

# Pavement Asset Management



**CDOT**  
**July 12, 2013**

# Presentation Overview

- Pavement Asset Management Development Objectives
- Traffic-Based Pavement Categories
- Category-Specific Treatment Options
- Drivability Life (DL) Analysis
- Schedule



# Development Objectives

Issues raised with the current RLS-based pavement asset management system:

- Projected theoretical \$8B RSL-0 future construction liability
- Not fiscally constrained to optimize pavement condition across the entire state system
- Pavement condition reporting metrics that frequently do not equate to public perception of roadway condition
- Unlimited project pavement treatment types allowed on all highways
- Infrequent surface treatment work across major segments of our pavement network



# Development Objectives

Key objectives of the new DL analysis method:

- DL method will recognize anticipated \$240M annual fiscal constraint to optimize pavement condition across the entire state system
- Improved condition metrics that will better reflect driver experience
- New pavement condition goals
- New treatment practices for traffic-based highway pavement categories
- DL method will result in statewide highway network with the most drivable roads due to more routine periodic surface treatments across the entire pavement network



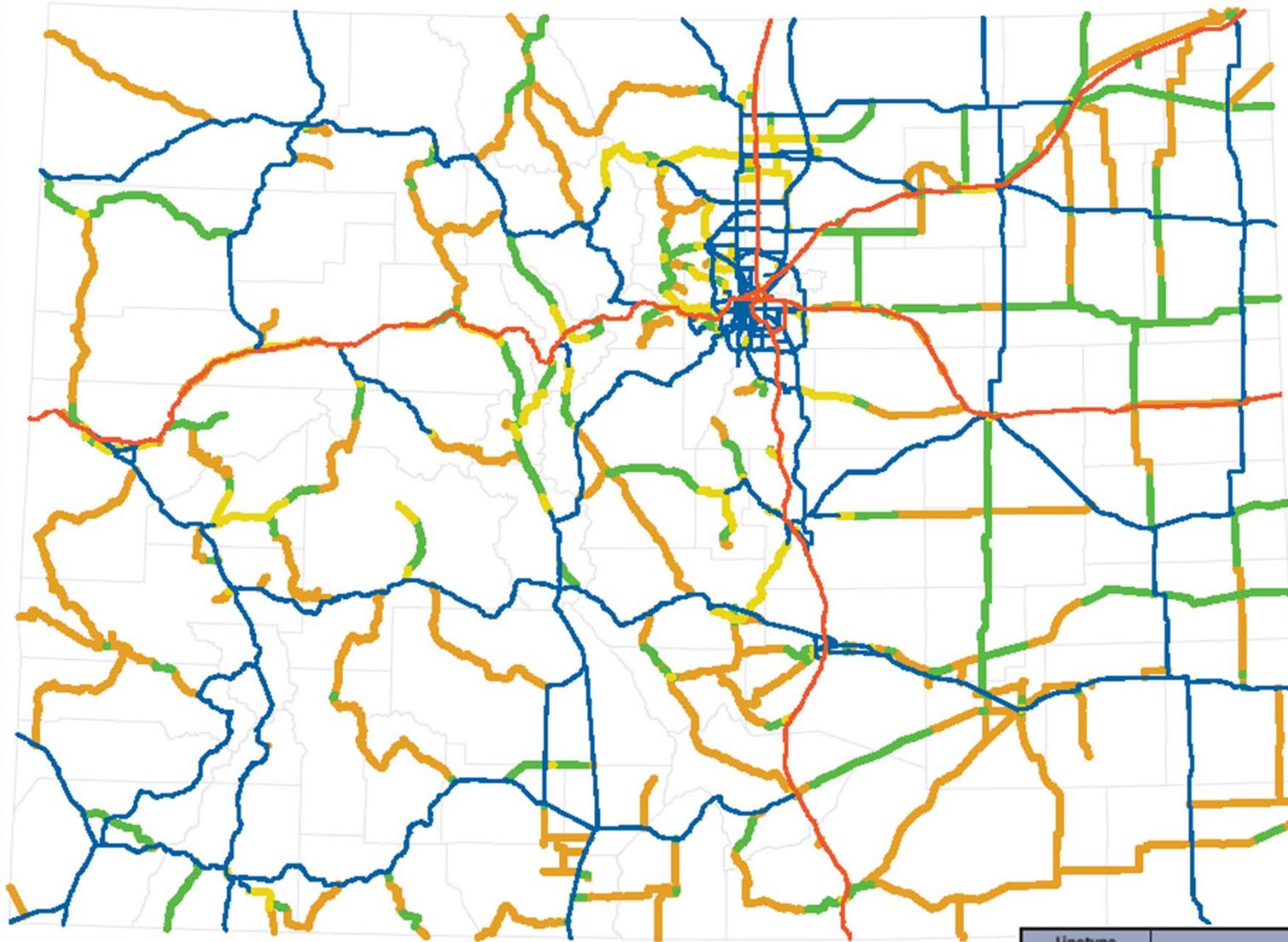
# Traffic-Based Pavement Categories

DL Traffic-Based Pavement Category	Lane Miles	%Lane Miles
Interstate	4,142	17.99%
*NHS High Volume AADT > 4,000 or Trucks > 1,000	6,020	26.15%
Other High Volume: AADT > 4,000 or Trucks > 1,000	1,247	5.42%
Medium Volume (*NHS and Other): AADT 2,000 – 4,000 and/or Trucks 100 – 1,000	6,001	26.06%
Low Volume (*NHS and Other): AADT < 2,000 and Trucks < 100	5,614	24.38%
<i>Total</i>	<b>23,024</b>	

\* May 31st filing, enhanced NHS, FHWA approval pending



# Traffic-Based Pavement Categories



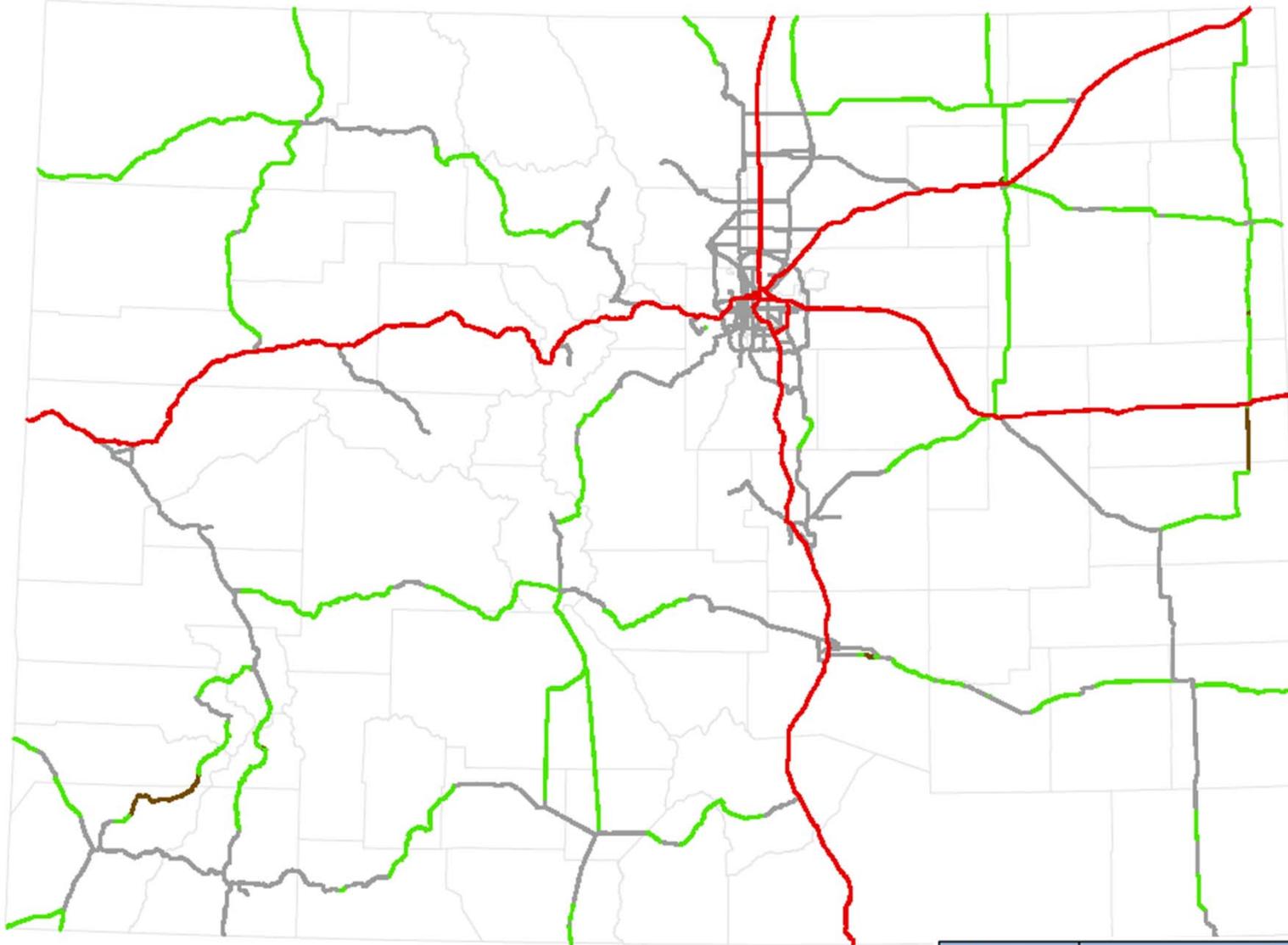
NOTE: This map shows categories with NHS NOT broken into High, Medium and Low traffic volumes.



Data Source: CDOT 2012 Highway Statistics,  
May 31st 2013 filing, FHWA approval pending

Linetype	Description
	Interstate
	NHS (Non-Interstate)*
	AADT >4000 or Trucks >1000
	2000- 4000 AADT or Truck is 100-1000
	AADT less than 2000 and Truck less than 100

# Enhanced NHS Traffic-Based Categories



NOTE: This map shows only the NHS broken into High, Medium and Low traffic volumes.



Data Source: CDOT 2012 Highway Statistics, May 31st 2013 filing, FHWA approval pending

Linetype	Description
	AADT >4000 or Trucks >1000
	2000- 4000 AADT or Truck is 100-1000
	AADT less than 2000 and Truck less than 100
	Total
* Enhanced NHS May 31st filing, FHWA approval pending	

# Category-Specific Treatment Options

- Interstate shall be constructed, rehabilitated, and maintained in accordance with AASHTO Pavement Design Standards, ensuring that these pavements meet Federal standards and provide reliable service to the traveling public.
- NHS High Volume shall be constructed, rehabilitated, and maintained as for the Interstate. These highways serve a large segment of the traveling public and provide critical routes for significant transportation of goods and services across regional boundaries.
- Other High Volume shall also follow AASHTO Pavement Design Standards. These highways serve a large segment of the traveling public and provide critical routes for significant transportation of goods and services across regional boundaries.

# Category-Specific Treatment Options

- Medium Volume highways shall be treated primarily with minor rehabilitation and pavement maintenance treatments. If formally approved by the Chief Engineer, major rehabilitation may be used only as needed to return the pavement to acceptable drivability condition.
- Low Volume highways are to be maintained above acceptable drivability standards with pavement maintenance treatments. If formally approved by the Chief Engineer, minor rehabilitation treatments may be used only as needed to return the pavement to acceptable drivability condition.

Maine, Oregon and Vermont are examples of other state DOTs which have implemented traffic-based pavement category performance targets to optimize the expenditure of limited funds and manage pavement conditions.

# Drivability Life

DL is based upon the level of driving conditions on pavements across the network. Drivability condition is a function of smoothness, pavement distress, and safety based on IRI, cracking and rut depth data collected annually.

- A goal of DL analysis method is to maximize acceptable driving conditions for the motoring public across the entire network. Unacceptable level of driving condition means that drivers must reduce speeds to compensate for unsafe factors, navigate around damaged pavement, or endure intolerably rough rides.
- DL work is being coordinated with “Moving Ahead for Progress in the 21st Century” (MAP-21 legislation) requirements



# Drivability Life

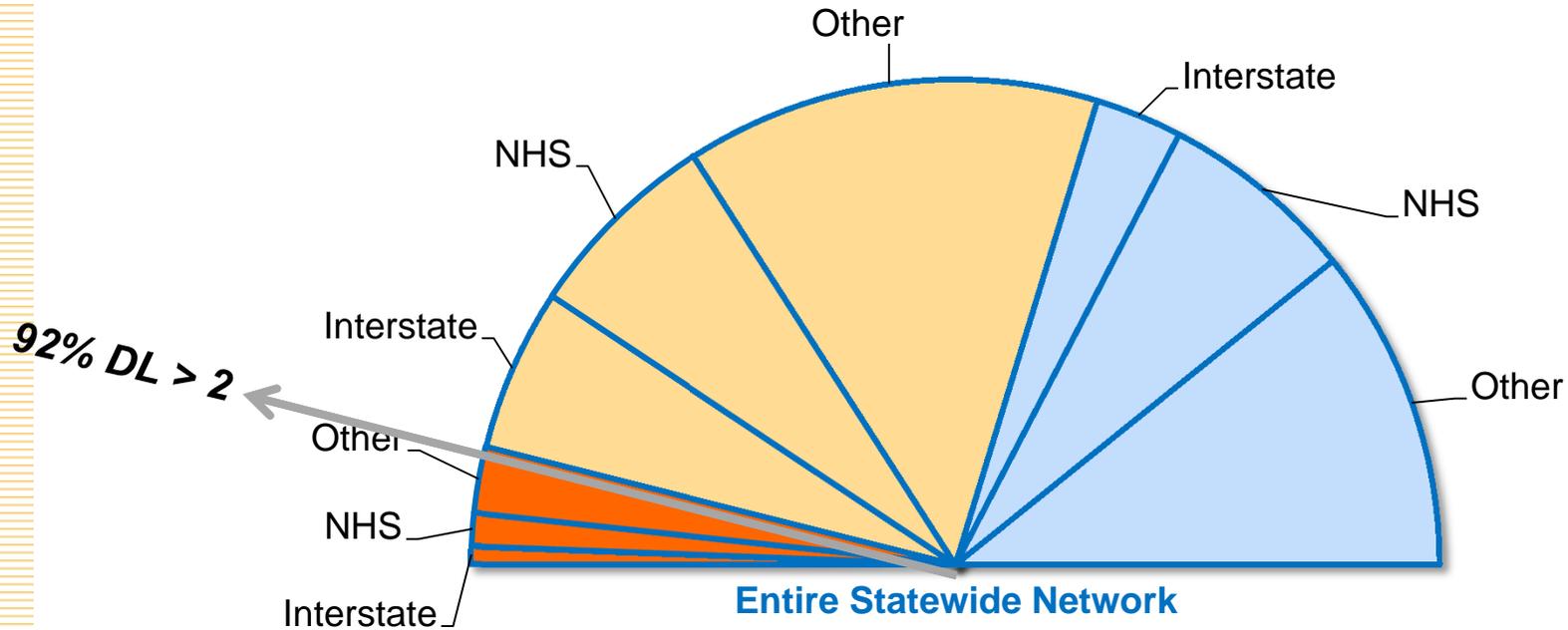
- Drivability Life is a measure, in years, of how long a highway will have *acceptable* driving conditions
- Drivability Life scale for reporting condition:
  - >10 years Drivability Life (High DL)
  - 3-10 years Drivability Life (Moderate DL)
  - ≤ 2 years Drivability Life (Low DL)

*(condition reporting format and scale are works in progress:  
10 years is a typical design period, ≤2 years indicates treatment  
required soon to maintain driving condition)*



# Drivability Life Distribution

## High/Moderate/Low Drivability Life



- 40% ■ DL > 10
- 52% ■ DL 3 - 10
- 8% ■ DL <= 2

**2012 Condition Distribution Based Upon Drivability Life**

	>10	3 - 10	<= 2
<b>Statewide</b>	40%	52%	8%
<b>Interstate</b>	33%	61%	6%
<b>NHS</b>	46%	46%	8%
<b>Other</b>	40%	52%	8%

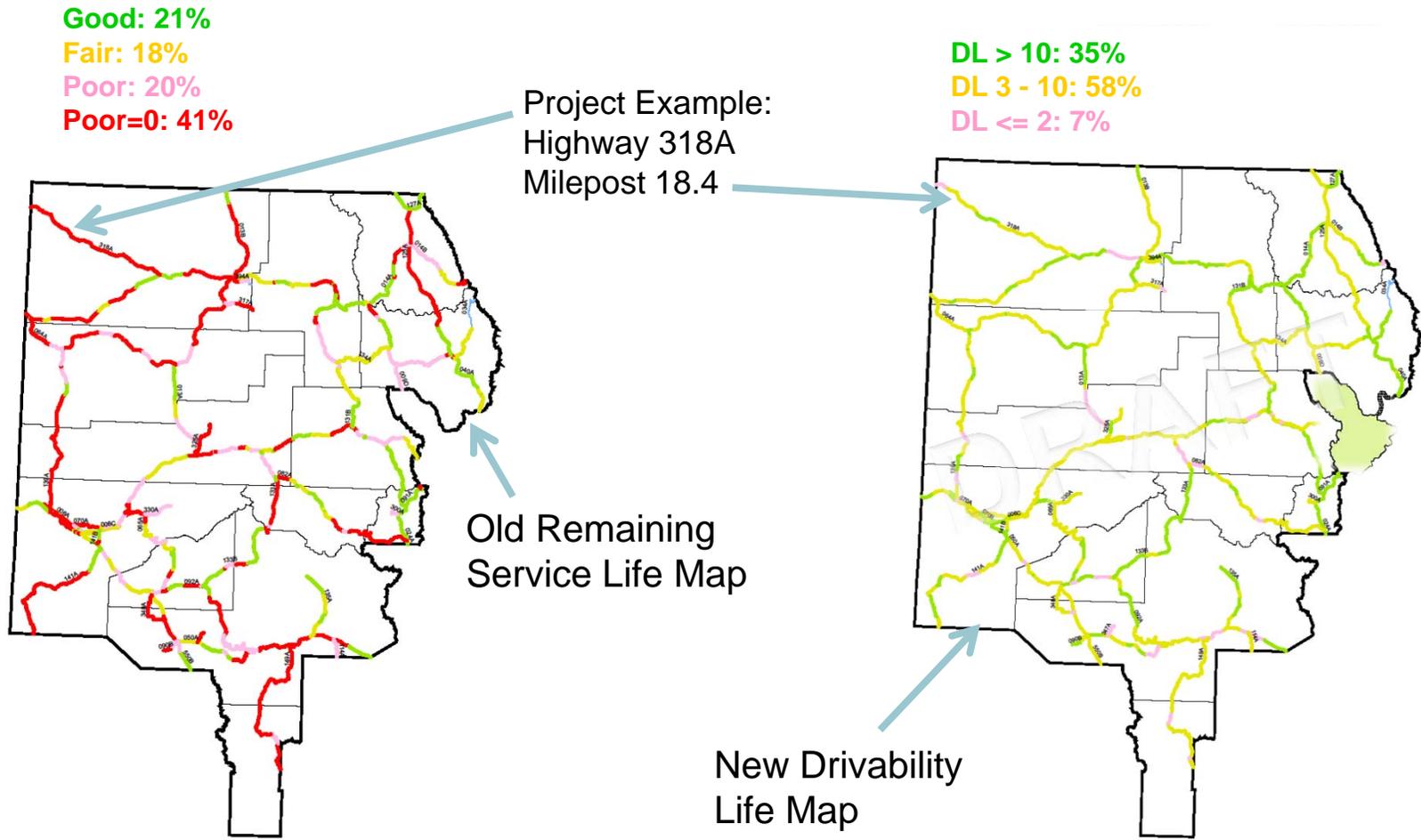
Data and Graphics for Illustration Purposes Only

# RSL Compared to DL

## Drivability Life Implementation

Regional Engineering remains a critical component of project development

- Region Example: 2012 Region 3 Condition Distribution Maps



# RSL Compared to DL

- **Example: 2012 Region 3 Highway 318A Milepost 18.4**
  - **Built in 1973**
  - **No recorded rehabilitations**
  - **Thin surface treatments and maintenance only**
  - **AADT = 220, AADT Combination Trucks = 20**



## RSL = 0

- Age
- Design expectations
- Cracking Distress, Smoothness, Rutting also were factors
- **Reconstruction work unlikely under previous RSL system**

## DL = 7

- Smoothness
- Cracking Distress
- Rutting
- **Next pavement maintenance work likely within 5 years**

# RSL Compared to DL

- **Example: 2012 Region 2 Highway 009A Milepost 11.4**
  - **Rehabilitated in 1984**
  - **Thin surface treatments and maintenance only**
  - **AADT = 810, AADT Combination Trucks = 70**



## RSL = 0

- Age
- Design expectations
- Cracking Distress, Smoothness, Rutting also were factors
- **Reconstruction work unlikely under previous RSL system**

## DL = 4

- Smoothness
- Cracking Distress
- Rutting
- **Maintenance work likely in next two years**

# RSL Compared to DL

- Example: 2012 Region 4 Highway 006J Milepost 390.4
  - Rehabilitated in 1991
  - Thin surface treatments and maintenance only
    - Note: Plow damage to surface seal
  - AADT = 710, AADT Combination Trucks = 70



## RSL = 0

- Age
- Design expectations
- Cracking Distress, Smoothness, Rutting also were factors
- **Reconstruction work unlikely under previous RSL system**

## DL = 3

- Smoothness
- Cracking Distress
- Rutting
- **Next maintenance work recommended soon to minimize rehabilitation need**

# RSL Compared to DL

- Example: 2012 Region 4 Highway 007E Milepost 7.0
  - Built in 1954
  - No recorded rehabilitation
  - Thin surface treatments and maintenance only
  - AADT = 270, AADT Combination Trucks = 0



## RSL = 0

- Age
- Design expectations
- Cracking Distress, Smoothness, Rutting also were factors
- **Reconstruction work unlikely under previous RSL system**

## DL = 0

- Smoothness
- Cracking Distress
- Rutting
- **Rehabilitation work is recommended**

# RSL Compared to DL

- **Example: 2012 Region 2 Highway 078A Milepost 27.1**
  - Rehabilitated in 1993
  - Thin surface treatments and maintenance
  - AADT = 50, AADT Combination Trucks = 0



## RSL = 0

- Age
- Design expectations
- Cracking Distress, Smoothness, Rutting also were factors
- **Reconstruction work unlikely under previous RSL system**

## DL = 0

- Smoothness
- Cracking Distress
- Rutting
- **Rehabilitation work is recommended**

# RSL Compared to DL

- Example: 2012 Region 5 Highway 090A Milepost 7.0
  - Built in 1978
  - No recorded rehabilitation
  - Thin surface treatments and maintenance only
  - AADT = 230, AADT Combination Trucks = 30



## RSL = 0

- Age
- Design expectations
- Cracking Distress, Smoothness, Rutting also were factors
- **Reconstruction work unlikely under previous RSL system**

## DL = 0

- Smoothness
- Cracking Distress
- Rutting
- **Rehabilitation work is recommended**

# RSL Compared to DL

- **Example: 2012 Region 5 Highway 015A Milepost 4.7**
  - **Rehabilitated in 1988**
  - **Thin surface treatments and maintenance only**
  - **AADT = 560, AADT Combination Trucks = 50**



## RSL = 0

- Age
- Design expectations
- Cracking Distress, Smoothness, Rutting also were factors
- **Reconstruction work unlikely under previous RSL system**

## DL = 7

- Smoothness
- Cracking Distress
- Rutting
- **Next maintenance work likely within 5 years**

# Schedule

Month	Tasks
Completed	<ul style="list-style-type: none"><li>• Drivability Life metrics and calculations are complete</li><li>• Traffic-based pavement categories are defined</li><li>• Treatments for pavement categories are identified</li></ul>
June	<ul style="list-style-type: none"><li>• Programming category-based treatment options are underway</li><li>• Initial draft 20-year predictions (based upon 2012 data) will be complete by the end of June.</li><li>• Loading 2013 data from Traffic, GIS, and Regions begins this month</li></ul>
July	<ul style="list-style-type: none"><li>• Loading 2013 condition data (cracking, IRI, and rutting) begins in July</li><li>• Verifying and checking 2013 DL results runs July through mid-August</li><li>• Present to Statewide Plan Committee the initial measures and targets for Policy Directive 14 development</li></ul>
August	<ul style="list-style-type: none"><li>• Final 2013 condition maps and reports completed mid-August</li><li>• Final 2013 20-year condition prediction completed end of August</li></ul>
September	<ul style="list-style-type: none"><li>• Full DL analysis implementation in September</li></ul>
Future	<ul style="list-style-type: none"><li>• Continue refinement of equations, variables, and programming September 2013 – June 2014</li></ul>

# Thank You

## Questions?

