



**JOINT COMMISSION ON TRANSPORTATION  
ACCOUNTABILITY  
Route 234 Porous Friction Course Pavement  
Experiment  
September 20, 2010**

**Gary R. Allen, Ph.D., VDOT Chief of Technology, Research & Innovation  
Kevin K. McGhee, P.E., VTRC Associate Principal Scientist**

# Project Objective

- **Oversee design, production and placement of experimental asphalt concrete pavement in Northern Virginia**
- **Assess experimental pavement from standpoint of tire-pavement noise, skid resistance, ride quality, cost, splash/spray and hydroplaning potential**

# Summary Points

- **Sponsored by FHWA and Virginia DOT**
- **8,200-foot experimental pavement:**
  - Route 234 near Manassas
  - 2,700 tons of Porous Friction Course (PFC)
- **Includes comparisons to:**
  - Original surface (old asphalt pavement)
  - Conventional surface (new asphalt pavement)
  - Premium structural surface (new Stone Matrix Asphalt)
- **Performance defined by:**
  - Tire-pavement noise
  - Ride quality
  - Skid resistance
  - Observed/subjective splash-spray

# Porous Friction Course

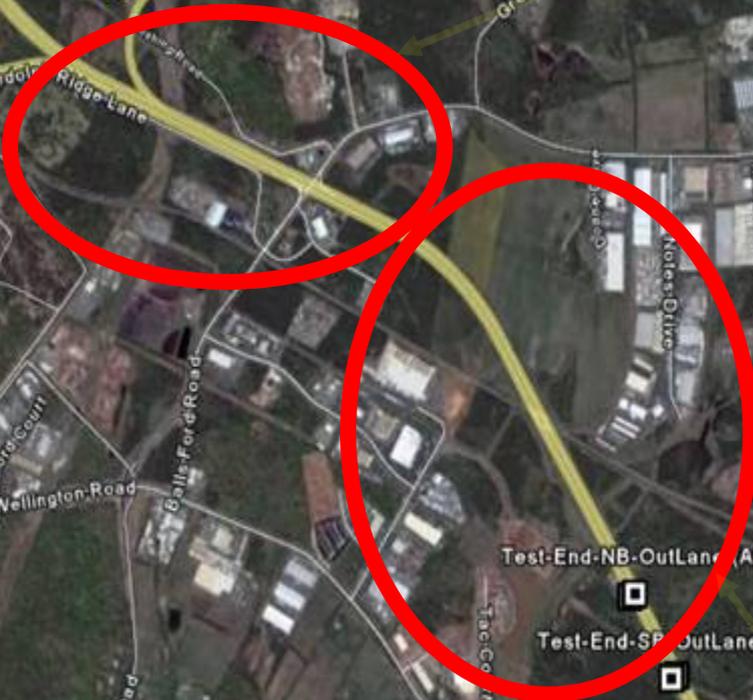
- **Design**

- 15 percent to 25 percent air voids, which promote rapid surface drainage (normal pavements ~6 percent air)
- Polymer-modified asphalt binders to ensure durability
- Thick, high-quality bonding membrane – promotes strong, impervious bond to original surface

- **Production and Placement**

- Temperature, placement, aggregate size/quality, binder grade, etc., similar to other premium mixes VDOT uses, such as SMA
- As a riding (non-structural) surface only, designed to be placed at thinner application rates → one-inch or less

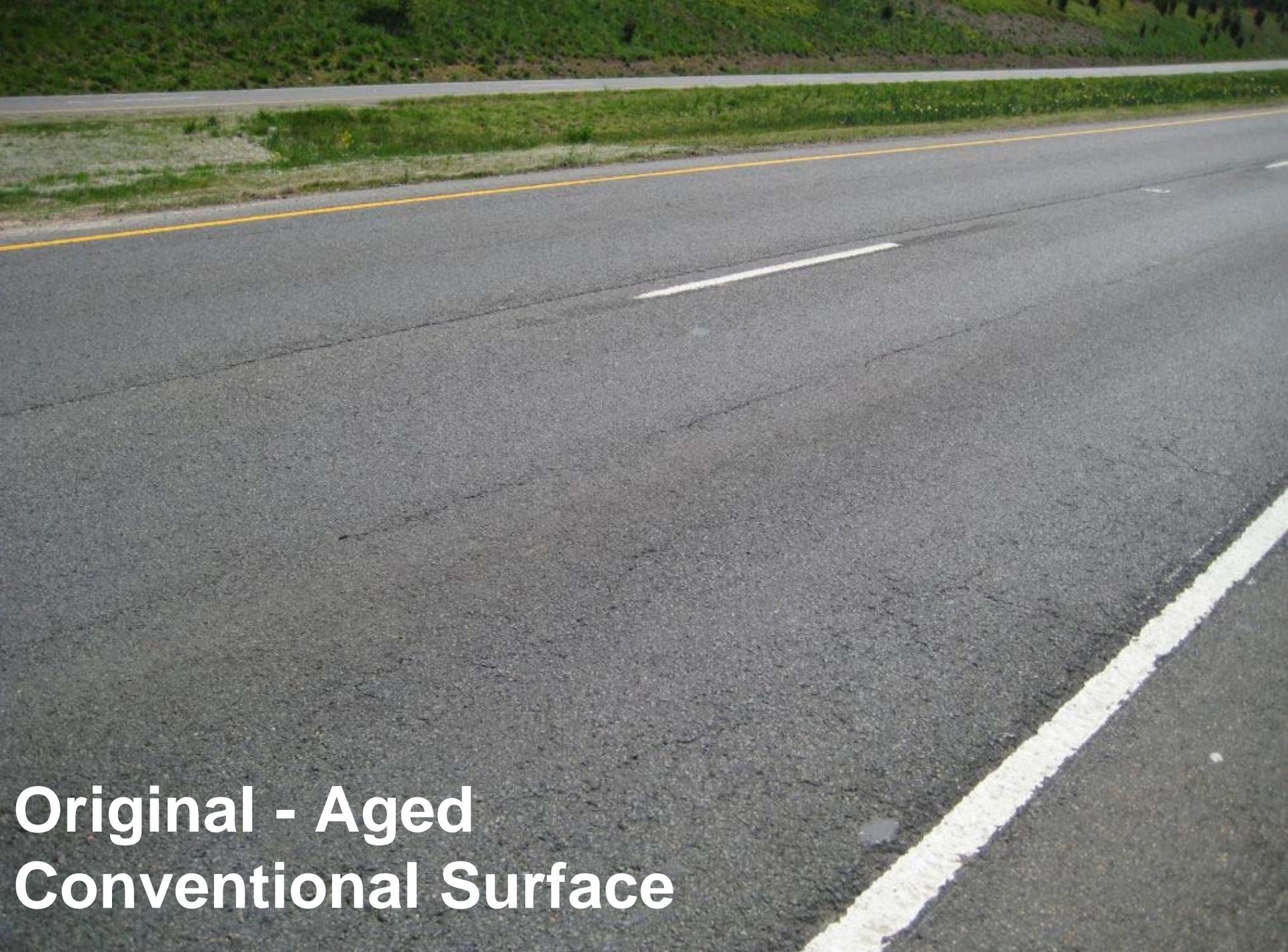
Conventional  
Pavement



Experimental  
Pavement

Prince William  
Parkway (Rt 234)





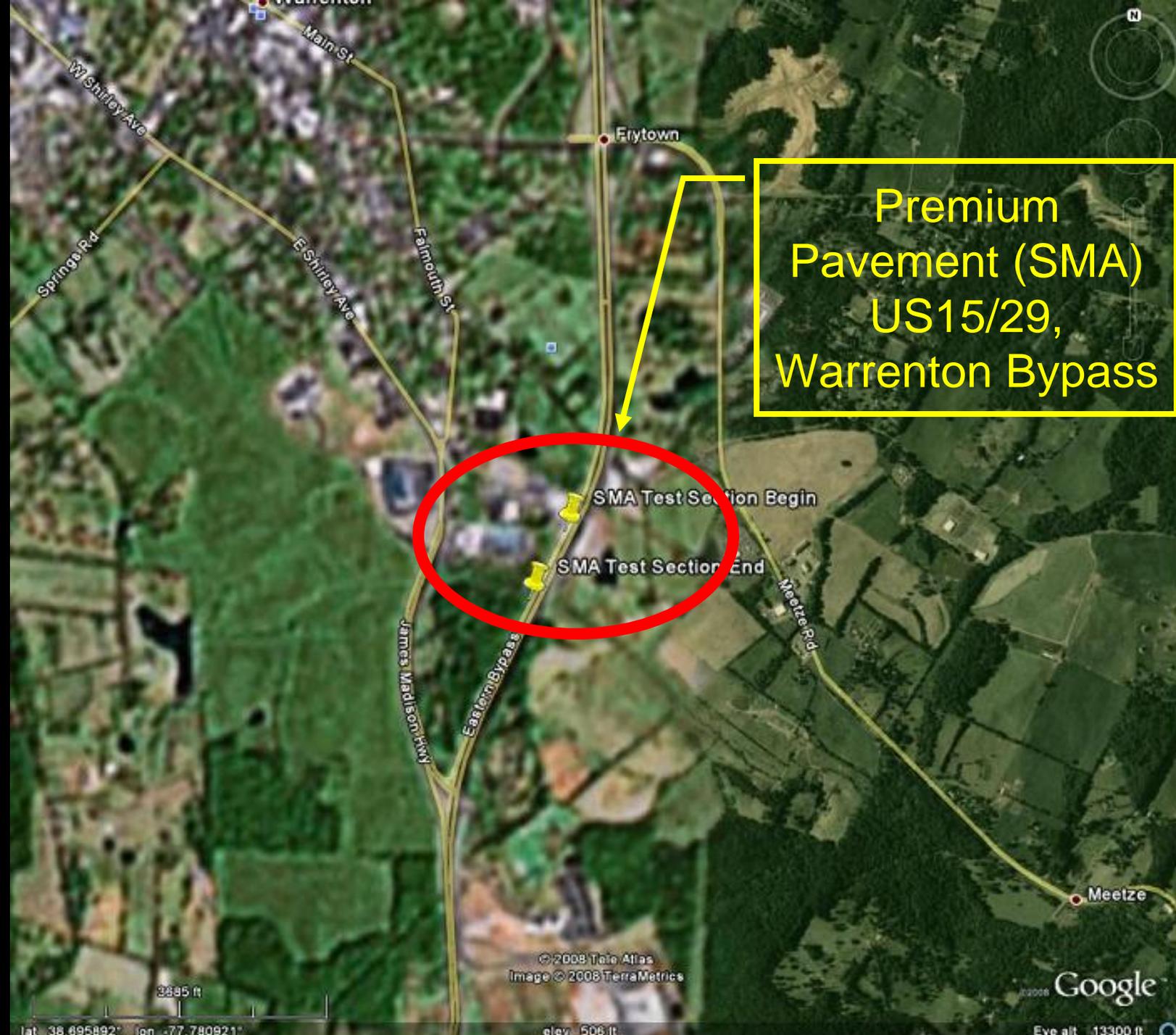
**Original - Aged  
Conventional Surface**



**Experimental  
(PFC)**



**New Conventional Surface**



Premium  
Pavement (SMA)  
US15/29,  
Warrenton Bypass

SMA Test Section Begin  
SMA Test Section End

© 2008 Tele Atlas  
Image © 2008 TerraMetrics

Google

lat 38.695892° lon -77.780921°

elev 506 ft

Eye alt 13300 ft

3895 ft



**New Premium  
Surface (SMA)**

# Functional Performance



Ride quality (International Roughness Index)

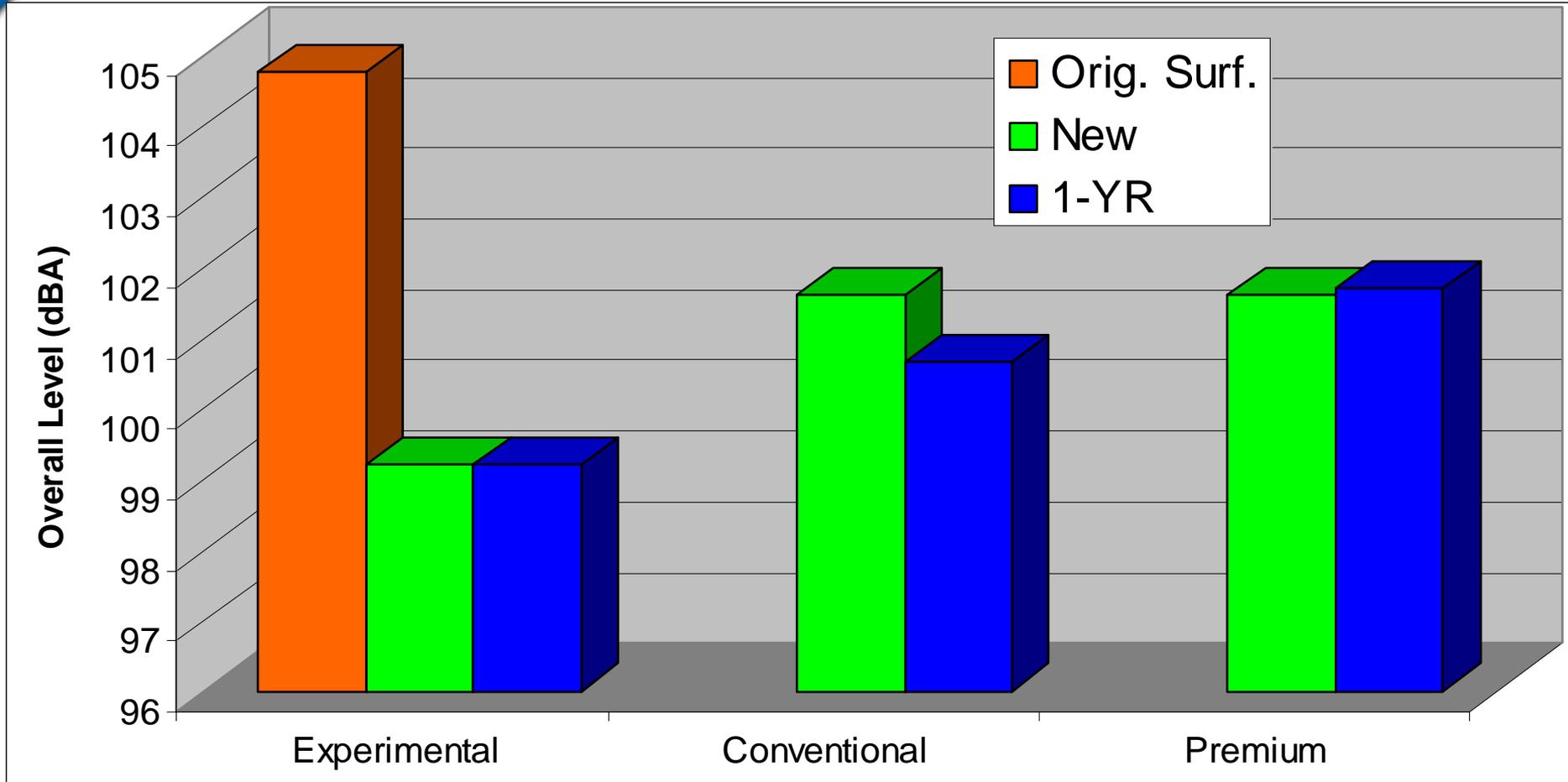


Skid resistance (SN40S)

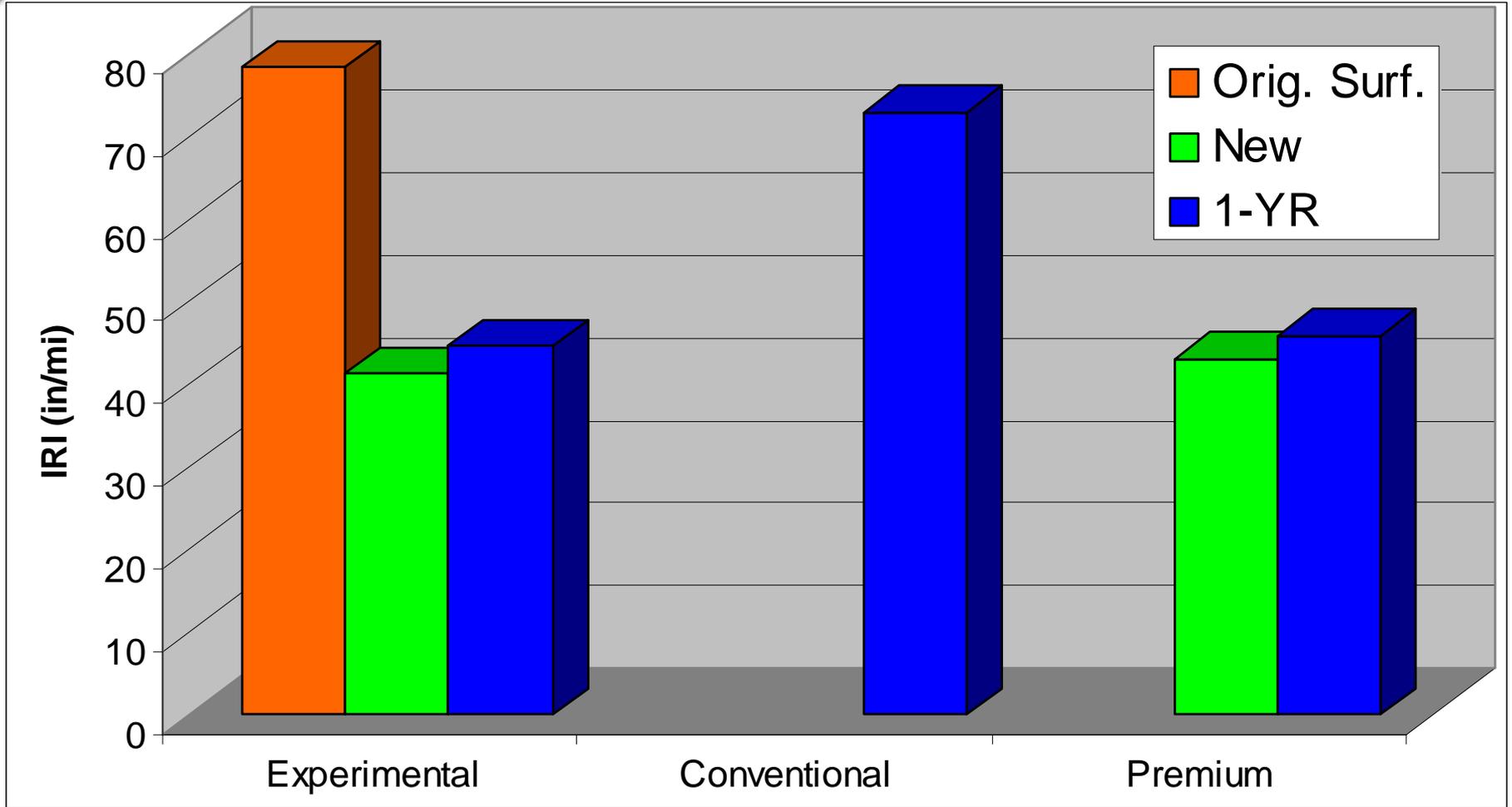
Tire-pavement noise (on-board sound intensity)



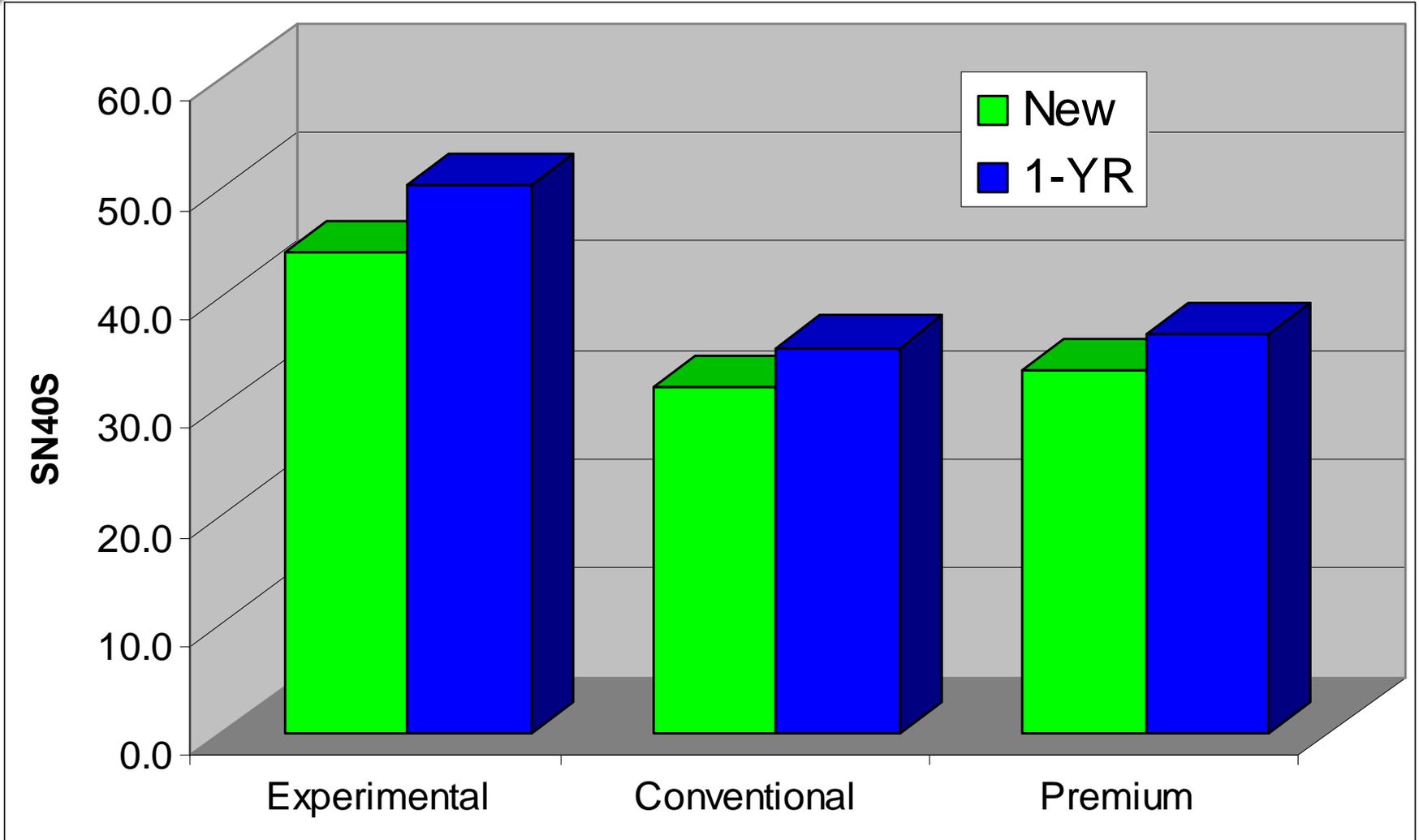
# Tire-Pavement Noise (OBSI)



# Ride Quality



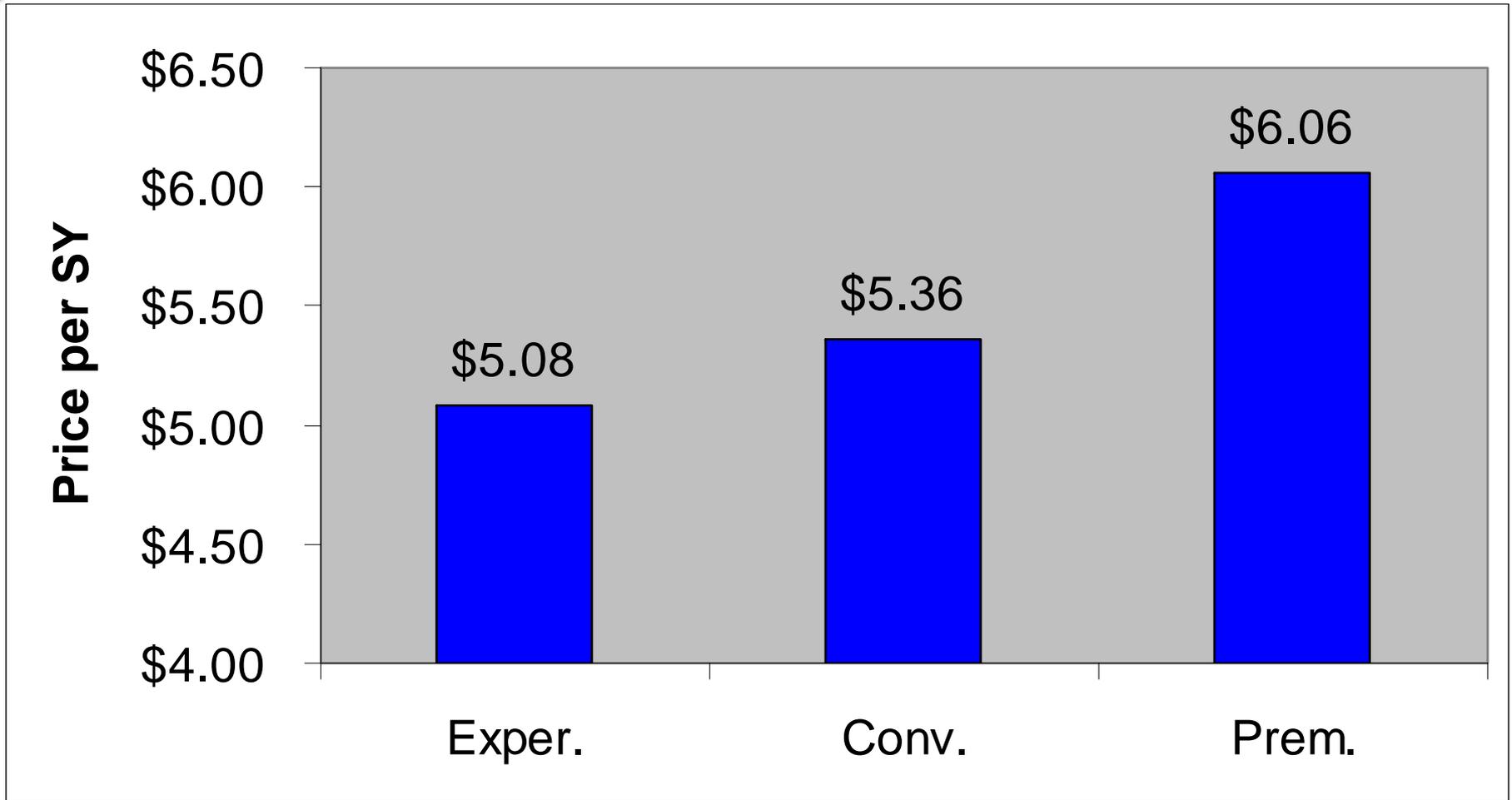
# Skid Resistance



# Splash and Spray



# Cost



Note: reflect typical application rates

# Assessment After One Year

- **Experimental Wearing Course (New-Generation PFC):**
  - Has excellent skid-resistance
  - Provides good ride quality with very thin layer
  - Acoustically superior (as measured at tire-pavement interface) compared to original surface and conventional alternatives
  - Cost-effective in applications where structural improvements to the pavement are not required
- **Candidate Applications:**
  - High-speed, high-volume routes where low tire-pavement noise, high skid-resistance, good ride quality and low splash and spray are critical
  - Facilities where pavement being overlaid is structurally sufficient

# The Rest of The Story

- See VTRC 09-R20
- Annual performance monitoring to continue
- Additional reports as warranted



## Since August 4

- **Continued monitoring**
  - 2-year in-service performance testing underway
  - Noise (OBSI) testing to include survey of other common surfaces (prem. asph., thin bonded wearing courses, tined & ground conc.)
- **Similar presentation made to VDOT's Maintenance Program Leadership Group (MPLG)**
- **October 9, 2010 Statewide VDOT/Industry Asphalt Co-op Meeting → Quiet Asphalt Implementation Task Force created**

# Quiet Asphalt Implementation Task Force

## Co-Chairs:

**Andy Babish, PE, State Materials Engineer**

**Richard Schreck, Executive Vice President, VAA**

## Members:

**Robbie Prezioso, PE, VDOT Acting Maintenance Division Administrator**

**Trenton Clark, PE, VDOT Asphalt Program Manager**

**David Lee, PE, VDOT Salem District Materials Engineer and Chairman VTRC Asphalt Research Advisory Committee**

**Michael Sprinkel, PE, VTRC Associate Director of Research**

**Kevin McGhee, PE, VTRC Associate Principal Scientist**

**Ed Dalrymple, Vice President, Chemung Contracting**

**David Helmick, Vice President, Superior Paving Corp.**

**JCTA Subcommittee on Quiet Pavements - TBA**

# **Mission: Successful Implementation of Quiet Asphalt Technologies in Virginia**

## **Objectives:**

- **Develop criteria for site selection and performance evaluation**
- **Identify “hot spots” for noise mitigation**
- **Identify candidate sites for application of technologies**
- **Determine which quiet asphalt mixes/systems are appropriate for use in Virginia**
- **Identify & address barriers to implementation**

# Task Force Timeline

- **Initial Task Force Meeting – October 18<sup>th</sup>**
- **Develop Draft Action Plan – by Governor’s Transportation Conference**
- **Final Action Plan – February 2011**
- **Install Additional Sites – beginning summer 2011**
- **Monitor Performance through 2014\***
- **Full Implementation by - 2015**

\*to include additional sites each year

# Is 2015 Too Long?

## Barriers to Implementation:

Title 23 part 772 of the U.S. Code of Federal Regulations requires that noise analysis be conducted when potentially impacted receivers are present. The latest rulings were issued June 21, 2010 and specifically address pavement type: *772.9(b) Average pavement type shall be used in the FHWA TNM [Traffic Noise Model] for future noise level prediction unless a highway agency substantiates the use of a different pavement type for approval by the FHWA.*

# Is 2015 Too Long?

## Additional Barriers to Implementation:

- **Past stripping/failure of underlying pavement due to loss of “evaporative drainage”**
- **Past premature and catastrophic mix failure – softer binders, no fibers (to hold binder on aggregate in mix), no polymers**
- **Reports of “black icing” – cools quickly and can store water that pushes up when it freezes**
- **Cost?**



Virginia Department of Transportation