

NCHRP 09-49

Performance of WMA Technologies
Stage I -Moisture Susceptibility



General Information

- PI – Amy Epps Martin
- Co-PI – Cindy Estakhri

- 30 Months
- \$450,000
- Start: July 26, 2010
- Texas Transportation Institute



Panel Members

Chair: Kim Willoughby (Washington DOT)

Ravi Chandran (Connecticut DOT)

Stacey Diefenderfer (Virginia TRC)

James Horn (Alaska DOT)

Scott Schram (Iowa DOT)

Matt Corrigan – FHWA

Dale Decker - Consultant

Syed Haider – Michigan State University

Rita Leahy – California APA

NCHRP : Ed Harrigan



Related NCHRP WMA Projects

- 9-43 – Mix Design
- 9-47A – Properties, Performance and Environment
- 9-49 – Moisture Susceptibility
- 9-49A – Long Term Performance



Objectives

- WMA Technologies Adversely Affect Moisture Susceptibility?
- Guides for Identifying and Limiting Moisture Susceptibility



Work Plan

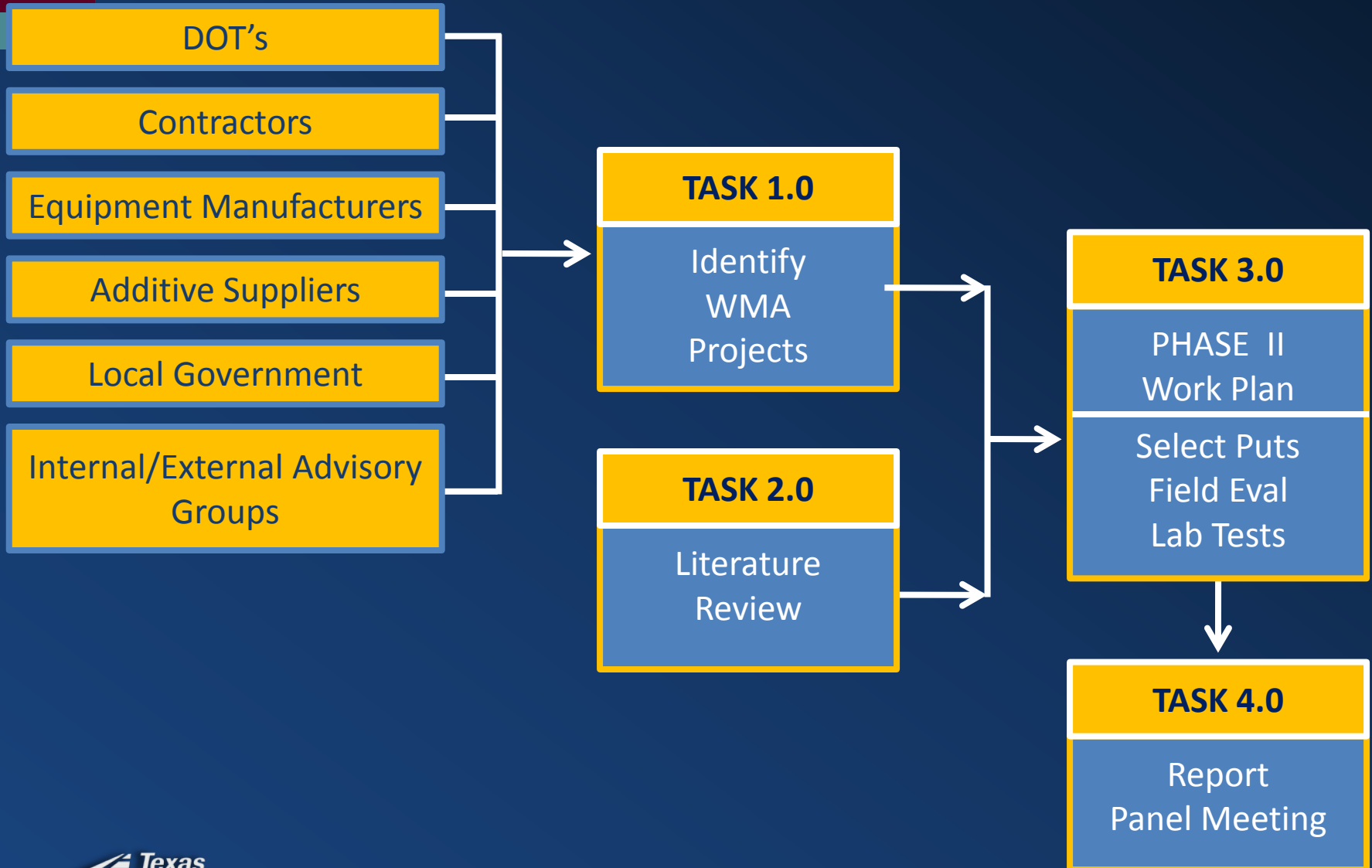
- 4 Phases
- 10 Tasks



PHASE I

INFORMATION COLLECTION

Phase I – Information Collection





Goals – Phase I and Phase II

- Reasons for Moisture Susceptibility (Field Performance)
- Time Horizons Associated with Moisture Susceptibility
- Ability of Standard Tests to Predict Moisture Susceptibility
- Materials and Methods to Minimize Moisture Susceptibility
- Evaluate Different Specimen Types (Lab/Field)



WMA Pavement Sites - General

- Climate
- Aggregate Type
- Binder Type
- Anti Stripping Agent
- Age
- Traffic
- Structural Section
- WMA Technology
- Performance
- Data Available



WMA Pavement Sites Selection

- A. Develop Detailed List
- B. Select About 20 Pavement Sites
 - 1. Collect More Details
- C. Select About 12 Pavements Sites
 - 1. 7 – Water Susceptibility Problems
 - 2. 5 - No Water Susceptibility Problems



WMA Pavement Sites Selection

D. Select About 5 Pavement Sites (12 Sections)

1. Control HMA Section
2. Multiple WMA Technologies
3. Original Materials and Mixtures
4. Performance Information
5. Laboratory and Field Test Data Available
6. DOT Cooperation

E. Field Work Cooperation

1. Visual Condition Surveys
2. GPR?
3. Cores?



WMA Pavement Sites – Likely Candidates

- FHWA Mobile Asphalt Testing Laboratory
- 9-47A Projects (NCAT)
- NCAT Test Track
- TxDOT
- Other States
- New Construction Sites (2011)



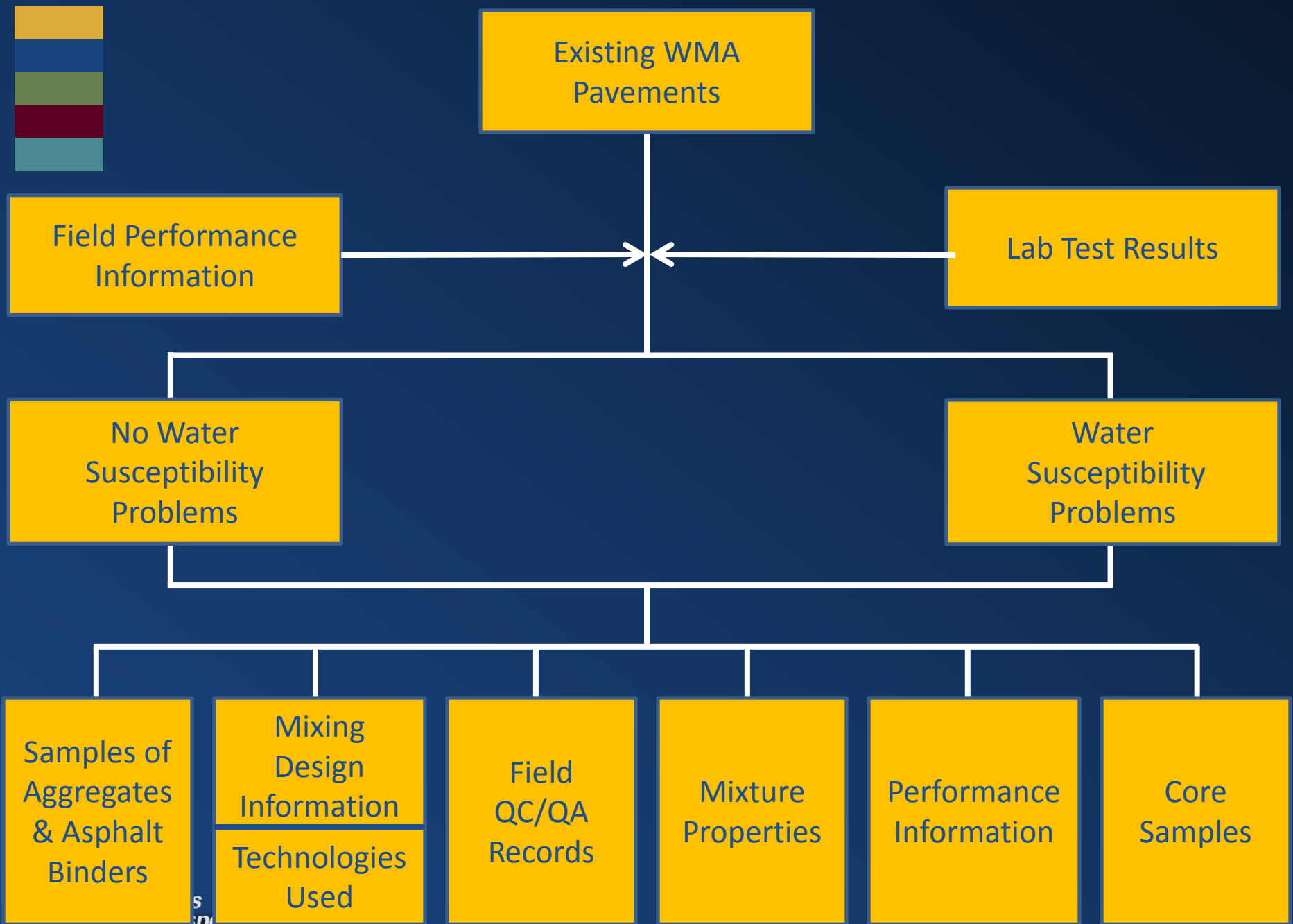
Specific Project Requirements

- Specimen Preparation
 1. Lab Mixed-Lab Compacted (LMLC)
 2. Plant Mix-Lab Compacted (PMLC)
 3. Plant Mix-Field Compacted (PMFC)
- Curing and Conditioning (Short and Long Term)
 1. Mixing Temperature
 2. Compacting Temperature
 3. In Service Temperature
 4. Length of Time



Specific Project Requirements

- Anti-Stripping Agents
 1. Lime (Hydrated)
 2. Liquid A
 3. Liquid B



Existing WMA Pavements

Field Performance Information

Lab Test Results

No Water Susceptibility Problems

Water Susceptibility Problems

Samples of Aggregates & Asphalt Binders

Mixing Design Information Technologies Used

Field QC/QA Records

Mixture Properties

Performance Information

Core Samples



Moisture Susceptibility Tests

Conditioned
vs
Non-conditioned

[Soak,
Vaccum Saturation,
Freeze-Thaw]

- Indirect Tensile Strength
- Resilient Modules
- Dynamic Modules (E)
- Dynamic Mechanical Analyzer
- Compressive Strength
- Stability (Marshall and Hveem)
- Repeated Load Triaxial (Permanent Deformation)

Wheel Tracking

- Hamburg
- Asphalt Pavement Analyzer



PHASE II

CONDUCT AND DOCUMENT

WORK PLAN DEVELOPED IN PHASE I




Phase II Conduct and Document Work Plan Developed in Phase I

- Task 5.0 – Conduct Experimental Plan
- Task 6.0 – Document Results



PHASE III AND IV

**GUIDELINES, SPECIFICATIONS AND
DOCUMENTATION**



Phase III and IV Guidelines, Specifications and Documentation

- Task 7.0 – Guides for Identifying and Minimizing
- Task 8.0 – Revisions to AASHTO Specs and Test Methods
- Task 9.0 – Document Results/Work Plan for Future Research
- Task 10.0 – Final Report

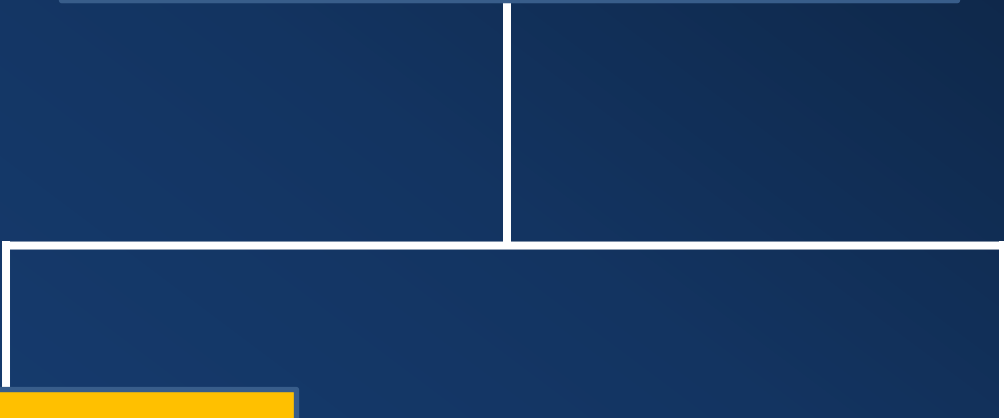


Key Information for WMA Studies

- Existing Pavement Sites with Evidence of Water Susceptibility
- Planned Pavement Sites
- Laboratory Water Susceptibility Studies
- Curing and Conditioning Times
- Water Susceptibility Tests
- Relationships between Tests and Performance



Advisory Groups



Internal

External



External Advisory Group

- Existing Pavement Sites
- Planned Pavement Sites
 - Identify Location
 - Assist with Planning/Placement
- Group Existing Technologies
- Identify New Technologies
- Sample Preparation
- Curing and Conditioning
- Anti Stripping Agents
- Review Test Programs, Results and Documents (NCHRP Approval)



External Advisory Panel

- Meet at WMA TWG
- Express Interest
- Willing to Help
- Contact Information



Questions ?