LTPP and Pavement Preservation

MWPPP Annual Meeting
Kansas City, Missouri
Monday – September 28, 2015

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Federal Highway Administration

LTPP
LONG TERM Pavement PERFORMANCE

Agenda

1. Background
2. Overview of Experiment Approach & Key Considerations
3. Experimental Designs & Project Layouts

1. Background

LTPP Mission

Increase pavement life by investigation of various designs of pavement structures and rehabilitated pavement structures, using different materials and under different loads, environments, subgrade soil, and maintenance practices

“Understand how pavements behave and why they behave as they do”

Project Objective

Design pavement preservation experiments for the LTPP program

- Enable LTPP to provide short- and long-term performance data on pavements relative to preservation technology
- Verify preservation as a viable technology in extending pavement life
- Document impacts of preservation to enable development and implementation of important products and tools

Project Activities

- Phase I
  - Expert Task Group (ETG)
  - **Experiment Designs**
  - Materials Sampling & Testing Plans
- Phase II
  - Performance Monitoring Requirements
  - Construction Requirements for RSCs
  - Other Data Collection Needs
  - Technical Support & Marketing

Expert Task Group (ETG)

Provide review/feedback throughout development of experiment

- Anita Bush (Nevada DOT)
- Colin Franco (Rhode Island DOT)
- Morgan Kessler (FHWA)
- David Luhr (Washington State DOT)
- Magdy Mikhail (Texas DOT)
- Jim Moulthrop (FP^2)
- Larry Scofield (IGGA)
- Roger Smith (Texas A&M University)

2. Overview of Experiment Approach & Key Considerations

LTPP Pavement Preservation Experiments

- SPS-11 AC Pavement Preservation Study
- SPS-12 PCC Pavement Preservation Study

Two experiments; consistent with other LTPP experiments

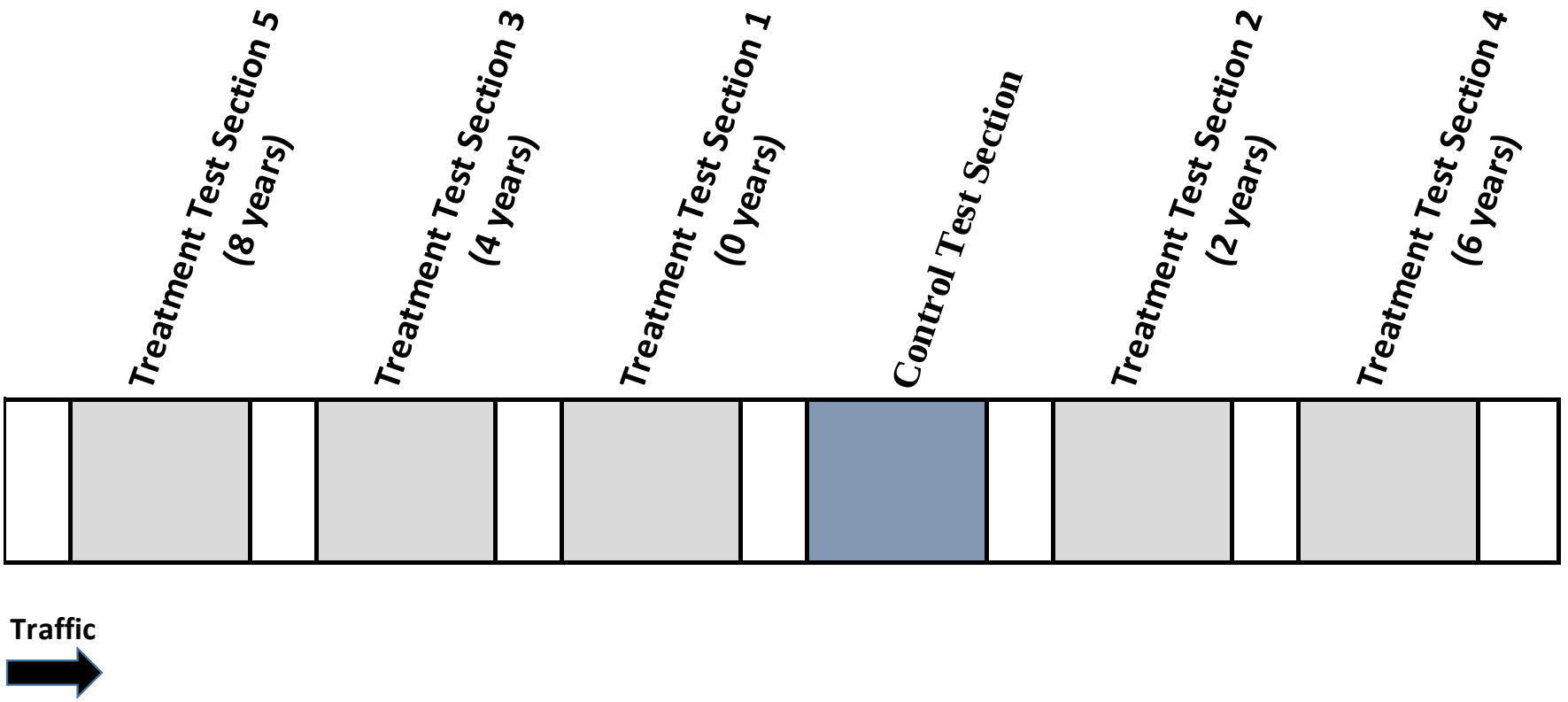
Experimental Approach

- Segregate treatment types and pavement project locations into discrete groups
- Apply same preservation treatment, at different times, on same pavement structure
- LTPP focus is on timing/distress propagation rates, while NCAT/MnROAD studies and others focus on treatment comparisons…

LTPP and NCAT/MnROAD studies complement / supplement each other

Example SPS-11 Project

6 test sections – 1 control (no overlay) and 5 treatment sections:



Preservation Treatments

AC Pavements (SPS-11)

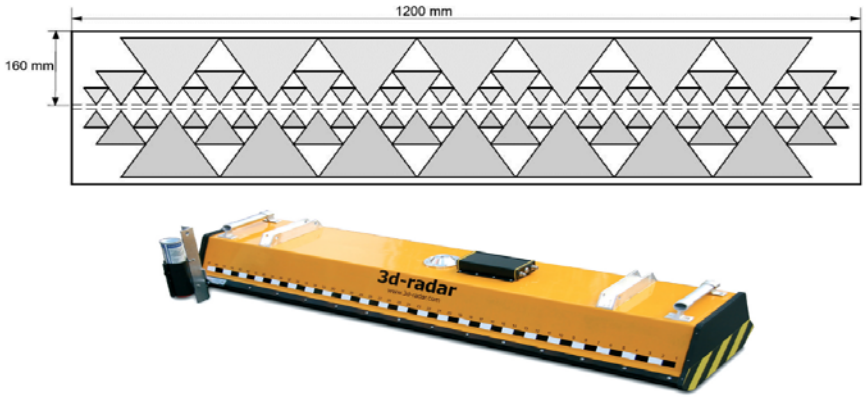
- Thin HMA overlays (< 1”)
- Chip seals
- Micro Surfacing

PCC Pavements (SPS-12)

- Diamond grinding & DBR
- Joint sealants
- Joint penetrating sealers

Pavement Types

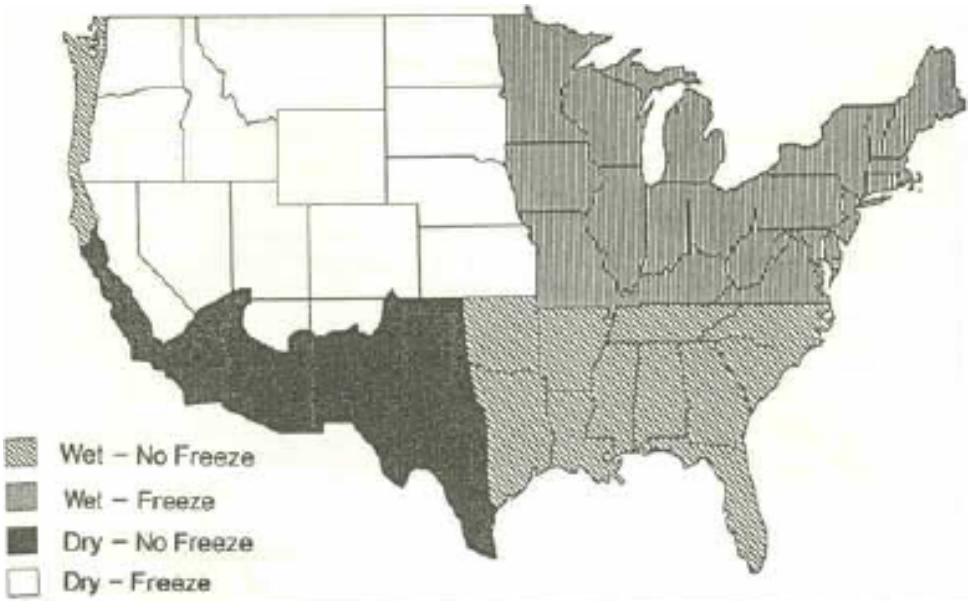
- SPS-11:
  - AC overlay of existing AC pavement (AC/AC)
- SPS-12:
  - Original jointed plain concrete pavement (JPCP)



Climate

Thresholds:

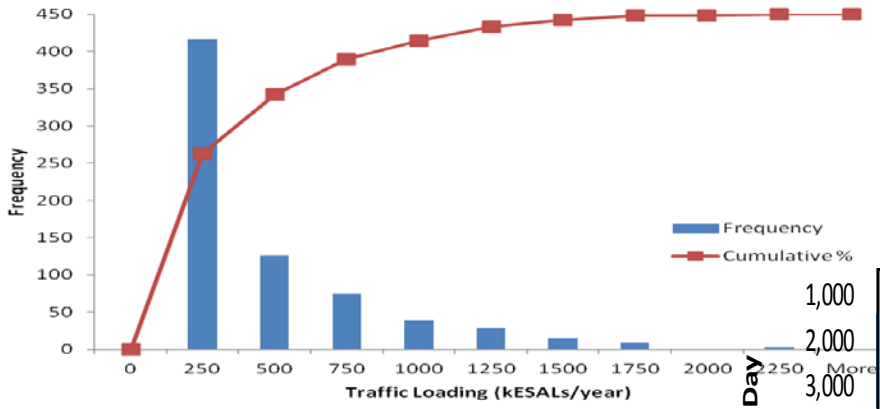
- Precipitation of 20 inches/year
- Freezing Index of 150°F-days/year

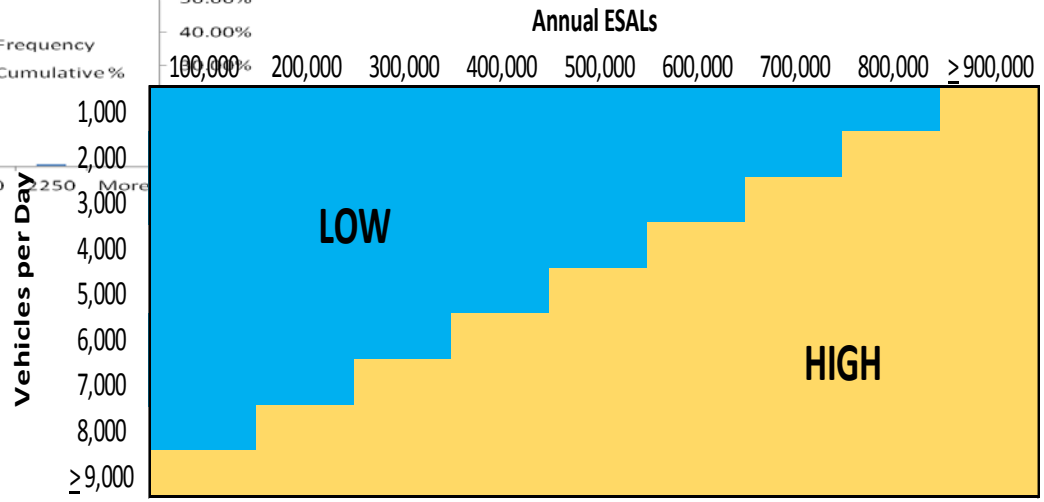


MERRA data

Traffic

- SPS-11 experiment considers both volumes and ESALs, while SPS-12 only considers ESALs





Replicates, Repeats & Supplemental

Replicates:

- Two per experimental cell; will depend on funding

Repeat:

- Control test section plus test sections that have not received treatment

Supplemental:

- Highly encouraged; will be supported and monitored by LTPP

3. Experimental Designs & Project Layouts

SPS-11 Matrix

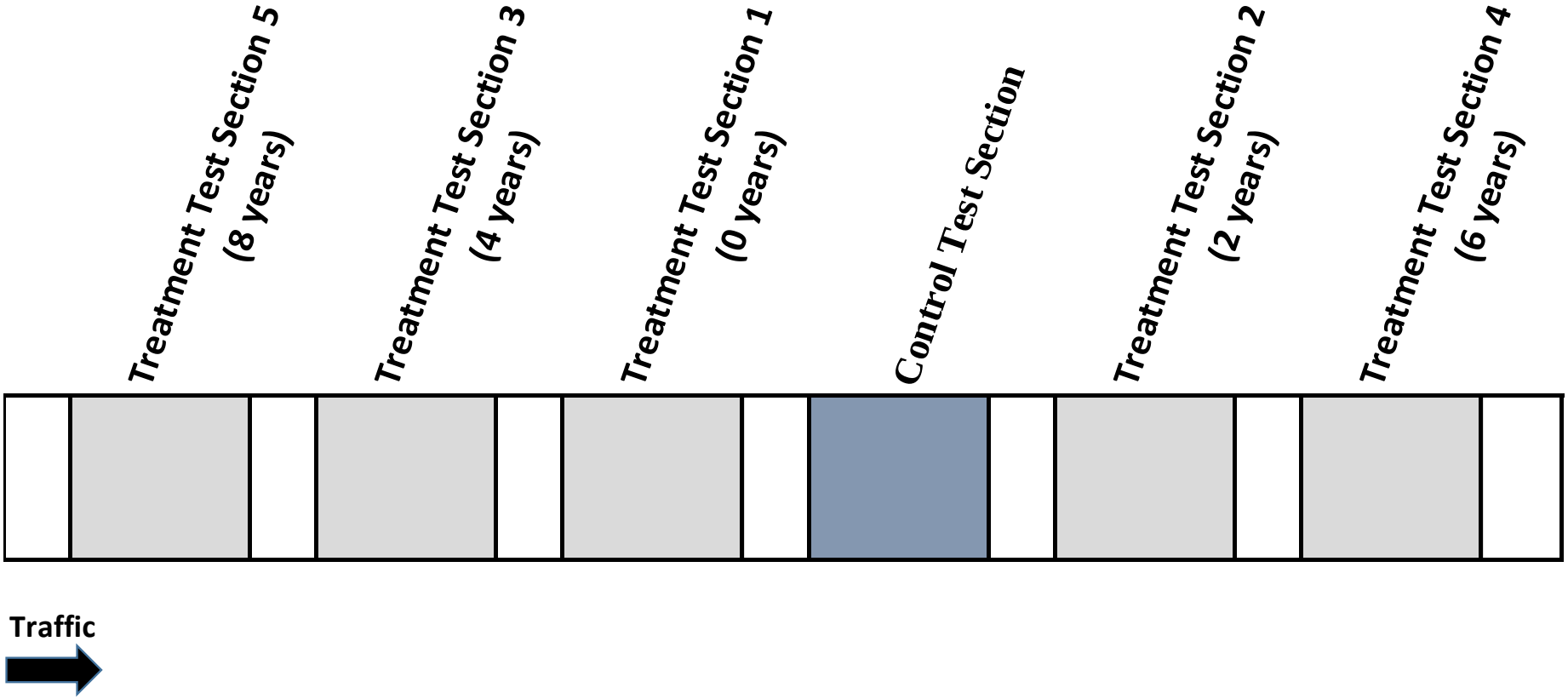
	Wet				Dry			
	Freeze		No Freeze		Freeze		No Freeze	
Sub-Experiment / Treatment	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**
Thin AC Overlay								
Chip Seal								
Micro-Surfacing								

Moisture

Temperature

Traffic

Typical SPS-11 Layout



SPS-12 Matrix

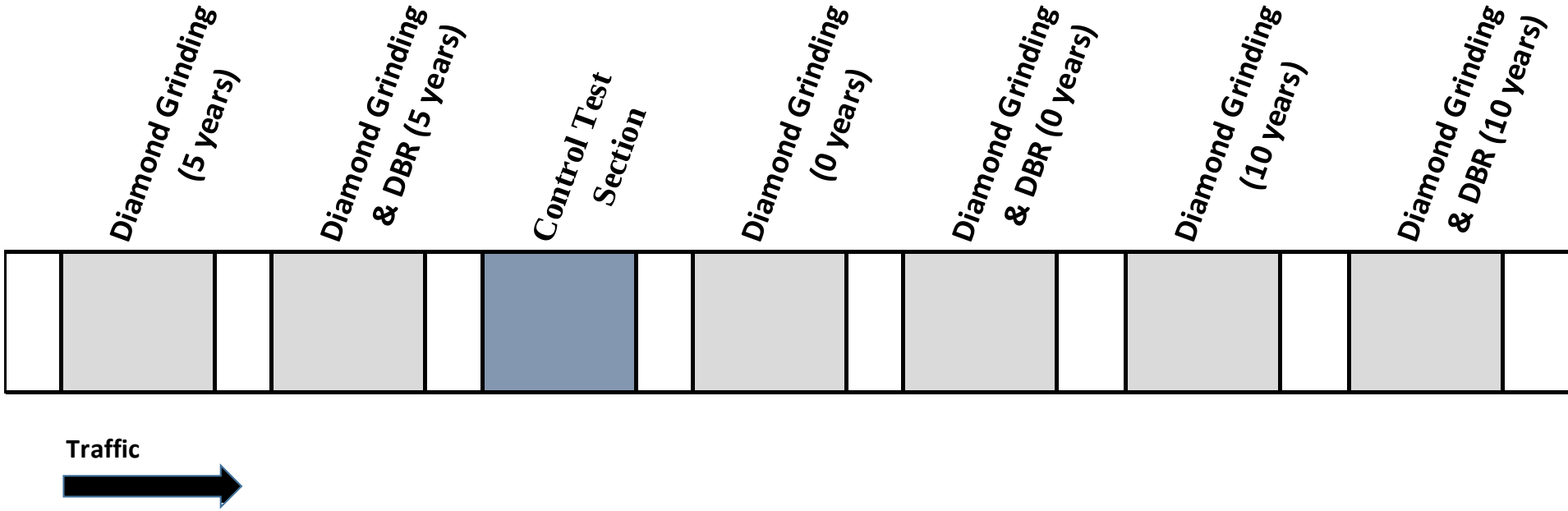
	Wet				Dry			
	Freeze		No Freeze		Freeze		No Freeze	
Treatment	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**
Diamond Grinding & Dowel Bar Retrofit								
Joint Sealant								
Joint Penetrating Sealers								

Moisture

Temperature

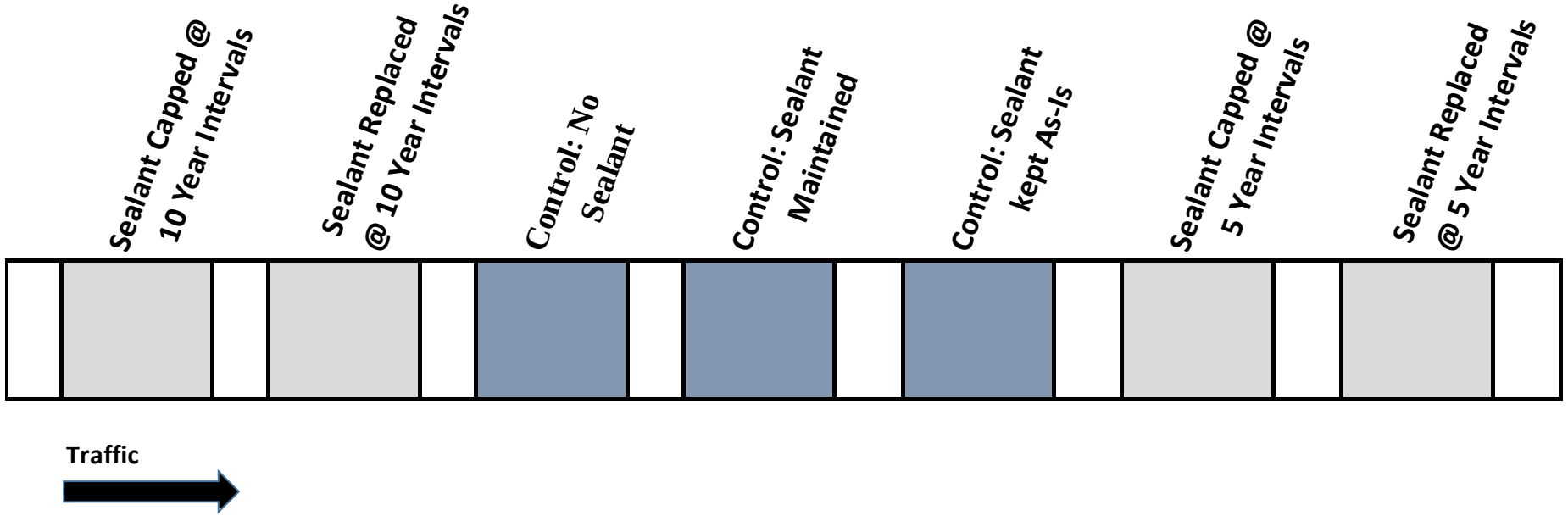
Traffic

Diamond Grinding & DBR

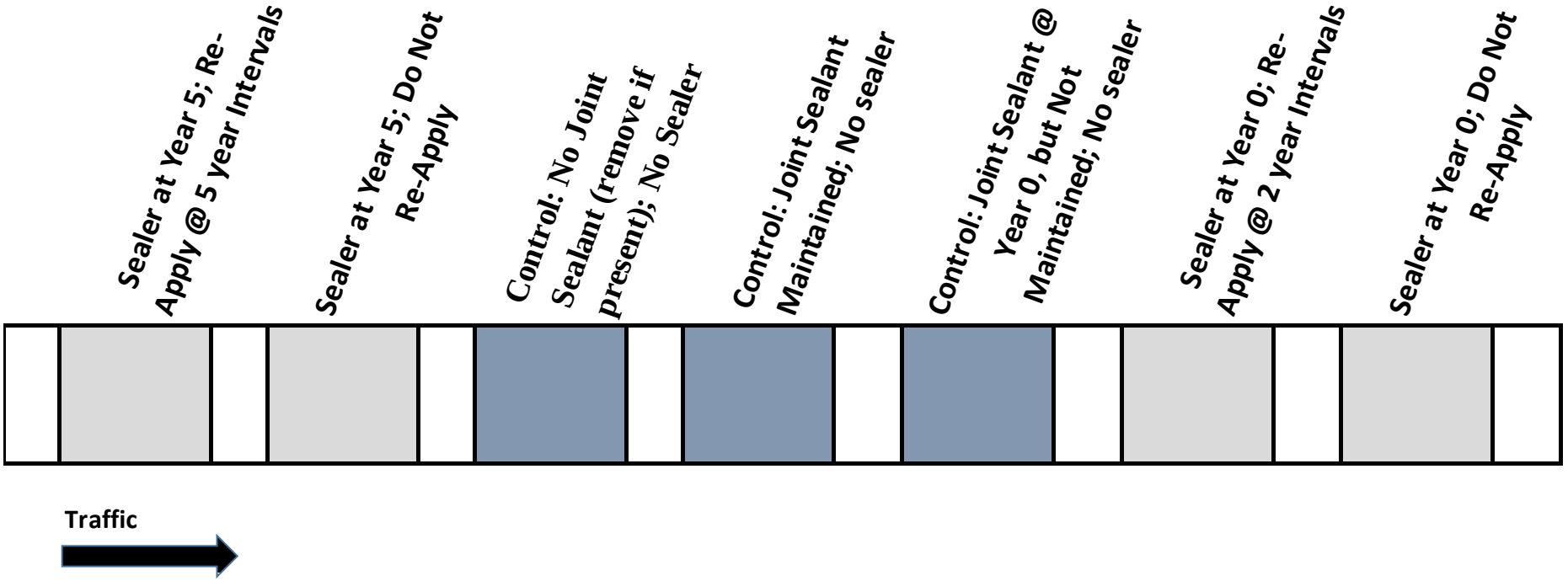


Joint Sealant

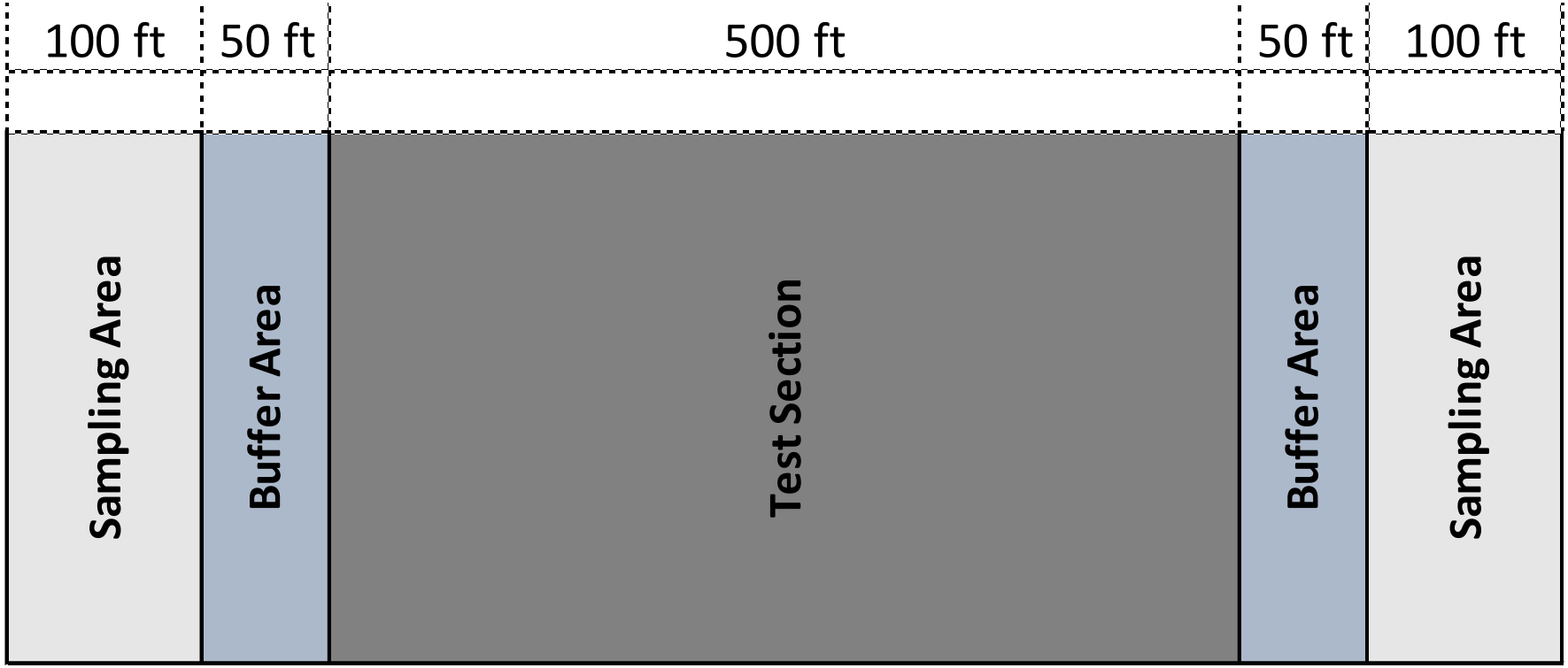
(Cap/Replace Sealant)



Penetrating Sealer
(Silanes or Siloxanes)



Typical Test Section



Summary

- Phase I: Experiment Designs and MS&T Plans will be completed shortly
- Phase II: has been approved and work will commence shortly
- Project Schedule: construction and data collection guidelines will be completed by next fall and, once done, will start to recruit projects