Experience and Performance of Pavement Preservation Activities in Nashville

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Why Pavement Preservation?

- Increased Financial Demands
- Increased Rate of Deterioration
- Philosophical Change in roadway management Needed
- Change from Reactive to Preventive

Purpose and Application of Preservation Treatments

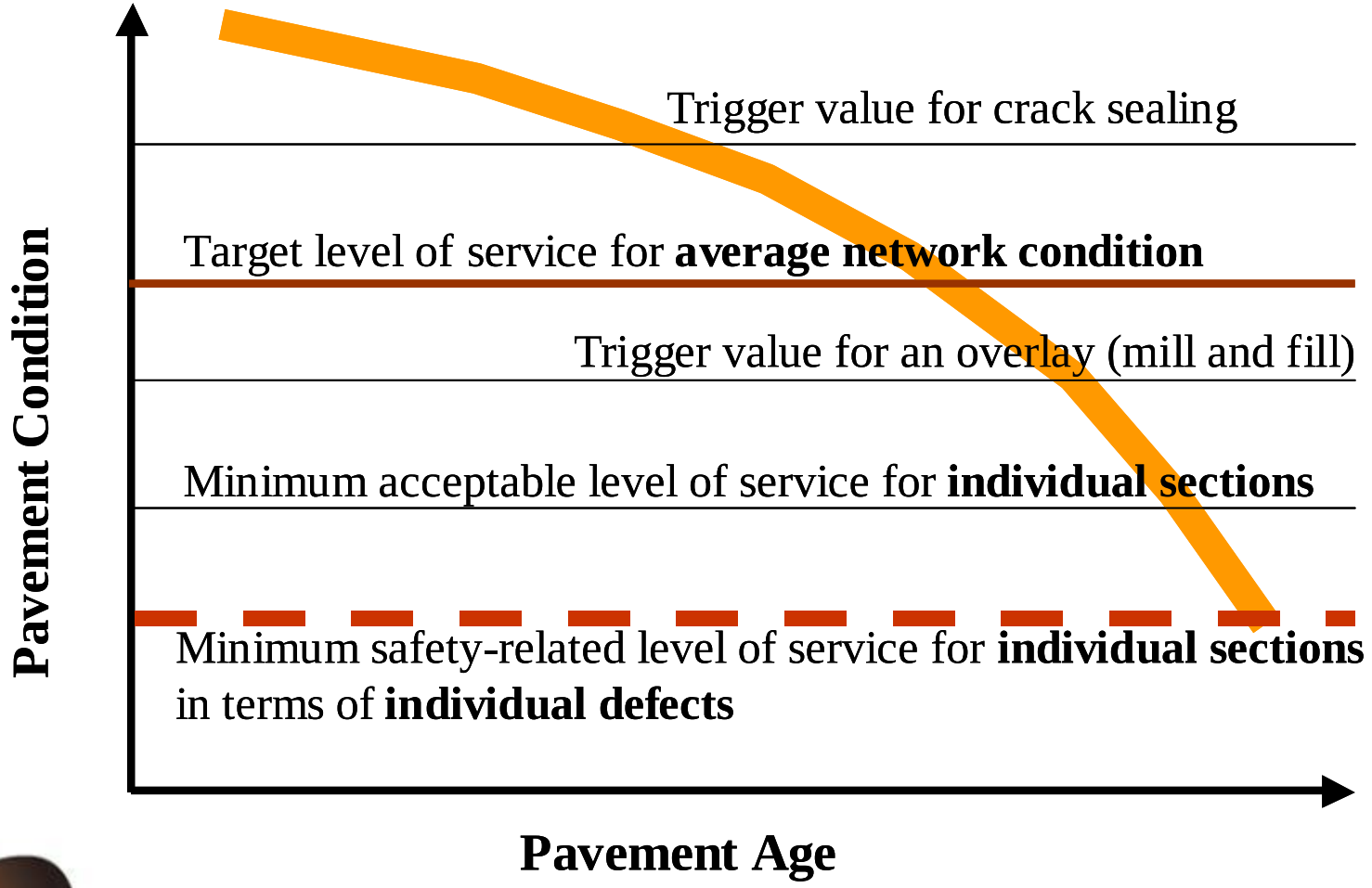
- Provide a new wearing surface
- Seal cracks in the surface
- Waterproof the surface
- Improve pavement surface friction and surface drainage
- Slow pavement weathering and aging
- Improve the surface appearance

Development of an Effective Program

- Establish management aspects of the program
- Establish technical aspects of the program
- Determine maintenance needs
- Provide framework for treatment selection
- Set priorities for needs
- Provide ongoing support, monitoring and assessment

Planning the Program

Step 1. Service Levels and Triggers



Step 2. Inventory Data – Pavements

- Location, roadway class, length, width and area
- Date of original construction and subsequent major maintenance
- Pavement condition (past and present)
  - Surface distress
  - Ride quality
- Traffic information

Pavement Condition Data

- Pavement condition data on your roadway network is crucial
- An agency needs to know what the distresses are on their roadway network
- This data includes, raveling, construction joint, base failures, pot holes & other distresses

Data Collection Process

- Survey vehicle equipped with digital cameras.
- Cameras simultaneously collects digital images
- Laser profilometer mounted to collect roughness data
- On board laser used to measure surface texture which determines severity of raveling

CartêGraph Navigator - PAVEMENTview - [Nashville Segments *]

File Edit View Forms Filters Records Actions GIS Reports Tools Window

<Unnamed>

PAVEMENTview

Segments

GIS

MAPdirector

ArcMap.exe

System

Home

Administrator

Segment Information

Segment ID: SEG-000028192

Old ID: 25929

Location

Route Name: RICHARDS RD

Route Start: UNA ANTIOCH PK

Route End: ANTIOCH PK

Route Length: 6602.33 ft

Segment Start: UNA ANTIOCH PK

Segment End: DEBRA DR

Address

Start Address: 631

End Address: 631

Features

Pavement Classification: AC Asphalt Concrete

Functional Classification: Urban Collector

District: 28

Paving Group: 5

Pavement Length: 1011.97 ft

Pavement Width: 20 ft

Pavement Area: 20239.4 ft²

GIS Status: 3

Forward Images

View All Images

Details

Inspections | Suggested Maintenance | Traffic | Events

Record: 1 of 4 Date: 06/23/2007

Inspected By: ARA OCI: 81.9

Type: Network-Level Inspections:ID: 59327

Condition Category	Index	Is Required	Notes	Rating
Distress	81.2	☐		Acceptable
Ride	60	☐	259 in/mi	Acceptable
Weathering	100	☐	None	None

Detailed Distress

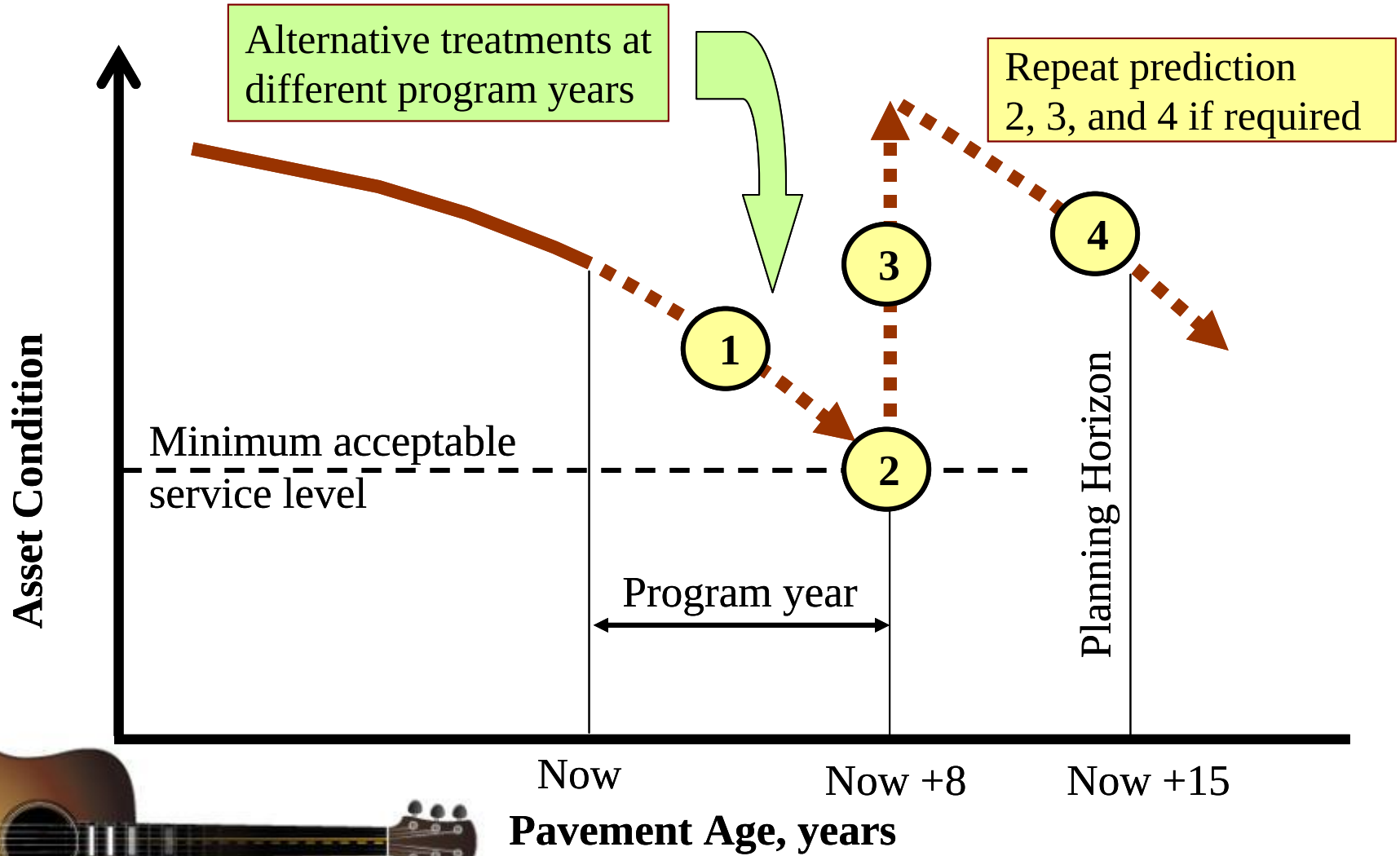
New Segment

Save Segment

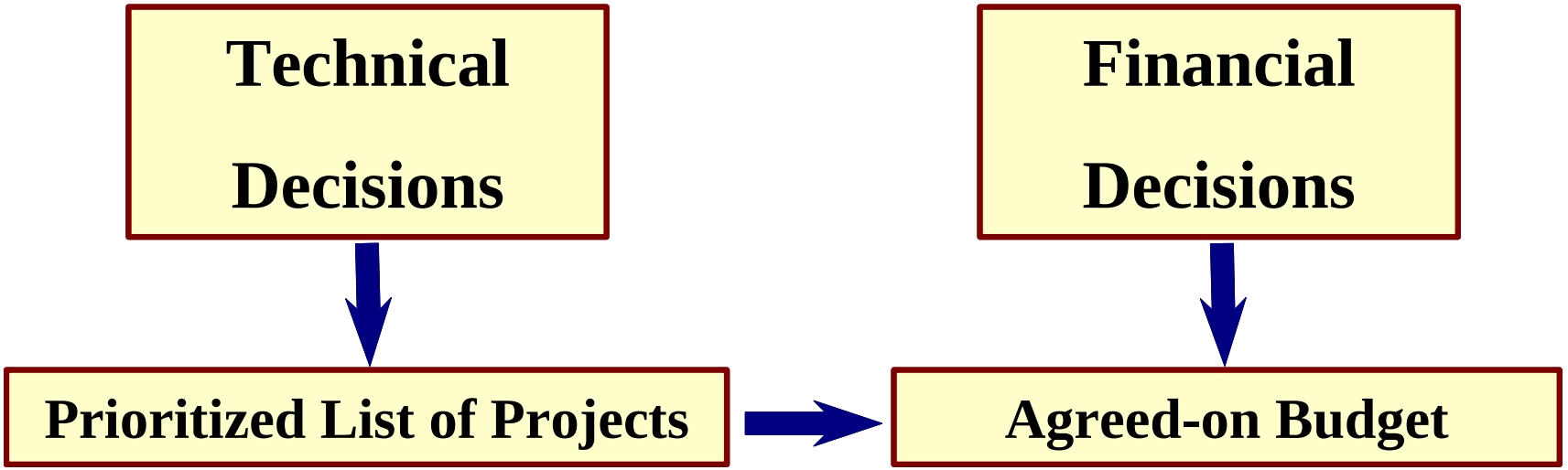
E-mail Segement

View Segments Report

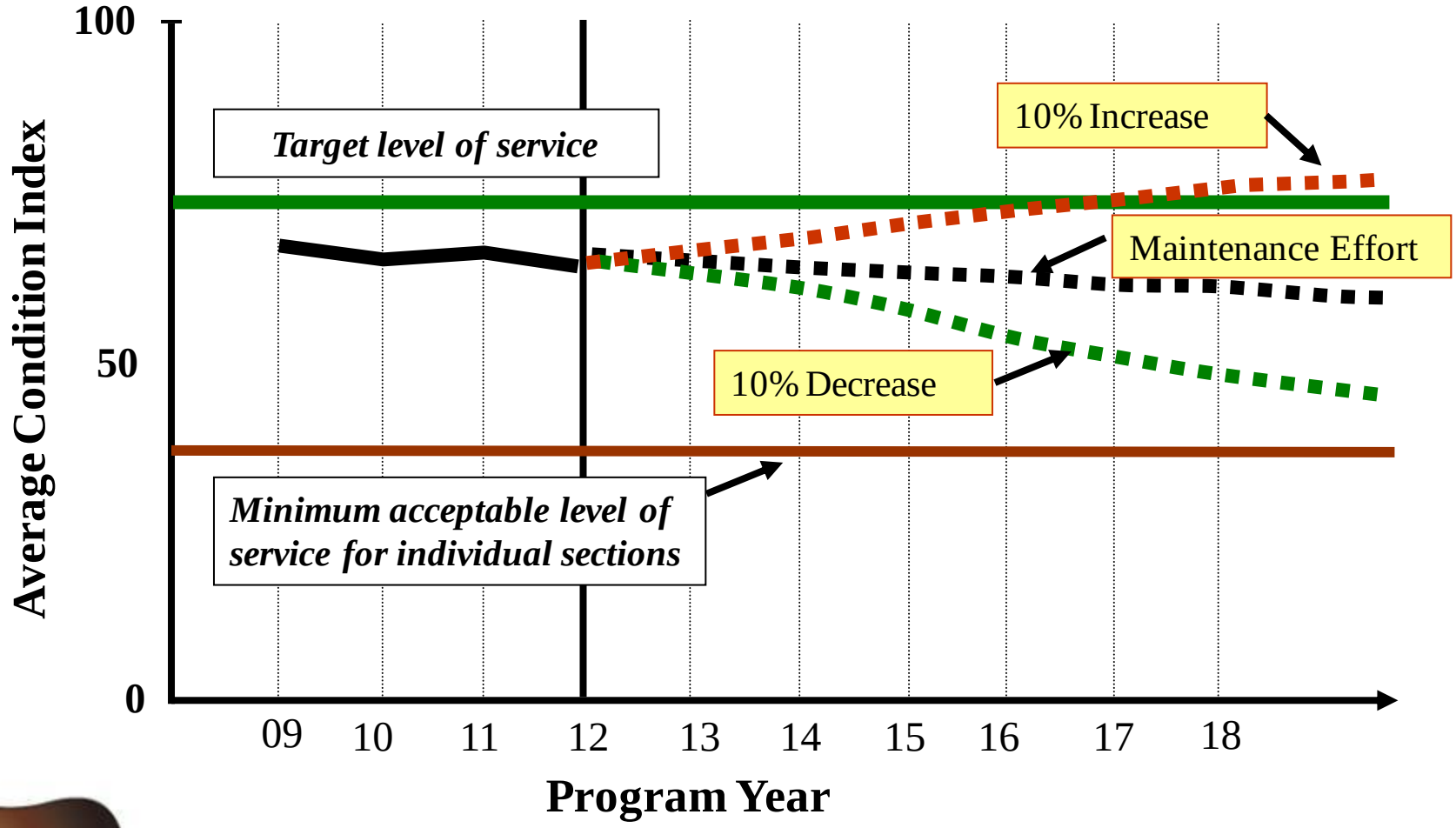
Step 3. Short Term Planning



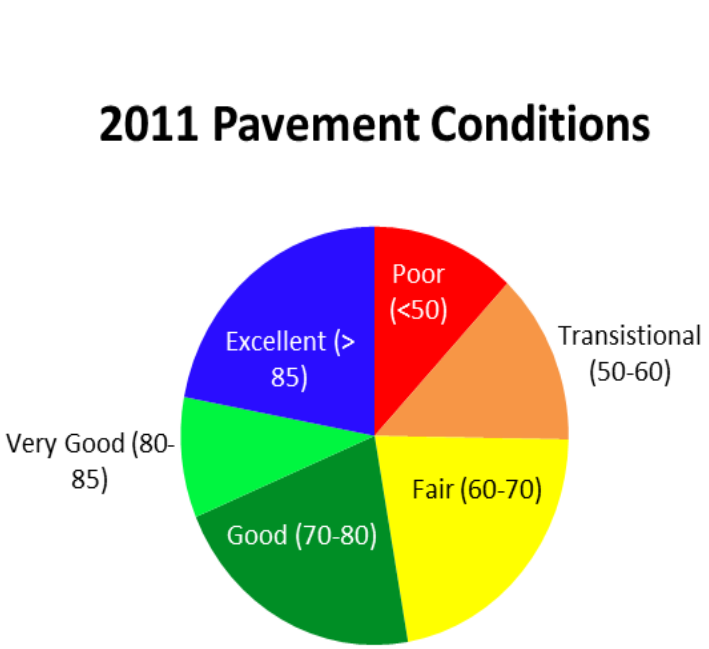
Step 4. Budgeting



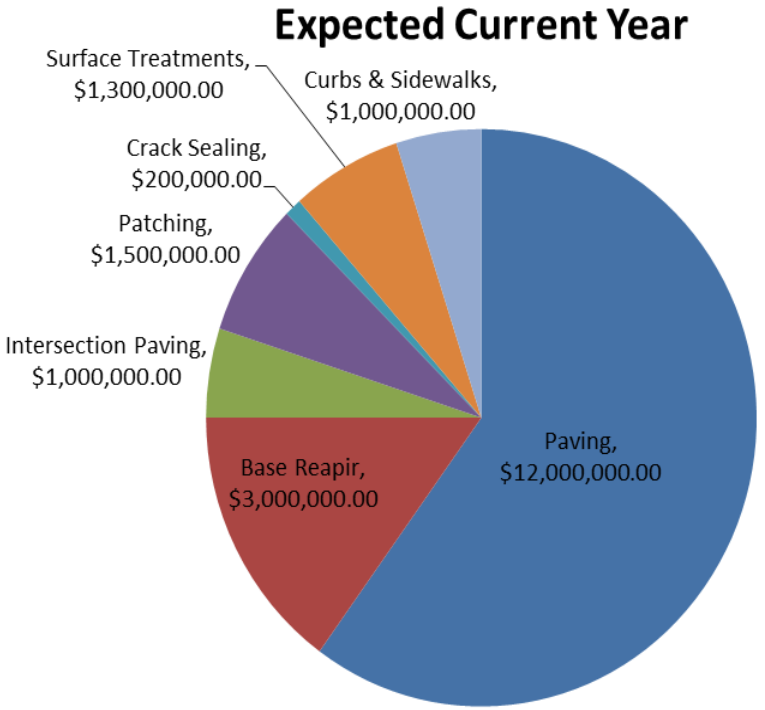
Step 5. Reporting



Strategic Plan



Current Condition Distribution

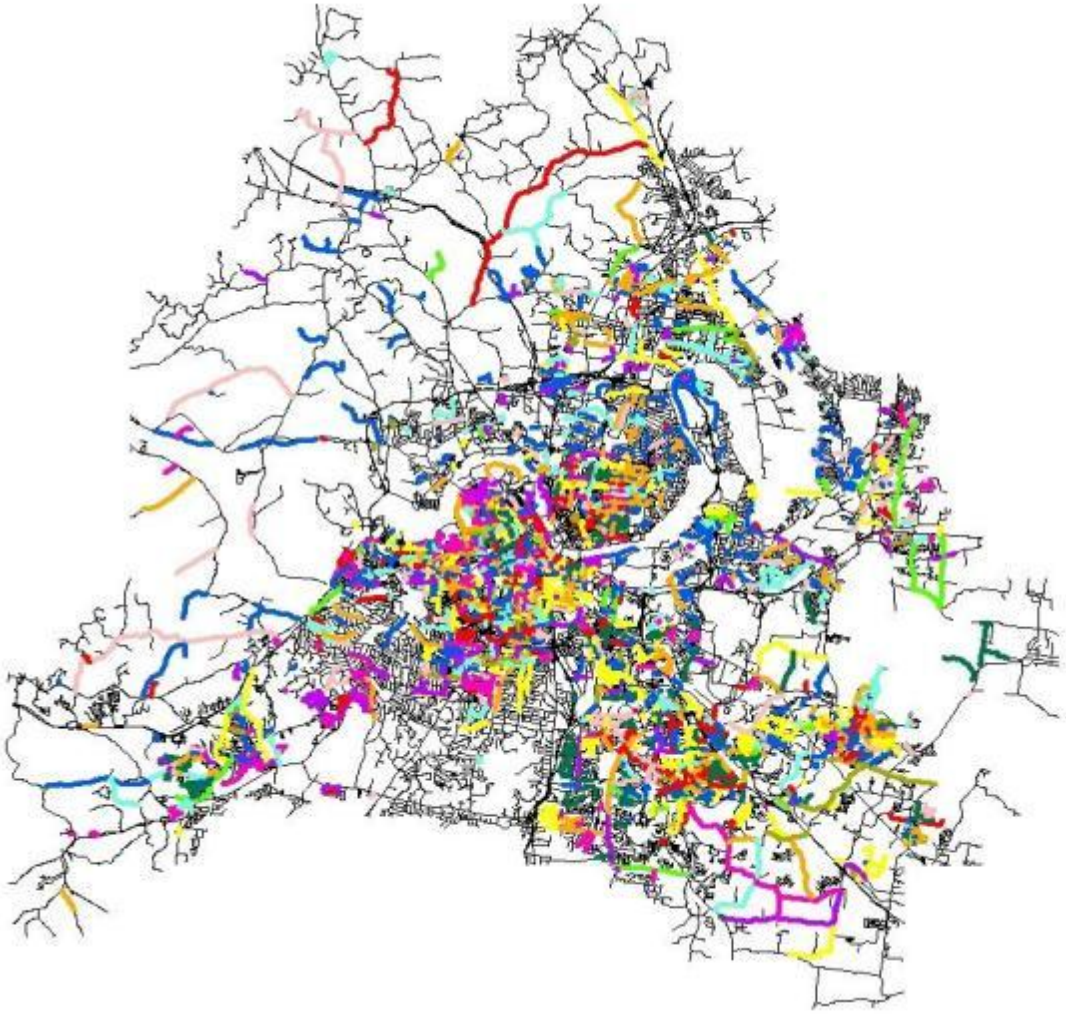


Roads Budget for 2012

Step 5. Reporting

- Show consequences of different budgets
- List specific projects that cannot be done because of funding limitations
- Track quantity of unfunded needs
- Monitor network performance trends:
  - Long-term trends in terms of network size
  - Network condition
  - Annual spending per length of pavement

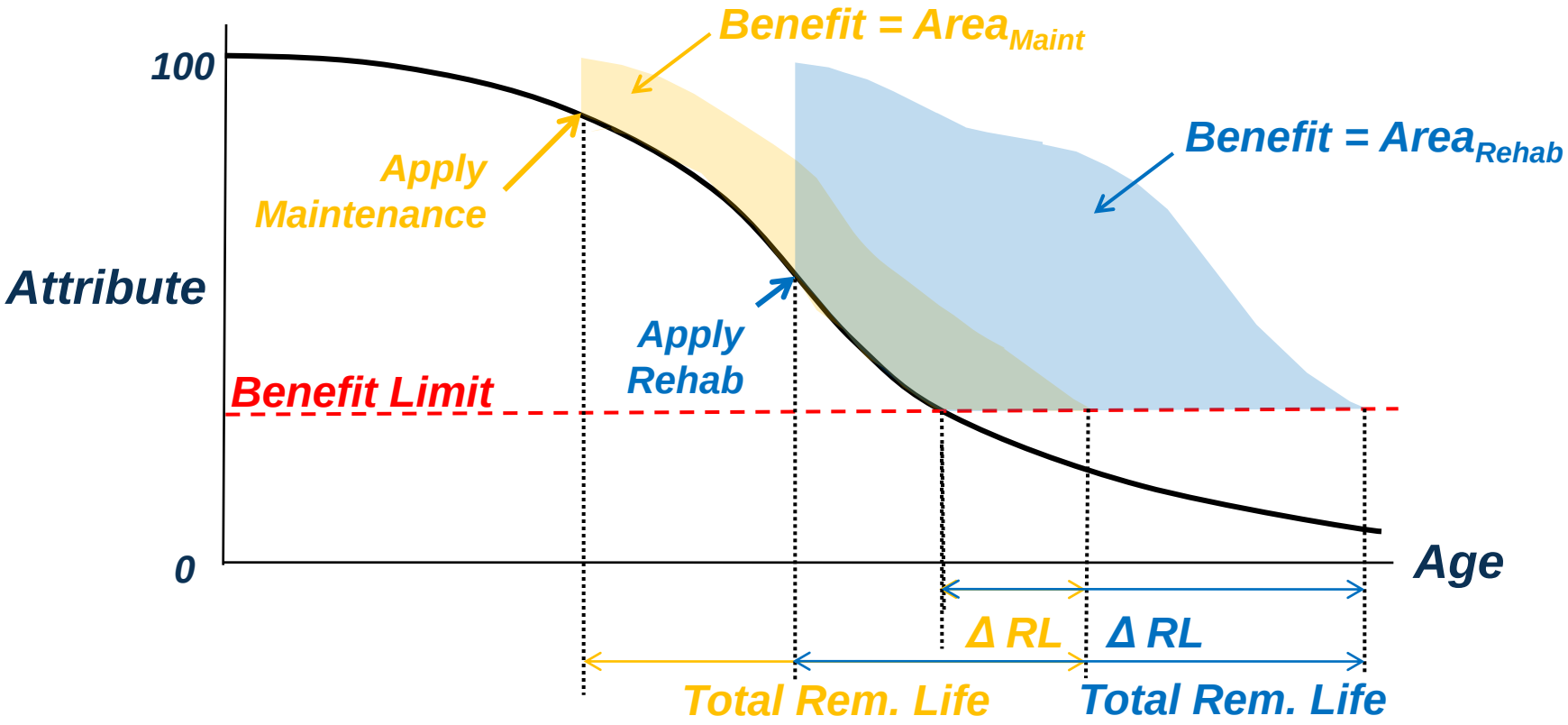
GIS Used to Help Plan Program



Benefits of a Rational Approach

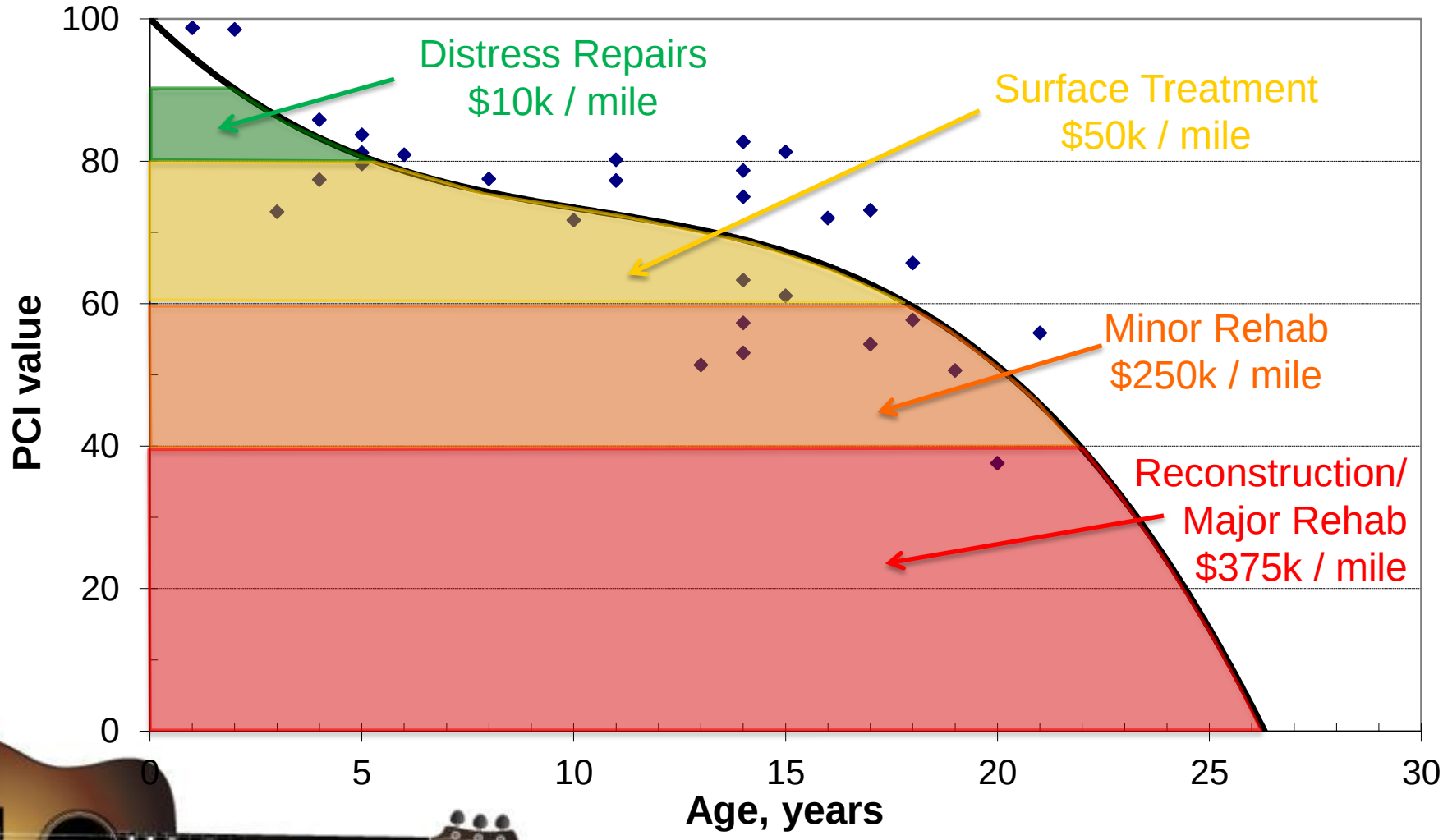
- Determine, document, and justify funding needs
- Prepare prioritized, needs-based budgets
- Provides a benchmark for pavement preservation decision making
- Provide objective information to senior decision makers and the public
- Promotes the cost-effective use of pavement investments

Measuring the Consequences of Decisions



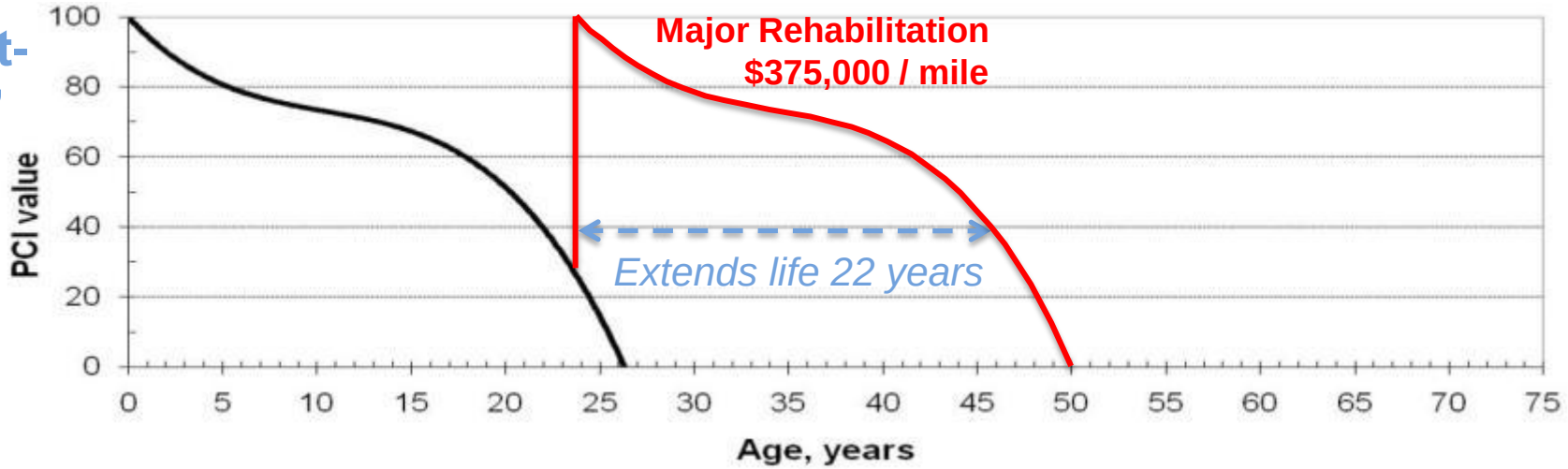
- Compare measures such as Benefit/Cost Ratio
  - Is (**Benefit**$_{Rehab}$ / **$$$** < **Benefit**$_{Maint}$ / **$**) ???

Representative Activities & Costs

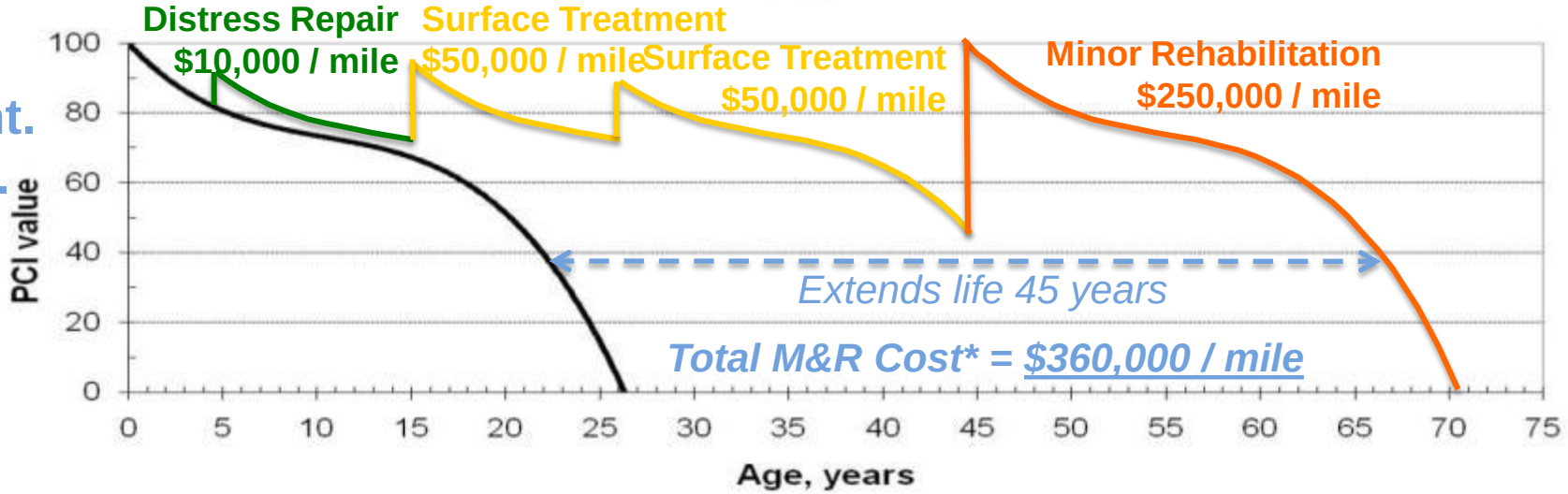


Preventive Maintenance Pays Off

"Worst-First"



Prevent. Maint.



*Does not account for inflation or discounting

Delivering the Preservation Program

Product Testing in Nashville

Reclamite
GSB 88
Rejuvaseal
PASS
Re-Play (Soy)
NovaChip
Liquid Road
Geogrid
Road New

Crack Seal
GSB-Restore
Slurry/Micro
Joint Bond
Infrared Patching
Warm Mix
Aspen
Polymer-Modified Asphalt

Surface Sealers - Reclamite

- Pink surface while curing; color fades away within 24 hours
- Requires aggregate (sand or slag) to be spread to retain skid resistance (affects the surface appearance)
- Adopted the use of pavement rejuvenators to protect pavement that is 3-5 years old
- Average Cost: $0.65 Per Square Yd




Crack Sealing

- Joint separation is biggest failure on roadway
- Crack sealant does just what its name implies
- Nashville has adopted crack sealing
- Average Cost: $1.70 per pound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GSB 88 – Our Experience

- Very tacky. Cure time not conducive to quick traffic-readiness
- Thin material composition – high water content in emulsion
- Metro Nashville pursuing alternative methods more aggressively
- Average Cost: $0.75 per Square Yard

GSB-Restore – Our Experience

- Greater material composition than GSB-88. Less watery
- Penetrates better than GSB-88
- Asphalt “clogs” were left on our on finished surface during our test section
- Outperforms GSB-88, but Metro still undecided on its use within Nashville
- Average Cost: $0.75 per Square Yard

Rejuvaseal – Our Experience

- Strong coal-tar smell calls attention to itself, caused unfavorable public perception
- Nashville's opinion is that the smell is too strong for application on residential streets
- Average Cost: $0.75 per Square Yard

Micro-Surfacing – Our Experience

- A step up from slurry seal
- Finish looks rough; highly textured
- Finished surface is thin and brittle
- Reflective cracking soon comes through
- Average Cost: $1.50 per Square Yard

PASS – Our Experience

- Cures to black appearance in 2-3 hours, allowing traffic back onto roadway

- Little impact on residents:
  - Requires no aggregate coating
  - Little or no odor

- PASS works well to stop raveling, seal out water, fill small cracks, and extend the lifetime of roadways that were last paved 7-10 years ago

PASS – Our Experience (cont'd)

- Requires re-striping
- Metro Nashville has adopted the use of polymer-modified asphalt surface sealants like PASS
- Using PASS lets Metro Nashville extend a roadway's lifetime by about 5 years before resurfacing is needed
- Average Cost: $0.70 Per Square Yard


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Joint Bond – Our Experience

- Tested on 1, 2, and 3 year-old roadways
- Determined it should be used on roads 1 to 2 years old
- Sooner the Better; Joint starts opening up around 3rd Year
- Average Cost: $0.65 per Linear Foot


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Re-Play – Our Experience

- Currently under testing
- Not enough experience with it yet to gauge its value to our program

Infrared Patching – Our Experience

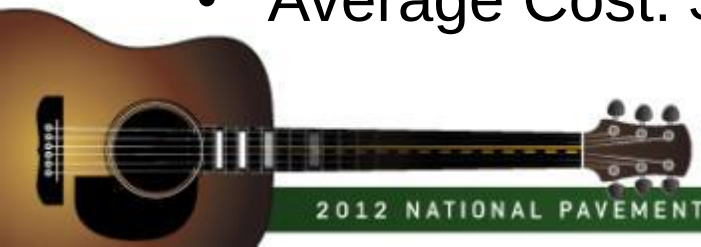
- Works very well on surface pop-out and old utility cuts
- New enough that there is not enough competition for bidding.
- Newer units perform scoring via automated means – no more raking.
- Average Cost: $4.70 Per Square Foot

Aspen – Our Experience

- Cures to black appearance in 2-3 hours, allowing traffic back onto roadway
- Requires no aggregate coating
- Little or no odor
- Aspen works well to stop raveling, seal out water, fill small cracks, and extend the lifetime of roadways that were last paved 7-10 years ago

Liquid Road–
Our Experience

- Appears to be a slow construction process
- Cannot let traffic drive on it until fully cured
- Major issue if gotten on concrete or aggregate driveways
- Durable Product; excellent for sealing open construction joints or pop-outs
- Average Cost: $2.65 Per Gallon

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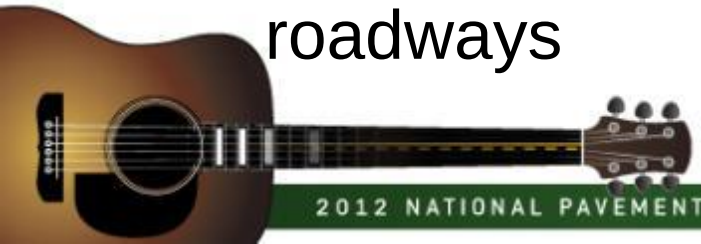
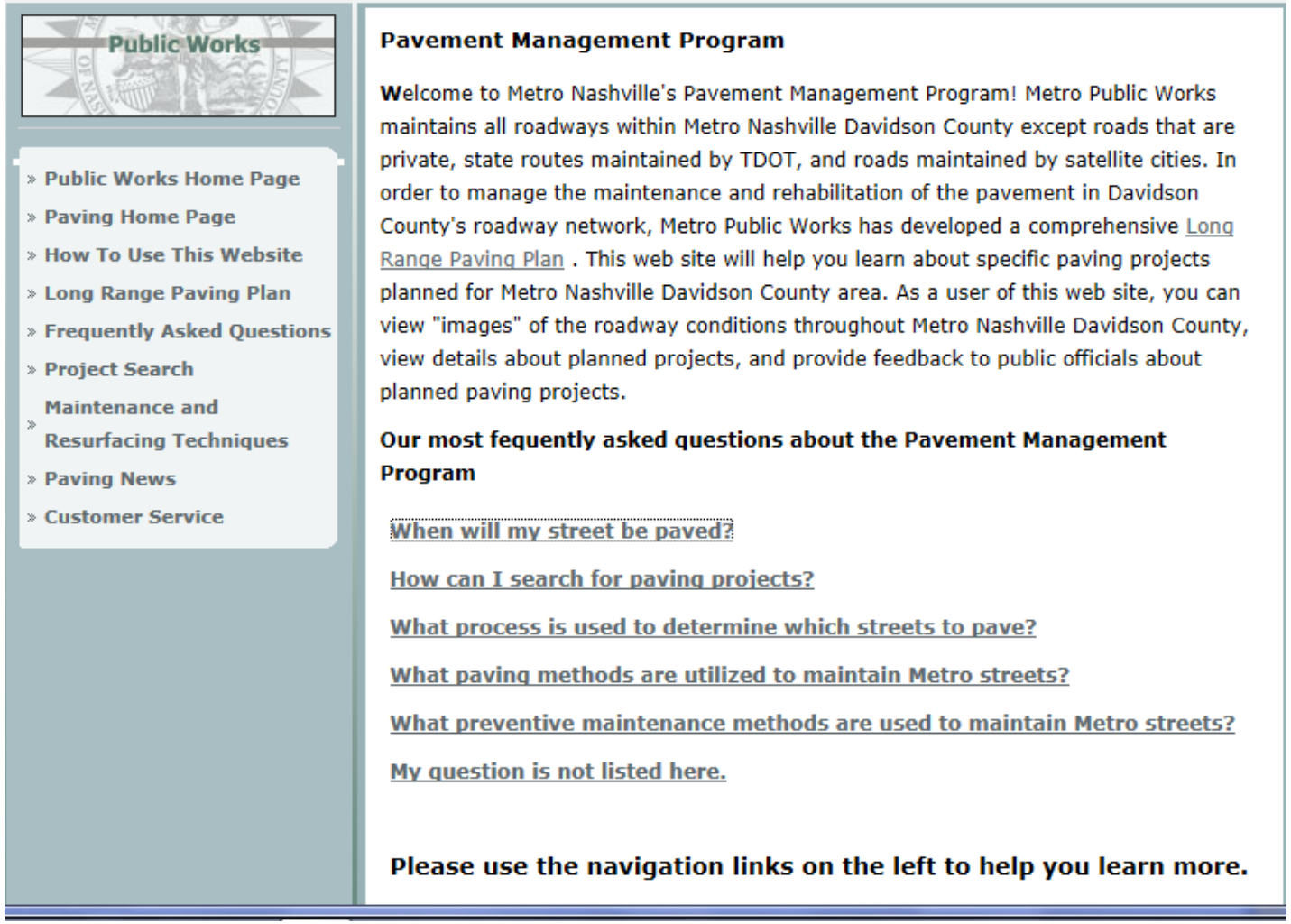
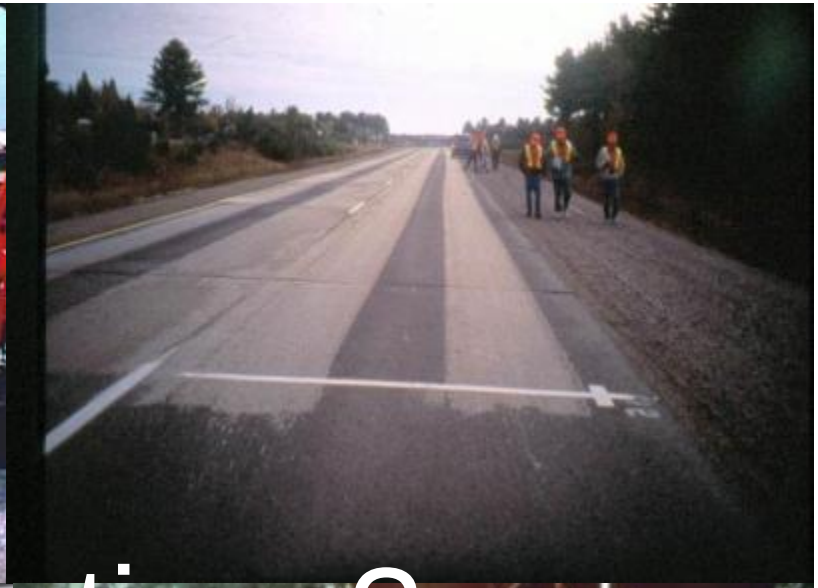
Our Plan

- Pave streets that need it
- Reclamite streets 0-3 years old
- Use products like PASS on streets 7-10 years old, that are severely raveled and have little or no cracking
- Crack seal streets that have construction joint separation
- Continue to researching and test products on roadways



Published Program





Questions?