

# 10th National Conference on Transportation Asset Management

April 28–30, 2014  
Miami, Florida

[www.trb.org/conferences/AssetManagement2014.aspx](http://www.trb.org/conferences/AssetManagement2014.aspx)

## Conference at a Glance

	Sunday, April 27	Monday, April 28	Tuesday, April 29	Wednesday, April 30	Thursday, May 1
8:00 a.m.					
8:30 a.m.					
9:00 a.m.		Workshops (5)	Breakout Sessions	Breakout Sessions	AASHTO Peer Exchange
9:30 a.m.					
10:00 a.m.					
10:30 a.m.			Breakout Sessions	Closing Session	
11:00 a.m.					
11:30 a.m.					
Noon					
12:30 p.m.			Luncheon		
1:00 p.m.	TRB Committee Meetings	Opening Session		Joint Meeting: TRB Asset Management Committee and AASHTO Subcommittee	
1:30 p.m.			Breakout Sessions		
2:00 p.m.					
2:30 p.m.					
3:00 p.m.			Breakout Sessions	Breakout Sessions	
3:30 p.m.					
4:00 p.m.					
4:30 p.m.					
5:00 p.m.					
5:30 p.m.		Posters and Reception	FTA ANPRM Outreach Session		
6:00 p.m.					
6:30 p.m.					
7:00 p.m.	Planning Committee Meeting				
7:30 p.m.					
8:00 p.m.					

### Post-Conference Webinars to Highlight Tracks

- **TAM Implementation Tips and Tricks**, May 15, 12:30 p.m.–2:00 p.m.
- **Highlights from the Tools and Technology Track of the 10th National TAM Conference**, May 19, 2:00 p.m.–3:30 p.m.
- **Peer to Peer: Detailed Looks at MAP-21 Asset Management Plan Pilot States**, May 22, 2:00 p.m.–3:30 p.m.
- **Adaptation to Extreme Weather Events and Climate Change**, June 11, 1:00 p.m.–2:30 p.m.
- **Transit State of Good Repair**, TBD
- **Performance Measurement for Asset Management: MAP-21 and Beyond**, July 30, 12:30 p.m.–2:00 p.m.

Signing up is easy:

1. Go to the main page of the TRB Webinar Program: [www.trb.org/ElectronicSessions/ConferenceRecordings.aspx](http://www.trb.org/ElectronicSessions/ConferenceRecordings.aspx). Webinars usually are posted two months before they occur.
2. Click on the webinar that you would like to attend. This will take you to the registration page.
3. Once you are at the registration page, click “Register Now.”

### Asset Management Help Desk

*Not Your Average IT Help Desk!*

Do you have questions about transportation asset management? Curious about that new ISO asset management standard? Stop by the Asset Management Help Desk, sponsored by the FHWA Transportation Asset Management Expert Task Group, and get your questions answered! Asset management experts will be on hand to talk about the latest research efforts, demonstrate new products such as the Transportation Asset Management Information Portal and the Transportation Asset Management Plan Builder, and connect you with the right people. Copies of the latest asset management publications will also be available for review, as well as the discount code for the latest edition of the *AASHTO Transportation Asset Management Guide: A Focus on Implementation*. The help desk will be open during breaks.

April 27–May 1, 2014



## A Milestone for Asset Management

The 10th National Transportation Asset Management Conference marks a substantial milestone for the asset management community. We expect record attendance, including representatives from 48 states and the District of Columbia. The conference will cover a broad range of topics on surface transportation modes of interest to diverse transportation agencies in all stages of implementation of asset management practices. The program is divided into six functional track areas, each with a distinct set of outcomes and highlights that will be summarized in the closing session.



*Bittner*

We are pleased that you have chosen to join us for this important and timely conference. The planning committee has structured the conference to serve as a forum for advancing asset management initiatives into practice from the Moving Ahead for Progress in the 21st Century Act (MAP-21) and as the venue for federal, state, local, and transit agencies; metropolitan planning organizations; and private-sector practitioners and university researchers to share knowledge, sponsor peer-to-peer learning, and work together.

The community of transportation asset management professionals gathered here in Miami will help guide the nation's efforts to preserve and maintain infrastructure and transit services. Information will be presented on how to properly plan for risks—including, but not limited to, extreme weather events. Whether your agency is just starting out, well under way, or at a higher maturity level than others, the knowledge presented over the next several days—and the contacts you make—will be valuable to future endeavors.

Welcome to Miami and enjoy the conference!

—Jason Bittner, *Conference Planning Committee Chair*  
*Cambridge Systematics, Inc.*

### Conference Planning Committee and Liaisons

Jason Bittner, Cambridge Systematics, Inc., *Chair*  
Sandy Amores, Miami–Dade Transit  
Melissa Batula, Pennsylvania Department of Transportation  
Jennifer Brandenburg, North Carolina Department of Transportation  
Michael Bridges, Louisiana Department of Transportation and Development  
Alex Calvillo, Oklahoma Department of Transportation  
Matthew Haubrich, Iowa Department of Transportation  
Garth Hopkins, California Department of Transportation  
Cassandra Isackson, Minnesota Department of Transportation  
Tim Lattner, Florida Department of Transportation  
Hyun-A Park, Spy Pond Partners, LLC  
Cory Pope, Utah Department of Transportation  
Scott Richrath, Colorado Department of Transportation  
Omar Smadi, Iowa State University  
David Springstead, Metropolitan Atlanta Rapid Transit Authority  
Ron Vibbert, Michigan Department of Transportation  
Kevin Walsh, Massachusetts Department of Transportation  
Andrew Williams, Ohio Department of Transportation  
Laura Zale, Southeastern Pennsylvania Transportation Authority  
Kathryn Zimmerman, Applied Pavement Technology, Inc.

#### *Liaisons*

Brian Alberts, Federal Transit Administration  
Steve Gaj, Federal Highway Administration  
Matt Hardy, American Association of State Highway and Transportation Officials  
Heather Holsinger, Federal Highway Administration  
Robert Kafalenos, Federal Highway Administration

April 27–May 1, 2014



## WORKSHOPS AND MEETINGS

Workshop numbers limited. Registration required for workshops; no fee.

### Sunday, April 27

1:00 p.m.–3:00 p.m.

**TRB Strategic Management Committee (ABC10), Orchid D**

Robert Paddon, Translink, *presiding*

3:30 p.m.–5:30 p.m.

**TRB Management and Productivity Committee (ABC20), Orchid C**

Maureen L. Hammer, Virginia Department of Transportation (DOT); Mary Taylor Raulerson, Kittelson & Associates, Inc., *presiding*

**TRB Transportation Issues in Major U.S. Cities Committee (ABE30), Orchid D**

Rina Cutler, City of Philadelphia, *presiding*

### Monday, April 28

7:00 a.m.–8:00 a.m.

**NCHRP 08-87 Panel Meeting, Gardenia A, (by invitation)**

Kathryn A. Zimmerman, Applied Pavement Technology, Inc., *presiding*

7:00 a.m.–8:30 a.m.

**TRB Management and Leadership Section (ABC00), Azalea**

Hyun-A Park, Spy Pond Partners, LLC, *presiding*

7:30 a.m.–8:30 a.m.

**Implementation Subcommittee of Transportation Asset Management Committee [ABC40(3)], Orchid D**

Joseph Guerre, Cambridge Systematics, Inc., *presiding*

**Communications Subcommittee of Transportation Asset Management Committee [ABC40(4)], Orchid A**

David L. Blake, AgileAssets, Inc., *presiding*

8:30 a.m.–noon

**Workshop: Financial Plan Requirement for the Asset Transportation Plan, Flagler**

Michael Bridges, Louisiana Department of Transportation and Development (DOTD), *presiding*

The long-range financial plan is not only an important component of a good transportation asset management plan (TAMP), it is a requirement under MAP-21. This workshop will provide a forum to discuss and answer questions from state DOTs by reviewing the financial plans from the Federal Highway Administration (FHWA) three-state TAMP pilot.

#### **Asset Valuation Approach to TAMP Financial Plans**

Gordon D. Proctor, Gordon Proctor and Associates

#### **MAP-21 TAMP Financial Plans Rulemaking Status**

Stephen J. Gaj, FHWA

#### **Three-State Pilot TAMP Financial Plan**

Michael Bridges, Louisiana DOTD; Mark Nelson, Minnesota DOT; Joseph Guerre, Cambridge Systematics, Inc.

**Workshop: Cross-Asset Allocation (NCHRP 08-91), Orchid C**

Michelle L. Maggiore, CH2M Hill; Kevin M. Ford, CH2M Hill; Craig Paul Secrest, High Street Consulting Group, LLC; Julie Lorenz, Burns & McDonnell, *presiding*

In this workshop, the CH2M Hill team will present and gather feedback for the cross-asset resource allocation framework and prototype tool being developed for the National Cooperative Highway Research Program (NCHRP) Project 08-91 that will be field-tested in summer 2014. The session will include tool testing by project panel members and opportunities for discussion and feedback.



**Workshop: Geographic Information System (GIS) for Asset Management (NCHRP 08-87), Tuttle**  
Frances D. Harrison, Spy Pond Partners, LLC, *presiding*

With its powerful capabilities for information integration, analysis, and communication, GIS is an essential tool in the transportation asset management (TAM) toolbox. This workshop presents preliminary results from NCHRP Project 8-87, Successful Practices in GIS-Based Transportation Asset Management, and will address opportunities for enhancing TAMP processes with GIS, key ingredients for successful implementation, and example applications from state DOT pilot demonstrations.

**Workshop: Introduction to Transportation Asset Management, Brickell**  
Sue McNeil, University of Delaware, *presiding*

This workshop will provide a foundation for practitioners to understand TAM and what it means for their organizations. State DOT, transit agency, and multimodal organization perspectives will be presented. Topics include resources and tools available to support asset management and practical steps to implementation.

**State DOT Perspective**

Shante Hastings, Delaware DOT

**Transit Agency Perspective**

Laura J. Zale, Southeastern Pennsylvania Transportation Authority (SEPTA)

10:00 a.m.–10:30 a.m.

**Break, Regency Ballroom Prefunction**

10:30 a.m.–noon

**Workshop: Gap Analysis (NCHRP 08-90), Monroe**

Kathryn A. Zimmerman, Applied Pavement Technology, Inc., *presiding*

Interested in benchmarking your asset management program to best practices? This workshop introduces a new gap analysis tool developed under NCHRP Project 08-90A that provides an objective, structured process for evaluating asset management practices and for identifying priorities for improvement. The tool evaluates policies and processes to support asset management, workforce involvement and training, organizational culture, asset data and knowledge, results orientation, and information systems.

11:30 a.m.–1:00 p.m.

**Pooled Fund: Meeting #1 (by invitation), Orchid A**

Matthew Haubrich, Iowa DOT, *presiding*

## Tuesday, April 29

7:30 a.m.–8:30 a.m.

**Analysis Subcommittee of Transportation Asset Management Committee [ABC40(2)], Orchid D**

William Robert, Spy Pond Partners, LLC, *presiding*

5:00 p.m.–7:00 p.m.

**Pooled Fund: Meeting #2 (by invitation), Orchid A**

Matthew Haubrich, Iowa DOT, *presiding*

## Wednesday, April 30

7:00 a.m.–8:30 a.m.

**Data Subcommittee of Transportation Asset Management Committee [ABC40(1)] and Statewide Transportation Data and Information Systems Committee (ABJ20), Orchid A**

Coco A. Briseno, California Department of Transportation (Caltrans), *presiding*

This joint meeting will examine the key data governance functions for asset management and will develop a research framework for asset management data governance and data business planning. Specific data planning and management practices—data business planning, data governance, and data standards—are particularly relevant to TAM. Data governance establishes the decision-making structures and processes for the management of data assets and performance of data functions.

Monday, April 28 to Wednesday, April 30, 2014



7:30 a.m.–8:30 a.m.

**Joint Subcommittee of Transit State of Good Repair**, *Hibiscus B*  
William Robert, Spy Pond Partners, LLC, *presiding*

12:30 p.m.–2:00 p.m.

**Pooled Fund: Meeting #3** (*members only*), *Hibiscus A*  
Matthew Haubrich, Iowa DOT, *presiding*

2:30 p.m.–6:30 p.m.

**TRB Committee: Joint Meeting with TRB Transportation Asset Management Committee (ABC40) and AASHTO Asset Management Subcommittee**, *Hibiscus B*  
Kathryn A. Zimmerman, Applied Pavement Technology, Inc.; Ananth K. Prasad, Florida DOT, *presiding*

## Thursday, May 1

9:00 a.m.–4:00 p.m.

**Peer Exchange: AASHTO Asset Management Subcommittee** (*by invitation*), *Brickell*  
Timothy A. Henkel, Minnesota DOT, *presiding*

Interested staff contact Matt Hardy, AASHTO, mhardy@ashto.org.

## CONFERENCE TRACK SUMMARIES

### Establishing, Using, and Monitoring Asset Management Plans

Michael Bridges, Louisiana DOTD, *track leader*

This track assists attendees in developing a required plan to meet the MAP-21 mandate and in identifying ways to use the plans to improve existing practices.

- Peer to Peer: Detailed Looks at MAP-21 Pilot States (page 8)
- Go Time: Building Your TAMP (page 13)
- Experiential Learning: TAMP Examples (page 16)
- Help-Desk Heroes: Resources to Develop Your TAMP (page 18)

### Implementation Within and Across Organizations

Katie Zimmerman, Applied Pavement Technology, Inc., *track leader*

The objective for this track is to understand and overcome barriers to implementation within a single organization as well as across organizations.

- A Solid Foundation: Building the Agency Framework to Support TAM (page 11)
- Bringing Everyone to the Table: Improving Agency Decision Making (page 13)
- Talking a Good Game: Communication Within and Across Organizations (page 14)
- Dollars and Cents: Return on Investment (ROI), Investment Planning, and Financing (page 16)

### Tools and Technology to Assist Decision Making

Matthew H. Hardy, American Association of State Highway and Transportation Officials (AASHTO), *track leader*

Highlights of this track are implemented and emerging practices, methods, and tools.

- Go Find Your Slide Rule: The Bleeding Edge of Asset Management (page 8)
- Informed Choices: Tools for Managing Risk and Analyzing Trade-Offs (page 11)
- Don't Reinvent the Wheel: Case Studies in TAM Technology and Data (page 16)
- TAM\*IT! Data and Information Management (page 18)



## Performance Measures for Asset Management

Matthew Haubrich, Iowa DOT; Tim Lattner, Florida DOT, *track leaders*

This track identifies emerging practices in the implementation of asset management performance measures.

- A Federalist Mindset: Where the States Are Looking to Take TAM (page 9)
- Getting It Together: Managing All Assets (page 12)
- Keeping It Local: Municipal and County TAM Approaches (page 14)
- What Comes Next? MAP-21 and Beyond (page 18)

## Transit State of Good Repair

Laura J. Zale, SEPTA, *track leader*

This track focuses on issues related to transit asset management and efforts to achieve a state of good repair.

- How Did We Get Here? Establishing the Context for Transit Asset Management (page 9)
- Getting Started: Tools and Technology for Transit Asset Management (page 12)
- Establishing Progress: Performance Measures for Transit Asset Management (page 15)
- Creating Your Road Map: Implementation Strategies for Transit Agencies (page 17)
- Oh, the Places You'll Go: Incorporating TAM Into Your Agency's Process (page 19)

## Adaptation to Extreme Weather Events and Climate Change

Robert Kafalenos, FHWA, *track leader*

Addressed in this track are the ways in which climate change and extreme weather events could affect transportation systems in the future and how to prepare.

- The Big Picture: Why Climate Change and Extreme Weather Events Matter (page 9)
- Protecting System Assets: What to Do for Climate Change and Extreme Weather Events (page 12)
- Transit Asset Management and Climate Adaptation (with State of Good Repair) (page 14)
- Been There, Done That: Experiences with Vulnerability Assessments, Part I (page 15)
- Less Duct Tape: Experiences with Vulnerability Assessments, Part II (page 17)
- Informed Decision Making: Cost Analysis and Risk Assessment for Adaptation to Climate Change and Extreme Weather Events (page 19)

# CONFERENCE SESSIONS

## Monday, April 28

1:00 p.m.–3:00 p.m.

**And We're Off: Why We're Here Again, Monroe**

Jason J. Bittner, Cambridge Systematics, Inc., *presiding*

### Welcome

Ananth K. Prasad, Secretary, Florida DOT

### Importance of Transportation Asset Management to States

Michael W. Hancock, Secretary, Kentucky Transportation Cabinet

### Importance of Transportation Asset Management to FHWA

Greg Nadeau, Deputy Administrator, FHWA

### Importance of the State of Good Repair to the Transit Community

Dorval Carter, Chief Counsel, Federal Transit Administration (FTA)

### Integrating Extreme Weather and Climate Change into Transportation Asset Management

Kevin Walsh, Director of Environmental Services, Massachusetts DOT

Monday, April 28, 2014



3:00 p.m.–3:30 p.m.

**Break**, *Regency Ballroom Prefunction*

3:30 p.m.–5:00 p.m.

## Plans

### **Peer to Peer: Detailed Looks at MAP-21 Pilot States**, *Brickell*

Jonathan Groeger, AMEC Environment and Infrastructure, Inc., *presiding*

Carolyn Morehouse, Alaska Department of Transportation and Public Facilities (DOT&PF), *recording*

The Louisiana, Minnesota, and New York State DOTs participated in an FHWA-sponsored pilot to develop TAMPs. When the pilot is finished, the other 47 state DOTs will have three good examples of TAMPs that meet the requirements of MAP-21. Participants will hear from the states and will have the opportunity to ask questions about their experiences.

### **MAP-21 Requirements for Development of Risk-Based Transportation Asset Management Plans**

Stephen J. Gaj and Nastaran Saadatmand, FHWA

#### **Louisiana TAMP**

Michael Bridges, Louisiana DOTD

#### **New York State DOT TAMP**

Joseph Guerre, Cambridge Systematics, Inc.

#### **Minnesota DOT TAMP**

Mark Nelson, Minnesota DOT

## Tools and Technology

### **Go Find Your Slide Rule: The Bleeding Edge of Asset Management**, *Flagler*

Matthew Hardy, AASHTO, *presiding*

Melany Reynolds, Georgia DOT, *recording*

This session introduces nine subjects at the forefront of TAM technologies and practices. Brief presentations will be followed by an evening poster session.

### **Smartphone-Based Roughness Measurement—An Alternative to the International Roughness Index (IRI)**

Steve Cook and William H. Tansil, Michigan DOT

### **Connected Vehicle Data Applications for Transportation Asset Management: Lessons Learned and Future Directions**

William H. Tansil, Michigan DOT; Eric Paul Dennis, Center for Automotive Research

### **Systematic Pavement Type Selection Approach that Includes Environmental (Life-Cycle Analysis) and Economic (Life-Cycle Cost Analysis) Comparisons**

Brian Killingsworth, National Ready Mixed Concrete Association (NRMCA)

### **Including Contractors in Our Work Order Process Through GIS Technology**

John P. Thomas, District of Columbia DOT

### **Integrating Traffic Operations Spatial Asset Management**

Peter C. Rafferty, University of Wisconsin–Madison

### **3-D Visualization for Inspection and Management of Complex Structures**

Jeremy Shaffer and Taylor Gilmore, Bentley Systems, Inc.

### **Snowplow Tracking**

Eric Abrams, Iowa DOT

### **Automatic Asphalt Crack Evaluation Using Crack Fundamental Element**

Chenglong Jiang and Yichang (James) Tsai, Georgia Institute of Technology

### **Integrating Probabilistic Life-Cycle Cost Analysis into the Pavement Design Process**

Jeremy Gregory and Omar Sweil, Massachusetts Institute of Technology



3:30 p.m.–5:00 p.m.

## Performance Measures

### **A Federalist Mindset: Where the States Are Looking to Take TAM, Monroe**

Matthew Haubrich, Iowa DOT, *presiding*

Steve Guenther, Caltrans, *recording*

Each state takes a unique approach to integrating TAM practices. This session provides a state-focused view of emerging practices and developments.

#### **Customer Service Level Approach for Maine DOT's Asset Management System**

Jeffrey L. Zavitski, Deighton Associates Limited; Chip Getchell, Maine DOT

#### **Making the Case for Asset Investment: Michigan's Use of Historic Analysis to Set the Context for Future Funding Decisions**

Kirk T. Steudle, Michigan DOT; William Robert, Spy Pond Partners, LLC

#### **Setting the Course for Minnesota: Integration of Performance and Targets into Transportation Asset Management Planning**

Kirby Becker and Mark Nelson, Minnesota DOT

#### **Setting Performance Measures and Setting Good Targets**

David Nicol, Delaware DOT

## Adaptation

### **The Big Picture: Why Climate Change and Extreme Weather Events Matter, Orchid C**

Heather Holsinger, FHWA, *presiding*

Jennifer L. Weeks, TRB, *recording*

This session kicks off the climate change track with an overview of the science behind climate change and projections of future impacts on the transportation sector. Speakers will discuss several recent transportation studies that focus on innovative approaches to climate change adaptation.

#### **Climate Change Science and Transportation Impacts**

Joseph Casola, Center for Climate and Energy Solutions

#### **The Gulf Coast 2 Study and FHWA Climate Resilience Framework**

Robert Kafalenos, FHWA

#### **NCHRP 20-83 (05) Study: Climate Change and the Highway System**

Michael Flood, Parsons Brinckerhoff

## State of Good Repair

### **How Did We Get Here? Establishing the Context for Transit Asset Management, Tuttle**

David Rose, Parsons Brinckerhoff, *presiding*

David M. Springstead, Metropolitan Atlanta Rapid Transit Authority (MARTA), *recording*

This informal session establishes the context of transit asset management from a regulatory perspective. FTA representatives will present updates on national initiatives, including an overview of comments received for the Advanced Notice of Proposed Rulemaking for MAP-21. American Public Transit Association (APTA) representatives also will provide updates on their development of transit asset management standards.

#### **Federal Policy and Rulemaking on Transit State of Good Repair**

Mshadoni Smith and Rotimi Ogunsuyi, FTA

#### **Update to APTA Standards on Transit State of Good Repair**

Richard Weaver, APTA

#### **Asset Management for Statewide Transit Resources: AASHTO Perspective**

Sharon Edgar, Michigan DOT

#### **Transportation Asset Management for Rural and Community Public Transportation Agencies**

Charles H. Dickson, Community Transportation Association of America, Inc.

#### **GAO's Analysis on Transit Asset Management Leading Practices and Capital Investment Effects**

Tina Paek, U.S. Government Accountability Office

Monday, April 28, 2014



5:00 p.m.–7:00 p.m.

**Posters and Reception**, *Jasmine*

**Michigan's Performance Measure Dashboard**

Brian Sanada, Michigan Transportation Asset Management Council; Krisanne McConnell, Michigan Center for Shared Solutions

**Web-Based Performance Management Suite at Colorado DOT**

Allen Ibaugh, Data Transfer Solutions; Kim Hubble, Colorado DOT

**Evaluation of National Bridge Inspection Standards Metrics Using Data Extracted from National Bridge Inventory Source Files**

Scott McClure, Michelle Langehennig, and David Hadwiger, New Mexico DOT

**Data Analysis in Monitoring Performance Measures**

Simon Topp and Manish Jethwa, Yotta DCL

**Social Return on Investment as an Asset Management Metric**

Catalina Miller and Douglas D. Gransberg, Iowa State University

**An Implementable Framework for Standardizing National Crack Performance Measure**

Yichang (James) Tsai and Chenglong Jiang, Georgia Institute of Technology

**Aligning System Performance with Investment Levels: Applying Response Surface Methodology to Manage Program-Level Vulnerabilities**

Richard Sarpong Boadi and Chieh Ross Wang, Georgia Institute of Technology

**TAM Synthesis and Work Plan for Alaska DOT&PF**

Paul D. Thompson, Consultant; Carolyn Morehouse, Alaska DOT&PF

**Using a Pavement Management System for Funding Acquisition**

William Patrick Kennedy, Denver Department of Public Works

**Are You Maintaining Your Maintenance Quality Assurance Program?**

Scott Bush, Wisconsin DOT

**California DOT: Asset Life-Cycle Costing**

Jonathan Fisher and Rob Zilay, Dye Management Group Inc.

**Self-Assessment and Comprehensive Gap Analysis: One Small Step for Pennsylvania DOT, One Giant Leap Towards Determining a Road Map for Programmatic Approach to Transportation Asset Management**

Wayne Francisco, GHD Consulting Inc.; Richard Heineman, Pennsylvania DOT

**State Agency Asset Management Taxonomy**

Darla James and Matthew Haubrich, Iowa DOT

**Climate Change and Risk-Based Asset Management**

John Vetterling, Colorado DOT

**Infrastructure Impacts, Vulnerabilities, and Design Considerations for Future Climate Change on Roads and Associated Infrastructure**

Susan Louise Tighe, University of Waterloo, Canada; Theuns F. P. Henning, University of Auckland, New Zealand

**Smartphone-Based Roughness Measurement: An Alternative to IRI**

Steve Cook and William H. Tansil, Michigan DOT

**Connected Vehicle Data Applications for Transportation Asset Management: Lessons Learned and Future Directions**

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**Systematic Pavement Type Selection Approach that Includes Environmental (Life-Cycle Analysis) and Economic (Life-Cycle Cost Analysis) Comparisons**

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**Including Contractors in Our Work Order Process Through GIS Technology**

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Monday, April 28, 2014



### 3-D Visualization for Inspection and Management of Complex Structures

Jeremy Shaffer and Taylor Gilmore, Bentley Systems, Inc.

### Snow Plow Tracking

Eric Abrams, Iowa DOT

### Automatic Asphalt Crack Evaluation Using Crack Fundamental Element

Chenglong Jiang and Yichang (James) Tsai, Georgia Institute of Technology

### Integrating Probabilistic Life-Cycle Cost Analysis into the Pavement Design Process

Jeremy Gregory and Omar Sweil, Massachusetts Institute of Technology

### Digital Landslide Inventory to Support Highway Corridor Management

Cliff Roblee, Caltrans; Chris Wills, California Geological Survey

## Tuesday, April 29

7:30 a.m.–8:30 a.m.

**Continental Breakfast**, *Regency Ballroom Prefunction*

8:30 a.m.–10:00 a.m.

### Tools and Technology

**Informed Choices: Tools for Managing Risk and Analyzing Trade-Offs**, *Flagler*

Scott Richrath, Colorado DOT, *presiding*

Mark Nelson, Minnesota DOT, *recording*

Sponsored by the Asset Management Planning Committee Steering Committee, this session is the second of two roundtable discussions in the peer exchange express format.

### Comprehensive Bridge Risk Analysis at Florida DOT

Paul D. Thompson, Consultant; Richard Kerr, Florida DOT

### Georgia DOT's Trade-Off Analysis Tool

Hugh Louch, Cambridge Systematics, Inc.; Angela Alexander, Georgia DOT

### Program for the Analysis of Risk and Resilience Evaluation

Aimee Flannery, AEM Corporation

### North Dakota Transportation Asset Management Trade-Off Tool

Jack Smith and Stephanie Weigel, North Dakota DOT

### Implementation

**A Solid Foundation: Building the Agency Framework to Support TAM**, *Brickell*

Melany Reynolds, Georgia DOT, *presiding*

Jennifer Trio, Connecticut DOT, *recording*

Agencies that use transportation asset management principles effectively have aligned their investment decisions with their strategic goals. This demands that the entire organization is on board and moving toward performance goals; however, aligning the organization can be a challenge. At this session, practitioners share the secrets to their success building organizational support for asset management.

### Change Management: The Overlooked Necessity for Transportation Asset Management Implementation

Gary Vansuch and Michelle Malloy, Colorado DOT

### Implementing Transportation Asset Management and Performance Measures Within and Across Organizations at the Connecticut DOT

Colleen Kissane, Connecticut DOT

### Lessons Learned in Aligning an Organization to Support TAM

Martin Kidner, Wyoming DOT

### Agency Culture Impacts on the Asset Management Plan

Peggy Knight and Matthew Haubrich, Iowa DOT



8:30 a.m.–10:00 a.m.

### Performance Measures

#### **Getting It Together: Managing All Assets**, *Monroe*

Andrew Williams, Ohio DOT, *presiding*

Jean Nehme, Arizona DOT, *recording*

Transportation agencies are responsible for more than pavements and bridges. This session highlights best practices for enterprise-level TAM practices and will include assets beyond pavements and bridges.

#### **Development of Optimized Work Plans for Non-Pavement and Non-Bridge Assets to Maximize Performance and Achieve Agency Targets**

Charles Pilson, AgileAssets, Inc.; Lonnie Watkins, North Carolina DOT

#### **Integrating a Safety Management System into Transportation Asset Management**

Joe G. McCarthy, JDI Consulting, LLC; Martin Kidner, Wyoming DOT

#### **Paradigm Shift in Monitoring and Maintaining Intelligent Transportation Systems Assets:**

#### **Case Study of Vehicle Detection System in Washington, D.C., Using Network Monitoring Tool**

Rakesh Nune and Brook Hailemariam, District of Columbia DOT

### Adaptation

#### **Protecting System Assets: What to Do for Climate Change and Extreme Weather Events**, *Orchid C*

Emmanuel B. (Cris) Liban, Los Angeles County Metropolitan Transportation Authority, *presiding*

Brian Beucler, FHWA, *recording*

This session provides tools and techniques for assessing potential impacts of climate change and extreme weather at the systems level. Presenters will discuss vulnerabilities; potential impacts; and methods for applying adaptation strategies in asset management, planning, design, maintenance, and more.

#### **Planning for Climate Change: Data Collection Tools, Techniques, and Results**

Gregory Ian Slater, Maryland State Highway Administration

#### **Tennessee Extreme Weather Vulnerability Assessment**

Leah Dundon, Vanderbilt University; Alan Jones, Tennessee DOT

#### **Integrating Climate Change Risk Information into Transportation Planning and Decision Making**

Joshua DeFlorio, Cambridge Systematics, Inc.; Richard Clarendon, AICP

### State of Good Repair

#### **Getting Started: Tools and Technology for Transit Asset Management**, *Tuttle*

Kyle Nicholson, Parsons, *presiding*

Laura Zale, SEPTA, *recording*

Selection and implementation of appropriate tools are integral to a successful asset management program, but the number and variety of available tools can make selection difficult. It is necessary to understand agency processes and objectives when defining a scope for tool procurement or development. This session surveys available tools and evaluation criteria for selecting and procuring tools that best fit an agency's needs.

#### **Development of Transit Asset Management Plan Guidance and Tools for Supporting MAP-21 Requirements**

William Robert, Spy Pond Partners, LLC

#### **Transit Economic Requirements Model (TERM): The TRB Review of TERM and What It Means for Transit Agencies**

Richard S. Laver, CH2M Hill; John D. Giorgis, FTA

Tuesday, April 29, 2014



## Description of the Prioritization Methodologies Used by the Massachusetts Bay Transportation Authority (MBTA) State of Good Repair Database and the Decision Support Tool for the MBTA Capital Investment Program

Robert Guphill and Victor Rivas, MBTA

10:00 a.m.–10:30 a.m.

**Break**, *Regency Ballroom Prefunction*

10:30 a.m.–noon

### Plans

#### **Go Time: Building Your TAMP**, *Monroe*

Alfredo Calvillo, Oklahoma DOT, *presiding*

Richard Heineman, Pennsylvania DOT, *recording*

The big question asked by most state DOTs is, “What should be in the TAMP?” This session reviews TAMP components in depth. Participants will hear from leaders in TAM on how best to meet MAP-21 requirements.

#### **Incorporating Life-Cycle Costs in a Transportation Asset Management Plan**

Prashant Ram and Kathryn A. Zimmerman, Applied Pavement Technology, Inc.

#### **What Assets Should We Include in Our Initial Plan?**

David Nicol, Delaware DOT

#### **Anatomy of a Transportation Asset Management Plan**

Jonathan Groeger, AMEC Environment and Infrastructure, Inc.; Nastaran Saadatmand, FHWA

#### **A View from the Top: CEO Roundtable**, *Flagler*

Matthew Hardy, AASHTO, *presiding*

Executive support for TAM principles enhances implementation considerably. This session brings together the CEOs from several state agencies to discuss their efforts to integrate TAM.

#### **Florida**

Ananth K. Prasad, Florida DOT

#### **Kentucky**

Timothy A. Henkel, Minnesota DOT

#### **Michigan**

Kirk T. Steudle, Michigan DOT

### Implementation

#### **Bringing Everyone to the Table: Improving Agency Decision Making**, *Brickell*

Brad W. Allen, New York State DOT, *presiding*

Ronald L. Vibbert, Michigan DOT, *recording*

Managing to the lowest life-cycle cost requires both capital and maintenance costs over the life of an asset to be considered in investment decisions. In the past, maintenance was not an integral consideration in investment decisions. This session provides strategies for linking planning, design, maintenance, and operations.

#### **From Design to Operations: What, When, and How?**

William Pratt, Connecticut DOT; Travis Ritter, Bentley Systems, Inc.

#### **Linking Maintenance Asset Management to Work Performed**

Marie Venner, Venner Consulting; Rico Baroga, Washington State DOT

#### **The Role of Maintenance in Asset Management**

Jennifer Brandenburg, North Carolina DOT

#### **Plans to Better Incorporate Maintenance into Investment Decisions**

Scott D. Zainhofsky, North Dakota DOT

Tuesday, April 29, 2014



10:30 a.m.–noon

## Adaptation

### **Transit Asset Management and Climate Adaptation (with State of Good Repair), Tuttle**

Brian Alberts, FTA, *presiding*

Heather Holsinger, FHWA, *recording*

This session presents specific transit case study examples of experiences, applied strategies, and lessons learned by asset managers, planners, and maintenance and operations staff in assessing vulnerabilities and adapting to climate change and extreme weather events. Several of the presentations will draw on the experience of participants in the FTA Climate Adaptation Pilot Program.

#### **Adapting to Climate Change Through Asset Management Planning**

David M. Springstead, MARTA

#### **Climate Vulnerability and Transit-Dependent Populations**

Emmanuel B. (Cris) Liban, Los Angeles County Metropolitan Transportation Authority

#### **Vulnerability and Risk Assessment of SEPTA's Regional Rail: Steps to Ensure Sustainability and Resiliency**

Cassandra Snow and Anne Choate, ICF International

#### **Measuring Transportation System Resilience: Response of Rail Transit to Weather Disruptions**

Raymond Chan and Joseph L. Schofer, Northwestern University

Noon–1:30 p.m.

**Lunch**, *Jasmine and Hibiscus*

1:30 p.m.–3:00 p.m.

## Implementation

### **Talking a Good Game: Communication Within and Across Organizations, Brickell**

Richard Heineman, Pennsylvania DOT, *presiding*

Scott Zainhofsky, North Dakota DOT, *recording*

TAM provides information for telling the story about asset needs and performance expectations under constrained conditions. The manner in which the story is told has a tremendous impact on whether the message is acted upon, however. Speakers will share their experiences in the successful use of asset management information to tell their story to internal and external stakeholders.

#### **Aligning Data Systems for Use by Agency Executives**

Kathryn A. Zimmerman, Applied Pavement Technology, Inc.; Joseph L. Schofer, Northwestern University

#### **Combining Risk Management and Asset Management to Georgia's Interstate Highway System**

Krystal Harris and Cynthia VanDyke, Georgia DOT; Sam Van Hecke, Cambridge Systematics, Inc.

#### **Telling an Effective Story: Improving the Understanding of Road Network Needs Through Performance Measurement and Monitoring**

Theuns F. P. Henning, University of Auckland; Susan Louise Tighe, University of Waterloo

#### **How Michigan Created a Unified Message on Pavement Preservation**

Jim Ashman, Michigan DOT

## Performance Measures

### **Keeping It Local: Municipal and County TAM Approaches, Monroe**

Peggi Knight, Iowa DOT, *presiding*

Tim Lattner, Florida DOT, *recording*

At the local level, TAM looks very different. In this session, presenters will share best practices at the local and county levels to garner support for their programs and to advance the state of the practice.

#### **Communicating Road Network Investment Priorities Using Risk-Based Asset Management**

Patricia Bugas-Schramm, PBS Consulting, Inc.; Liane Welch, Tillamook County Public Works



## Performance Management in MAP-21: A Regional Effort

Sui G. Tan, Metropolitan Transportation Commission

## Innovative Performance-Based Asset Management Strategy for Streetlights in Washington, D.C.

Soumya Dey and Jama Abdi, District of Columbia DOT

1:30 p.m.–3:00 p.m.

### Adaptation

#### **Been There, Done That: Experiences with Vulnerability Assessments, Part I, Flagler**

Garth Hopkins, Caltrans, *presiding*

Mike Culp, FHWA, *recording*

This session presents specific case studies, applied strategies, and lessons learned by asset managers, planners, and maintenance and operations staff in assessing vulnerabilities and adapting to climate change and extreme weather events. Several presentations will draw on the experience of participants in the FHWA Climate Change Resilience Pilot Program.

#### **Massachusetts DOT–FHWA Climate Change Pilot: Assessing Vulnerabilities and Developing Adaptation Strategies for the Central Artery Project in Boston, Massachusetts**

Kevin Walsh, Massachusetts DOT

#### **Flash Flood Vulnerability and Adaptation Assessment in Northeast and Southeast Minnesota**

Kirby Becker, Minnesota DOT

#### **Arizona DOT: Critical Transportation Assets, Climate Change, and Extreme Weather Adaptation Experiences and Lessons Learned**

Steven Olmsted, Arizona DOT

### State of Good Repair

#### **Establishing Progress: Performance Measures for Transit Asset Management, Tuttle**

David M. Springstead, MARTA, *presiding*

Sandy Amores, Miami–Dade Transit, *recording*

Condition and performance monitoring are critical foundations of transit asset management. Performance measures provide a framework for discussing the impacts of investment decisions on assets. This session provides an overview of performance measures to consider when developing an asset management plan and procedures, with presentations on incorporating risk, reliability, and safety into asset management plans.

#### **Risk-Based Transit Condition Assessment and Investment Prioritization Approach for Asset Management**

Carlos Alvarado and Richard Laver, CH2M Hill

#### **Stretching Your Budget and Your Assets with a Reliability-Centered Maintenance Program**

Robert Giacobbe, Accenture

#### **Building Sustainable Asset Management at Bay Area Rapid Transit**

Patricia Bugas-Schramm, PBS Consulting, Inc.; Frank Ruffa, San Francisco Bay Area

Rapid Transit District

#### **Aligning the MAP-21 Mandate to ISO55001: A Guide for Transit Agencies in Introducing an Asset Management and Management System**

Christian Roberts, Parsons Brinckerhoff

3:00–3:30 p.m.

**Break, Regency Ballroom Prefunction**

Tuesday, April 29, 2014



3:30 p.m.–5:00 p.m.

## Plans

### **Experiential Learning: TAMP Examples**, *Monroe*

Scott D. Zainhofsky, North Dakota DOT, *presiding*  
Jennifer Brandenburg, North Carolina DOT, *recording*

Participants of this session will hear how New Zealand and three state DOTs have developed and used their TAMPs to manage their transportation infrastructure.

### **Lessons Learned During the Development of the Colorado DOT Risk-Based Asset Management Plan, Including a Discussion of Balancing Risk and Reward**

William Johnson and John Vetterling, Colorado DOT; Randy Jensen, FHWA

### **Florida's Transportation Asset Management Plan**

David Lee and Tim Lattner, Florida DOT

### **The Evolution from a Simple Planning Document to an Integrated Asset Management Plan**

Theuns F. P. Henning, University of Auckland; Ross Waugh, Waugh Infrastructure Management, Ltd.

### **New Jersey DOT TAMP**

David Kuhn, New Jersey DOT

## Tools and Technology

### **Don't Reinvent the Wheel: Case Studies in TAM Technology and Data**, *Flagler*

Coco A. Briseno, Caltrans, *presiding*  
Chris DeVerniero, Montana DOT, *recording*

As the saying goes, you want to be the second mouse to get the cheese—not the first mouse! Representatives from four transportation agencies tell their stories of using technology and data to support TAM programs. Participants will learn from their experiences implementing technological aspects of TAM within their organizations.

### **Strengthening the City of Philadelphia's Asset Management Program**

Rina Cutler, City of Philadelphia; Hyun-A Park, Spy Pond Partners, LLC

### **Asset Data Integration at the Rhode Island DOT**

Joseph Baker, Rhode Island DOT

### **Transportation Asset Management Decision Support Tools and Technology**

Andrew Williams, Ohio DOT

### **Traffic and ITS Assets Data Management at Virginia DOT**

Frances Harrison, Spy Pond Partners, LLC; Vanloan Nguyen, Virginia DOT

## Implementation

### **Dollars and Cents: Return on Investment (ROI), Investment Planning, and Financing**, *Brickell*

Mark Nelson, Minnesota DOT, *presiding*  
Stan Burns, Minnesota DOT, *recording*

A TAMP contains both a financial plan and long-term investment strategies that detail how assets will be maintained under a constrained fiscal environment. This session features practitioners discussing the financial aspects of TAMP development and concludes with a presentation on incorporating the concept of sustainability into a TAMP's financial plan.

### **Establishing a Single Source of Truth for Life-Cycle Management**

Walter Keith Dotson, Kentucky Transportation Cabinet; Travis Ritter, Bentley Systems, Inc.



## **Integrating the Transportation Asset Management Plan into Minnesota DOT Plans and Programs**

Kirby Becker and Mark Nelson, Minnesota DOT

### **Colorado DOT TAM and Financial Planning**

Scott Richrath, Colorado DOT

### **Incorporating the Concept of Financial Sustainability in the Financial TAMP**

Gordon D. Proctor, Gordon Proctor and Associates

3:30 p.m.–5:00 p.m.

#### **Adaptation**

### **Less Duct Tape: Experiences with Vulnerability Assessments, Part II, Tuttle**

Kevin Walsh, Massachusetts DOT, *presiding*

Brian Alberts, FTA, *recording*

This session presents specific case study examples of experiences, applied strategies, and lessons learned in the assessment of vulnerabilities and the development of adaptation strategies. Several presentations will draw on the experience of participants in the FHWA Climate Change Resilience Pilot Program.

### **Climate Change and Extreme Weather Adaptation Options for Transportation Assets in the San Francisco Bay Area**

Stefanie Hom, Metropolitan Transportation Commission

### **Vulnerability Assessment of Critical Transportation Assets to Extreme Weather Events and Climate Change in Hillsborough County, Florida: Model Process for Including Resiliency Considerations into the Transportation Planning Process**

Rich Clarendon, Hillsborough County Planning Commission and Metropolitan Planning Organization;

Josh De Florio, Cambridge Systematics, Inc.

### **Preparing for Climate Change at Massport's Logan International Airport and Port Facilities**

Brenda Enos, Massport; Lisa C. Dickson, Kleinfelder, Inc.

#### **State of Good Repair**

### **Creating Your Road Map: Implementation Strategies for Transit Agencies, Orchid C**

Richard S. Laver, CH2M Hill, *presiding*

William Robert, Spy Pond Partners, LLC, *recording*

This session provides an overview on transit asset management implementation strategies, pitfalls to avoid, and emerging success factors. Agency representatives will describe the asset management implementation at the asset class and maintenance levels. The session also includes a discussion of life-cycle cost management.

### **Asset Management and State of Good Repair: Converting Data into Information to Help You Manage Your Assets, RTD's Path to Installing an Asset Management Program**

Jim Sutton and Lou Cripps, Denver Regional Transportation District

### **Lessons Learned in the Implementation of the FTA Asset Management Guide**

David Rose, Parsons Brinckerhoff

### **Utah's Comprehensive Transit Asset Management System**

Paul Edwards, Utah Transit Authority; Jeremy Shaffer, Bentley Systems, Inc.

5:15 p.m.–6:15 p.m.

### **FTA National Transit Asset Management System Rulemaking Advance Notice of Proposed Rulemaking (ANPRM) Outreach, Tuttle**

John D. Giorgis and Mshadoni Smith, FTA, *presiding*

This informal session sponsored by the Asset Management Planning Committee will provide an update on FTA's TAM rulemaking. Representatives from FTA will discuss what they have heard from ANPRM responses and will participate in a Q&A session at the end of the presentation.

Tuesday, April 29, 2014



## Wednesday, April 30

7:30 a.m.–8:30 a.m.

**Continental Breakfast**, *Regency Ballroom Prefunction*

8:30 a.m.–10:00 a.m.

### Tools and Technology

**TAM\*IT! Data and Information Management**, *Flagler*

Corey Pope, Utah DOT, *presiding*

Anita Bush, Nevada DOT, *recording*

Data and information are important aspects of a TAM program. Right now, the technology is evolving and changing rapidly. This session features a peer exchange express format.

#### Using GIS Technology to Integrate Asset Data

Lou Henefeld, Colorado DOT

#### Collecting and Managing Transportation Assets in Arkansas

Sharon Hawkins and Jacqueline Hou, Arkansas State Highway and Transportation Department

#### One State's Method of Cracking the Data Nut

Martin Kidner, Wyoming DOT

#### Development of a Transportation Asset Management Information System for Alaska DOT&PF

Anita Vandervalk-Ostrander, Cambridge Systematics, Inc.; Carolyn Morehouse, Alaska DOT&PF

### Plans

**Help-Desk Heroes: Resources to Develop Your TAMP**, *Brickell*

Michael Bridges, Louisiana DOTD, *presiding*

Josh Brench-Bresher, South Dakota DOT, *recording*

More and more resources are becoming available to state DOTs to assist with developing their own TAMPs. The participants in this session will learn what is available now and what will be available in the coming months.

#### TAMP Templates

Hyun-A Park, Spy Pond Partners, LLC

#### TAM Gap Analysis Tool

Kathryn A. Zimmerman, Applied Pavement Technology, Inc.

#### AASHTO TAM Guide

Matthew Hardy, AASHTO

### Performance Measures

**What Comes Next? MAP-21 and Beyond**, *Monroe*

Matthew Haubrich, Iowa DOT, *presiding*

Andrew Williams, Ohio DOT, *recording*

MAP-21 provides new challenges and opportunities for transportation agencies. Sponsored by the Asset Management Planning Committee Steering Committee, this session will explore the future of TAM adoption and future research areas, including new approaches to capturing value.

#### MAP-21 Performance Measure Rules

Francine Shaw Whitson, FHWA

#### Using Performance Measures in Performance Based-Planning and Program

Tashia J. Clemons and Egan R. Smith, FHWA

#### TAM Expert Task Group and the Future of Transportation Asset Management

Timothy A. Henkel, Minnesota DOT



8:30 a.m.–10:00 a.m.

## Adaptation

### **Informed Decision Making: Cost Analysis and Risk Assessment for Adaptation to Climate Change and Extreme Weather Events**, Tuttle

Robert Kafalenos, FHWA, *presiding*  
Jennifer L. Weeks, TRB, *recording*

This session focuses on risk assessment, consideration of the cost of damage resulting from climate change and extreme weather, and the cost of adapting infrastructure to better withstand future impacts. Speakers will address topics from cost–benefit analysis and life-cycle cost analysis to the incorporation of risk analysis in evaluating adaptation options.

#### **Leveraging Entry Points in the Transportation Asset Management Framework to Facilitate Integration of Extreme Weather Risk**

Anne Choate and Cassandra Snow, ICF International

#### **Including Climate Change Risks in Investment Prioritization Approach for Asset Management**

Emily Grenzke, CH2M Hill

#### **Adapt to Mitigate: Evaluating Climate Adaptation Strategies at the Chicago Transit Authority**

Karl Peet, Chicago Transit Authority

#### **Asset Management and Preservation Investment Strategies: Cost–Benefit and Cobenefits**

Marie Venner, Venner Consulting

## State of Good Repair

### **Oh, the Places You'll Go: Incorporating TAM into Your Agency's Process**, Orchid C

Robert L. Peskin, AECOM, *presiding*  
Brian Alberts, FTA, *recording*

A successful transit asset management program allows an agency to develop capital improvement strategies based on asset needs. The development of these programs requires the dedication of resources and support at all levels of the agency. Agency representatives will discuss organizational and resource needs, integration of asset management into the capital improvement process, and the cultural change required to support asset management.

#### **Implementing an Asset Management Program at a Legacy Transit System During a Capital Funding Crisis**

Laura J. Zale and Jeffrey Knueppel, SEPTA

#### **Beginning an Asset Management Program: Perspectives of a Growing Agency**

Paul Edwards, Utah Transit Authority; Benjamin D. Witter, Bentley Systems, Inc.

#### **RTA Annual Reporting Process**

Yonel Grant, CH2M Hill; John Goodworth, Chicago Regional Transportation Authority

#### **Asset Management at the New York MTA**

Craig Stewart, New York Metropolitan Transportation Authority

10:00 a.m.–10:30 a.m.

**Break**, Regency Ballroom Prefunction

10:30 a.m.–noon

### **Are We There Yet? Transportation Asset Management Is Here to Stay**, Monroe

Jason J. Bittner, Cambridge Systematics, Inc., *presiding*

#### **Asset Management Plans**

Michael Bridges, Louisiana DOTD

#### **Implementation Within and Across Organizations**

Kathryn A. Zimmerman, Applied Pavement Technology, Inc.

#### **Tools and Technology to Assist Decision Making**

Matthew Hardy, AASHTO

#### **Performance Measures for Asset Management**

#### **Transit State of Good Repair**

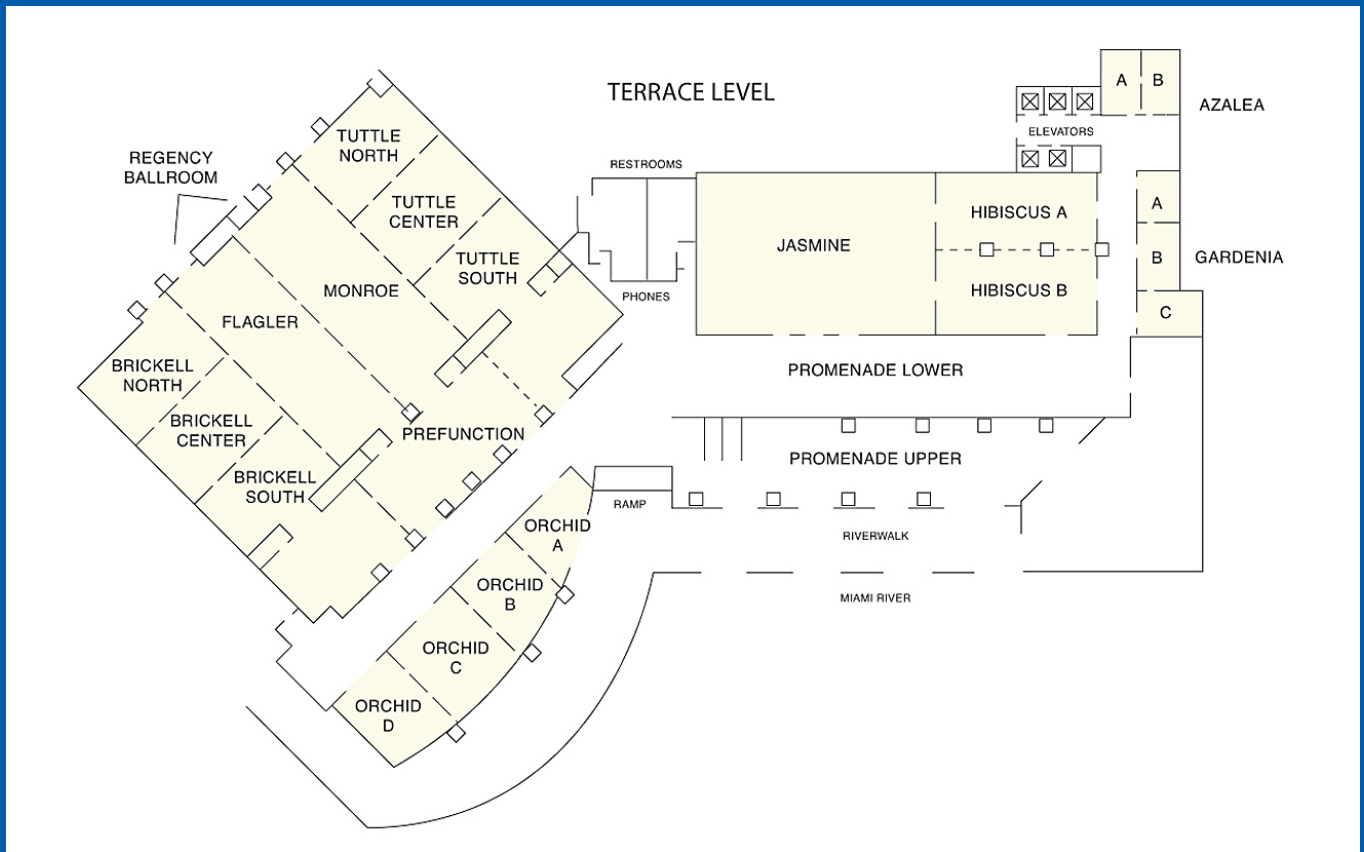
Laura J. Zale, SEPTA

#### **Adaptation to Extreme Weather Events and Climate Change**

Robert Kafalenos, FHWA

Wednesday, April 30, 2014





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