733	59	5
66	8	2388	66	8	70	5	2737	71	5
66	2	2391	67	2	70	2	2843	70	2
64	8	2395	64	8	64	9	2847	64	9
75	2	2399	75	2	66	11	2854	66	11

Recorded by Bruce Myers Direction WB Lane 1 Time from 12:40 pm to 1:33 pm
Ray Pollow

6.1.3 SHEET 20 PAGE 3

Sheet 20	* STATE_CODE Arkansas
LTPP Traffic Data	*SPS PROJECT_ID
Speed and Classification Checks * 101 of* 112	* DATE 10/20/2006

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	2869	64	5					
71	6	2871	71	6					
69	5	2879	69	3					
62	9	2886	62	9					
49	2	2887	50	2					
60	9	2895	61	9					
61	9	2899	60	9					
70	2	2901	70	2					
64	9	2902	64	9					
64	9	2903	64	9					
62	9	2914	62	9					

Recorded by Bruce Myers Direction WB Lane 1 Time from 1:35pm to 1:38pm
Ray Pollow

7.0 TEST TRUCK CALIBRATION RECORDS

7.1.1 VALIDATION RUNS DEC-13-2006

International Road Dynamics Inc.

FHWA VERIFICATION

Static Test Vehicle Measurements

ID				GVW	F/A	T1	T2	1>2	2>3	3>4	4>5
1				64.0	10.8	27.0	26.2	19.5	4.2	29.7	10.0
2				75.4	11.0	30.3	34.1	17.0	4.3	26.8	10.0

Dynamic Test Vehicle Measurements

ID	V#	Speed	Temp	GVW	F/A	T1	T2	1>2	2>3	3>4	4>5
1	160	51	39	63.5	10.7	27.1	25.7	19.6	4.3	29.5	10.1
2	161	51	39	75.4	10.8	30.8	33.8	17.0	4.3	26.7	9.9
2	476	70	39	73.8	10.0	28.0	35.8	16.9	4.3	26.7	10.0
1	969	58	40	61.4	9.6	25.9	26.0	19.5	4.3	29.4	10.1
2	970	58	40	72.5	10.0	30.6	31.9	16.9	4.3	26.8	9.9
1	1131	67	40	61.2	10.3	26.3	24.6	19.5	4.4	29.4	10.0
2	1133	72	43	80.3	9.8	32.5	38.0	16.9	4.3	26.9	10.0
2	1320	55	43	70.3	10.4	30.0	32.5	16.9	4.3	26.7	10.0
1	1492	56	45	63.0	9.8	27.6	25.5	19.5	4.3	29.4	10.0
2	1493	59	45	69.9	9.1	29.4	31.4	17.0	4.3	27.1	10.0
1	1661	65	47	65.3	11.1	27.4	26.8	19.5	4.3	29.4	10.0
2	1663	70	47	71.9	9.8	28.9	33.3	16.9	4.3	26.9	10.0
1	1891	70	48	62.8	9.9	26.0	26.9	19.3	4.3	29.6	10.1
2	1892	71	48	74.7	10.0	29.2	35.5	16.9	4.4	26.7	10.0
1	2067	55	51	63.2	9.8	27.3	26.1	19.4	4.3	29.4	10.0
2	2068	54	51	73.8	10.5	30.1	33.1	16.9	4.3	26.7	10.0
1	2238	60	52	62.4	10.0	26.5	26.0	19.5	4.3	29.4	10.1
2	2241	63	52	71.9	10.0	30.1	31.7	16.8	4.3	26.8	9.9
1	2795	55	60	63.4	10.6	28.0	24.7	19.5	4.3	29.4	10.0
2	2796	55	60	75.8	10.3	31.6	33.9	17.0	4.3	27.0	10.0
1	2986	58	61	64.7	10.6	28.2	26.1	19.5	4.3	29.4	10.1
2	2987	59	61	75.6	10.1	31.5	34.0	16.9	4.3	27.0	10.0
1	3344	55	63	63.7	10.3	26.9	26.5	19.5	4.3	29.4	10.1
2	3345	55	63	74.9	10.9	30.8	33.1	16.9	4.3	26.7	9.9
1	3507	70	64	67.7	11.4	27.6	28.0	19.6	4.4	29.5	10.1
2	3509	70	64	79.8	10.0	32.7	37.1	16.9	4.4	27.0	10.0
1	3693	68	64	67.4	10.5	28.3	28.6	19.4	4.3	29.5	10.1
2	3695	68	64	77.5	10.0	31.1	36.3	16.9	4.4	26.7	10.0
1	3880	62	64	60.2	10.3	26.6	24.3	19.6	4.3	29.5	10.0
2	3881	66	64	75.6	10.1	30.8	34.7	16.9	4.5	26.5	9.9
1	4045	59	64	64.4	9.8	28.2	26.4	19.5	4.3	29.5	10.0
2	4046	59	64	75.2	10.2	31.8	33.3	16.9	4.3	26.9	10.0
1	4237	55	65	63.4	11.1	27.0	25.3	19.5	4.3	29.4	10.0
2	4238	55	65	76.6	11.0	31.0	34.7	16.9	4.3	26.8	10.0
1	4441	69	61	67.5	10.6	28.6	28.3	19.5	4.3	29.4	10.0
2	4442	71	61	75.4	10.4	31.3	33.8	16.8	4.4	26.6	9.9
1	4636	64	60	65.0	10.9	28.1	26.0	19.6	4.4	29.7	10.1
2	4637	66	60	75.6	9.7	30.3	35.7	16.9	4.3	26.8	9.9

Date:	2006/12/13
Technician:	Bruce Myers
Location:	Arkansas 1-30, MP 101.8

7.1.2 TEST TRUCK ERROR CALCULATIONS DEC-13-2006

Truck	V#	Speed	Temp	GVW	F/A	T1	T2	1>2	2>3	3>4	4>5
1	160	51	39	-0.8%	-0.9%	0.4%	-1.9%	0.1	0.1	-0.2	0.1
2	161	51	39	0.0%	-1.8%	1.7%	-0.9%	0.0	0.0	-0.1	-0.1
2	476	70	39	-2.1%	-9.1%	7.6%	5.0%	-0.1	0.0	-0.1	0.0
1	969	58	40	-4.1%	11.1%	4.1%	-0.8%	0.0	0.1	-0.3	0.1
2	970	58	40	-3.8%	-9.1%	1.0%	-6.5%	-0.1	0.0	0.0	-0.1
1	1131	67	40	-4.4%	-4.6%	2.6%	-6.1%	0.0	0.2	-0.3	0.0
2	1133	72	43	6.5%	10.9%	7.3%	11.4%	-0.1	0.0	0.1	0.0
2	1320	55	43	-6.8%	-5.5%	1.0%	-4.7%	-0.1	0.0	-0.1	0.0
1	1492	56	45	-1.6%	-9.3%	2.2%	-2.7%	0.0	0.1	-0.3	0.0
2	1493	59	45	-7.3%	17.3%	3.0%	-7.9%	0.0	0.0	0.3	0.0
1	1661	65	47	2.0%	2.8%	1.5%	2.3%	0.0	0.1	-0.3	0.0
2	1663	70	47	-4.6%	10.9%	4.6%	-2.3%	-0.1	0.0	0.1	0.0
1	1891	70	48	-1.9%	-8.3%	3.7%	2.7%	-0.2	0.1	-0.1	0.1
2	1892	71	48	-0.9%	-9.1%	3.6%	4.1%	-0.1	0.1	-0.1	0.0
1	2067	55	51	-1.3%	-9.3%	1.1%	-0.4%	-0.1	0.1	-0.3	0.0
2	2068	54	51	-2.1%	-4.5%	0.7%	-2.9%	-0.1	0.0	-0.1	0.0
1	2238	60	52	-2.5%	-7.4%	1.9%	-0.8%	0.0	0.1	-0.3	0.1
2	2241	63	52	-4.6%	-9.1%	0.7%	-7.0%	-0.2	0.0	0.0	-0.1
1	2795	55	60	-0.9%	-1.9%	3.7%	-5.7%	0.0	0.1	-0.3	0.0
2	2796	55	60	0.5%	-6.4%	4.3%	-0.6%	0.0	0.0	0.2	0.0
1	2986	58	61	1.1%	-1.9%	4.4%	-0.4%	0.0	0.1	-0.3	0.1
2	2987	59	61	0.3%	-8.2%	4.0%	-0.3%	-0.1	0.0	0.2	0.0
1	3344	55	63	-0.5%	-4.6%	0.4%	1.1%	0.0	0.1	-0.3	0.1
2	3345	55	63	-0.7%	-0.9%	1.7%	-2.9%	-0.1	0.0	-0.1	-0.1
1	3507	70	64	5.8%	5.6%	2.2%	6.9%	0.1	0.2	-0.2	0.1
2	3509	70	64	5.8%	-9.1%	7.9%	8.8%	-0.1	0.1	0.2	0.0
1	3693	68	64	5.3%	-2.8%	4.8%	9.2%	-0.1	0.1	-0.2	0.1
2	3695	68	64	2.8%	-9.1%	2.6%	6.5%	-0.1	0.1	-0.1	0.0
1	3880	62	64	-5.9%	-4.6%	1.5%	-7.3%	0.1	0.1	-0.2	0.0
2	3881	66	64	0.3%	-8.2%	1.7%	1.8%	-0.1	0.2	-0.3	-0.1
1	4045	59	64	0.6%	-9.3%	4.4%	0.8%	0.0	0.1	-0.2	0.0
2	4046	59	64	-0.3%	-7.3%	5.0%	-2.3%	-0.1	0.0	0.1	0.0
1	4237	55	65	-0.9%	2.8%	0.0%	-3.4%	0.0	0.1	-0.3	0.0
2	4238	55	65	1.6%	0.0%	2.3%	1.8%	-0.1	0.0	0.0	0.0
1	4441	69	61	5.5%	-1.9%	5.9%	8.0%	0.0	0.1	-0.3	0.0
2	4442	71	61	0.0%	-5.5%	3.3%	-0.9%	-0.2	0.1	-0.2	-0.1
1	4636	64	60	1.6%	0.9%	4.1%	-0.8%	0.1	0.2	0.0	0.1
2	4637	66	60	0.3%	11.8%	0.0%	4.7%	-0.1	0.0	0.0	-0.1

7.1.3 OVERALL PERFORMANCE DEC-13-2006

International Road Dynamics Inc.

FHWA VERIFICATION

Specifications					
Confidence	95%	Speed range low	50	to	57
	(1.96)	Speed range medium	57	to	65
Gross vehicle weight	10%	Speed range high	65	to	76
Tandem group weight	15%	Temperature range low	30	to	40
Single axle weight	20%	Temperature range medium	40	to	50
Axle spacings	0.5	Temperature range high	50	to	60

Overall					
Characteristic	Error	StdDev	Specification	Calculated	Pass/Fail
Gross vehicle weight	-0.5%	3.4%	10%	7.2%	pass
Tandem group weight	0.6%	4.2%	15%	8.9%	pass
Single axle weight	-5.8%	4.8%	20%	15.2%	pass
Axle spacings	0.0	0.1	0.5	0.3	pass

Speed range 50 to 57 (12 runs)				
Characteristic	Error	StdDev	Specification	Calculated
Gross vehicle weight	-1.1%	2.0%	10%	5.2%
Tandem group weight	-0.3%	2.5%	15%	5.4%
Single axle weight	-3.5%	3.7%	20%	5.5%
Axle spacings	0.0	0.1	0.5	0.3

Speed range 57 to 65 (12 runs)				
Characteristic	Error	StdDev	Specification	Calculated
Gross vehicle weight	-1.9%	3.2%	10%	8.4%
Tandem group weight	-0.7%	3.8%	15%	8.4%
Single axle weight	-6.8%	5.5%	20%	17.8%
Axle spacings	0.0	0.1	0.5	0.3

Speed range 65 to 76 (14 runs)				
Characteristic	Error	StdDev	Specification	Calculated
Gross vehicle weight	1.3%	3.9%	10%	9.3%
Tandem group weight	2.6%	5.0%	15%	12.6%
Single axle weight	-6.8%	4.7%	20%	16.3%
Axle spacings	0.0	0.1	0.5	0.3

Temperature range 30 to 40 (6 runs)				
Characteristic	Error	StdDev	Specification	Calculated
Gross vehicle weight	-2.5%	1.8%	10%	6.3%
Tandem group weight	-1.9%	3.7%	15%	9.3%
Single axle weight	-6.1%	4.2%	20%	14.7%

Temperature range 40 to 50 (8 runs)				
Characteristic	Error	StdDev	Specification	Calculated
Gross vehicle weight	-1.8%	4.6%	10%	11.1%
Tandem group weight	-0.1%	5.0%	15%	10.1%
Single axle weight	-8.6%	5.7%	20%	20.1%

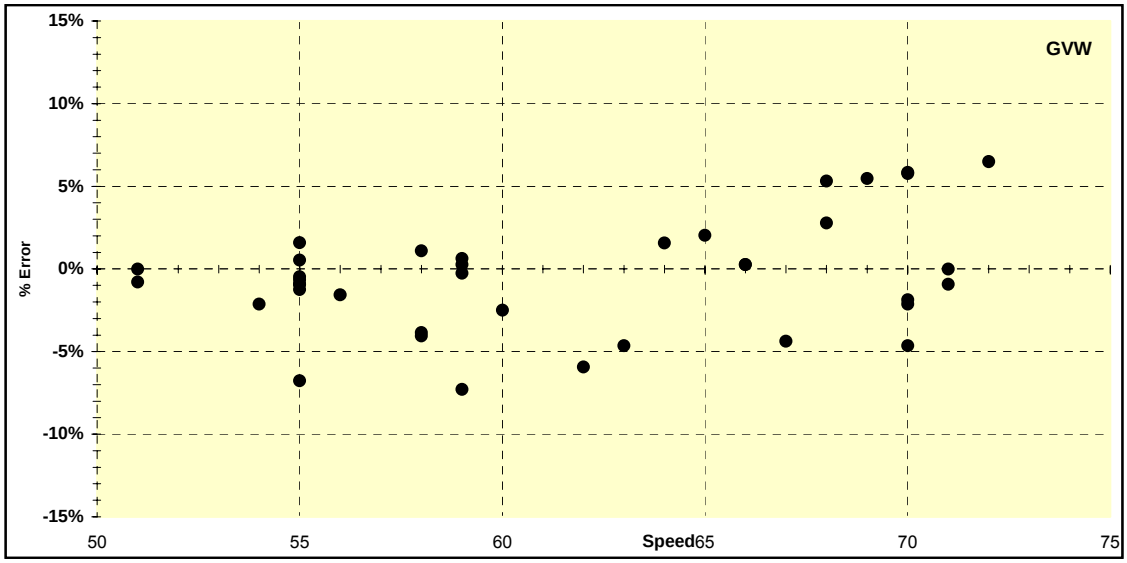
Temperature range 50 to 60 (8 runs)				
Characteristic	Error	StdDev	Specification	Calculated
Gross vehicle weight	-1.1%	2.0%	10%	5.1%
Tandem group weight	-0.2%	3.3%	15%	7.0%
Single axle weight	-6.2%	4.2%	20%	14.7%

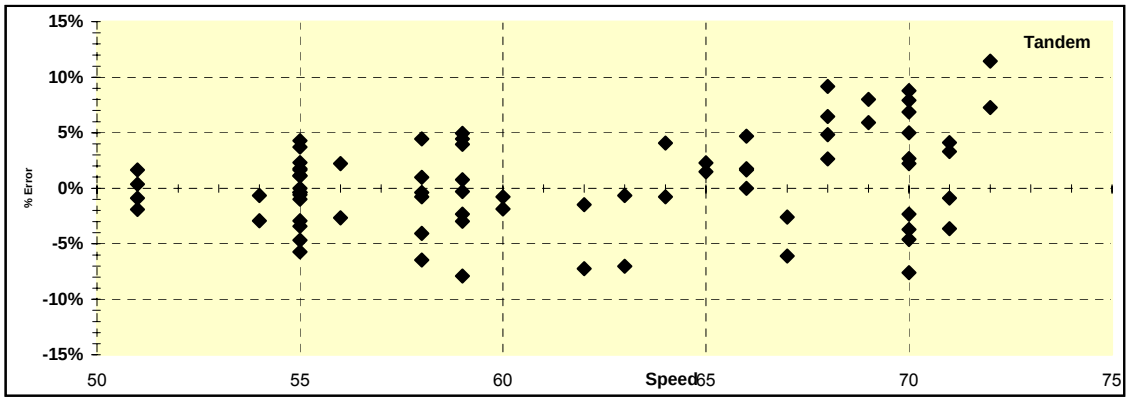
Arkansas 1-30, MP 101.8 Bruce Myers 2006/12/13

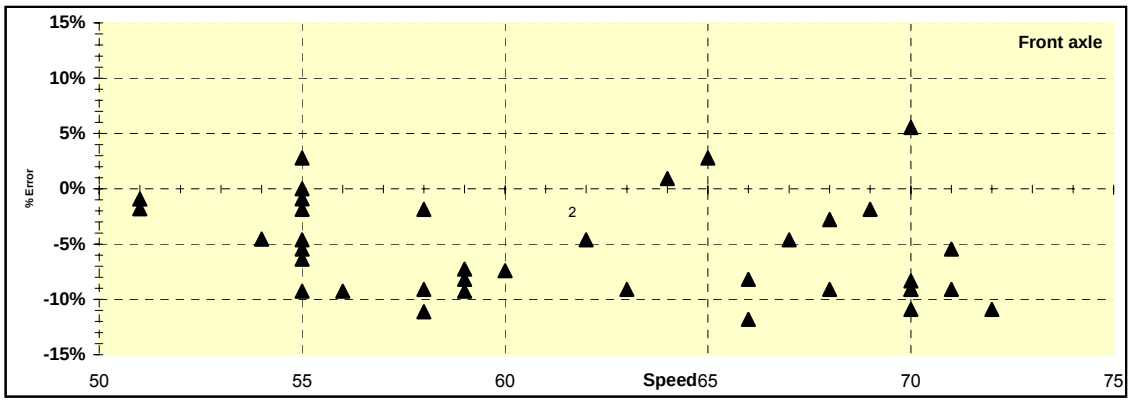
7.1.4 WEIGHT GRAPHS DEC-13-2006

International Road Dynamics Inc.

FHWA VERIFICATION





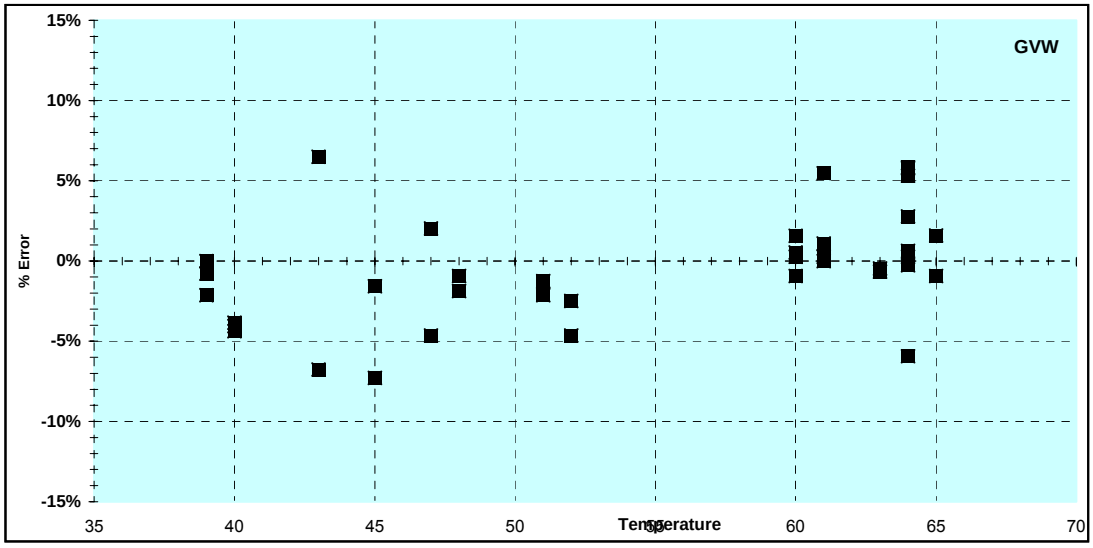


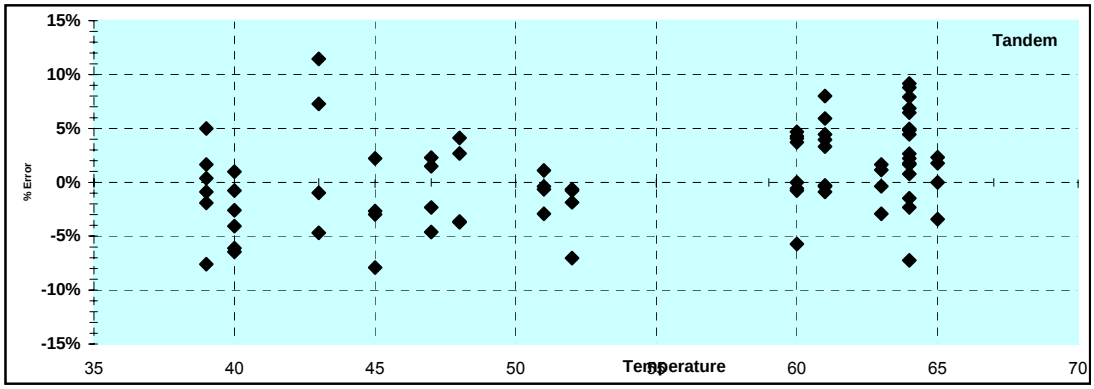
Arkansas 1-30, MP 101.8 Bruce Myers 2006/12/13

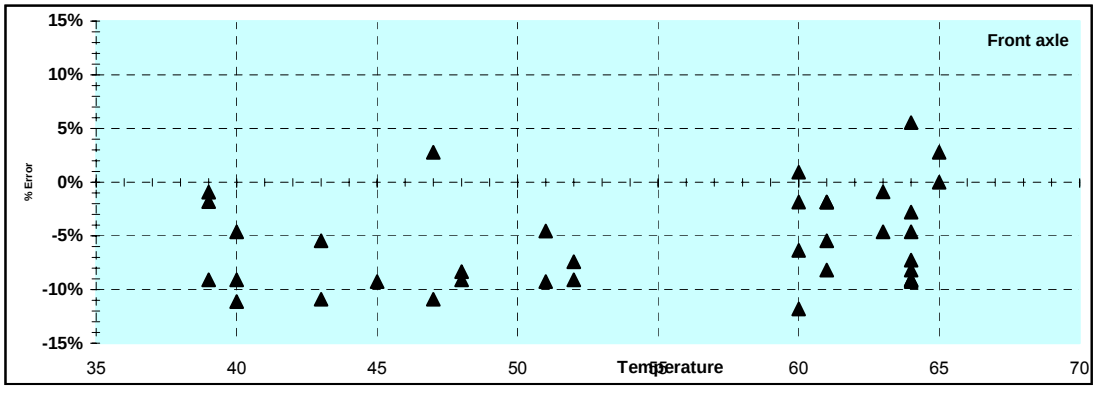
7.1.5 TEMPERATURE INFLUENCE GRAPHS DEC-13-2006

International Road Dynamics Inc.

FHWA VERIFICATION







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