

Andover Pavement Management Planning

1. Pavement Management Concepts
2. Street Scan Road Evaluation
3. Plan implementation in Andover

Pavement Preservation

pre·serve (pri-zērv') verb

to keep in good condition

to keep safe from harm

to prevent decay

maintain

39% of Connecticut's rural pavements are in poor condition.

That ranks Connecticut 2nd worst in the nation only behind Rhode Island.

14.1 miles of Andover's roads are rated Poor or Failing (42%)



Why Are Our Roads Bad?

Not enough \$

Not enough planning

Not enough personnel



Asphalt Cement Price History--1992 to Present (Annual Average \$ Per U.S. Liquid Ton)



“Worst First”

Andover has used a “Worst First” approach (poor planning). In other words we wait until a road gets really bad and people complain, then Repave or Reconstruct it. This leads to high costs and poor road conditions

Tools used by Andover on Roads:

- Crack Seal
- Paving and Reconstruction
- Fix potholes

Tools and Techniques Andover Needs

We need to switch to a Preservation First Strategy including:

- Fog Seal
- Crack Seal
- Chip Seal
- Micro Surfacing
- Cape Seals
- Cold In-place Recycling



Pavement Preservation Saves Money!

Photo taken on: April 16, 2019

2004: Mill & Fill

2004 : Mill & Fill

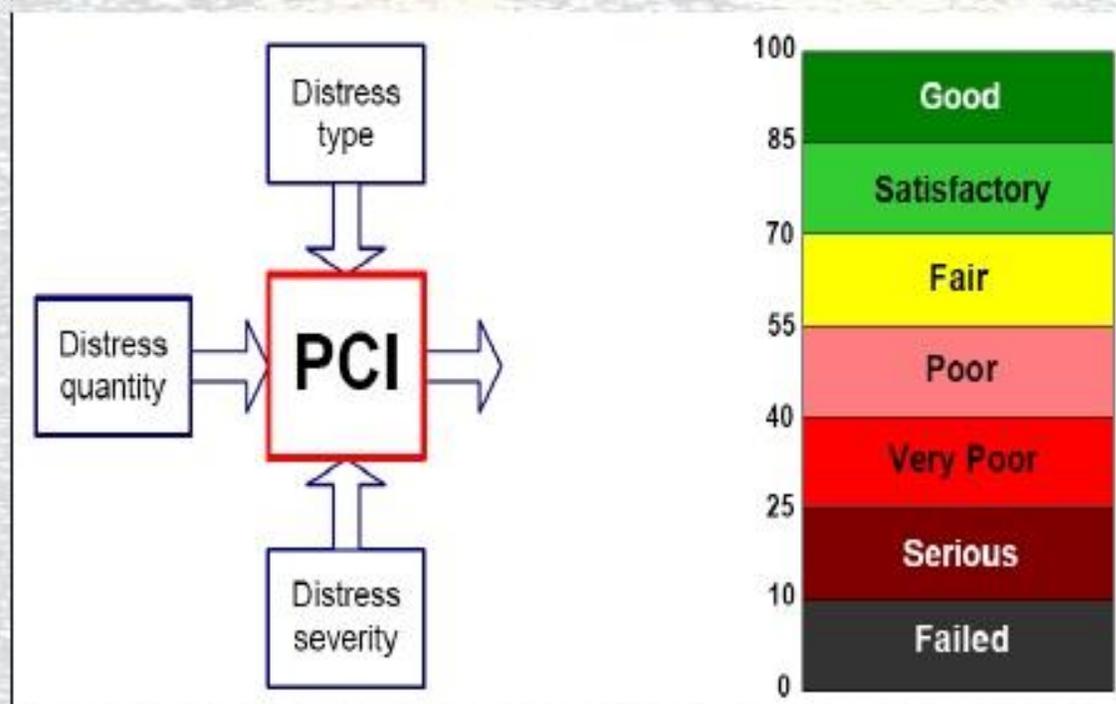
2010 : Crack Sealing
& Micro Surfacing

2018 : Crack Sealing

Pavement Preservation Saves Money!

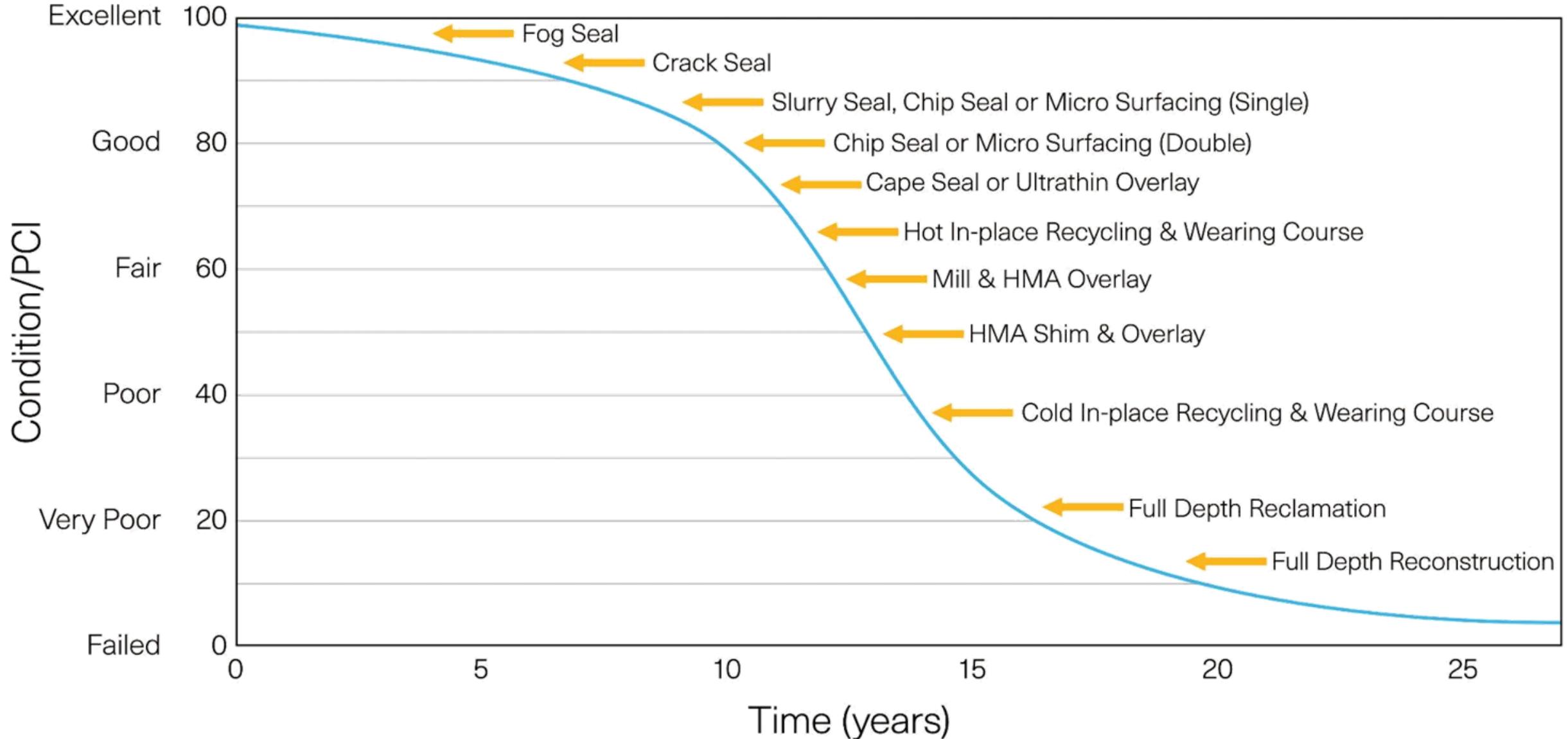
Pavement Condition Index (PCI)

- The PCI is a condition rating that ranges from 0 to 100
- Weighted average PCI = pavement section PCI * by its area / by the total square footage of the specific network or pavement area.

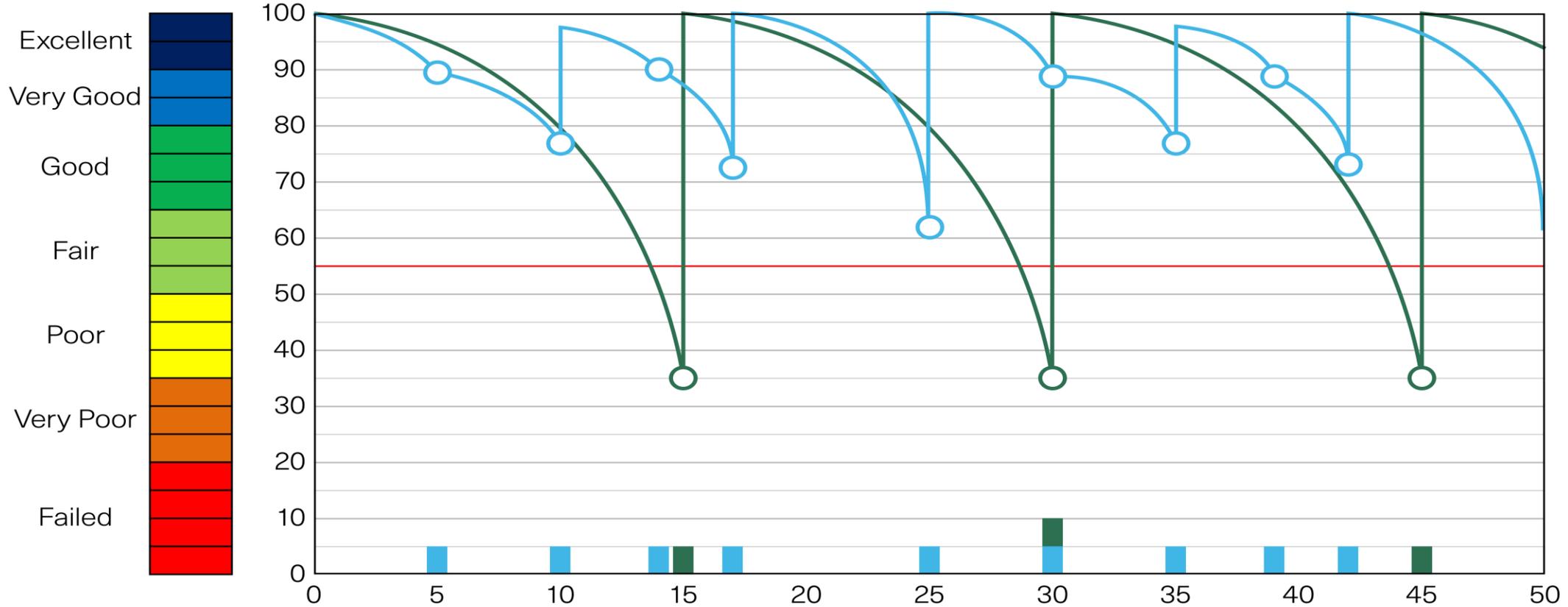


Asphalt Deterioration Curve

Applying the Right Treatment, to the Right Road, at the Right Time



Preservation vs. Rehabilitation



Excellent
Very Good
Good
Fair
Poor
Very Poor
Failed

Preservation Strategy: 

- Year 2 and 27: Fog Seal
- Years 5, 14, 30 & 39: Crack Sealing
- Years 10 & 35: Chip Seal or Cape Seal
- Years 17 & 42: Cape Seal
- Year 25: Mill and fill 2" HMA Overlay

Total Cost/SY over 50 Years = \$31.50

Rehabilitation Strategy: 

- Year 15: Mill and fill plus 2" HMA Overlay
- Year 30: FDR plus 4" HMA Overlay
- Year 45: Mill and fill plus 2" Overlay

Total Cost/SY Over 50 Years = \$46.00

Note: these are present day costs without inflation



Pavement Preservation



Roadway Network Service Life:



Andover roads age 34 mile-years every year

If you maintain the roads and do 34 mile-years of maintenance / treatment, the road stay in the same condition.

Do More- the roads get better.

Do Less- the roads get worse.

For Each Treatment Used:



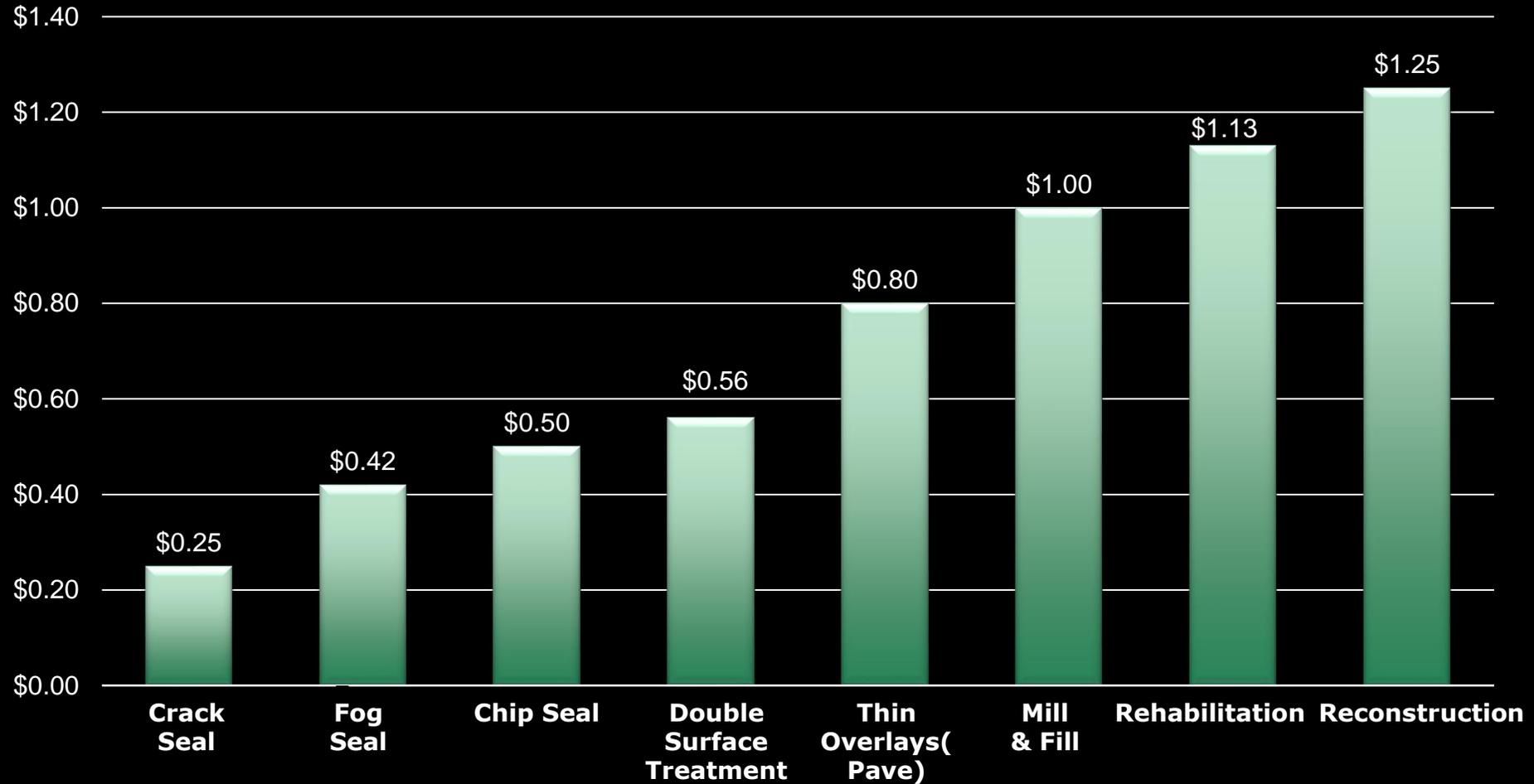
= Added Network Service Life

Road Treatment Alternatives - Equivalent Annual Costs (EAC)

Treatment Alternative	Cost		Estimated Service Life (Years)	EAC (\$/SY/Year)
	(\$/Lane-Mile) *	(\$/SY)		
Crack Seal	\$ 3,520	\$.50	2	\$0.25
Fog Seal	\$ 8,800	\$ 1.25	3	\$0.42
Chip Seal + Fog Seal	\$ 17,600	\$ 2.50	5	\$0.50
Double Surface Treatment	\$ 31,680	\$ 4.50	8	\$0.56
1.5" paving course	\$ 56,320	\$ 8.00	10	\$0.80
Mill-and-Fil	\$ 91,520	\$13.00	13	\$1.00
Rehabilitation	\$119,680	\$17.00	15	\$1.13
Reconstruction	\$176,000	\$25.00	20	\$1.25

* Based on 12' lane widths

EAC by Strategy (\$/SY/Year)

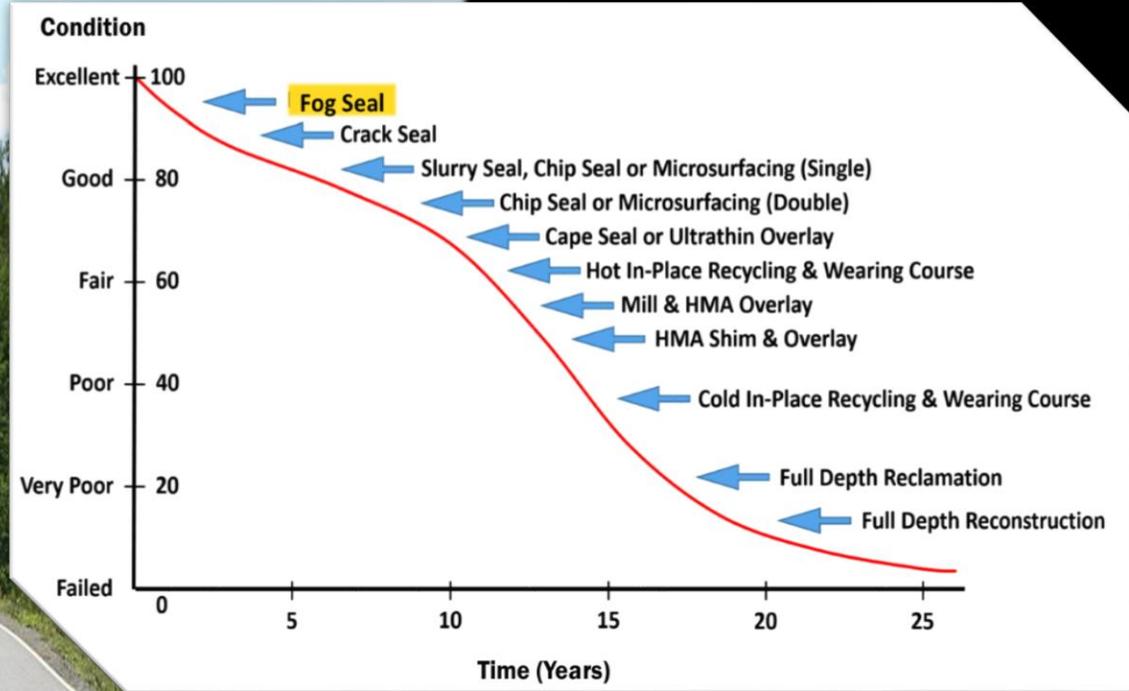
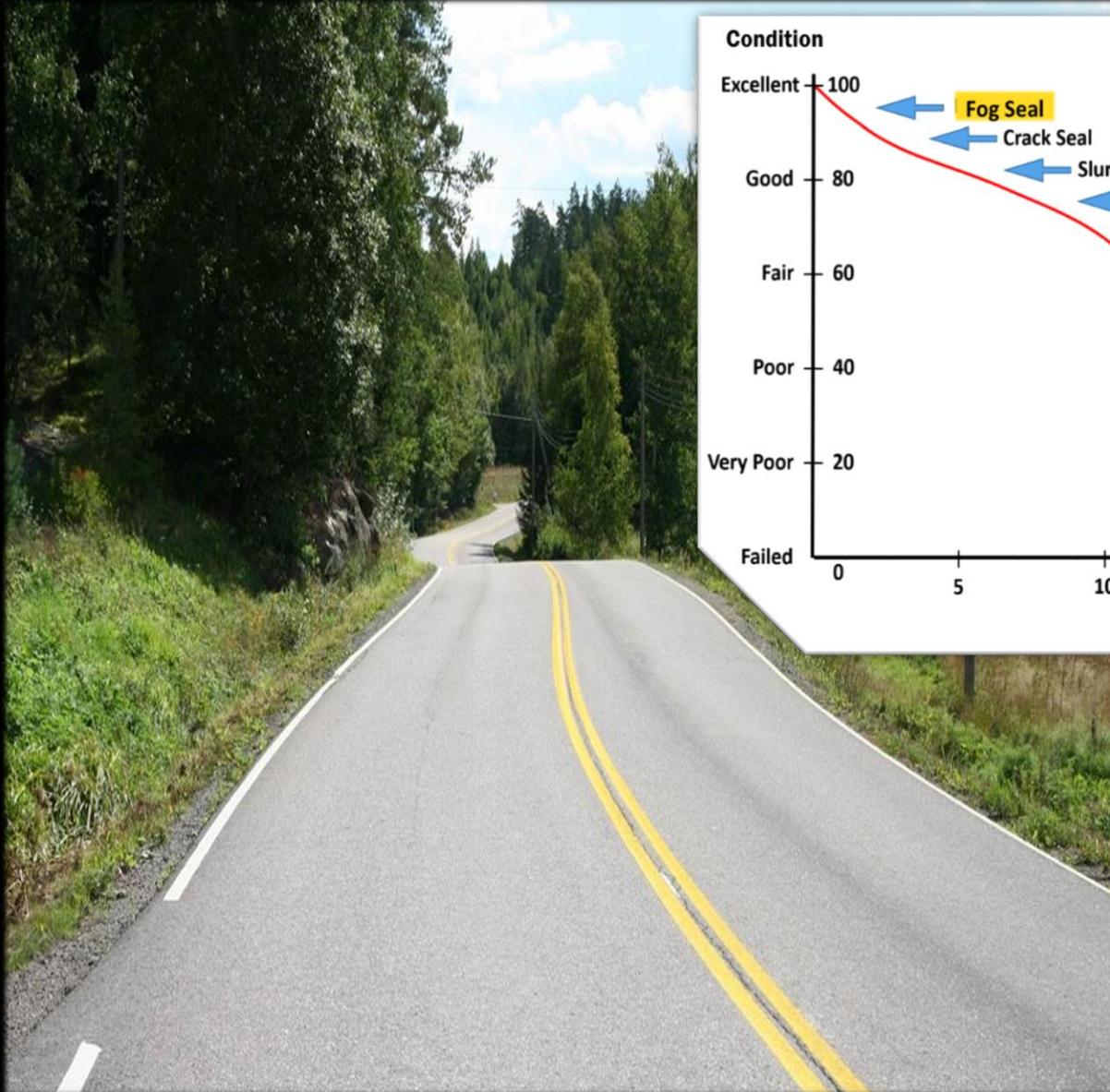


Fog Seals

Light application of emulsified asphalt with rejuvenator) applied to newer pavements as a protectant



Fog Seals



Fog Seals

- Protects against oxidation, moisture intrusion & raveling
- Low cost (and low EAC) with 2-4 year life extension
- Delays the need for more expensive repairs
- Replaces Maltenes lost from oxidation

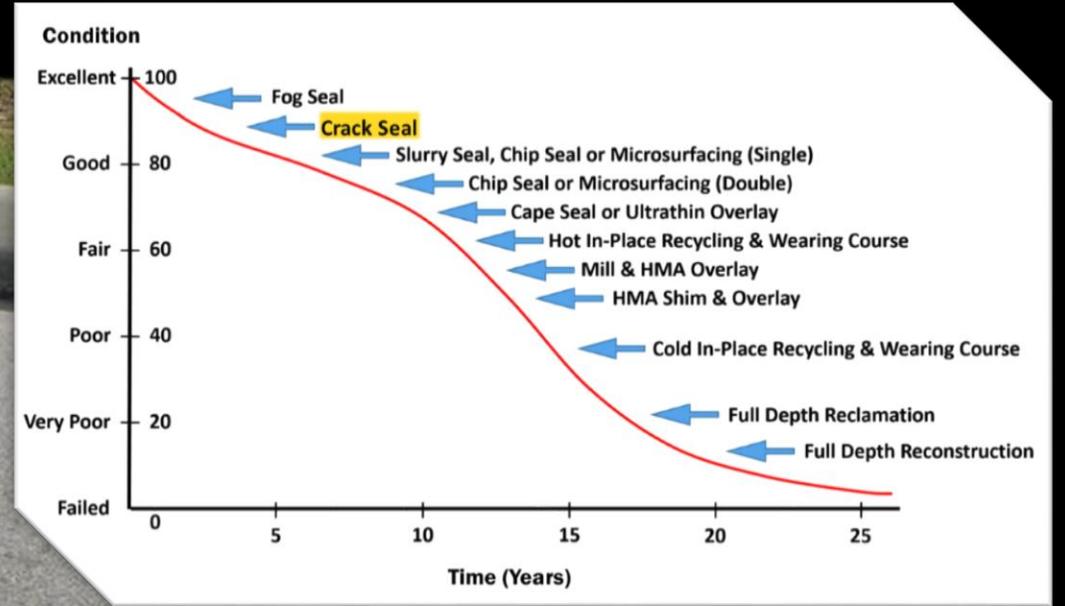
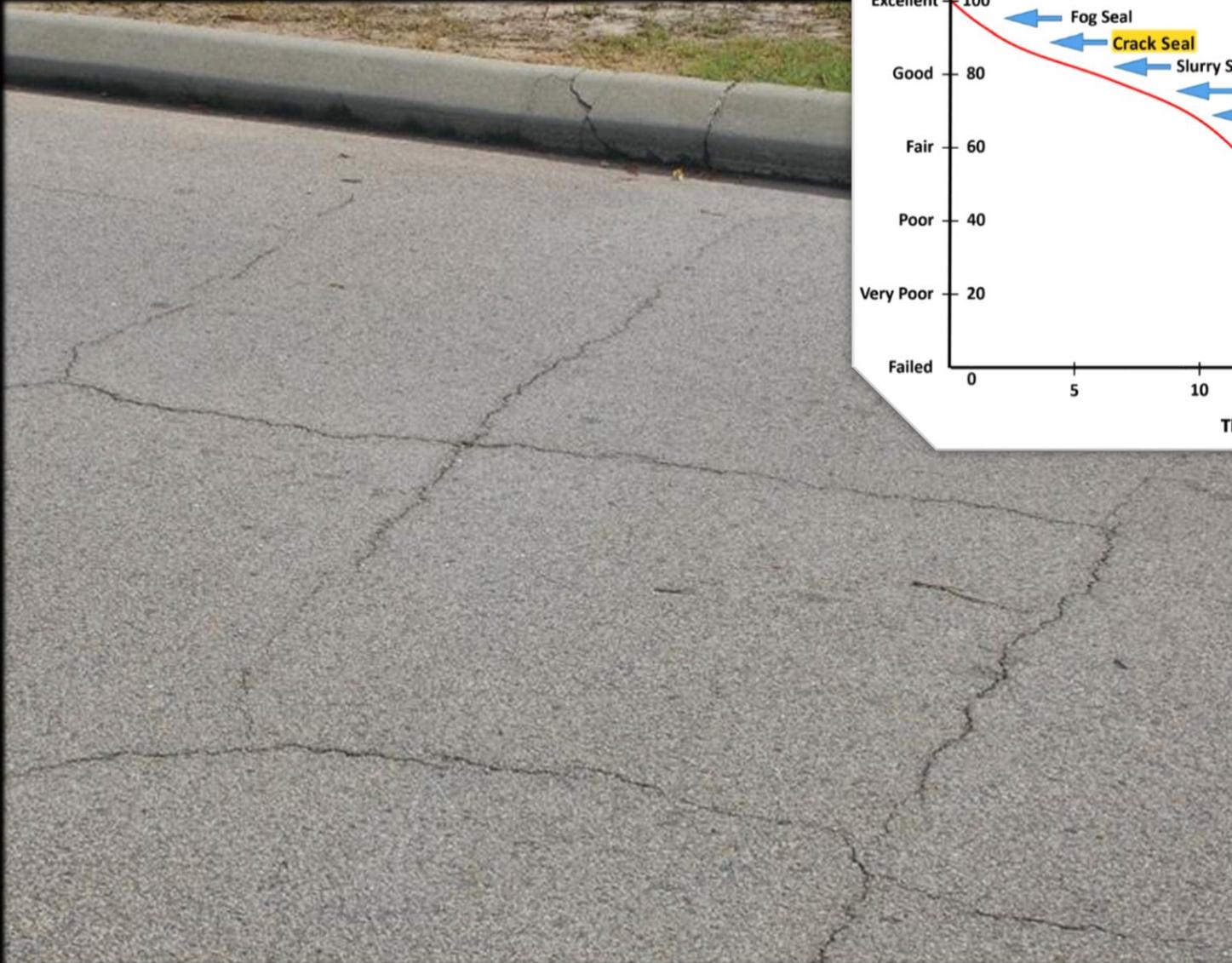


Crack Seal

Modified asphalt compounds hot-applied to prepared crack reservoirs to keep out moisture and incompressibles



Crack Seal



Crack Seal

- Reduces potholes and subbase failures
- Minimal impact on traffic & neighborhoods
- Extremely cost-effective



Chip Seals

- Can treat pavements in fair to good condition with moderate cracking
- Selective shimming beforehand
- Can be combined with Fog Seal or Microsurfacing

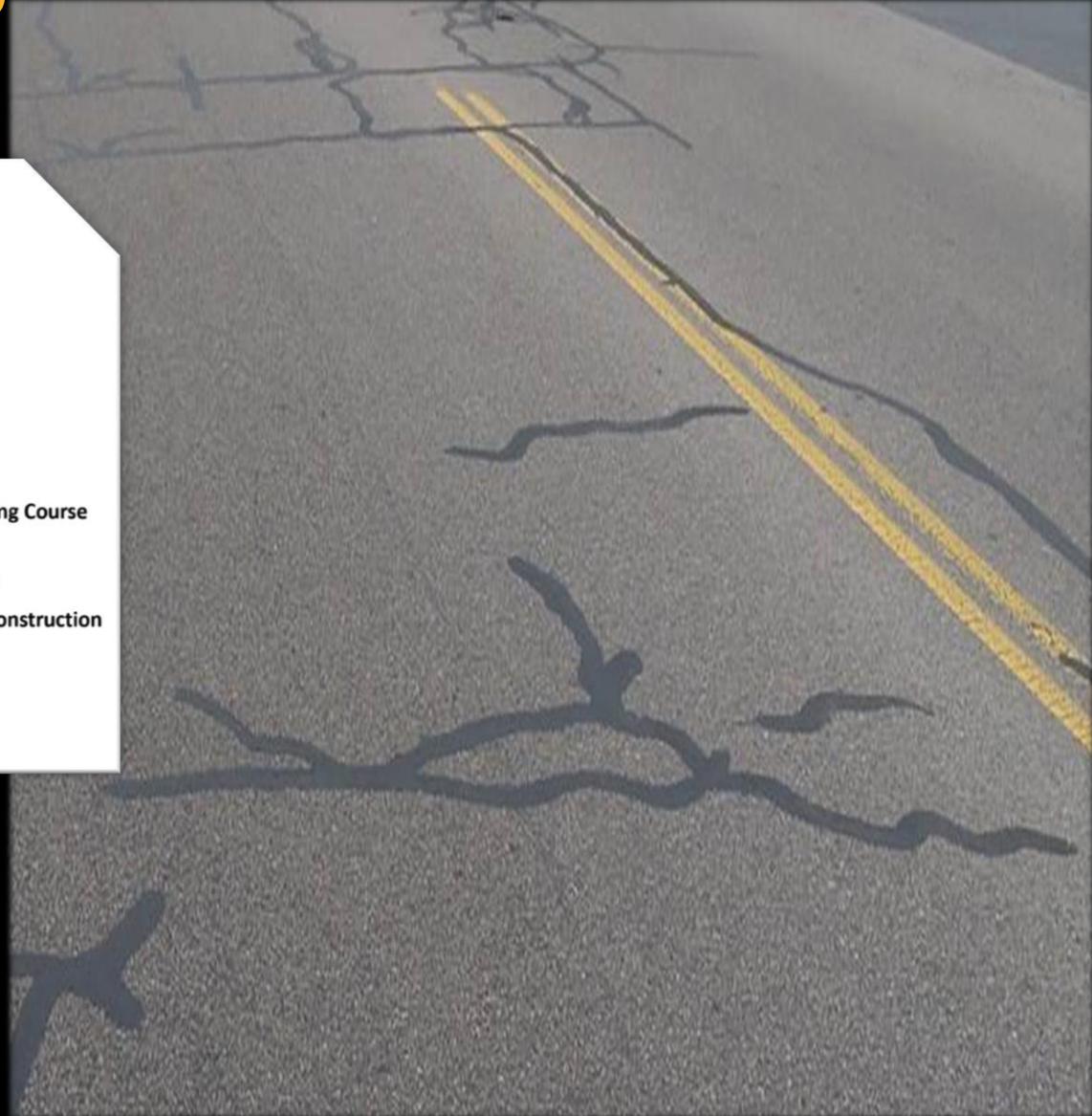
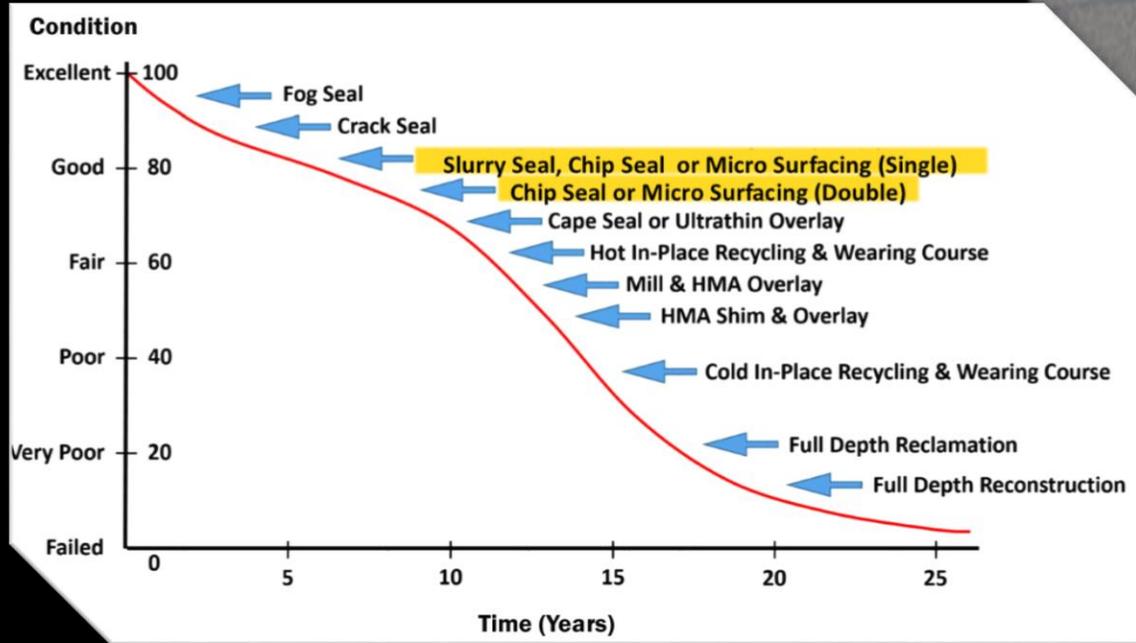


Micro Surfacing

Engineered blend of asphalt emulsion, fine crushed aggregate and mineral filler wet applied as a surface treatment



Micro Surfacing



Micro Surfacing

- Protects pavement from oxidation and moisture intrusion
- Restores surface characteristics with minimal elevation change
- Increases skid resistance

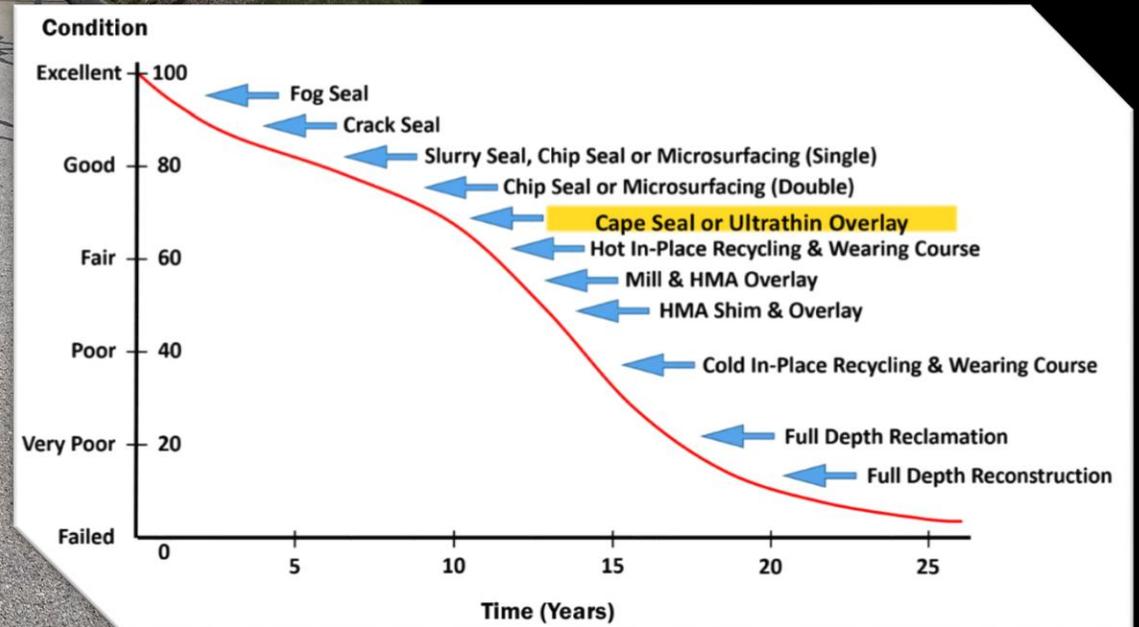
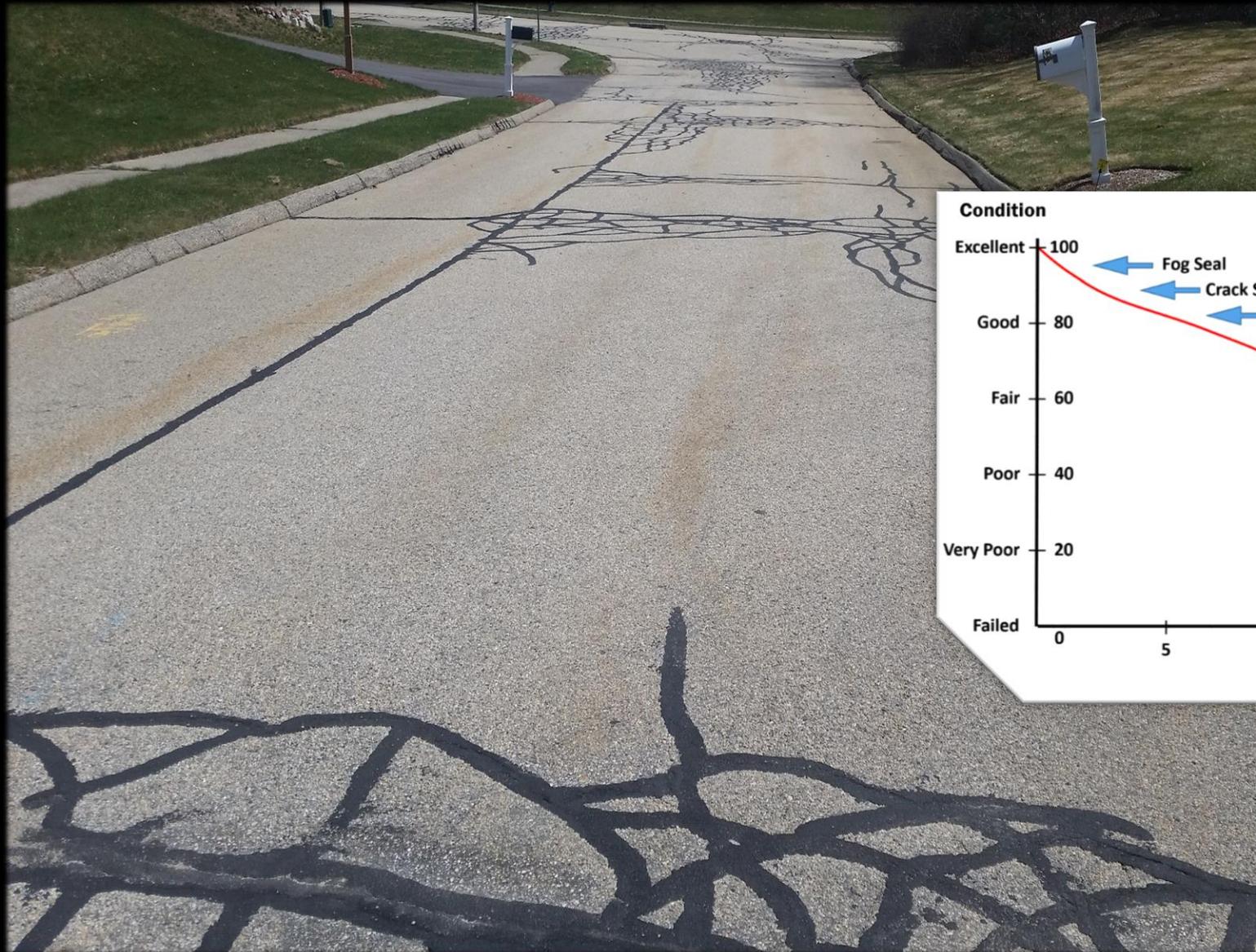


Cape Seals

2-step surface treatment for more distressed pavements consisting of a chip seal with micro surfacing on top



Cape Seals



Cape Seals

- Step 1 Chip Seal
- Step #2 Micro Surfacing provides smooth, black finish
- More accepted in urban and suburban areas



Chip Seal + Fog Seals

1. Chip Seal
 2. Light application of emulsified asphalt (Fog Coat) over the Chip Seal
- increases chip retention and make surface smoother



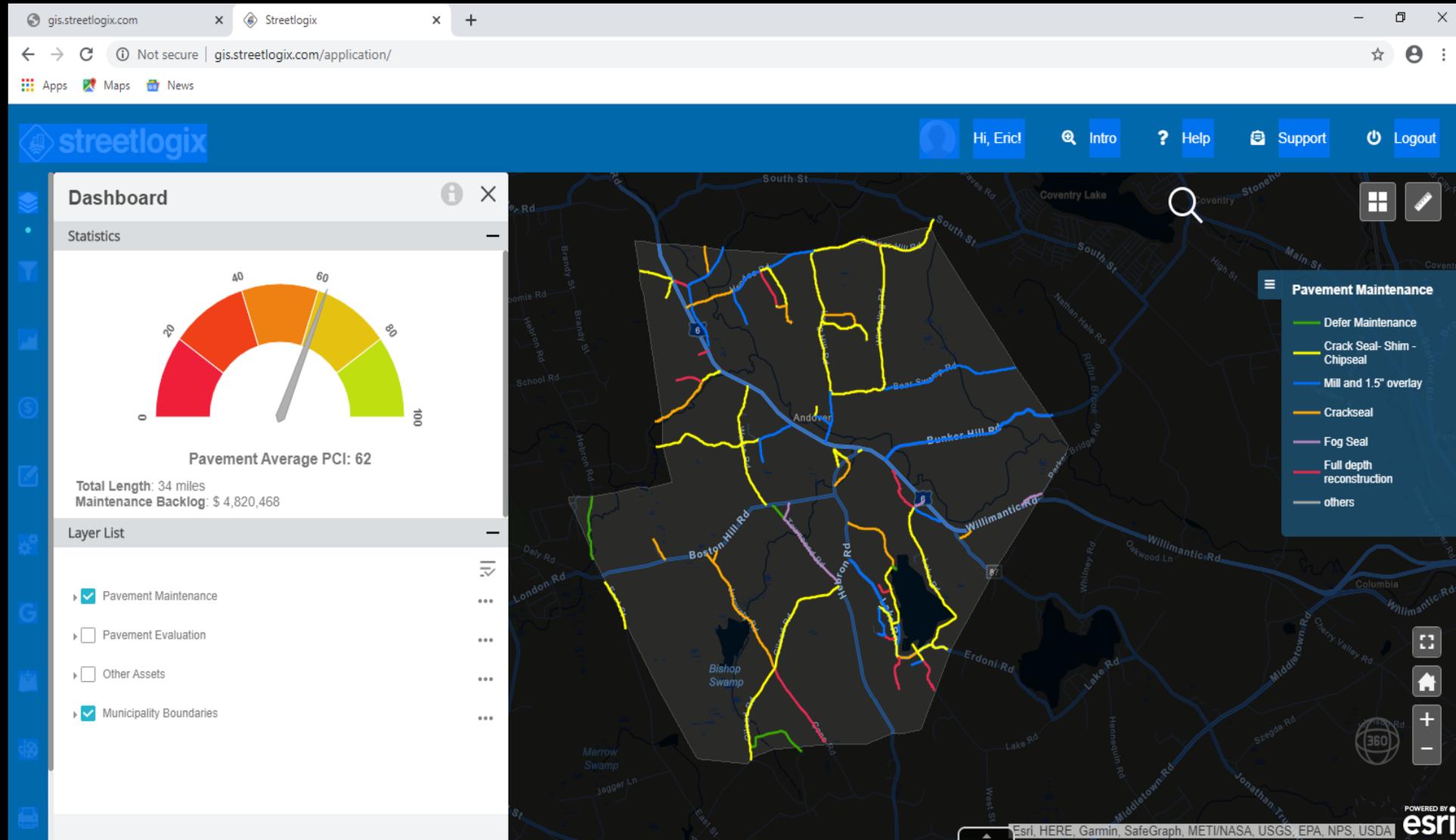
Street Scan Pavement Evaluation

Automated data collection
AI program takes human
element out of evaluation
process

Data is post processed and
then checked for accuracy
Evaluated for smoothness,
rutting, cracks, potholes
raveling, etc. to determine
the pavement condition
index

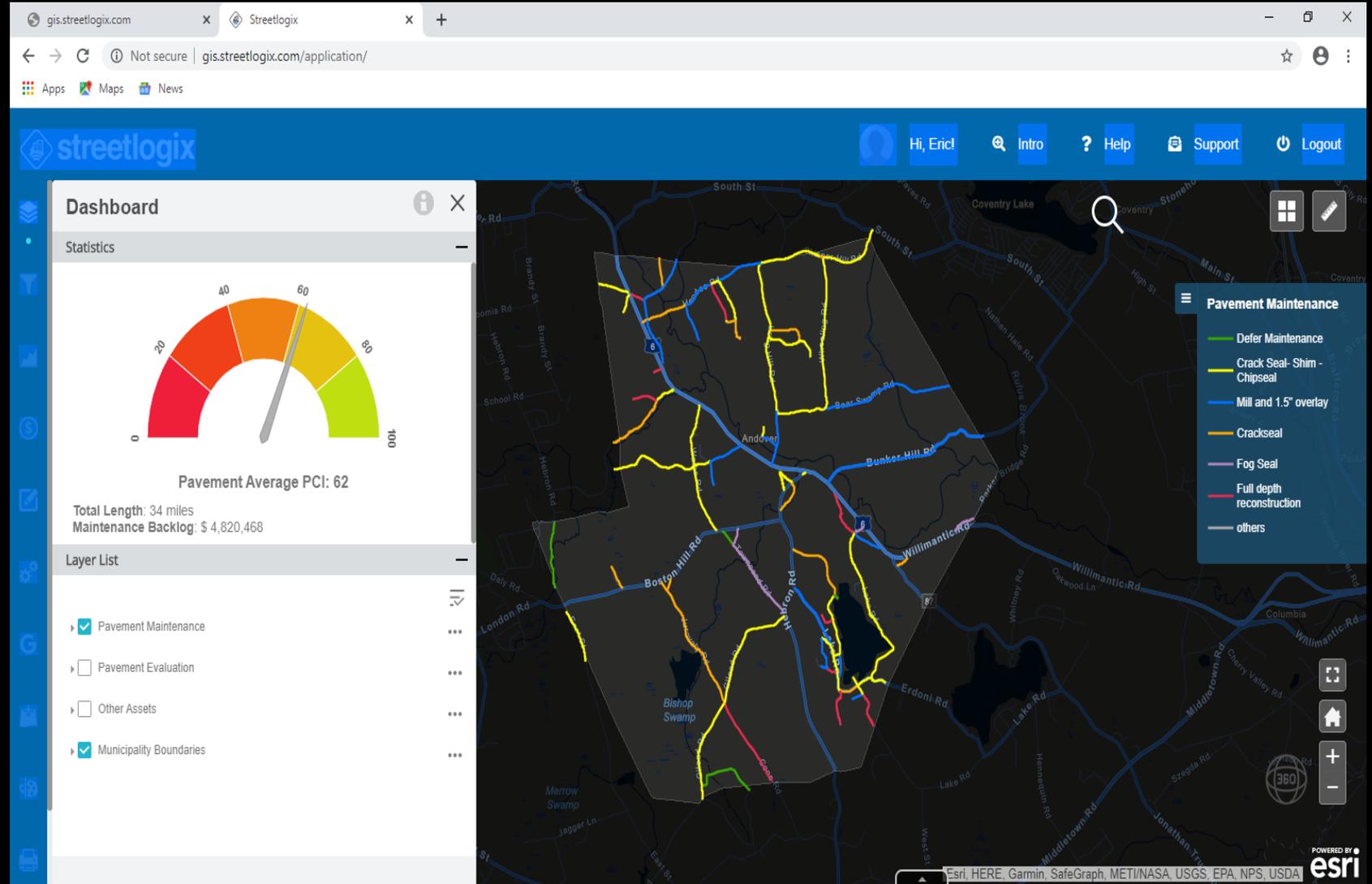


Street Scan Pavement Evaluation



Street Scan Pavement Evaluation

Online cloud based program Streetlogix
Fully customizable program for budgeting and evaluating repair and maintenance options for roadways



Street Scan Pavement Evaluation

- Average PCI in Andover is 62
- Ideal Roadway Network objective PCI is ~80
- Andover is approximately \$4.8 million dollars behind in roadway maintenance
- Average road is at 75% of its useful lifespan
- 42% of Andover roads are rated Poor, Very Poor or Serious/Failing
- Roads deteriorate quickly when they get below a PCI of 55

Andover's Pavement Plan

Assumptions:

- We will get town aid road this year and next year. (delayed again)
- Next year we will budget \$300,000 for roads and try to preserve as much as we can.
- Between this year and next we can spend at least \$100,00 from TAR on roadwork
- We will have \$175,000 between now and July 1

Pavement Plan

Goal #1 :

To preserve the good to moderate roads as best we can and prevent further deterioration. We will do aggressive pavement preservation to keep good roads good. This will provide the maximum benefit in the long run. We will probably be able to keep the average road condition improving slightly next year if we put in \$300,000 + 100,000 from TAR plus this year's remaining money.

Pavement Plan

Goal #2

Align our roadwork preservation with necessary drainage work. Currently the rate limiting step is our ability to do the drainage work prior to Road work. This does not include large Culverts which will be addressed separately. At our current rate we have a 7-10-year backlog of drainage projects related to our roadway. Our pavement plan matches the drainage projects that we can accomplish.

Pavement Plan

Use the following techniques:

- Crack Seal (INDUS using CRCOG bid for PCRM)
- Fog Seal- rejuvenator (INDUS or Comer need quotes from each)
- Shim (Comer, Hains, ETC)
- Chip Seal + Fog Seal (fill not rejuvenating) Comer State bid price match very complete
- Chipseal plus microsurfacing (called Cape seal) Comer Chipseal Plus Indus micro don't want to use Gorman
- 1.5" mill and paving overlay Bid out
- Pothole repair Rent a tow behind DuraPatcher from Comer and use town crew for labor

Pavement Plan- Crack Seal:

Allocate \$50,000 in 2020-21 budget

Priority's will be established by roads that will be chip sealed in 2021 and 2022 budget.

Use CRCOG bid \$1.53 LB for PCRM Crack sealing with Fibers quote valid through Sept 2020 Price range Andover has paid in last 5 years \$1.46-\$1.76 lb material applied

Compound contains liquid asphalt, crumb rubber and polyester fibers (more expensive but longer lasting than other compounds)

Pavement Plan- Fog Seal (rejuvenating):

Road List By Priority Ballpark \$40,000

- Windrush
- East St- Portion that was repaved
- Townsend Rd
- Sunset Lane
- Walking track at Veterans memorial field

RYAN Rd* will not be fog sealed so we can compare its deterioration to Townsend

Pavement Plan- Shimming:

Road List By Priority Ballpark \$75,000

- Shim roads getting chip sealed where needed
- Bridge on Merritt pave to sides to prevent infiltration
- Shoddy Mill Rd after drainage work before paving
- Shim transfer station after rebuilding walls
- West St
- Bear Swamp

Pavement Plan- Chipseal:

Chipseal priority list: \$200,000

- Juravoty Ln + fog (leave ¼ mile un fogged for comparison)
- School St + micro
- Lakeside Dr + Micro
- Riverside Dr + fog coat
- Oak Farms + micro or fog
- Stanly Dr +micro or fog
- Chesterbrook + micro or Fog
- Oak Farms Rd (can it be Chip sealed or is it too far gone? (test) + fog
- Wales Rd + micro
- Transfer station double Chipseal after wall repair and shimming
- Pine Ridge double Chipseal
- Dogwood
- Shadblow

Pavement Plan- Repave:

Mill and Fill priority list: \$200,000

Mill 1.5" of asphalt off of the existing road surface

Then apply a 2" lift of asphalt compacted to 1.5"

- Shoddy Mill Rd from Rt 6 to Wales Rd ~\$70 K
- Long Hill Rd from Rt 6 to just past Bear Swamp Road ~ \$70K

This will be competitively bid via RFP

Pavement Plan- Pothole Patching:

- Traditional Pothole Patching Options:
 - By hand with hot patch and vibrator
 - Ideally cut out bad area and do full depth patch
 - By Hand with Cold Patch and hand tamper-
 - least desirable
 - Can be done in cold weather

Pavement Plan- Pothole Patching:

Allocate \$20,000 for pothole patching

- Mastic Sealing potholes
 - Tried this 2019 mixed results
 - Durable and long lasting
 - Expensive.
- **Durapatcher**
 - Rent machine from Comer
 - Tow behind truck
 - Uses liquid asphalt plus stone from the truck
 - May be most cost effective
 - Uses existing town crew

Pavement Plan- Pothole Patching:

- Durapatcher
 - Blow out loose material with hot knife
 - Spray hot liquid asphalt as tack coat
 - Spray a mix of stone and hot asphalt (fill pothole)
 - Spray loose stone on top



Pavement Plan- Cost Estimates:

• Crack Seal	\$50,000
• Chipseal	\$200,000
• Shim	\$75,000
• Mill and Fill	\$140,000
• Pothole	\$20,000
• Roadwork Total	\$485,000

Totals subject to change with money available and cost estimates