Pavement Evaluation & Maintenance Prioritization

presented by:

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LEARNING OBJECTIVES

1. Define a Complete Asset Inventory
2. Understand Network Level vs. Project Level Maintenance Strategies
3. Apply an Objective Methodology for Maintenance Prioritization
4. Optimize expenditures to achieve condition goals

Project Goals

- Implement data driven decisions
- Maximize use of limited funds
- Improve coordination and scheduling
- Maintain 80% of road system in good repair with NO failures

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Network Level R.A.M.P.

- Plan for the future by:
  - Analyzing the overall health of the network
  - Calculating annual budgets based on standardized maintenance options
  - Facilitating a proactive approach to address maintenance needs early
  - Avoiding costly full road reconstruction
- Should be used to establish proper funding levels to meet network goals
- Does not eliminate the need for project-level planning

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1 Locate & Quantify Assets

- Existing LRS can be used or a new one can be developed
- Uniquely identifying each roadway is critical to managing the R.A.M.P.
- Allows attributes, defects, and assets to be related to each roadway and for the roadways to be represented in GIS

2 Inspect & Classify Roadway Conditions

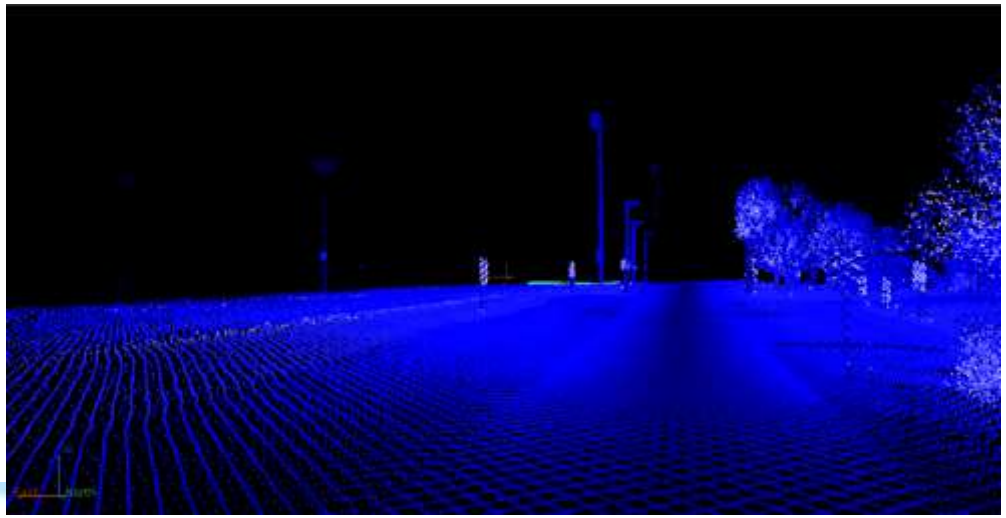
- Choose an objective measure of roadway health
- Agencies can use their preferred inspection methodology
- Map each roadway distress that exists within your network

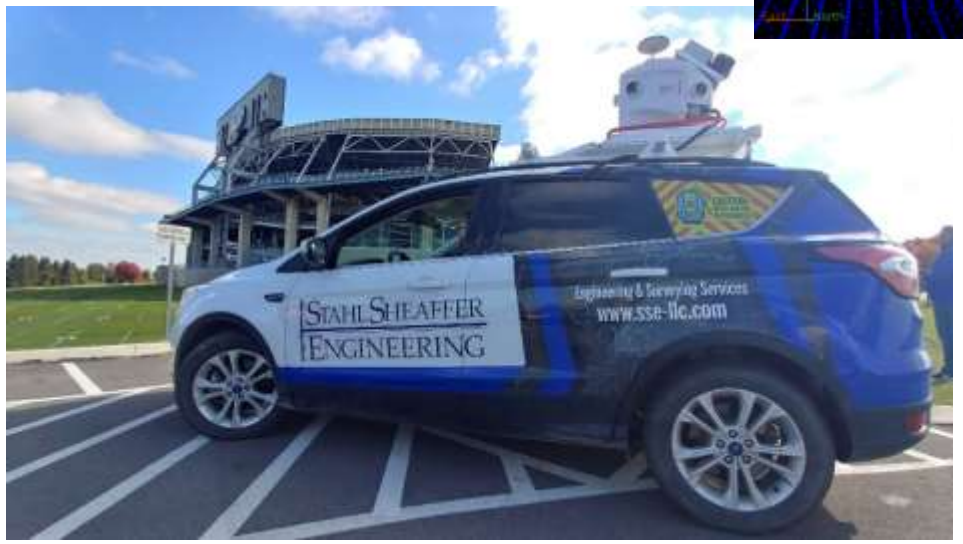
Inspect & Classify Roadway Conditions 2

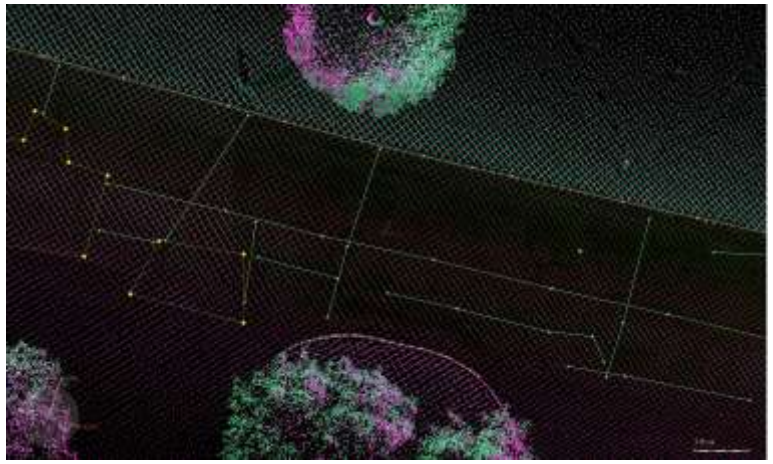
Condition Assessment – Data Collection

Mobile LiDAR:

- Faster
- Safer
- Minimal traffic impact







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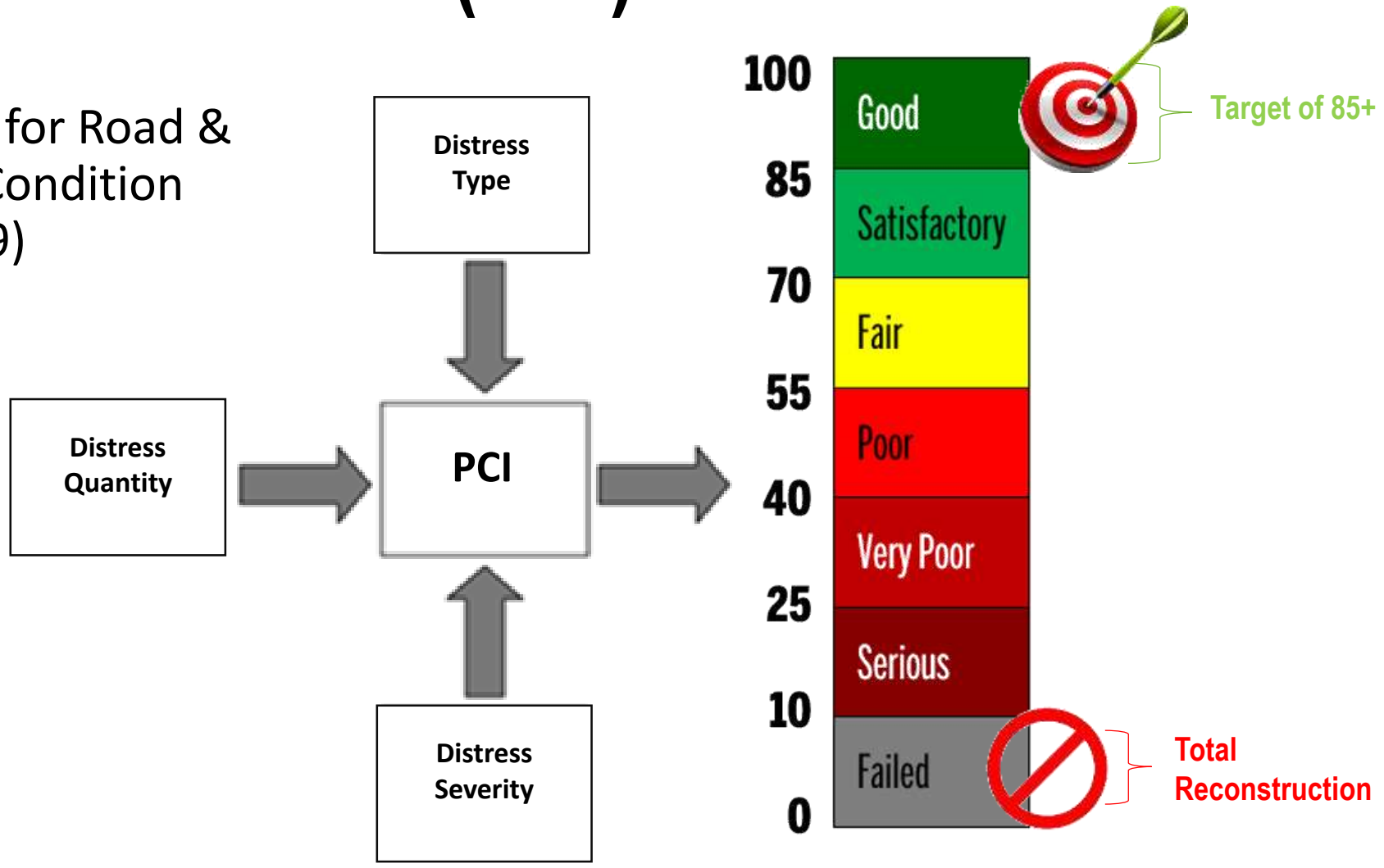
Condition Assessment – Features Extracted

- Roadway Defect Type:
  - Cracks
  - Bleeding
  - Rutting
  - Potholes
  - Failures
- Roadway Defect Severity and Area
- Parallel Ditches
- Bus Stops
- Sidewalk Ramps
- Curbs
- Site Distances

Pavement Condition Index (PCI)

- ASTM Standard Practice for Road & Parking Lots Pavement Condition Index Surveys (D6433-09)



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3 Predict Future Condition

- Develop a roadway deterioration model using:
  - an existing model
  - any available historical pavement condition data
  - an anecdotal understanding of your network pavement performance
- Nationally recognized standards/PennDOT performance curves

Predict Future Condition 3

4 Define Standardized Maintenance

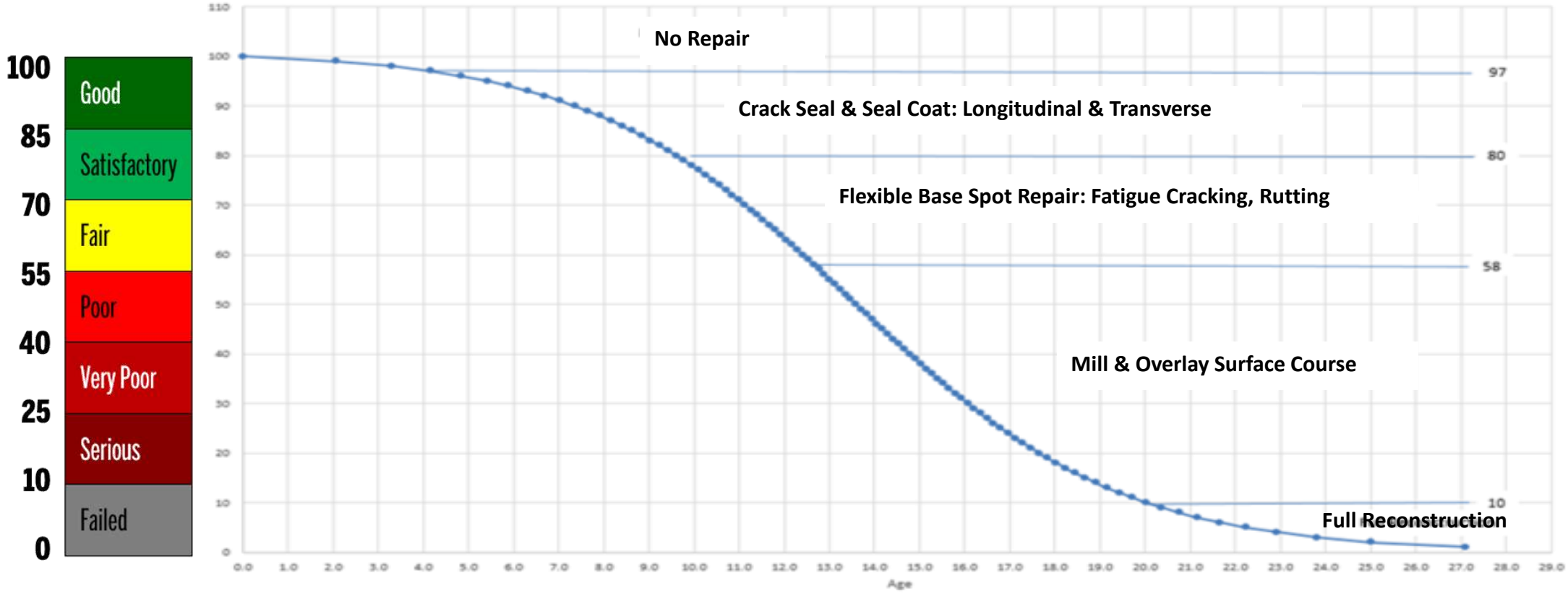
- What are the industry standards now?
- What can we do or manage easily?

Define Standard Maintenance Operations 4

- What has worked in the past?
- What failed?

Standard Maintenance Operations

- **Standard Maintenance Options –** Zones along the deterioration curve that align with the anticipated modes of failure and expected repair need.



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5 Determine Priorities

Determine Priorities 5

- Asset Criticality
- Preferences
- Mission
- Objectives

Criticality Factors

- Total monetary value of the asset
- Roadway class
- Traffic projects (type and number)
- Aesthetics/visibility
- Effect on network if asset disabled
- Bus route
- ADA need

6 Develop Maintenance Budget/Schedule

- Culmination of the Network Level planning
- Generalized maintenance schedule, not a project schedule

LRS ID	Road Name	2017 Repair	2018 Repair	2019 Repair	2020 Repair	2021 Repair	2022 Repair	2023 Repair
12700	Curtin Road	No Repair	No Repair	No Repair	Crack Seal & Seal Coat	No Repair	No Repair	Crack Seal & Seal Coat
12700	Curtin Road	Mill & Overlay Surface Course	No Repair	No Repair	No Repair	Crack Seal & Seal Coat	No Repair	No Repair
23600	Porter Road	No Repair	No Repair	Crack Seal & Seal Coat	No Repair	No Repair	Mill & Overlay Surface Course	No Repair
23600	Porter Road	No Repair	No Repair	Flexible Base Repair	No Repair	No Repair	Flexible Base Repair	No Repair
13600	Services Road	No Repair	No Repair	No Repair	Crack Seal & Seal Coat	No Repair	No Repair	Crack Seal & Seal Coat
12700	Curtin Road	No Repair	No Repair	No Repair	Flexible Base Repair	No Repair	No Repair	Flexible Base Repair
21500	Burrowes Road	No Repair	Flexible Base Repair	No Repair	No Repair	Flexible Base Repair	No Repair	Mill & Overlay Surface Course
22400	Shortlidge Road	No Repair	No Repair	No Repair	Crack Seal & Seal Coat	No Repair	No Repair	Flexible Base Repair
11800	Hastings Road	Full Reconstruction	No Repair	No Repair	Flexible Base Repair	No Repair	No Repair	Flexible Base Repair
11500	McKean Road	No Repair	Mill & Overlay Surface Course	No Repair	No Repair	Flexible Base Repair	No Repair	No Repair
12100	Pollock Road	No Repair	No Repair	No Repair	Flexible Base Repair	No Repair	No Repair	Flexible Base Repair
23600	Porter Road	No Repair	No Repair	Crack Seal & Seal Coat	No Repair	No Repair	Flexible Base Repair	No Repair
22700	Bigler Road	No Repair	No Repair	No Repair	Crack Seal & Seal Coat	No Repair	No Repair	Crack Seal & Seal Coat
23000	Big Hollow Road	No Repair	No Repair	Mill & Overlay Surface Course	No Repair	No Repair	Crack Seal & Seal Coat	No Repair
22700	Bigler Road	No Repair	No Repair	No Repair	Crack Seal & Seal Coat	No Repair	No Repair	Crack Seal & Seal Coat
13000	Fischer Road	No Repair	Mill & Overlay Surface Course	No Repair	No Repair	Crack Seal & Seal Coat	No Repair	No Repair
11800	Hastings Road	No Repair	No Repair	Full Reconstruction	No Repair	No Repair	Crack Seal & Seal Coat	No Repair
11800	Hastings Road	No Repair	Full Reconstruction	No Repair	No Repair	Crack Seal & Seal Coat	No Repair	No Repair
12400	Eisenhower Access	No Repair	Mill & Overlay Surface Course	No Repair	No Repair	Crack Seal & Seal Coat	No Repair	No Repair
12100	Pollock Road	No Repair	No Repair	No Repair	Crack Seal & Seal Coat	No Repair	No Repair	Crack Seal & Seal Coat
12100	Pollock Road	Flexible Base Repair	No Repair	No Repair	Crack Seal & Seal Coat	No Repair	No Repair	Flexible Base Repair
22700	Bigler Road	No Repair	No Repair	Crack Seal & Seal Coat	No Repair	No Repair	Flexible Base Repair	No Repair
12700	Curtin Road	No Repair	No Repair	No Repair	Flexible Base Repair	No Repair	No Repair	Flexible Base Repair
22700	Bigler Road	No Repair	No Repair	No Repair	No Repair	Crack Seal & Seal Coat	No Repair	No Repair
24200	Orchard Road	Crack Seal & Seal Coat	No Repair	No Repair	Mill & Overlay Surface Course	No Repair	No Repair	Crack Seal & Seal Coat
12700	Curtin Road	No Repair	Flexible Base Repair	No Repair	No Repair	Mill & Overlay Surface Course	No Repair	No Repair
22400	Shortlidge Road	No Repair	No Repair	No Repair	Crack Seal & Seal Coat	No Repair	No Repair	Crack Seal & Seal Coat
23000	Big Hollow Road	No Repair	No Repair	No Repair	Crack Seal & Seal Coat	No Repair	No Repair	Crack Seal & Seal Coat
23300	University Drive Ext	No Repair	No Repair	No Repair	No Repair	Crack Seal & Seal Coat	No Repair	No Repair
21800	Fraser Road	No Repair	No Repair	No Repair	Flexible Base Repair	No Repair	No Repair	Flexible Base Repair
22400	Shortlidge Road	No Repair	No Repair	Mill & Overlay Surface Course	No Repair	No Repair	Crack Seal & Seal Coat	No Repair
22100	Allen Road	No Repair	No Repair	No Repair	No Repair	No Repair	Full Reconstruction	No Repair

Budget vs. Condition

PRIORITIZATION

=

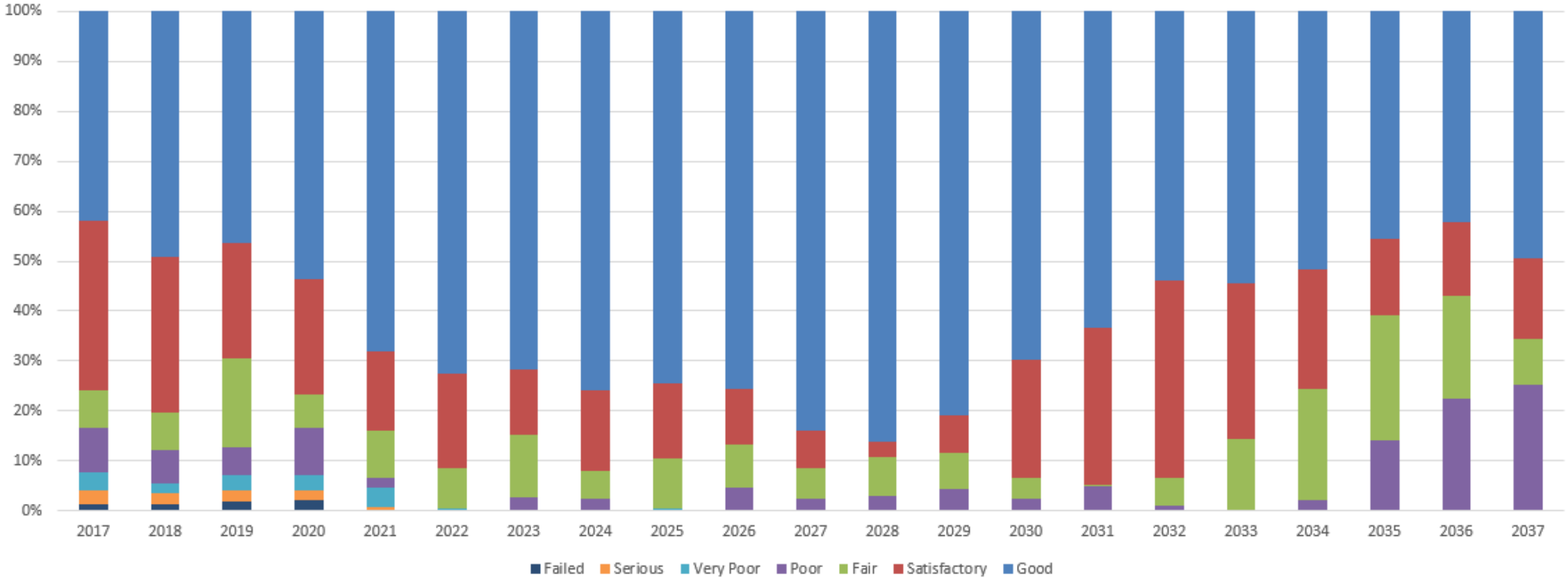
Condition + Criticality + Maintenance Expense = **Budget**

(unlimited funds)

OR

Budget (set) + Criticality + Maintenance Expense = **Condition**

Network Condition Breakdown



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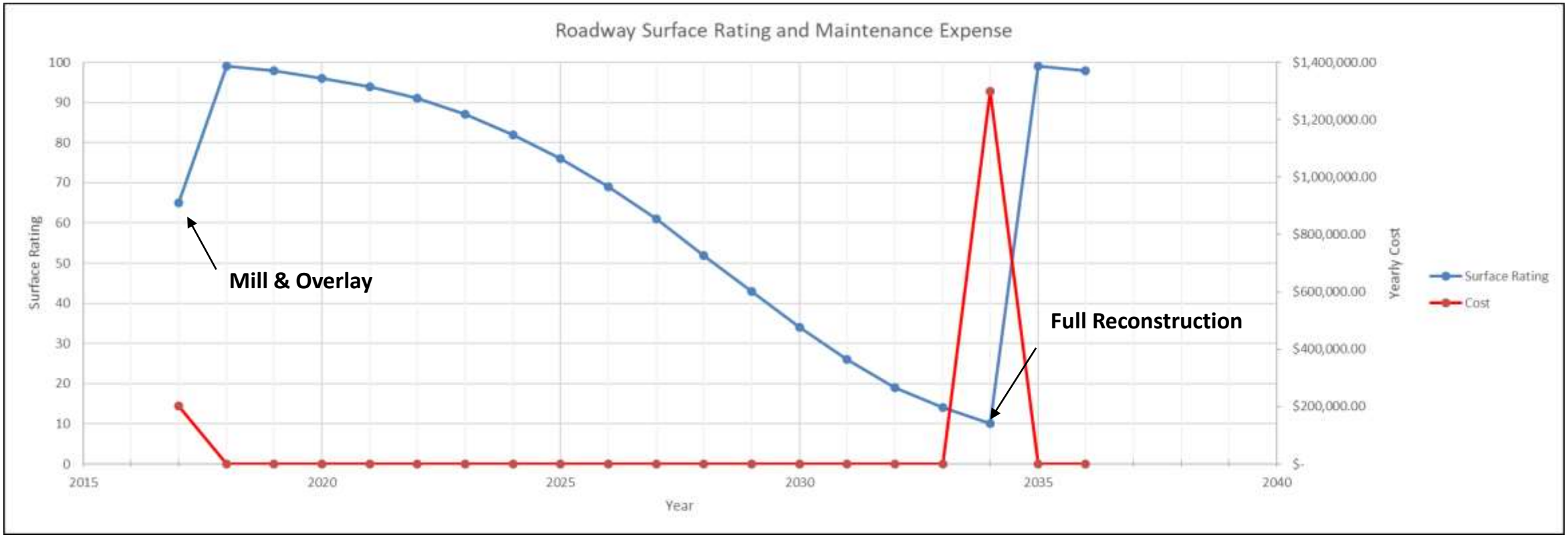
Tool Impact

- **No maintenance: Total anticipated 20-year cost = $1,501,600**



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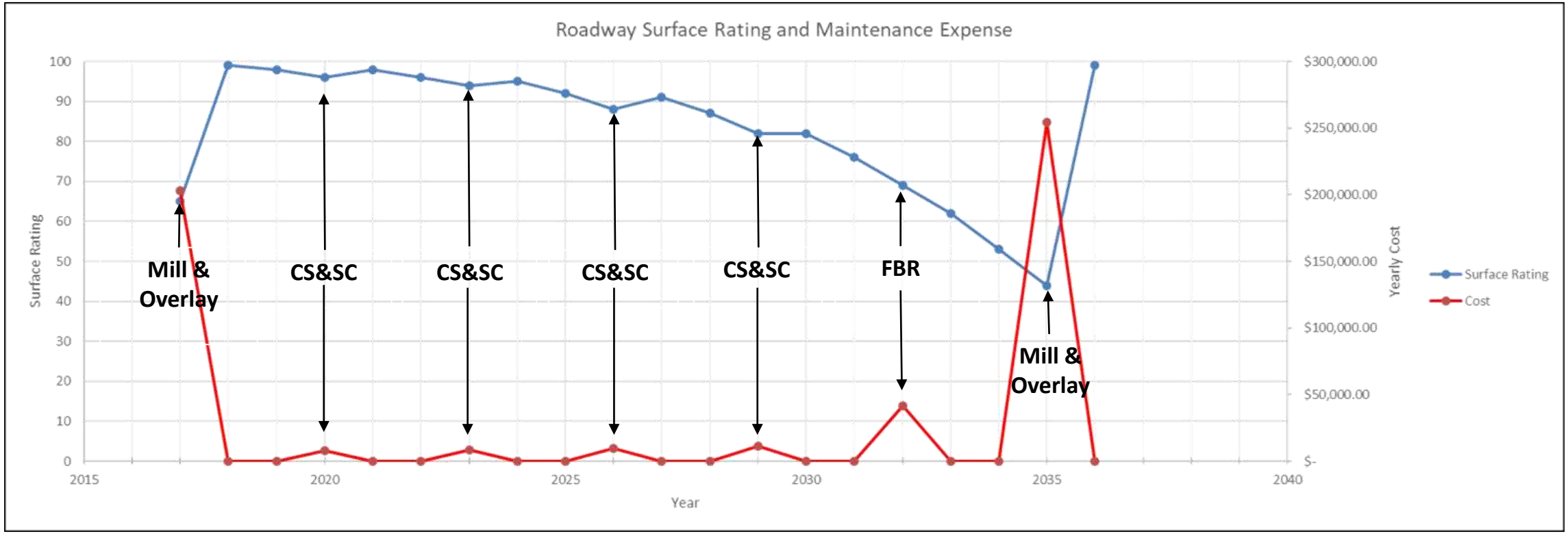
Tool Impact

- **Regular maintenance: Total anticipated 20-year cost = $536,560**

Savings of $1 million for one road



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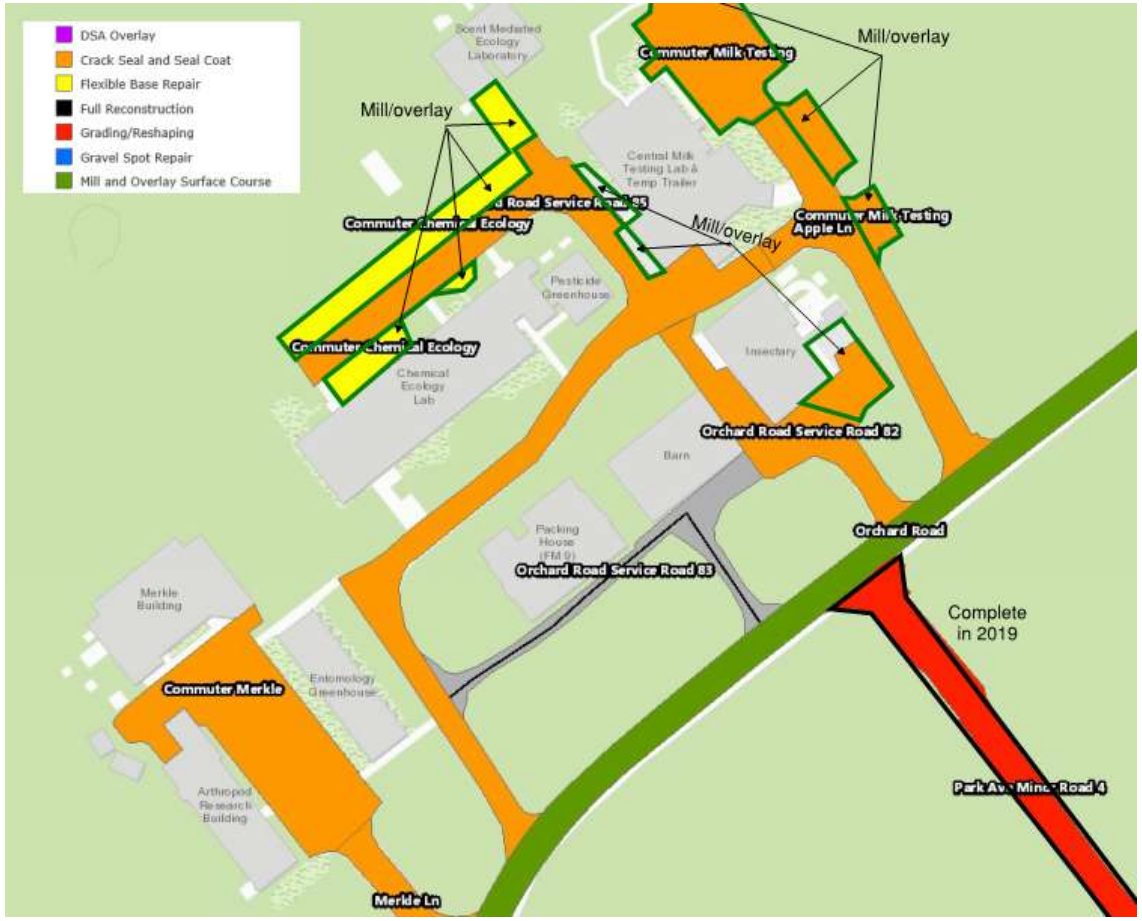
Project Level R.A.M.P.

Building on the Network Level R.A.M.P.:

- Select maintenance projects to maximize constructability based on:
  - Network RAMP results
  - Known utility, capital improvement, etc. projects
  - Geographical Groupings
- Organize bid documents by operation
- Perform construction oversight



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Goals Met

- Data Driven Decisions
- Proactive Long-Term Plan
- Historical, Searchable Repair Record and Detailed Data
- LiDAR Basemapping Data Available for Other Projects
- Larger % of Roads in Good Repair

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Questions?
Thank You

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