



Tire / Pavement Noise

OBSI and How it is Being Used in Texas

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IHEEP 2009



Tire | Pavement Noise

- Introduction
- Comparisons
- Research Program
- Rodeo Testing.



Tire - Pavement - Noise -

What is OBSI?

On-Board Sound Intensity



Tire / Pavement Noise

Standard Method of Test for

**Measurement of Tire/Pavement
Noise Using the On-Board Sound
Intensity (OBSI) Method**

AASHTO Designation: **TP 76-08**

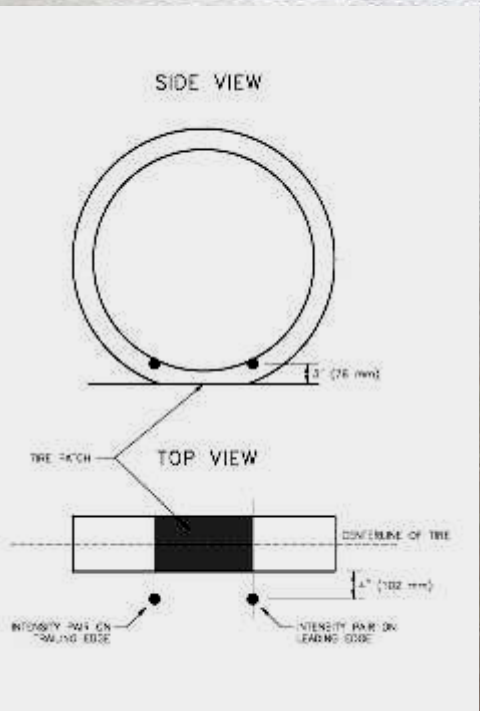
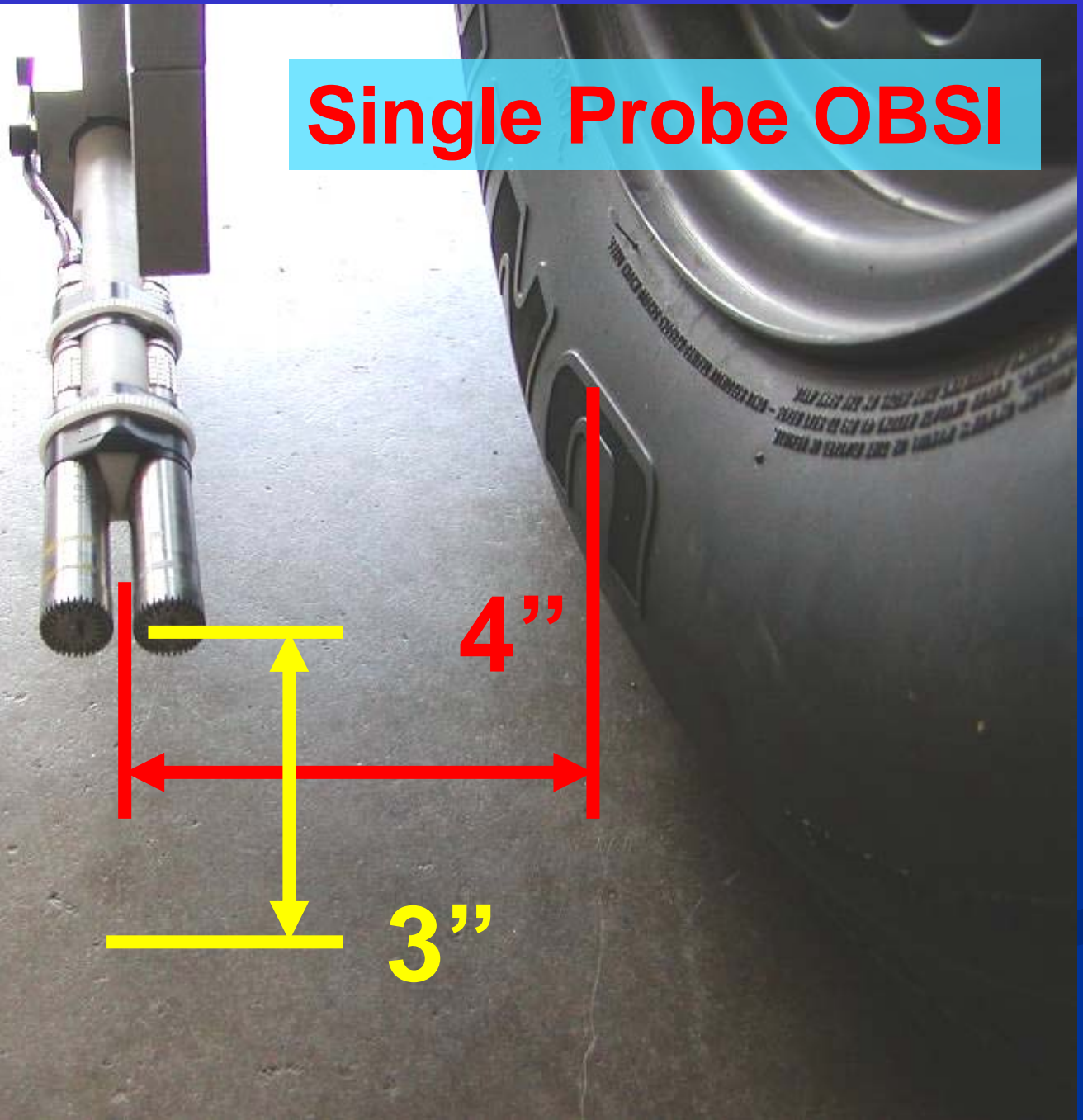


Single Probe OBSI



Dual Probe OBSI

Single Probe OBSI





Tire - Pavement - Noise -

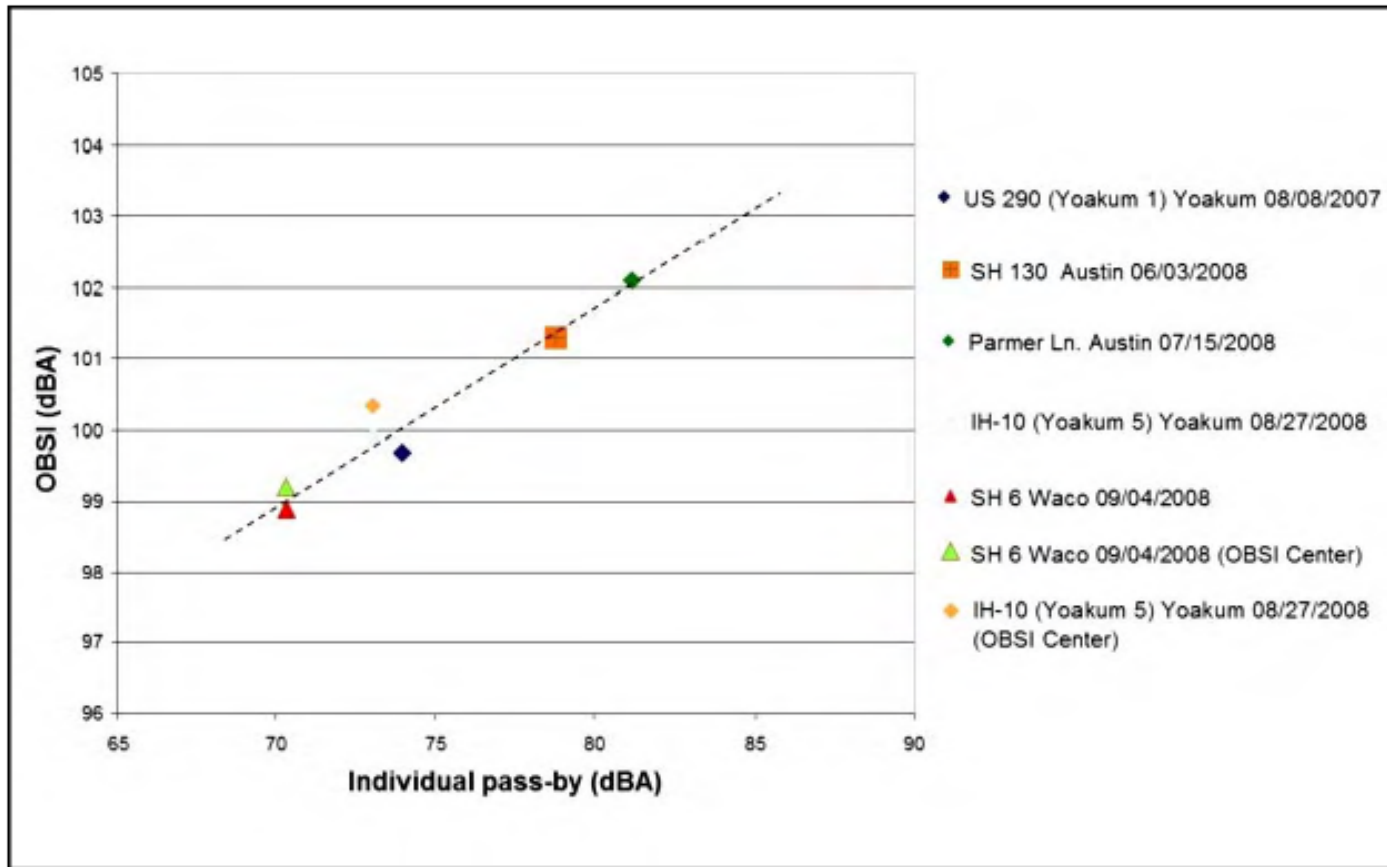


Figure 2.12: Comparison of OBSI levels to pass-by



Tire - Pavement - Noise -

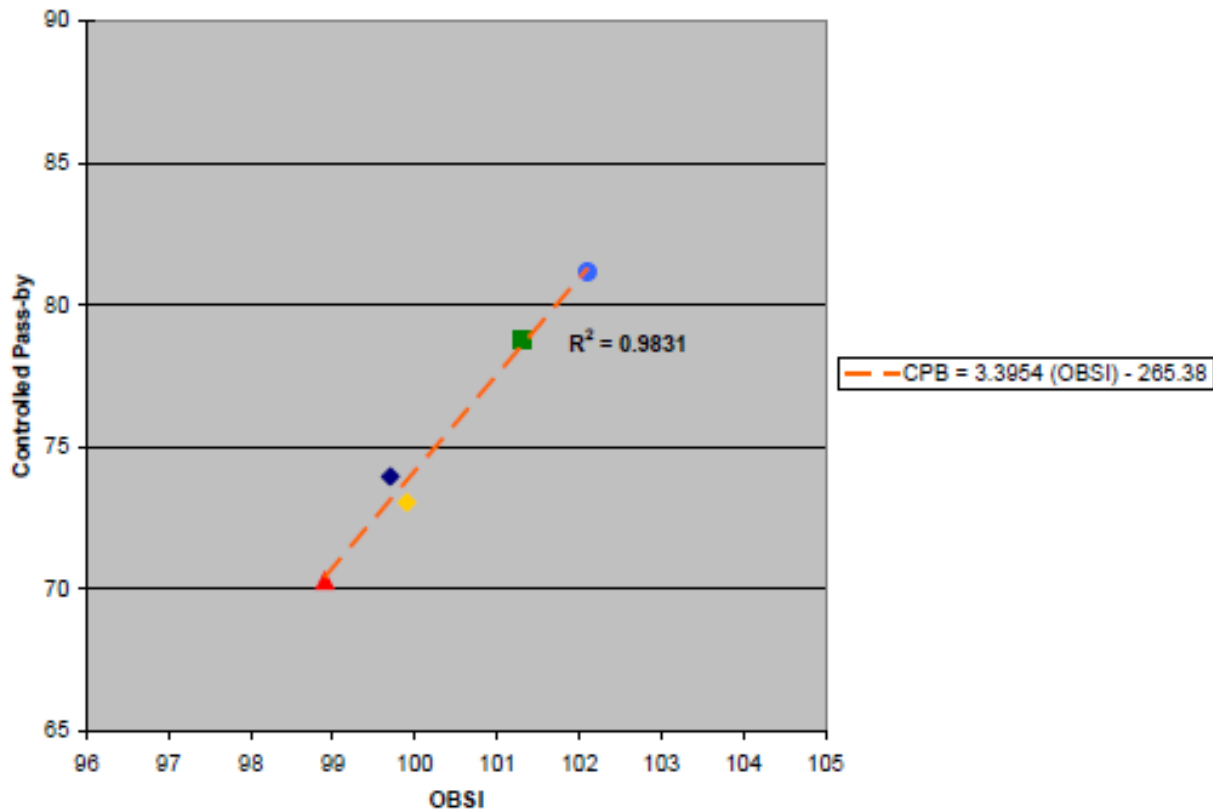
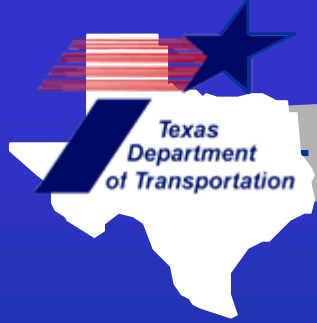


Figure 5.14: Linear regression of controlled pass-by and OBSI



Tire / Pavement Noise

Research Program

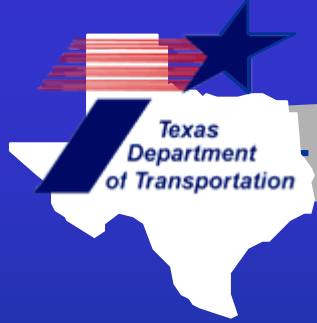
- **Goals**
 - Construction/Pavement (CST)
 - Improved Designs
 - Safety/Durability (+) ...and Quieter
 - Measurement Protocol ...OBSI
 - Environmental (ENV)
 - Avoid Impacts = Avoid Noise Barriers
 - Measurement Protocol ...SPB and OBSI
 - SPB compared to TNM "Average"
 - Seek FHWA approved adjustment in TNM
- **Status: Collecting Data**
 - Two OBSI systems (TxDOT and CTR)
 - According to AASHTO TP 76-08 Standard



Tire / Pavement Noise

Data Collection Objectives and Work Plan

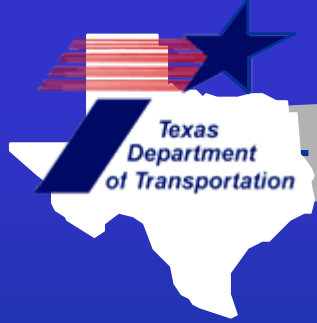
- **Objectives**
 - **Process development**
 - Characterize Texas pavements
 - Factors
 - Trends
 - Noise 'Families'
 - **Information support (CST- M&P)**
 - Design guidelines
 - Project-level support
 - Facts / information exchange
 - **Policy support (ENV)**
 - Policy decision support
 - Facts / information exchange



Tire / Pavement Noise

- **Action Plan**

- Become familiar with OBSI
- Participate in state and national OBSI discussions
- Analyze data collected, try to understand data types
- Test Section selection (4–8 sites / sect.)
- Monitoring schedule
- Collection coordination (TxDOT/CTR)
- Database management



Tire - Pavement - Noise -

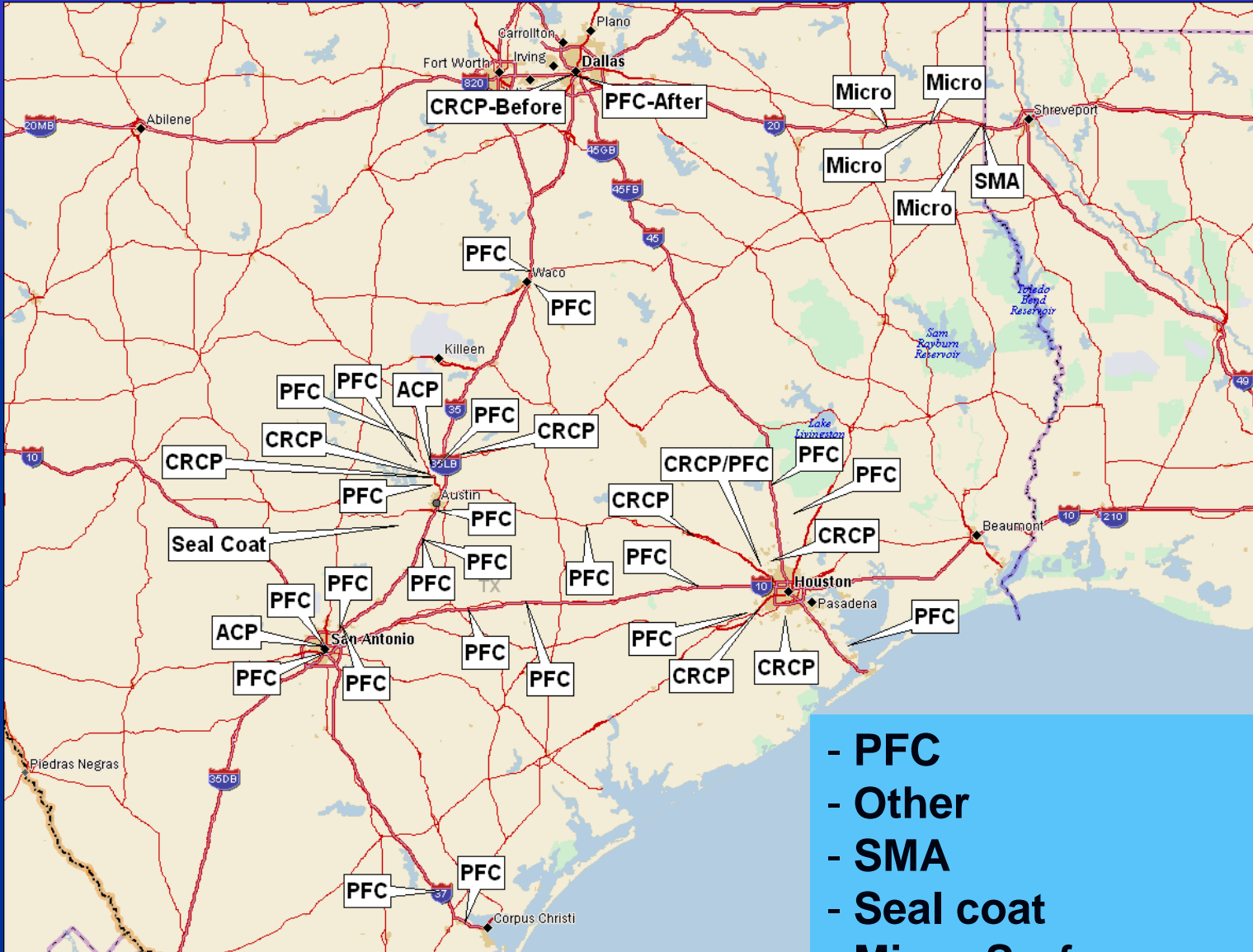
- **Action Plan – continued**

- **Test Sections tested to date by ‘Family’**

- PFC	24
- Other	2
- SMA	1
- Seal coat	1
- Micro-Surface	4
- PCC	9

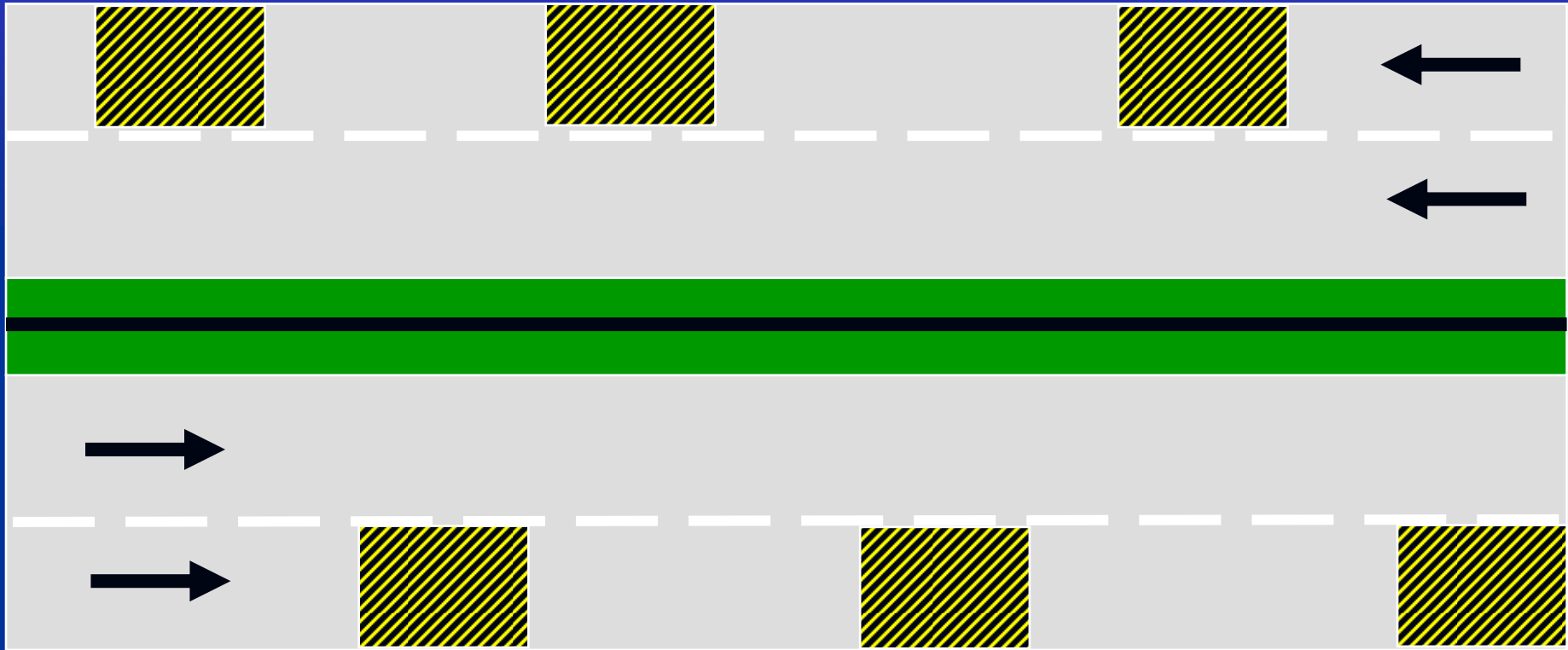
- **Additional Test Sections planned**

TxDOT & CTR OBSI Test Sections Collected to Date



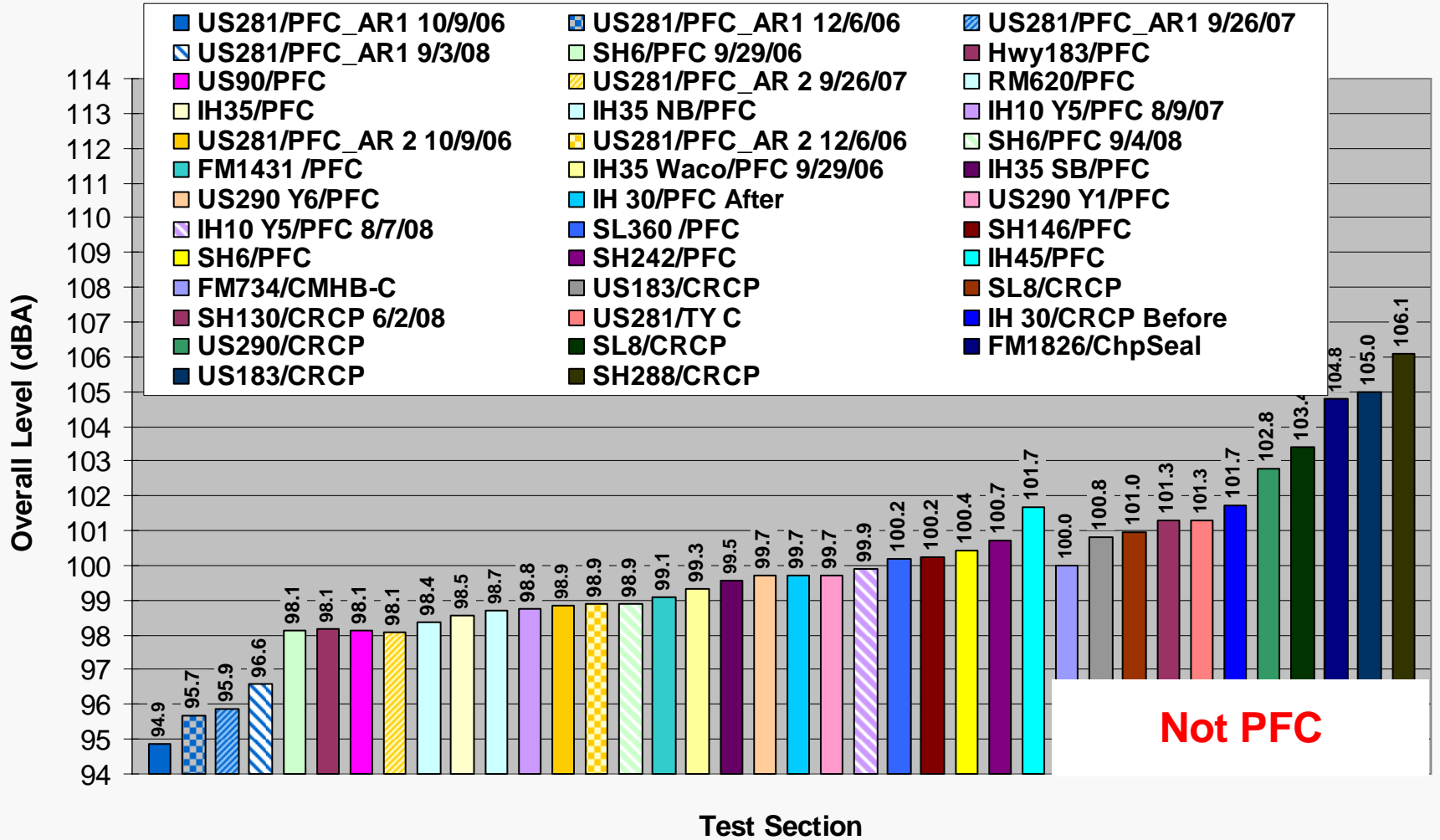
- PFC	24
- Other	2
- SMA	1
- Seal coat	1
- Micro-Surface	4
- PCC	9

One Noise Test Section with 6 OBSI Test Sites

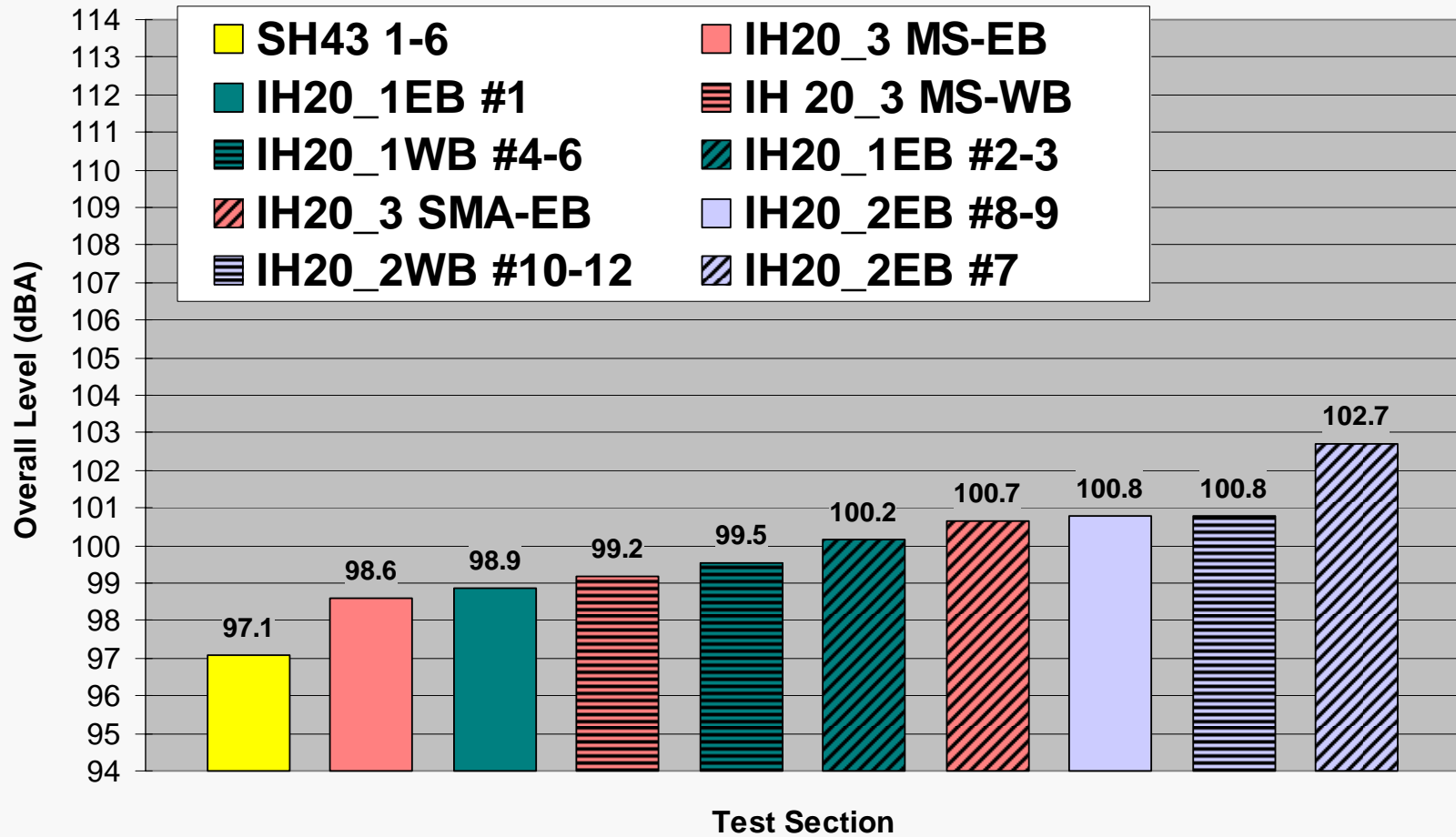


OBSI Site 440'

Tire/Pavement Noise Sound Intensity Flexible & Rigid Pavement Test Sections - TxDOT & CTR



Tire/Pavement Noise Sound Intensity Microsurface/SMA Pavement Test Sections, Near Marshall, TX





Tire | Pavement Noise

Texas OBSI Rodeo's 9/6/2007 & 7/15/2008

Participants

TxDOT

CTR

The Transtec Group, Inc.



Tire / Pavement Noise

Items to Note:

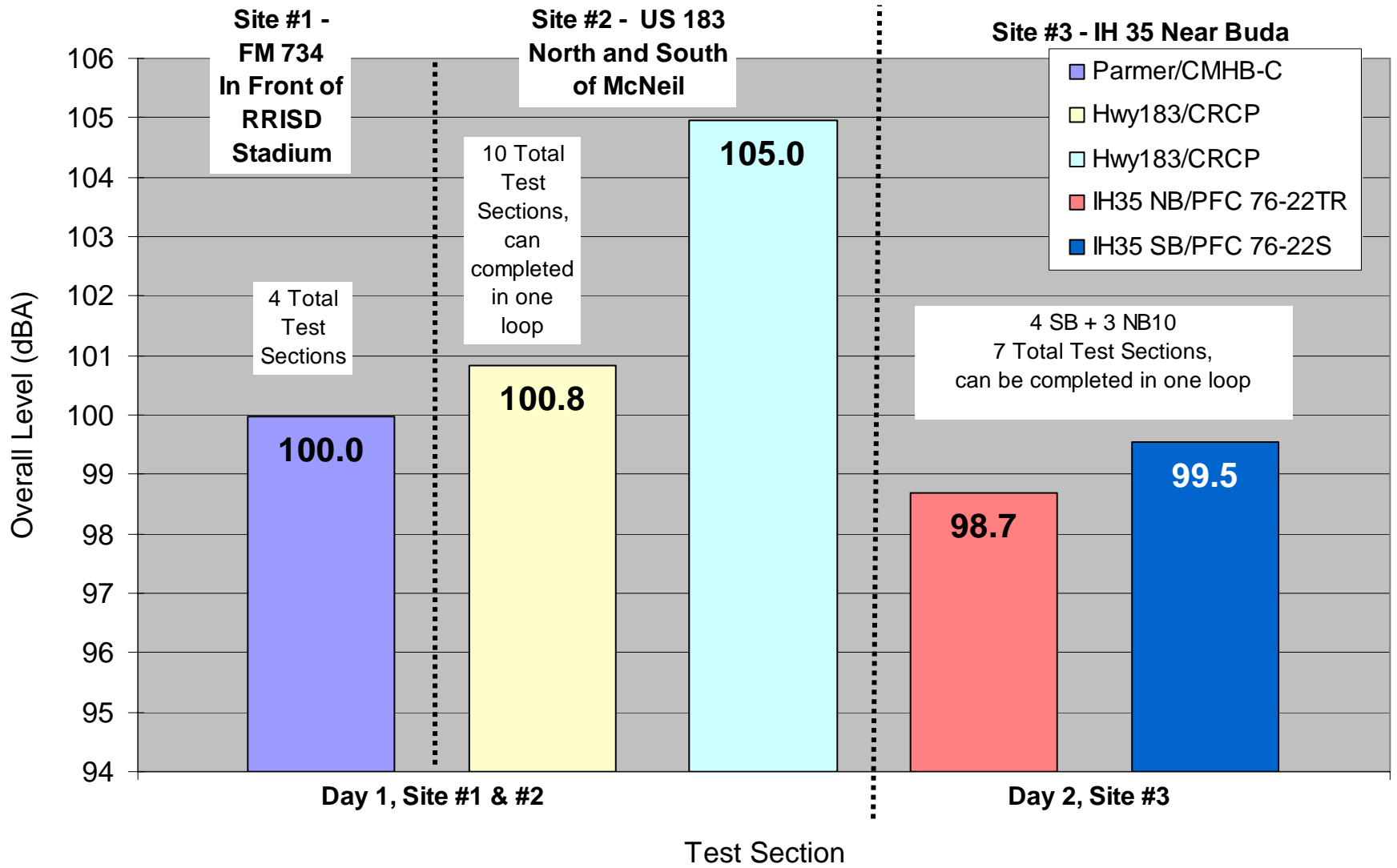
TxDOT & CTR

- Used Single Probe OBSI System
- Larson Davis Analyzer
- 2001 Chevrolet Malibu Test Vehicle
- 15" Tiger Paw AWP Test Tire (9/6/07 CTR & TxDOT)
- 16" Tiger Paw SRTT Test Tire (7/15/08 TxDOT only)

Transtec

- Used Dual Probe OBSI (TGI Design 9/6/07)
- Used Dual Probe OBSI (Donavan Design 7/15/08)
- Transtec Designed Sound Analyzer
- Buick Test Vehicle
- 16" Tiger Paw SRTT Test Tire

**Tire/Pavement Noise Sound Intensity
Local Rodeo Test Sections - Site Comparison/Test Plan**



FM 734 Test Site, Section 1T



IH 35 Test Site, Section 7T



US 183 Test Site, Section 5T

Newer CRCP



US 183 Test Site, Section 10T

Older CRCP



2007 Local OBSI Rodeo - TxDOT vs TGI - Austin, TX

US 183 - Newer Concrete

	TxDOT	TGI	Diff
5T	102.1	104.7	2.6
6T	102.7	105.5	2.8
7T	101.0	103.9	3.0
8T	101.2	103.5	2.3
9T	101.7	103.6	1.8

Avg 101.7 104.2 2.5

Avg Diff of Runs 2.5

IH 35 SB - PFC

	TxDOT	TGI	Diff
7T	101.0	101.9	0.9
8T	100.8	102.2	1.4
9T	100.4	102.0	1.6
10T	100.9	102.1	1.3

Avg 100.7 102.0 1.3

Avg Diff of Runs 1.3

FM 734 - CMHB-C

	TxDOT	TGI	Diff
#1T	101.0	105.2	4.1
#2T	101.7	105.6	4.0
#3T	100.2	104.4	4.2
#4T	101.6	104.9	3.3

Avg 101.1 105.0 3.9

Avg Diff of Runs 3.9

US 183 - Older Concrete

	TxDOT	TGI	Diff
10T	106.2	108.0	1.8
11T	106.3	108.1	1.7
12T	106.8	108.6	1.8
13T	106.4	107.7	1.4
14T	105.9	107.3	1.4

Avg 106.3 107.9 1.6

Avg Diff of Runs 1.6

IH 35 NB - PFC

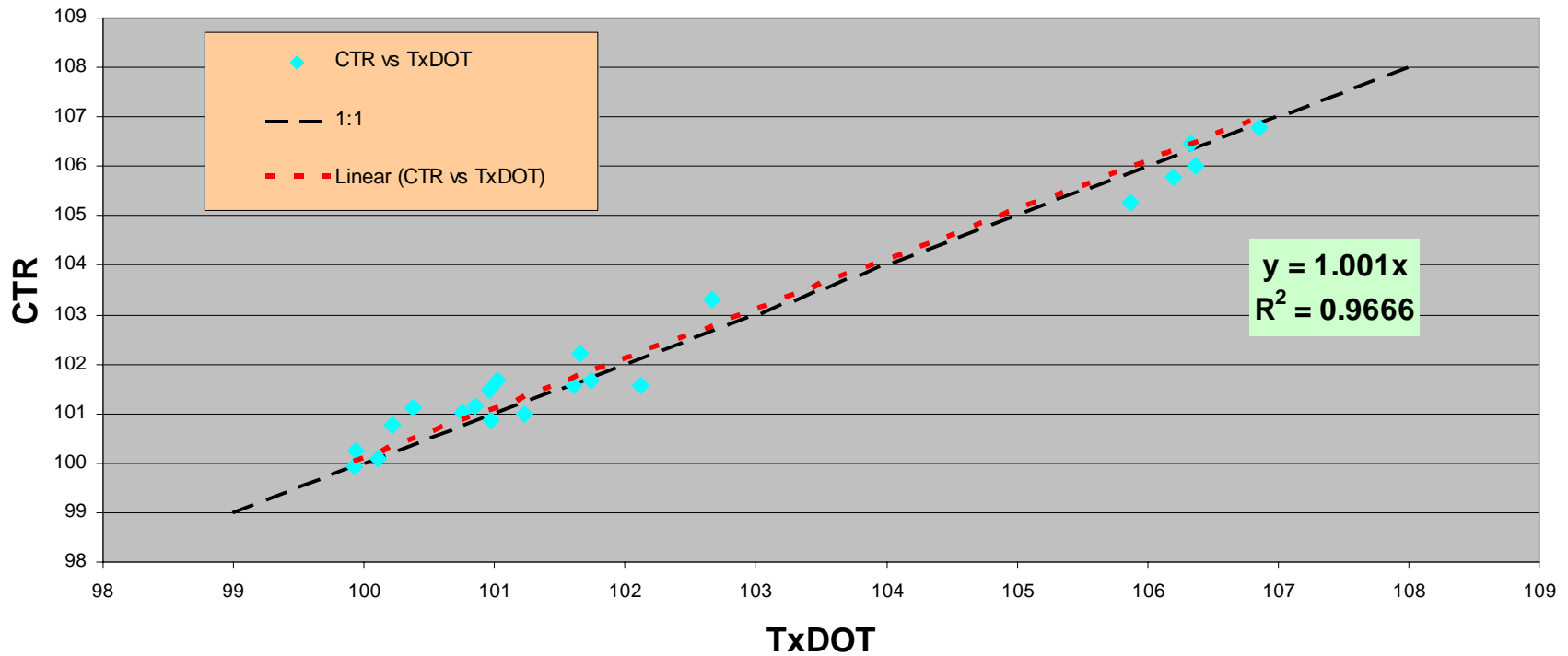
	TxDOT	TGI	Diff
11T	99.9	100.9	1.0
12T	99.9	100.7	0.8
13T	100.1	100.6	0.5

Avg 100.0 100.7 0.8

Avg Diff of Runs 0.8

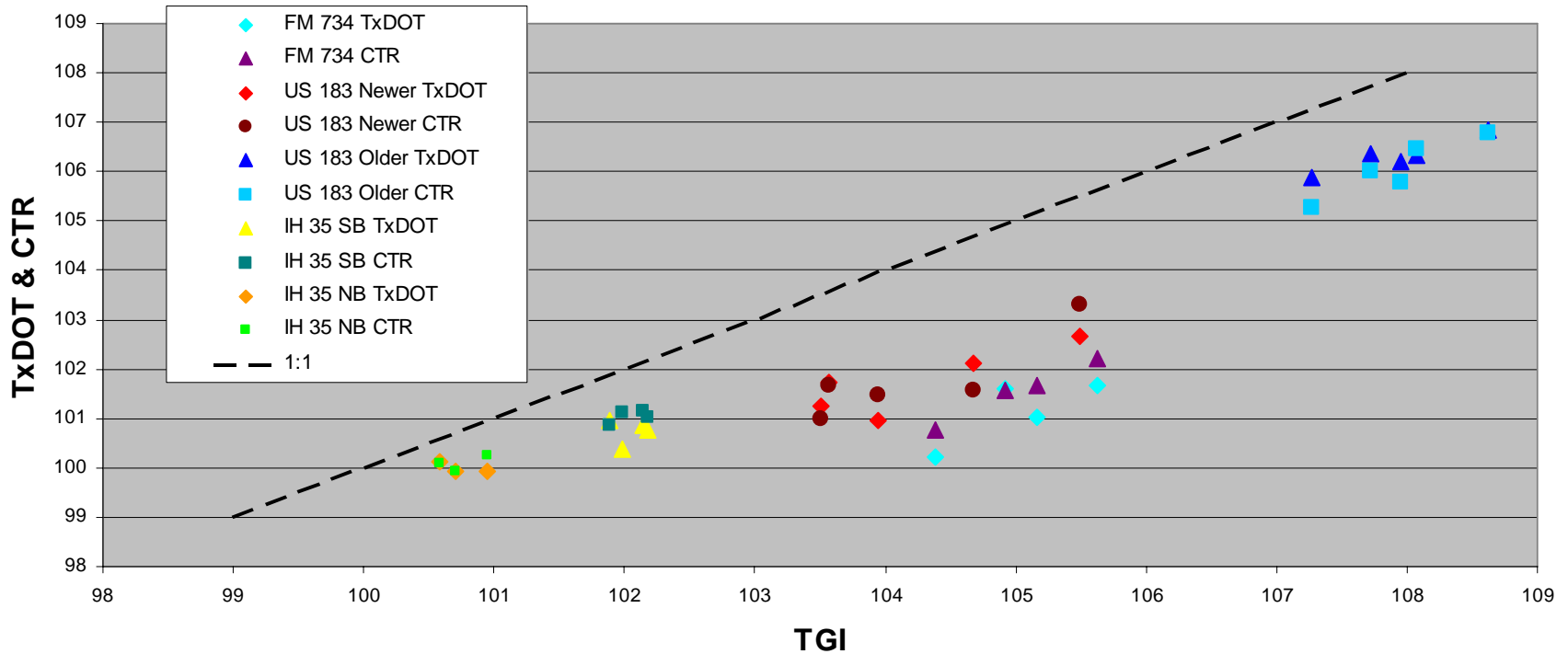
Original Data Collection on 9/6/2007

Tire/Pavement Noise Sound Intensity
OBSI Local Rodeo Test Sections - Comparison



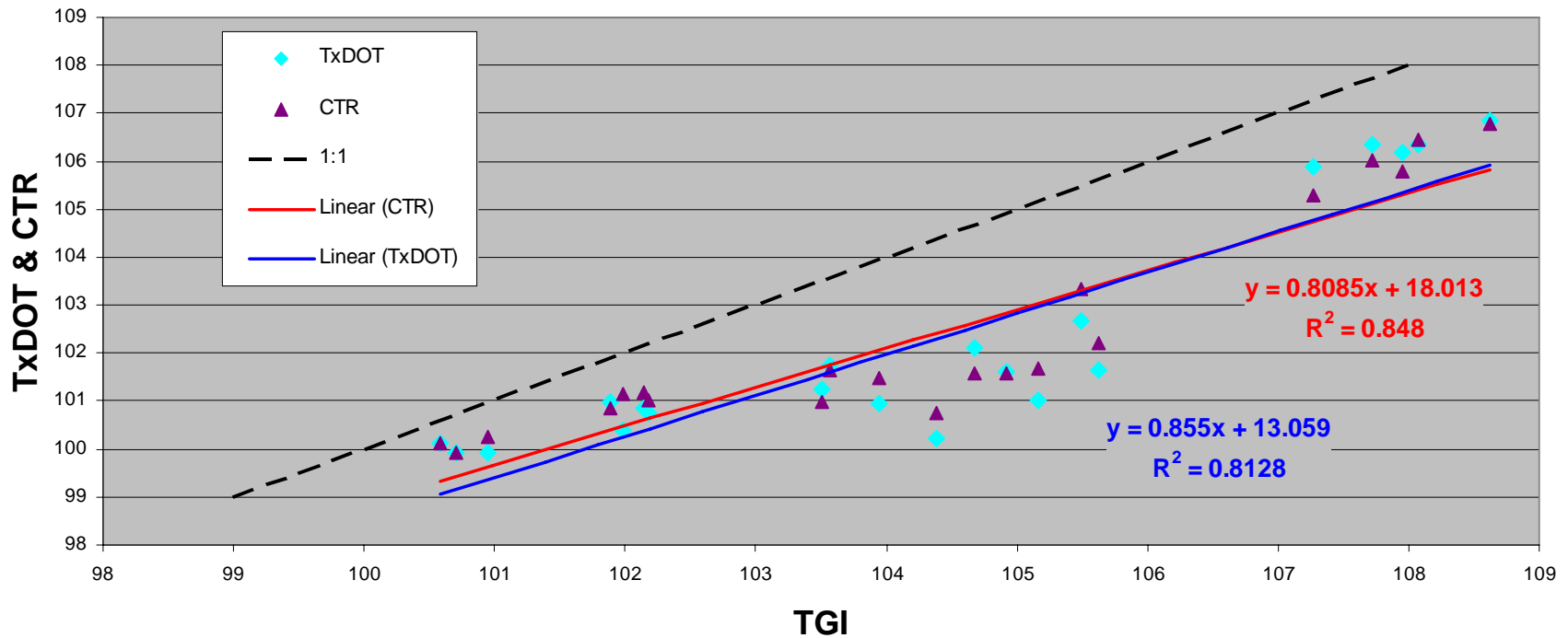
Original Data Collection on 9/6/2007

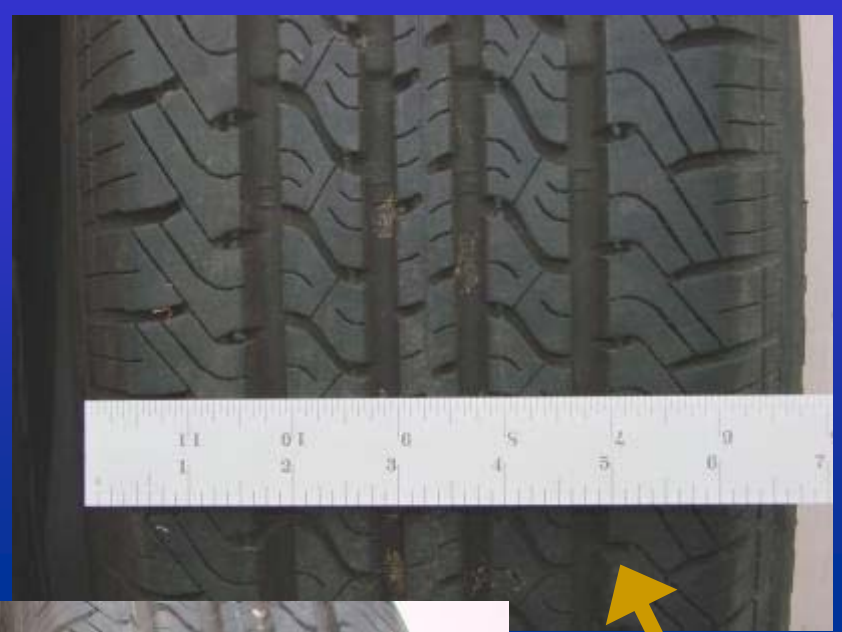
Tire/Pavement Noise Sound Intensity OBSI Local Rodeo Test Sections - Comparison



Original Data Collection on 9/6/2007

Tire/Pavement Noise Sound Intensity OBSI Local Rodeo Test Sections - Comparison





SRTT

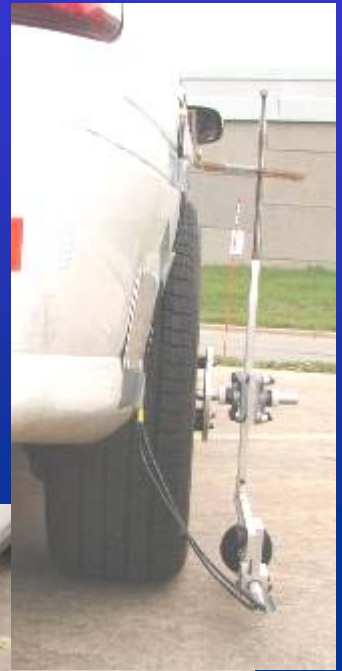


AWP



AWP Tire





SRTT Tire

2007 Local OBSI Rodeo - TxDOT vs TGI - Austin, TX

Follow-Up with TxDOT using a SRTT Tire: Data Collected on 7/15/08

US 183 - Newer Concrete

	TxDOT	TGI	Diff
5T	102.9	105.1	2.2
6T	103.0	105.9	2.9
7T	102.6	104.2	1.6
8T	103.1	103.5	0.4
9T	103.4	103.8	0.4
Avg	103.0	104.5	1.5

Avg Diff of Runs **1.5**

FM 734 - CMHB-C

	TxDOT	TGI	Diff
#1T	102.8	104.4	1.6
#2T	104.0	104.7	0.7
#3T	102.5	103.9	1.4
#4T			
#5T	103.3	104.5	1.2
Avg	103.2	104.4	1.2

Avg Diff of Runs **1.2**

US 183 - Older Concrete

	TxDOT	TGI	Diff
10T	106.4	107.4	1.0
11T	106.7	107.2	0.5
12T	106.8	107.8	1.0
13T	106.4	107.2	0.8
14T	106.1	107.0	0.9
Avg	106.5	107.3	0.8

Avg Diff of Runs **0.8**

Possible Explanation of FM 734 Difference

0.7 dBA = Tire Age Difference

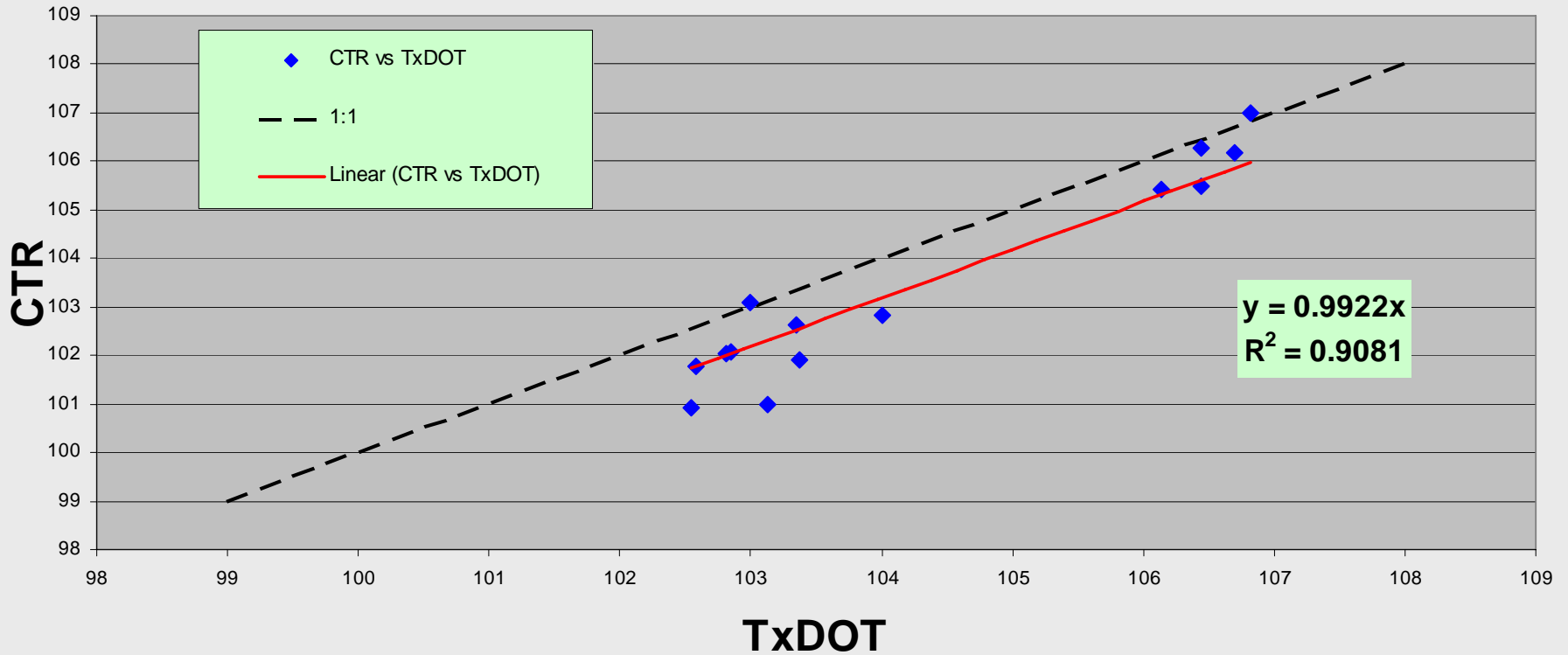
0.2 dBA = Microphone Spacing

0.3 dBA = Environmental Correction

1.2 dBA = Average Difference FM 734

Follow-Up Data Collection on 7/15/2008

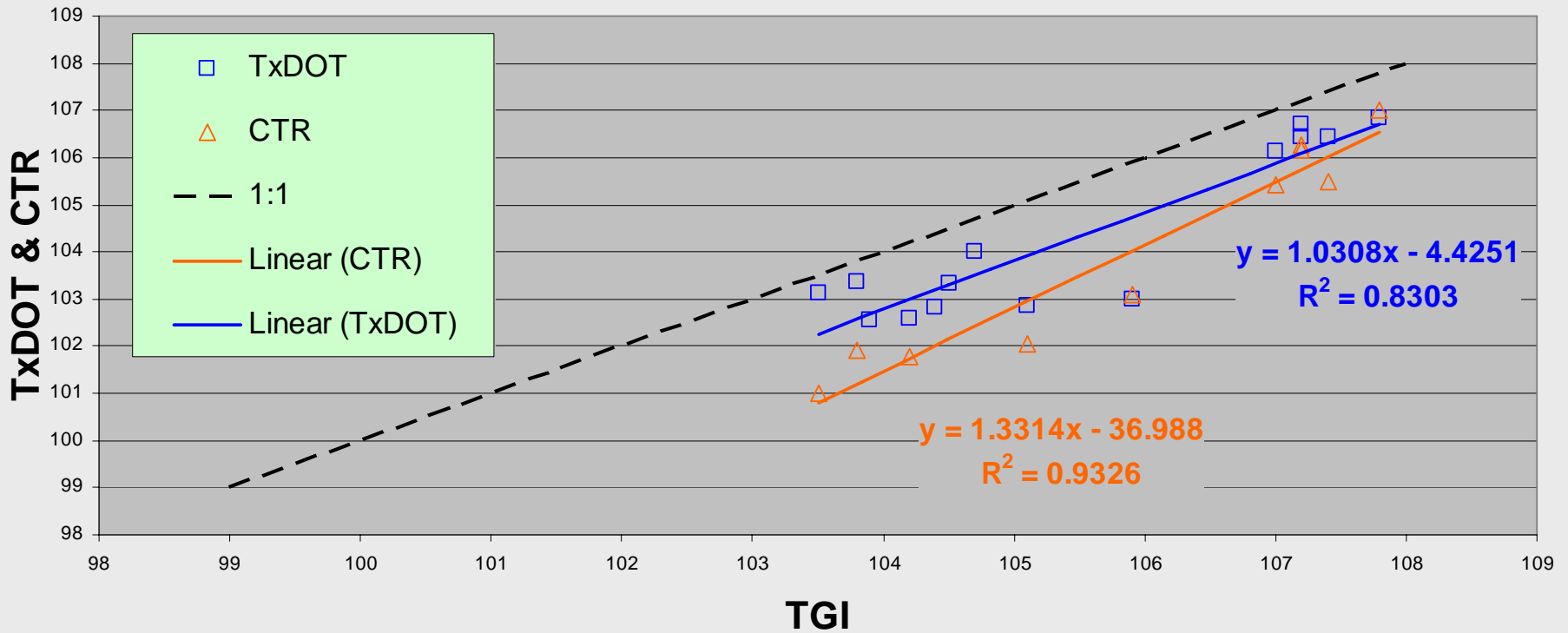
**Tire/Pavement Noise Sound Intensity
OBSI Local Rodeo Test Sections - Comparison
Follow-Up with TxDOT using a SRTT Tire: Data Collected on 7/15/08**



Follow-Up Data Collection on 7/15/2008

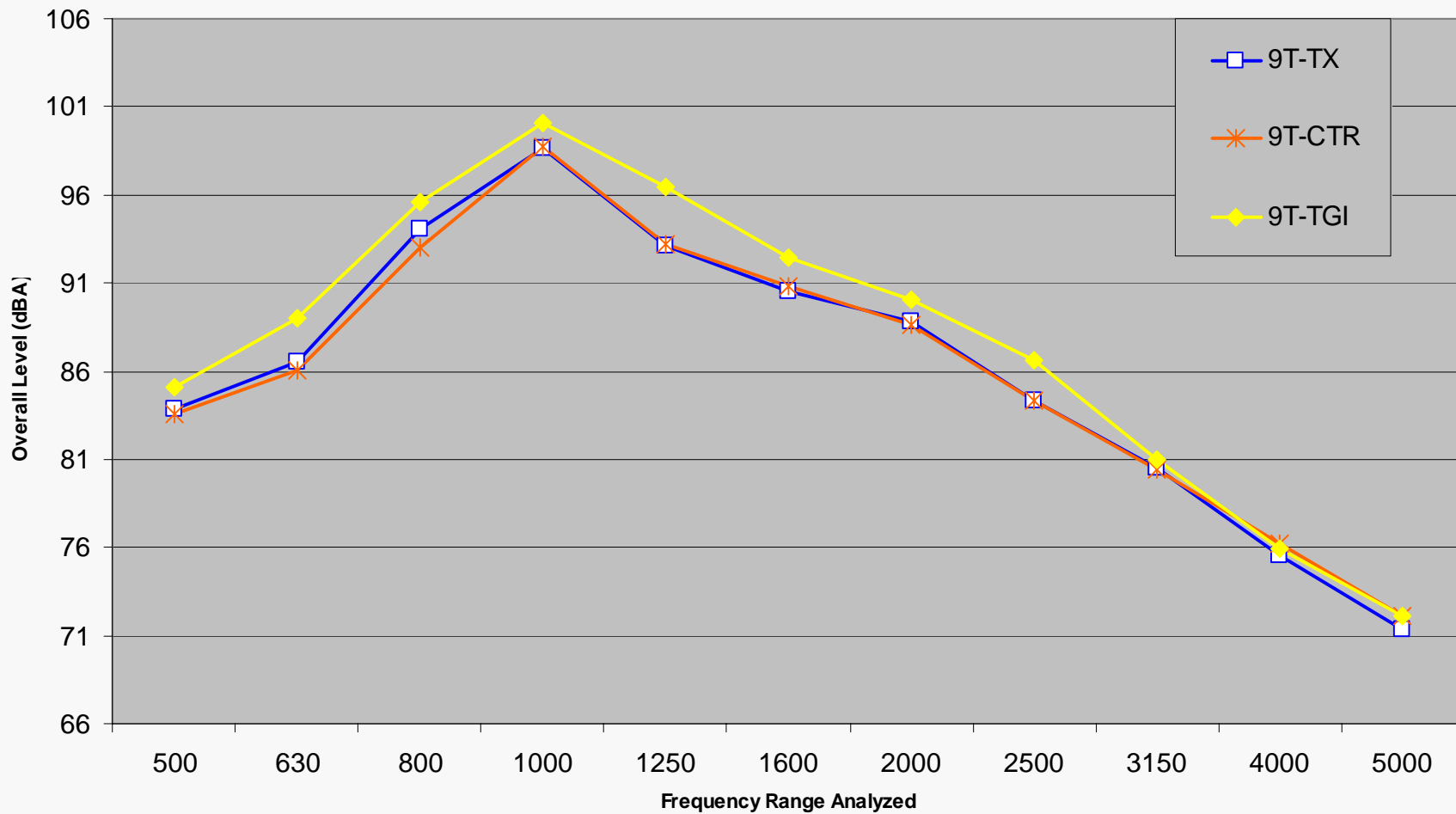
Tire/Pavement Noise Sound Intensity OBSI Local Rodeo Test Sections - Comparison

Follow-Up with TxDOT using a SRTT Tire: Data Collected on 7/15/08

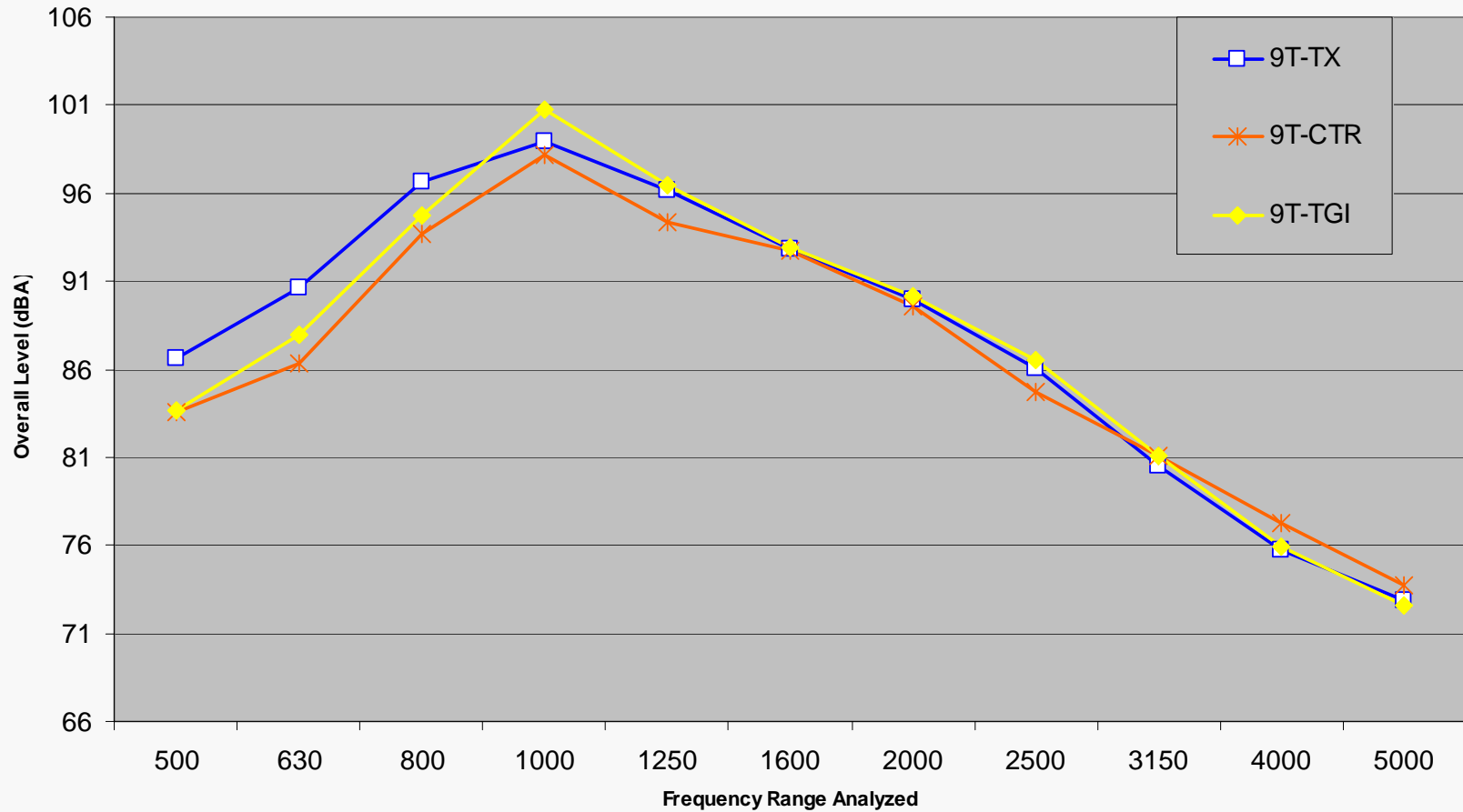


Tire/Pavement Noise Sound Intensity

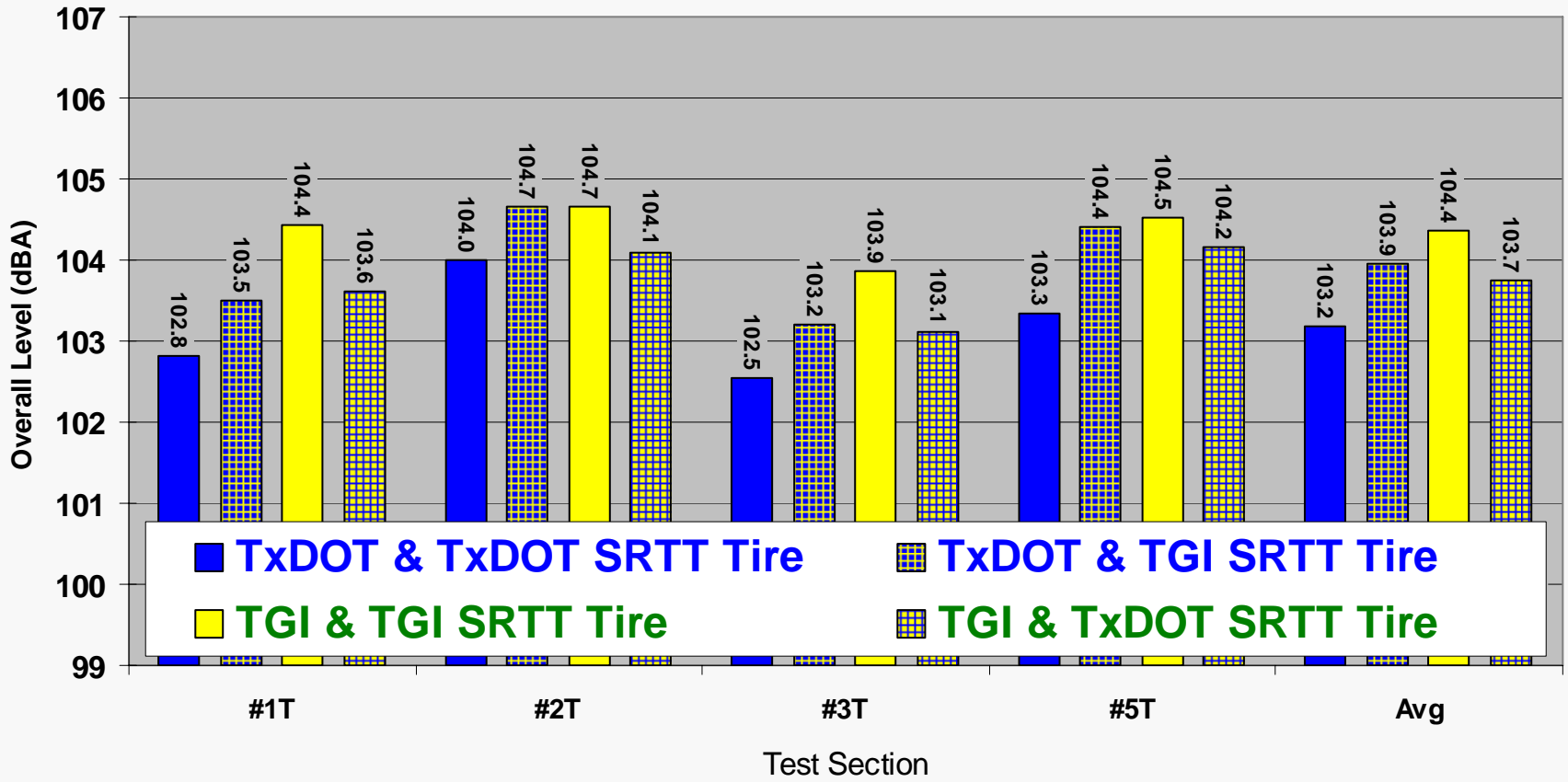
US 183 Test Section - 9T - 9/6/2007



Tire/Pavement Noise Sound Intensity US 183 Test Section - 9T - 7/15/2008



Tire/Pavement Noise Sound Intensity
FM 734 OBSI Local Rodeo Test Sections: New Vs Older SRTT Tire
Comparison
Tires Run on TxDOT & Transtec Vehicles - 7/15/2008



SPTC

Noise Pooled Fund

Other DOTs

Noise Studies

International

Tours / Studies

Rigid Branch

Lisa Lukefahr

RTI

German Claros

Research

CTR

Terry / Manuel

AASHTO

SCOM / JToP/
NCHRP

Design / Policy

Jeff Seiders

PAM Branch

John Wirth

Magdy Mikhail

ENV

Brandy Huston

ENV Policy

Volpe/FHWA

Acoustic Center

TRB

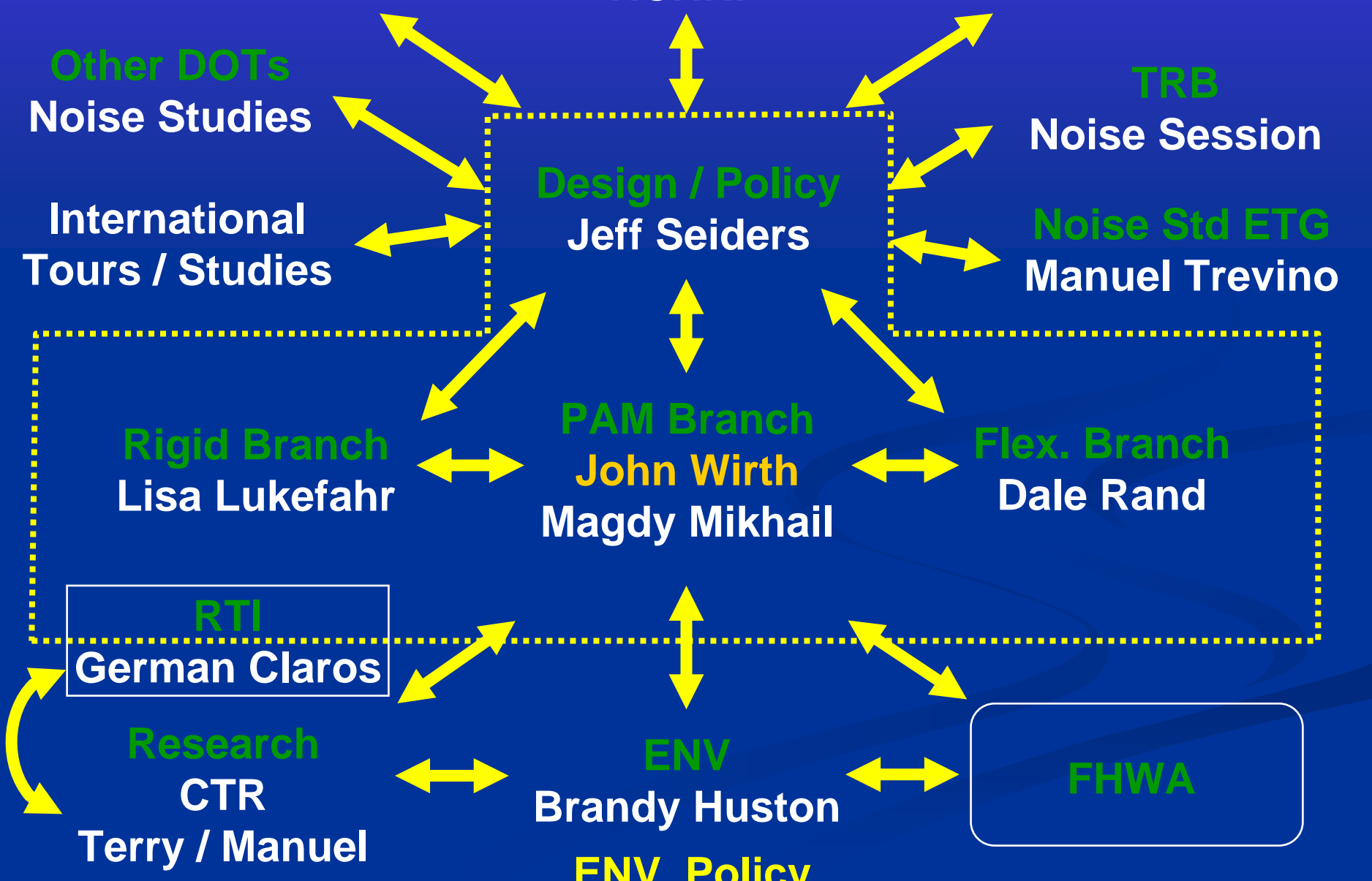
Noise Session

Noise Std ETG
Manuel Trevino

Flex. Branch

Dale Rand

FHWA





Tire - Pavement - Noise -

Thank You!