



Pavement Management (PM) Update

Pavement Management Inventory and Ranking

November 12, 2019

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Inventory Needs vs. Funding

Paved roads (locals, collectors, arterials): approximately 700 centerline miles

**Resurfacing Target:
35 to 49 centerline miles per year**

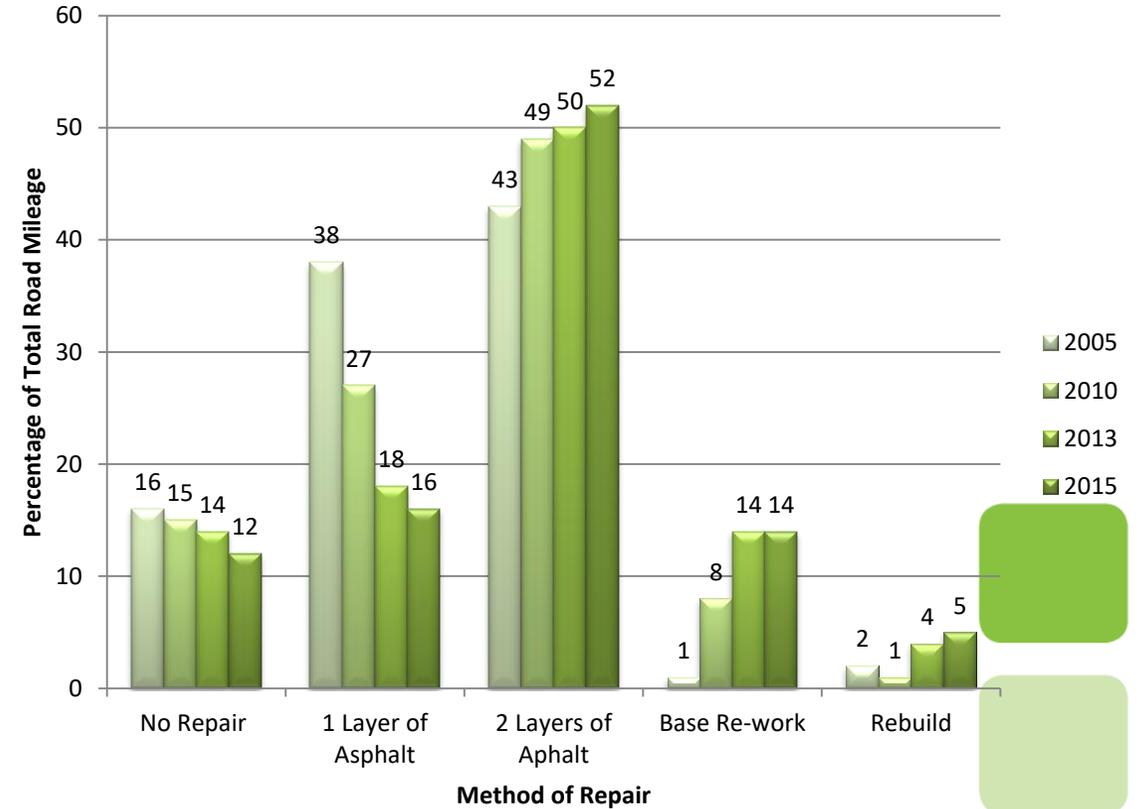
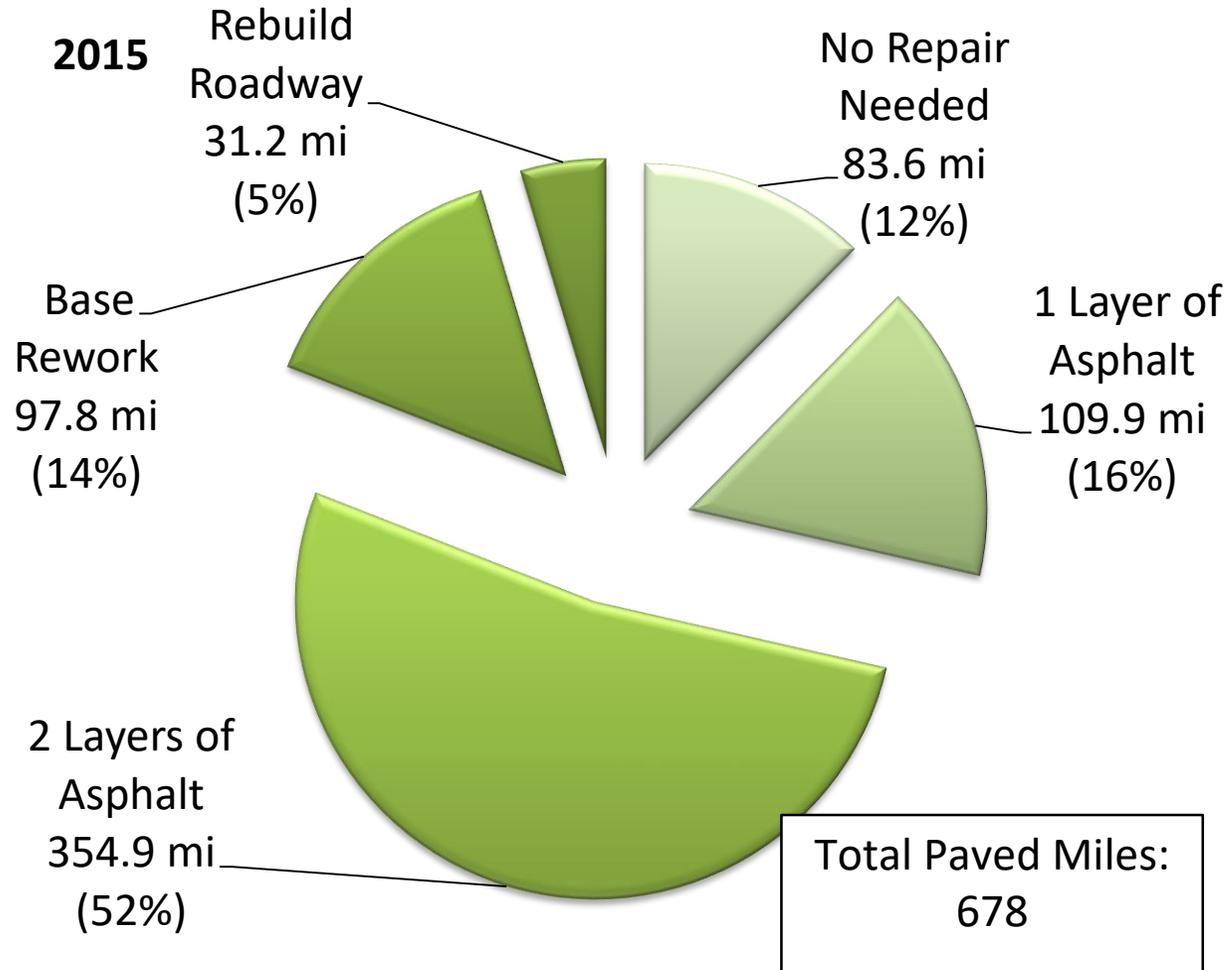
**\$12.25 M to \$17.75 M
required annually**

**FY19 Adopted - \$3.68 M
FY20 Adopted - \$3.95 M
FY21 Proposed - \$3.89 M
FY22 Proposed - \$4.45 M
FY23 Proposed - \$3.71 M
FY24 Proposed - \$4.54 M**

**Inventory Condition
Backlog Continues to Grow**



Pavement Condition Inventory vs. Time

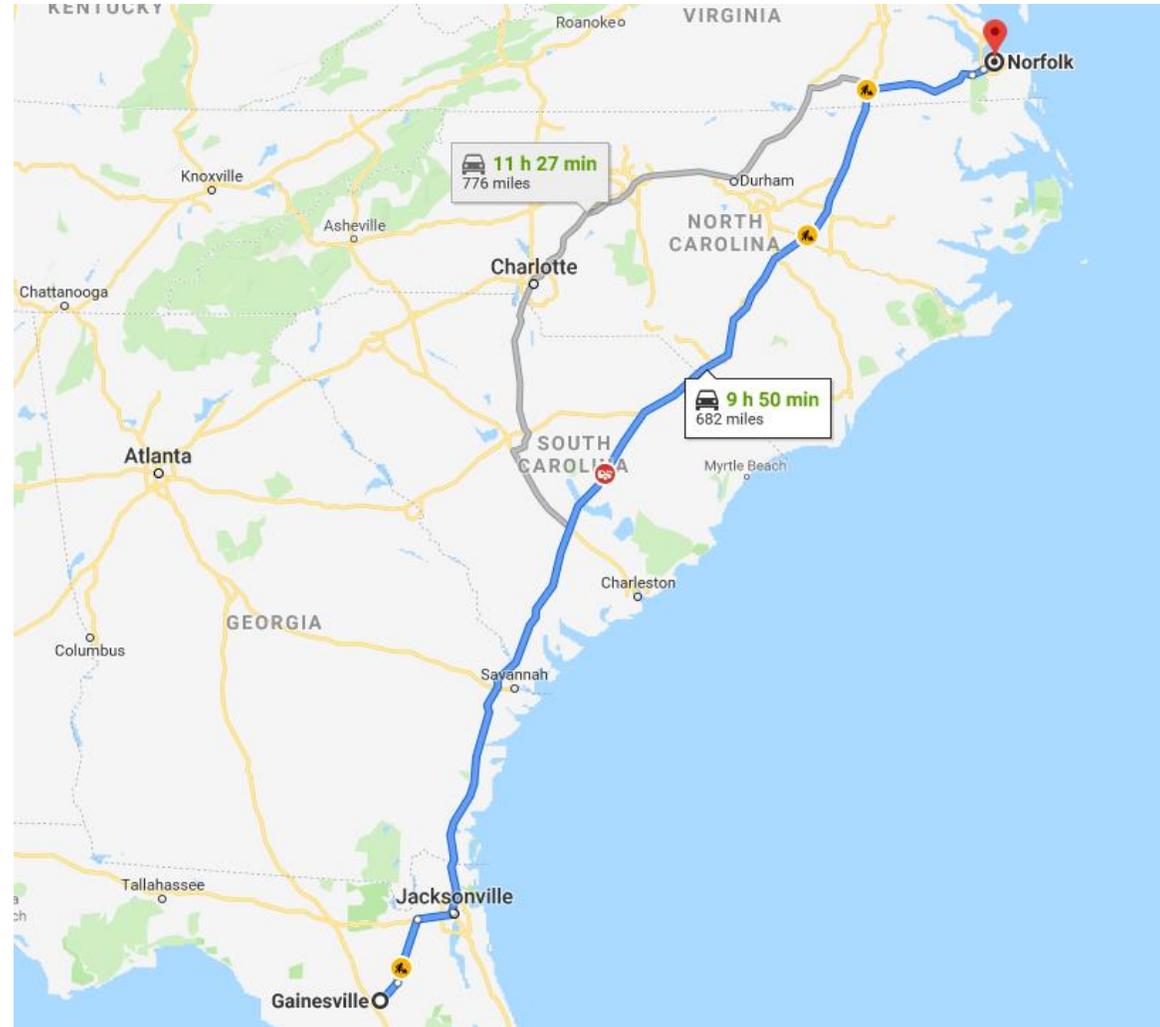


**Inventory Condition Backlog
Continues to Grow
Update scheduled for 2020**

Pavement Condition Inventory

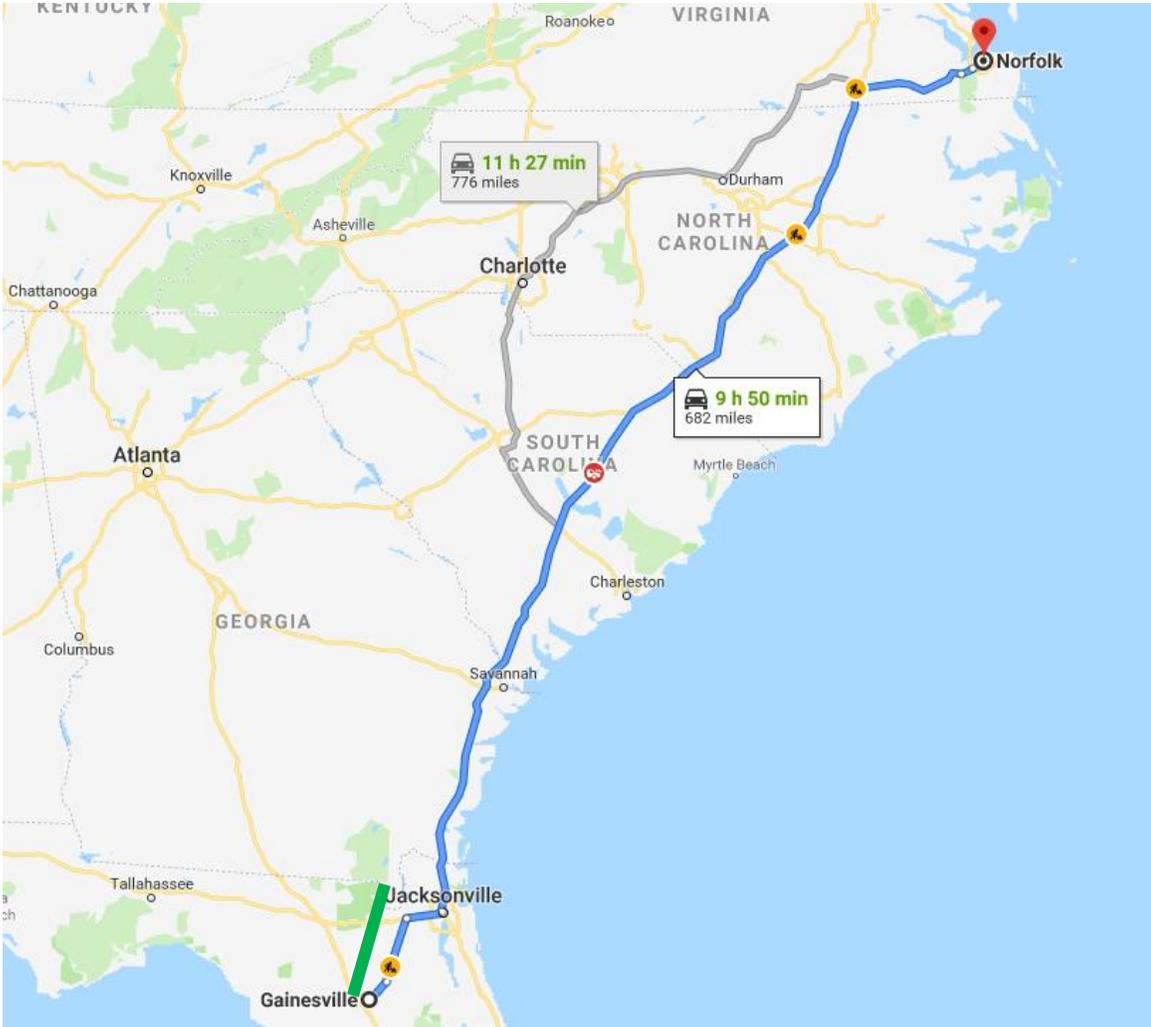
Alachua County's paved inventory stretches from Gainesville to Norfolk, VA

Approximately a 10 hr drive straight at legal operating speed



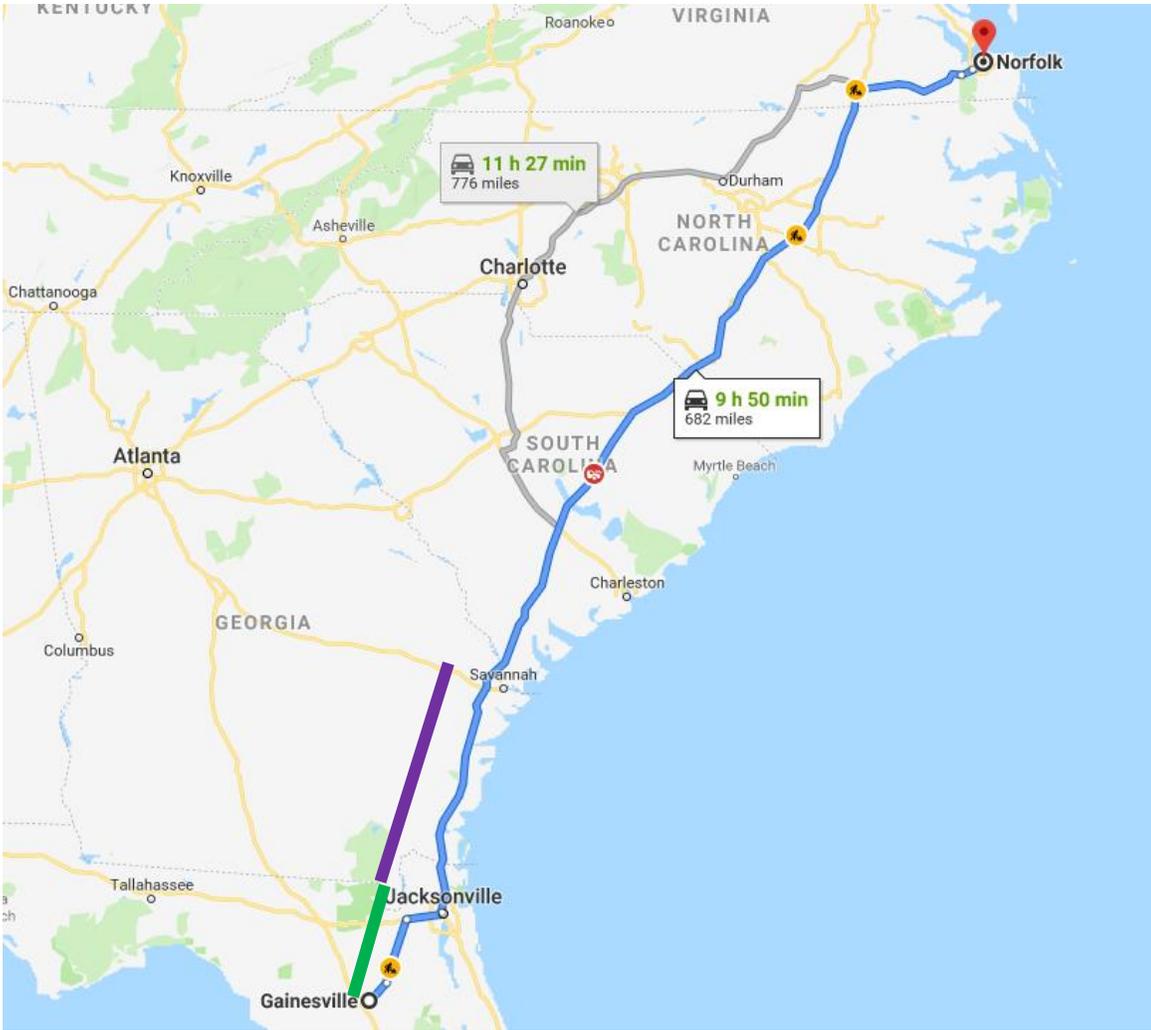
Pavement Condition Inventory

GNV to JAX – **Excellent**
1.5 hrs – 83 miles



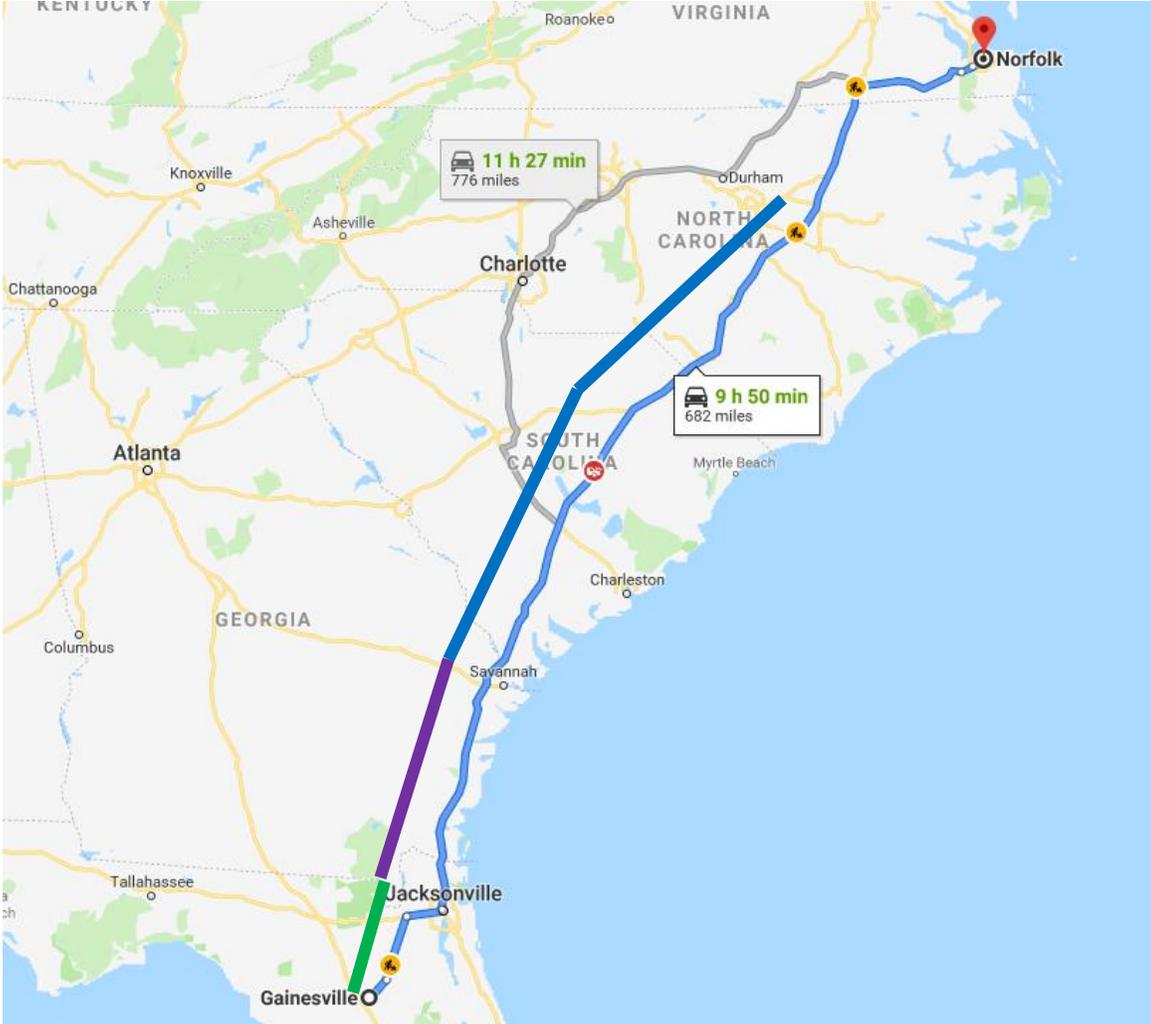
Pavement Condition Inventory

JAX to Savannah – **Good**
1.75 hrs – 110 miles



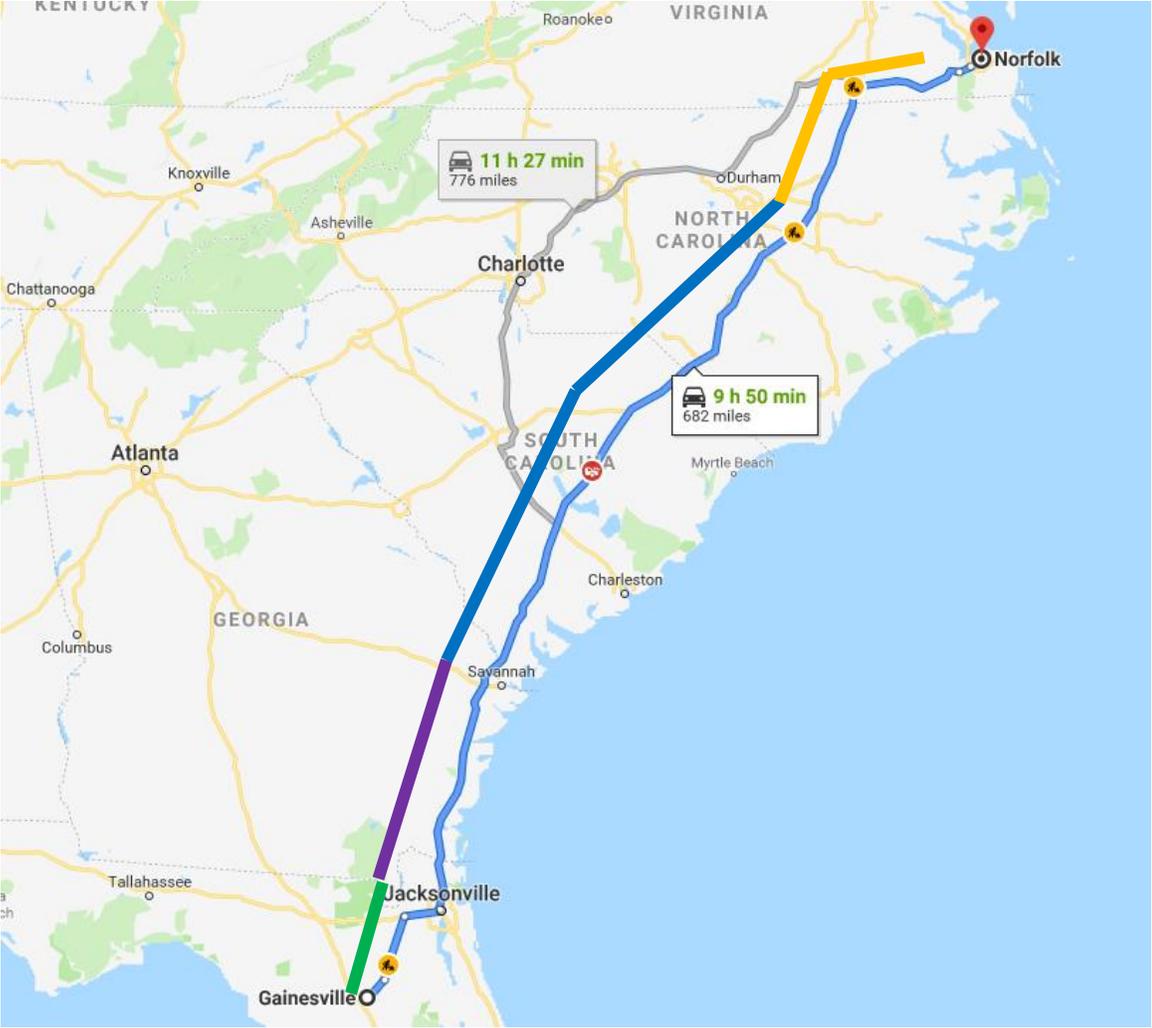
Pavement Condition Inventory

Savannah to Raleigh – Fair
4.75 hrs – 355 miles



Pavement Condition Inventory

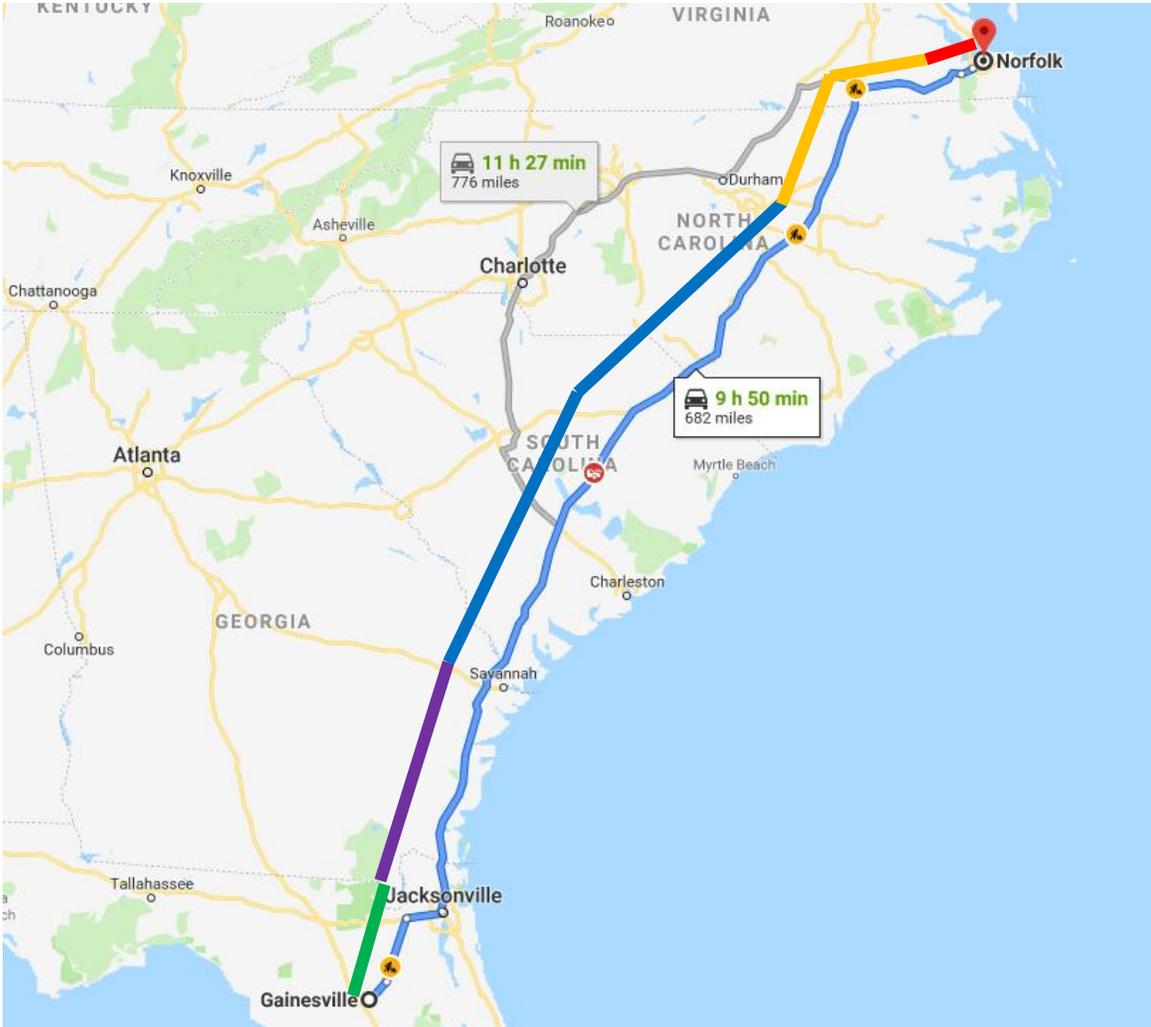
Raleigh to Suffolk – **Poor**
1.5 hrs – 98 miles



Pavement Condition Inventory

Suffolk to Norfolk – **Very Poor**

0.5 hrs – 31 miles



Pavement Condition Inventory

GNV to JAX – **Excellent**

1.5 hrs – 83 miles

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1.75 hrs – 110 miles

Savannah to Raleigh – **Fair**

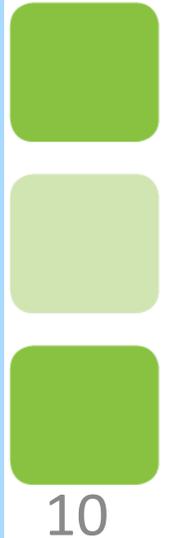
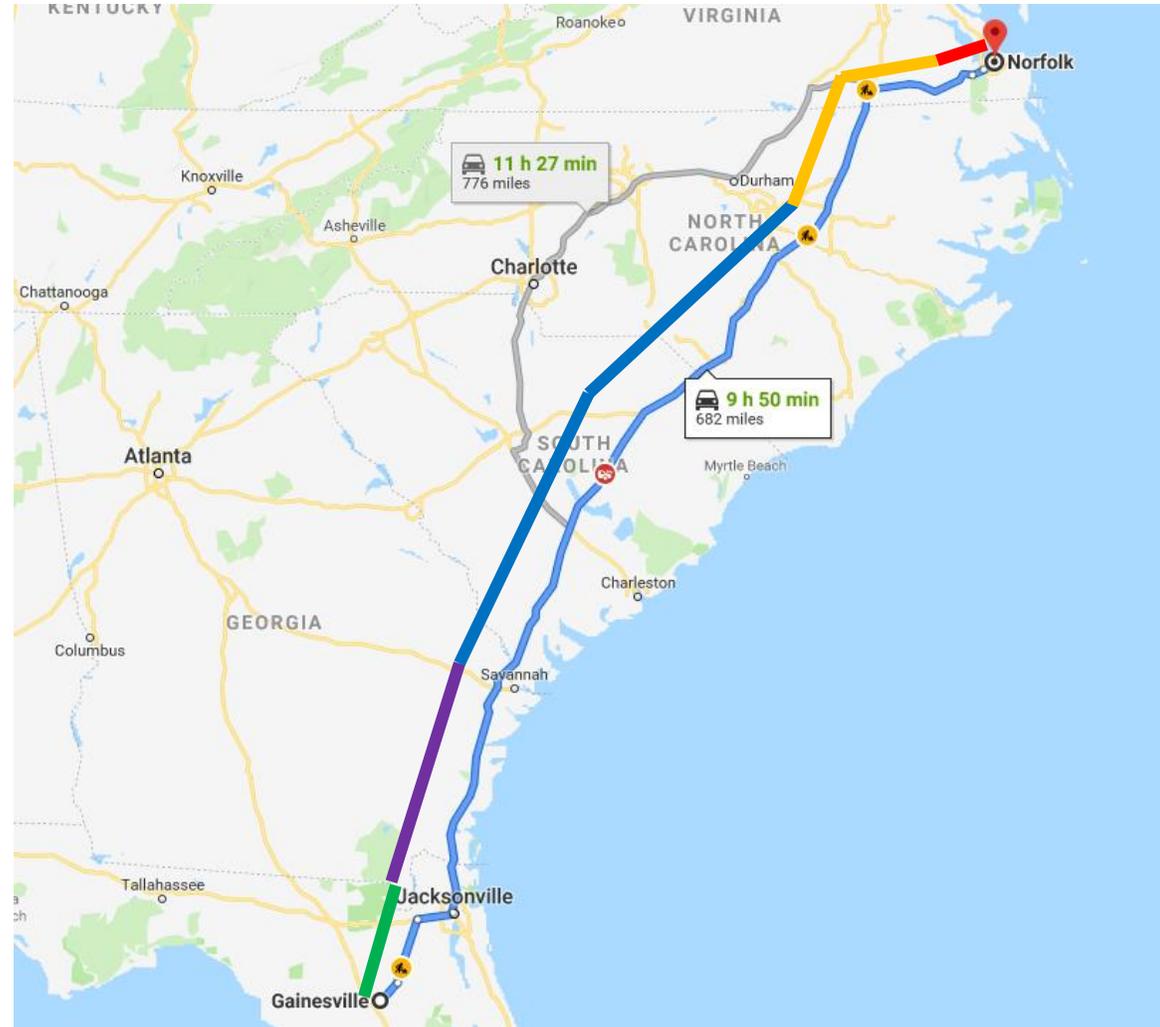
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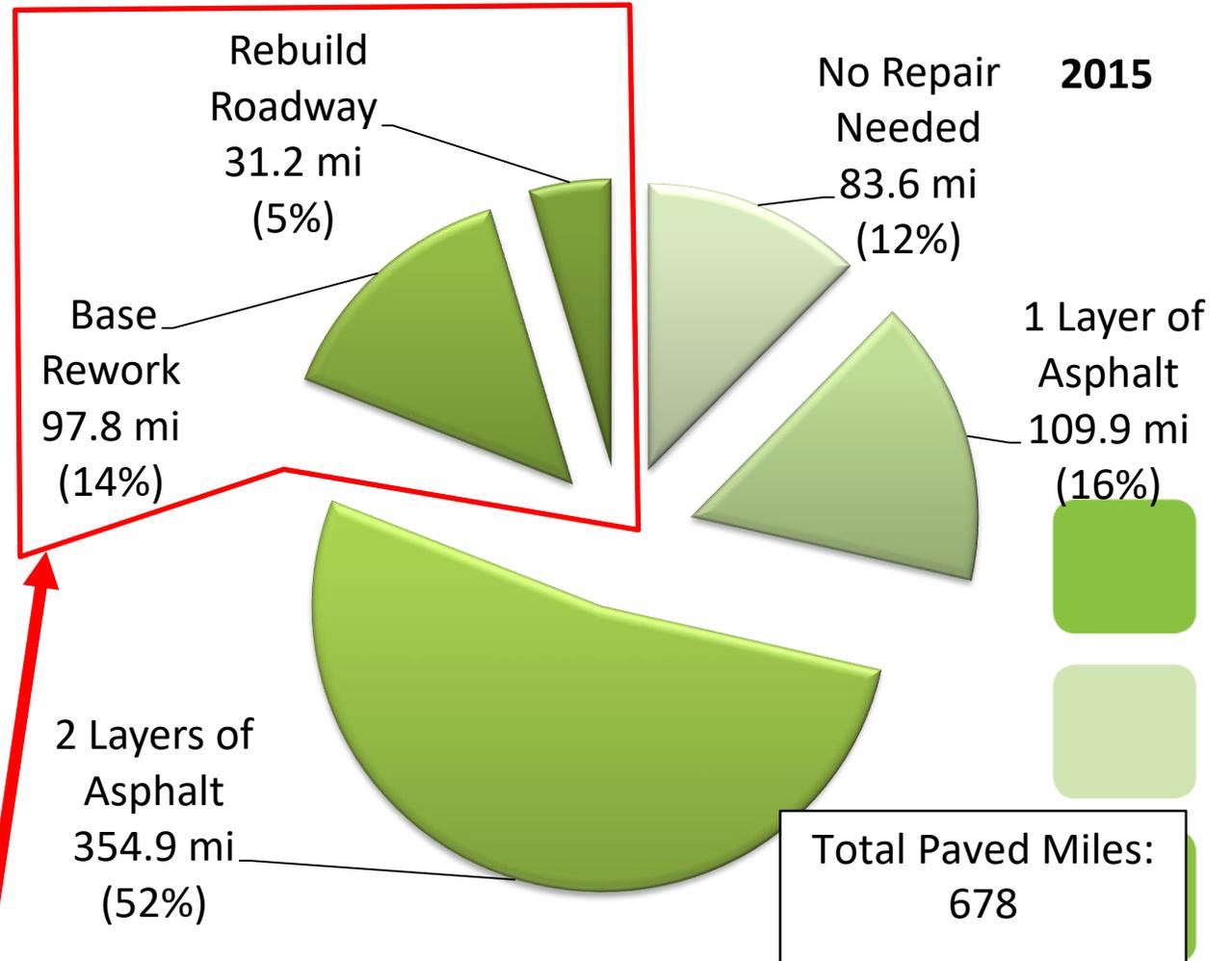
Pavement Management Ranking Methodology

Ranking Methodology

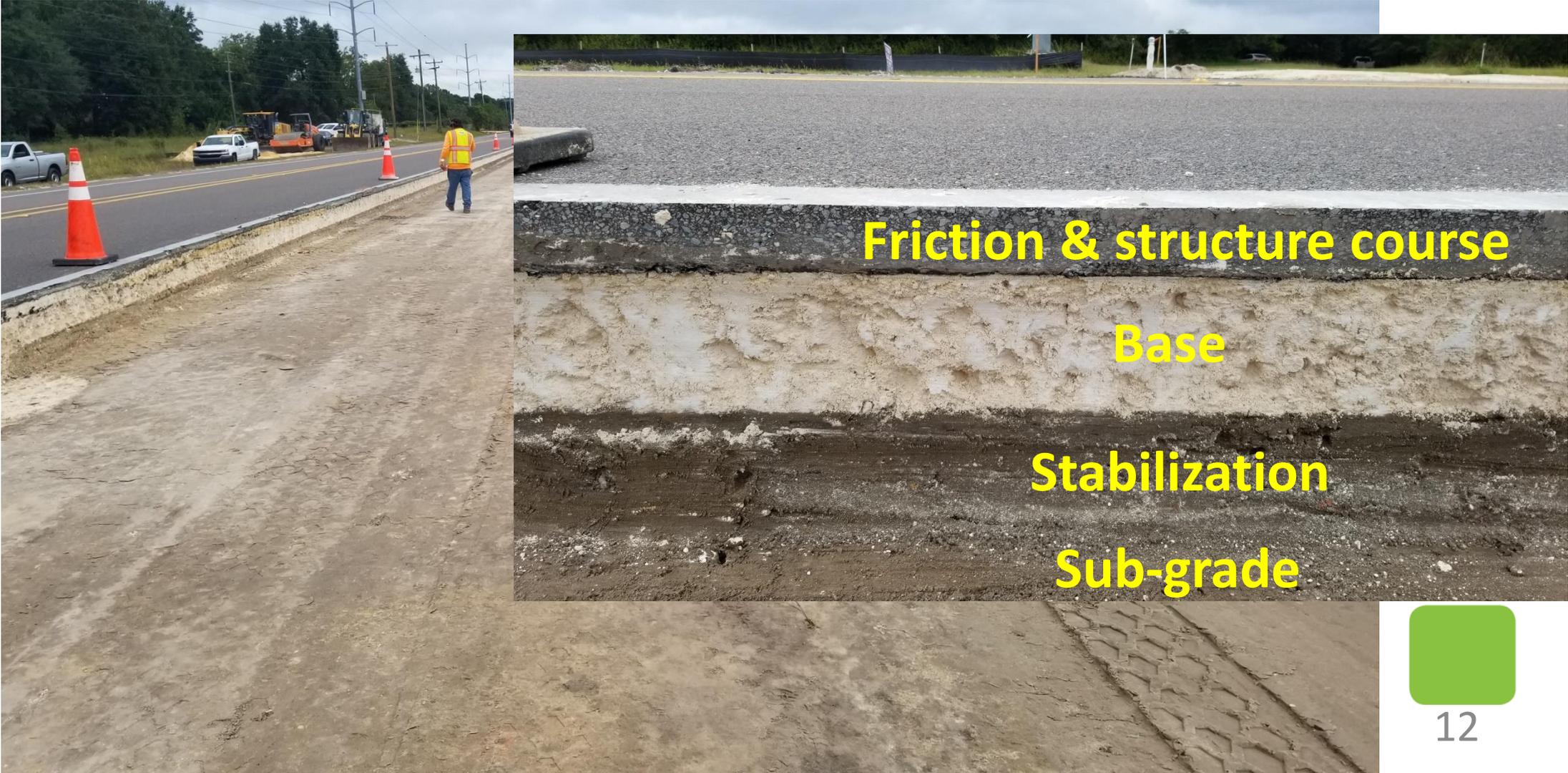
Factor	BoCC Approved 2011	BoCC Approved 2017
Pavement Condition	55%	65%
Deterioration Rate	25%	10%
Traffic Volumes	10%	25%
Crash Rate	10%	Tie-Breaker
Adjustments	Previous Commitments	2 list; Full Depth Reclamation or Mill & Resurface

Worst-First Approach

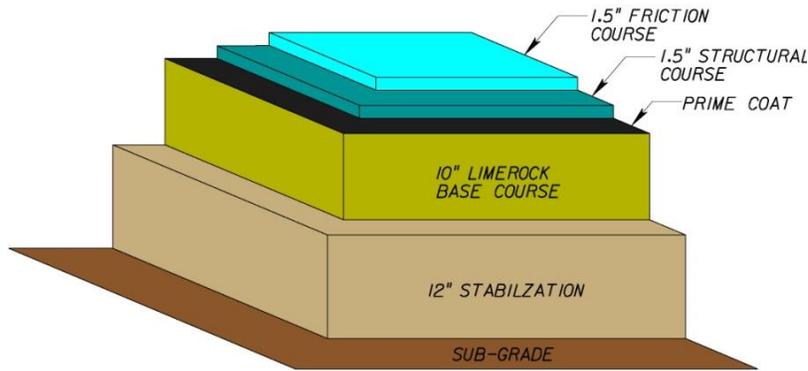
All funding goes to bottom end of inventory



Pavement Structure



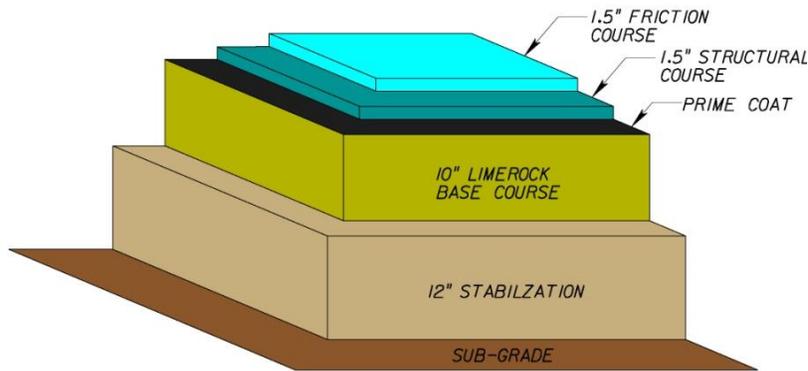
Pavement Structure



- **Goal**
 - **Sound foundation to support roadway loading & to keep water for infiltrating from the top to the bottom**



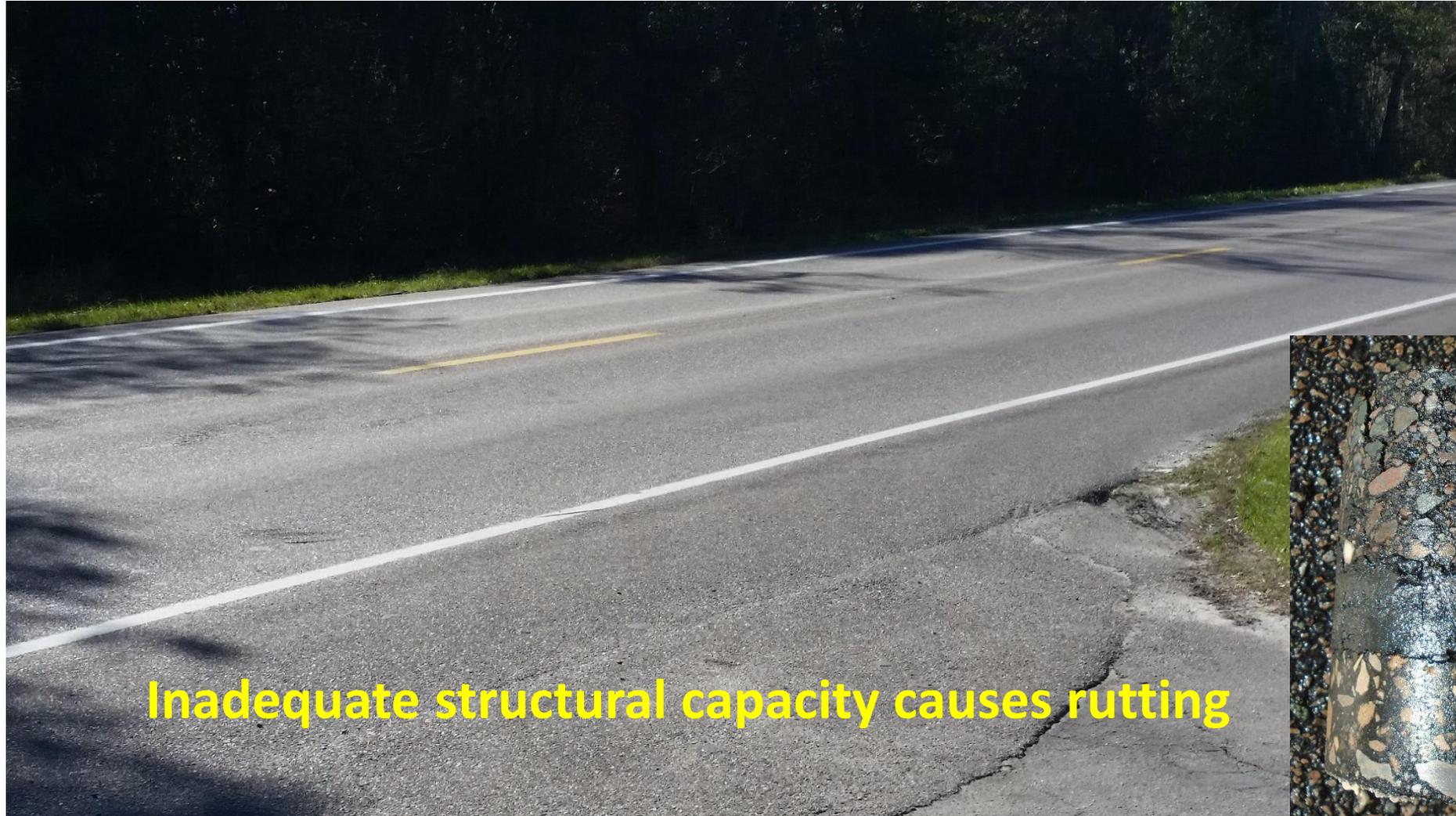
Pavement Structure Failures vs. Repair Types



- Friction course – Shingles
 - **Excellent** – 83 miles
- Structure course – Felt/moister barrier
 - **Good** – 110 miles
- Base course – Decking
 - **Fair** – 355 miles
- Stabilization – Trusses
 - **Poor** – 98 miles
- Sub-grade – Building Interior
 - **Very Poor** – 31 miles



Pavement Failures



Inadequate structural capacity causes rutting



Pavement Failures



Inadequate structural capacity causes rutting

Caused by traffic loading

Pavement is not strong enough to support traffic loads



Preserving pavement is not possible



Pavement Failures



Pavement oxidizes and loses flexibility



Pavement cracks



Water intrusion & potholes



Pavement Failures



**Combination of aged
pavement and inadequate
structural capacity**

**Pavement preservation
not possible**



Pavement Management Techniques

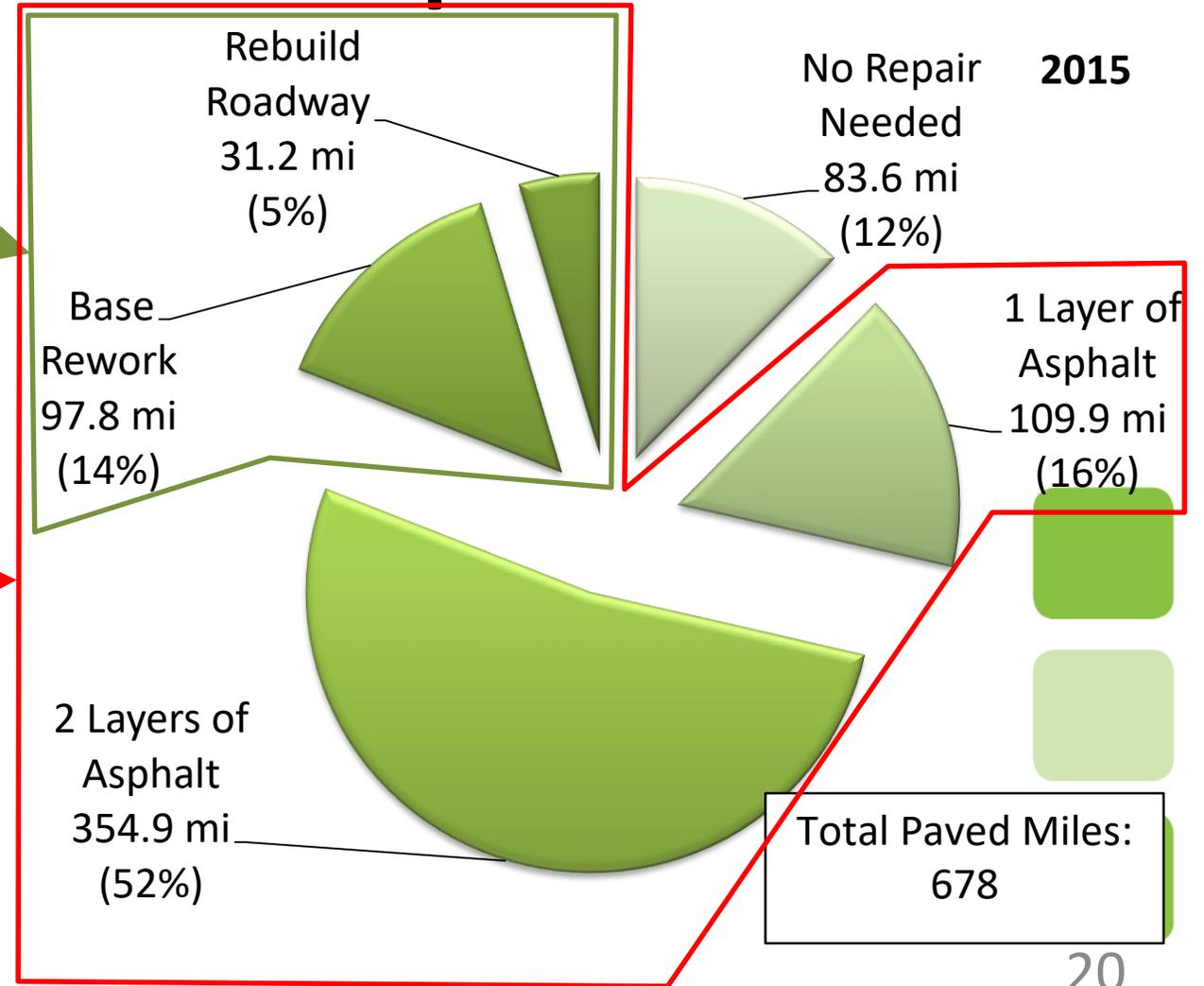
- **Worst-First – Current Practice**
 - Conventional – Most peers utilize this method
 - Asset decays and is replaced
 - Does not take into account backlog
 - Costly
- **Optimization – Staff recommends PM Study**
 - Recommended by FHWA (Pavement Preservation)
 - Sustainable – Asset protected and left in place
 - Fiscally responsible & minimizes backlog growth
 - More visibility



Pavement Management Techniques

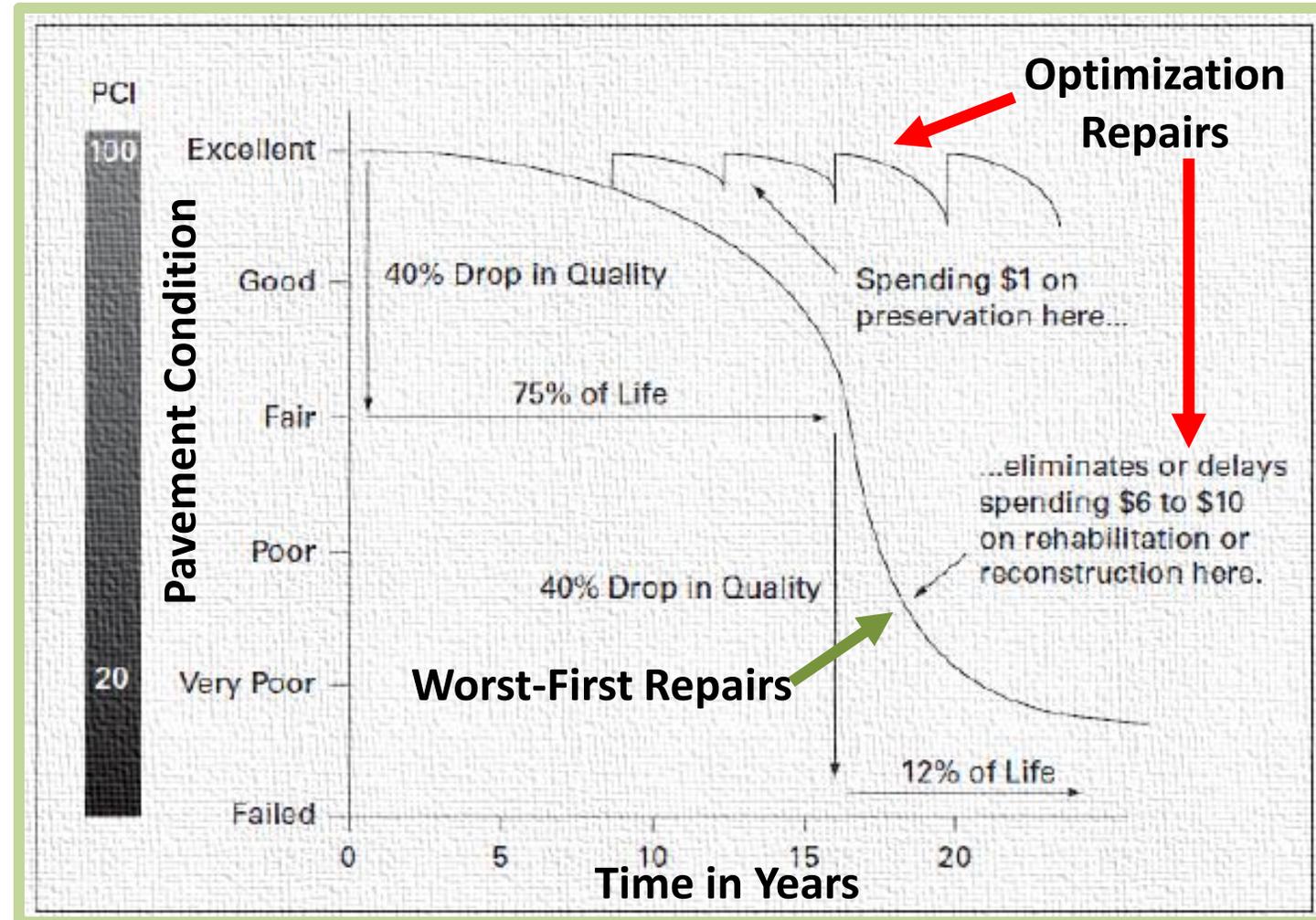
Worst-First Approach
All funding goes to bottom end of inventory

Optimization Approach
Funding is spread throughout inventory to minimize backlog



Pavement Management Techniques

- Pavements can be preserved at a frequent cycle at fraction of the costs without having to replace asphalt
- Alternatively pavements can be replaced at the end of the life at a higher cost
- Optimization utilizes both repair techniques, splitting the budget between the types of repairs in order to minimize the backlog



Pavement Management Techniques



Crack Sealing



Rejuvenation



Sealing



Microsurfacing



**Hot In-Place
Recycle**



Mill & Resurface



**Cold In-Place
Recycle**



**Full Depth
Reclamation /
Reconstruction**

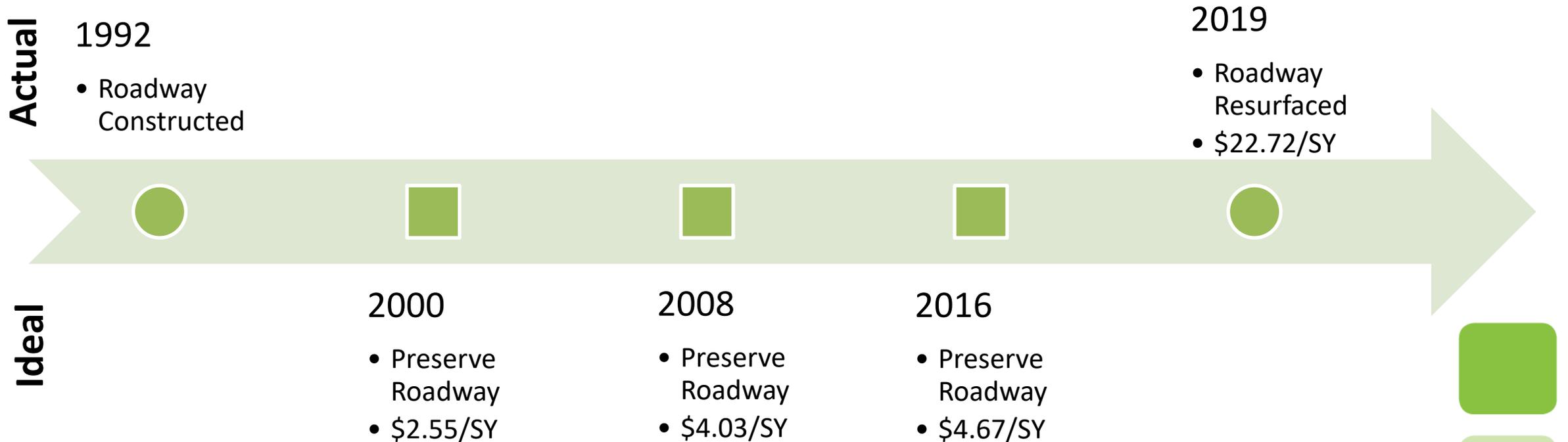
Cutting Edge Pavement Management

- **Pavement Preservation**
Techniques that reduce pollutants
 - Rejuvenates asphalt (extends pavement life)
 - Self-cleaning, Self-regenerating, air-purifying surface that removes nitrogen oxides (NO_x) and volatile organic compounds (VOC_s).

The infographic is a vertical poster with a green and blue color scheme. At the top left is the Pavement Technology Inc. logo (a circular emblem with 'PTI' and 'SINCE 1974'). To the right is the slogan 'Real Science. Real Results.' and the website 'www.pavetechinc.com'. The main body is split into two vertical panels. The left panel, titled 'ANY TOWN... TODAY ORDINARY PAVEMENT', shows a brown car on a grey road with grey spheres representing 'Vehicular Pollutants (NO_x)'. The right panel, titled 'YOUR TOWN... TOMORROW PHOTOCATALYTIC PAVEMENT', shows a green car on a blue road with blue spheres representing 'Harmless Nitrates (NO₃)'. Sunlight rays from the top center illuminate the scene. At the bottom, a green bar contains the text: 'Titanium Dioxide-Based Cationic Carrier Liquids Deeply Penetrate Pavement. Sunlight + TiO₂ Photocatalyze Vehicular Exhaust, Transforming Pollutants Into Harmless Nitrates.' The chemical formula 'TiO₂' is repeated several times along the bottom edge of the road surface.

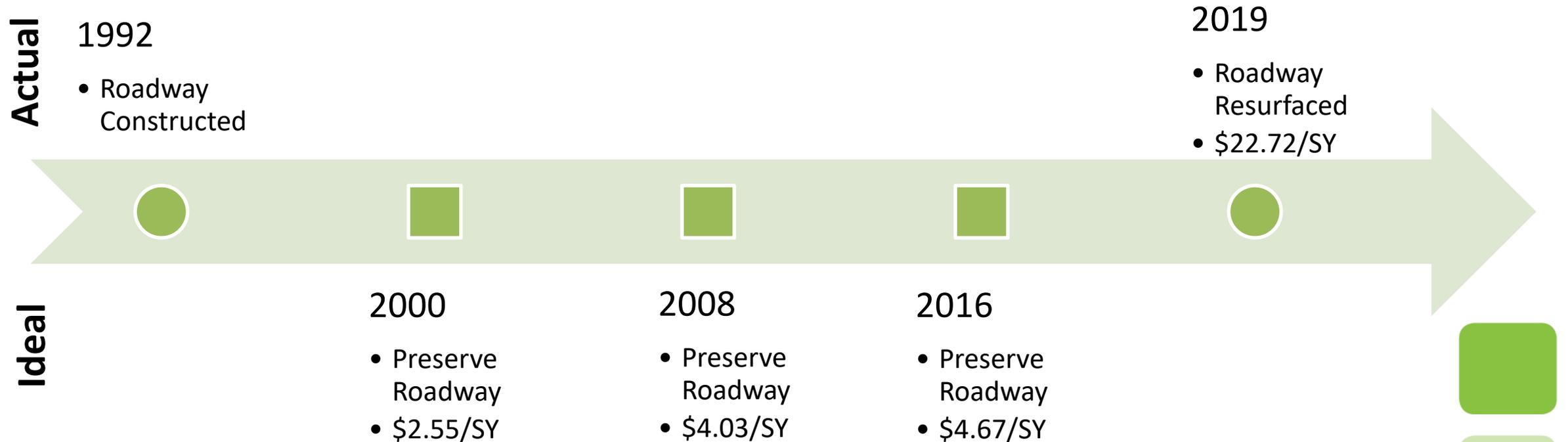


Roadway Example – NW 43rd Street



- **Pavement Preservation - \$11.25/SY or \$2.34 M**
- **Delayed (Actual) Resurfacing - \$22.72/SY or \$4.72 M**
- **Estimated sunk cost - \$2.38 M**

Roadway Example – NW 43rd Street



- **Ideal Resurfacing (2008) - \$9.99/SY or \$2.08 M**
- **Pavement Preservation (2 cycles) - \$6.58/SY or \$1.37 M**
- **Cost difference - \$0.71 M**

Roadway Example – Tale of Two Cities

**Bridgeport,
Connecticut**

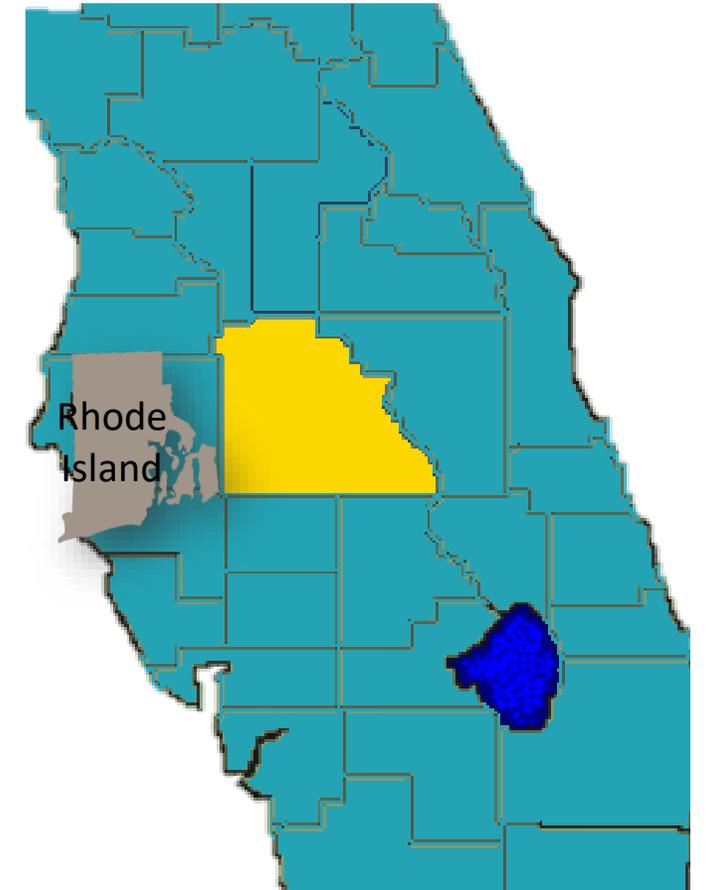
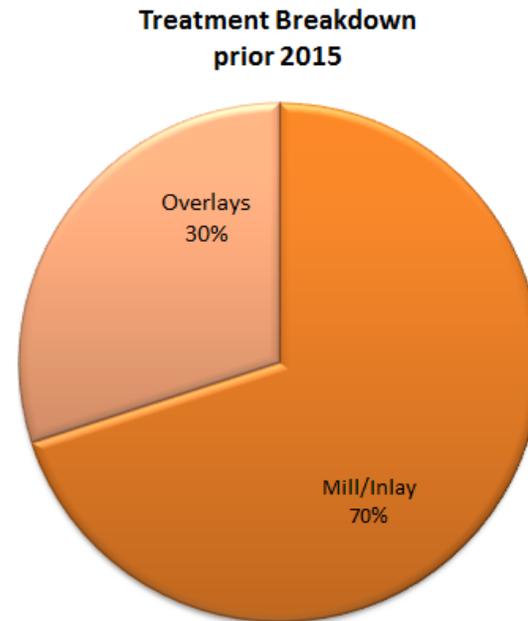


**Fairfield,
Connecticut**



Peer Review – Optimized PM Methodology

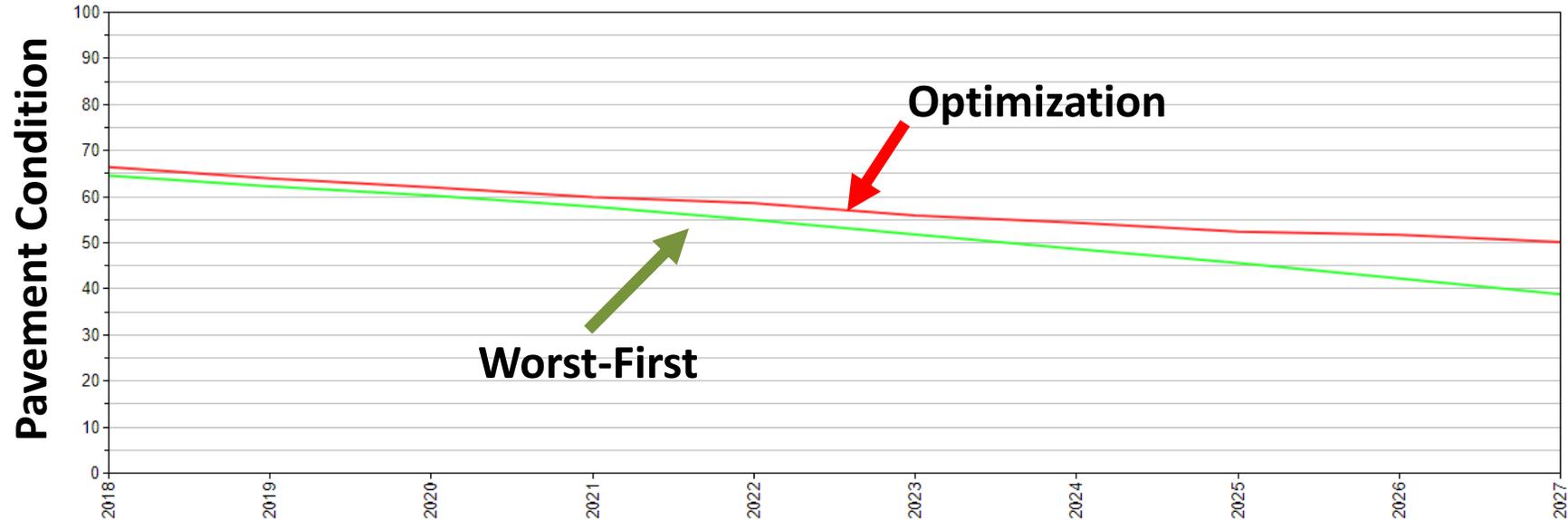
- **Polk County**
 - Fourth largest County
 - 2,520 centerline miles of paved roadway
 - Pre-2015: Avg. 75 miles/year resurfacing
 - Optimization: Avg. 170 miles/year preservation & resurfacing (resurfacing reduced)



Peer Review – Optimized PM Methodology

- Polk County: Optimized vs. Worst-First

**Network
condition
vs.
Time**



Average PCI in 2027

Optimized PCI: 50

Worst-First PCI: 38

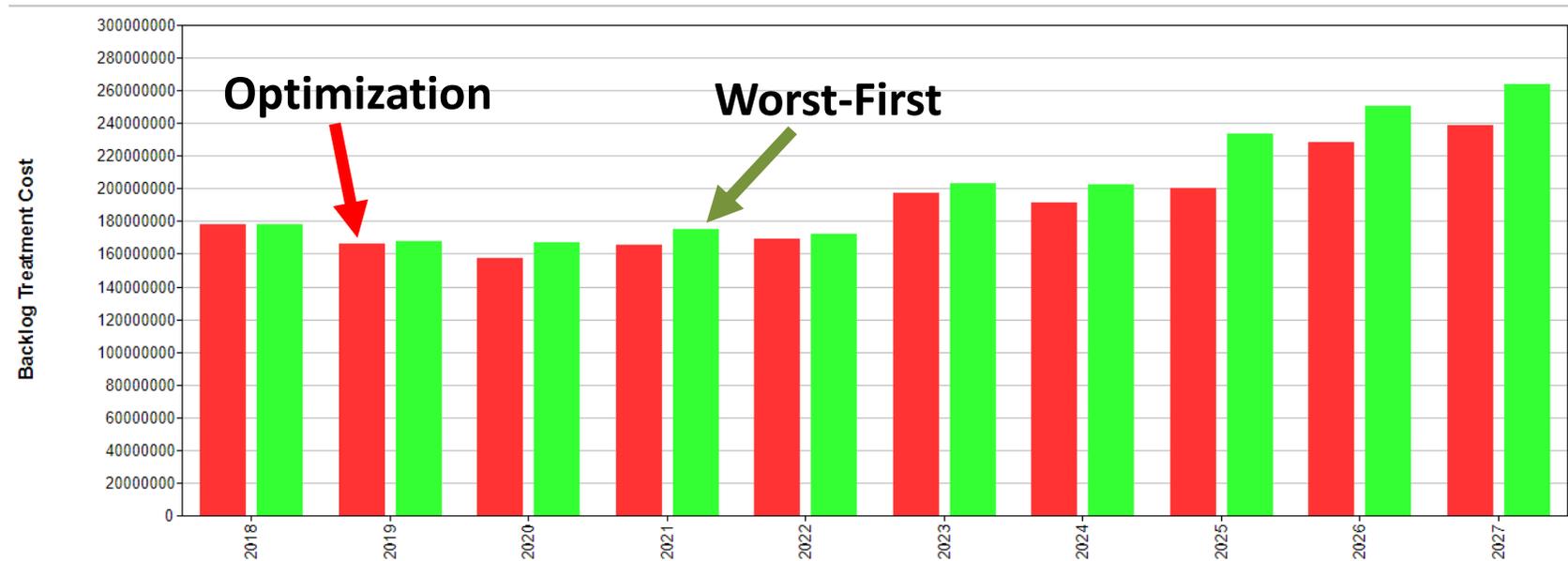
**Network Condition
Improvement:
12 PCI Points**



Peer Review – Optimized PM Methodology

- Polk County: Optimized vs. Worst-First

**Minimize
Backlog &
Costs to
Public**



Total Backlog Cost in 2027:
Optimized: \$238.5 Million
Worst-First: \$263.9 Million

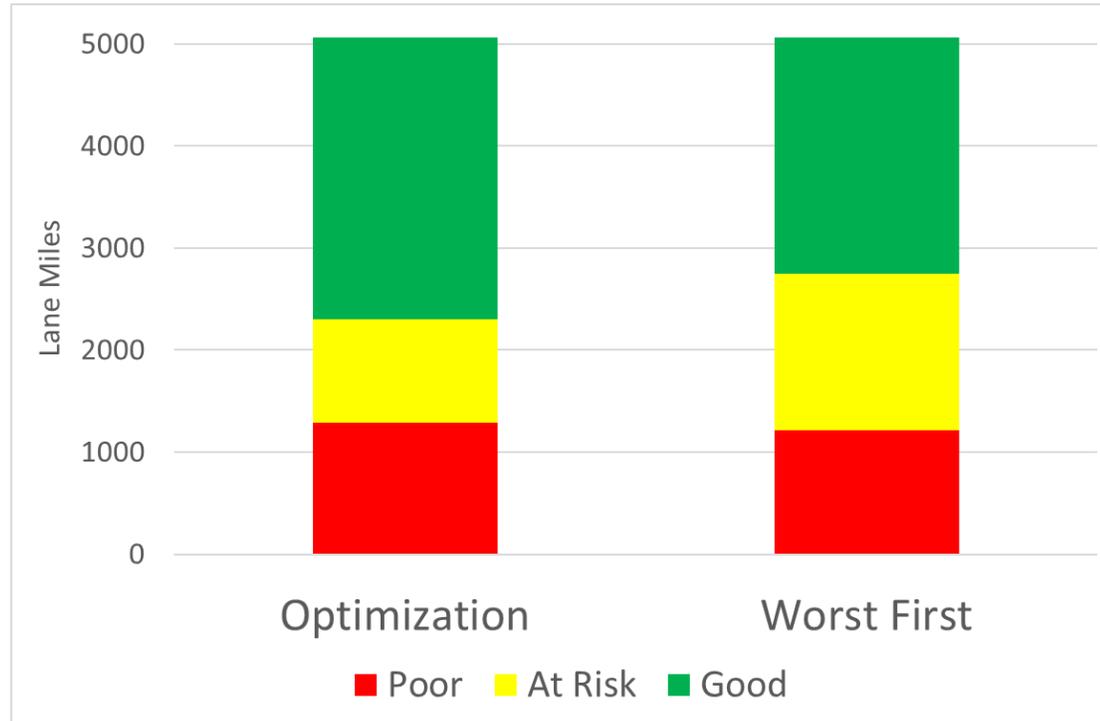
**Money Saved by Improving
Management Process:
\$25.4 Million**



Peer Review – Optimized PM Methodology

- Polk County: Optimized vs. Worst-First

Inventory Condition



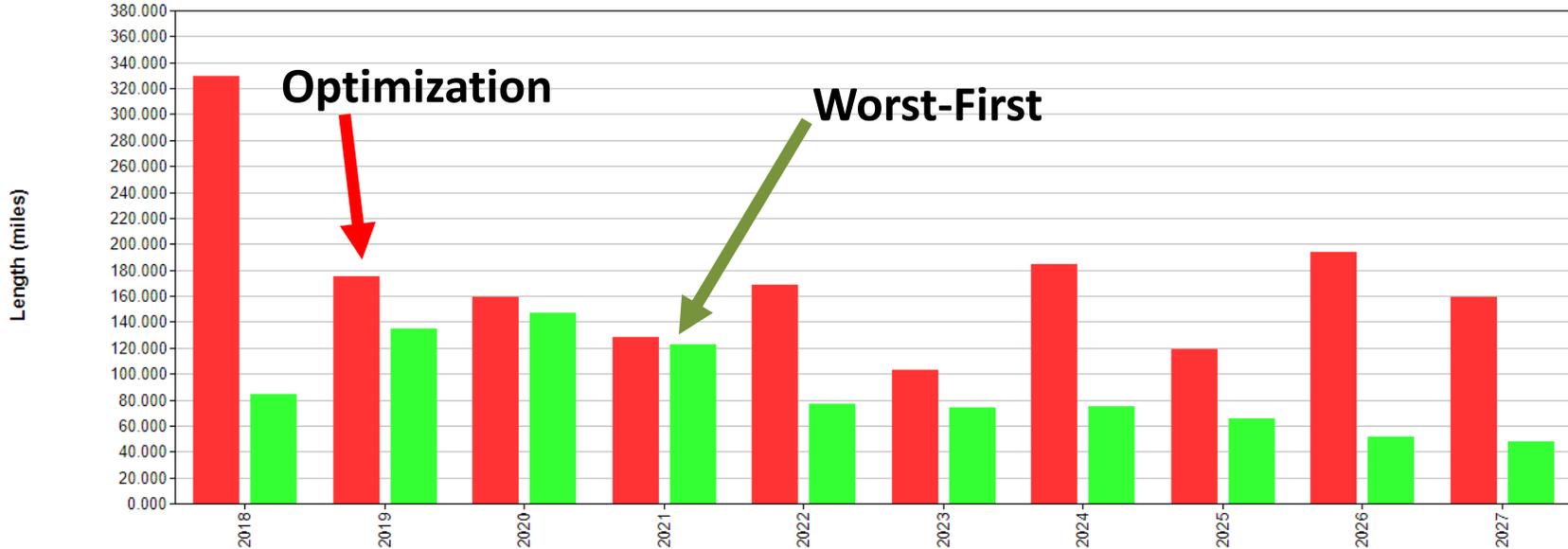
Percent Increase of Good Roads by 20% with similar percent Poor Roads



Peer Review – Optimized PM Methodology

- Polk County: Optimized vs. Worst-First

Increased
Visibility to
Public



Total Centerline Miles Treated over 10 Years (2,529 mile network)

Optimized: 1,719 miles (68%)

Worst-First: 879 miles (35%)

**% Increase in Roads
Repaired: 95%**

Study Deliverables

- Updated pavement inventory
- Optimized work plan to minimizing future backlog
- Ability to run budget scenarios and estimate inventory impacts



Recommendation

- **Approve Budget Amendment 20-223 funding a Pavement Management Study & Training with Gas Tax Reserves in the amount of \$250,000**
- **Present an Optimized Pavement Management Program vs. Worst-First Management Program no later than the FY 2022 Budget Cycle**

