Town of Tyngsborough
Pavement Management System

Baden
CONSULTING SERVICES

Presented at: Tyngsborough Board of Selectmen
April 11, 2022 at 6:00pm

TOWN OF TYNGSBOROUGH MASSACHUSETTS

Presentation Overview

- Pavement Management Concepts
- Pavement Management in Tyngsborough
  - Methodology
  - Current Conditions & Backlog
  - Budget Analysis
- Recommendations

Pavement Management Concepts

What is Pavement Management?

- The practice of planning for pavement maintenance and rehabilitation with the goal of maximizing the value and life of a pavement network.

Otherwise known as

"Getting the Biggest Bang for Your Buck"

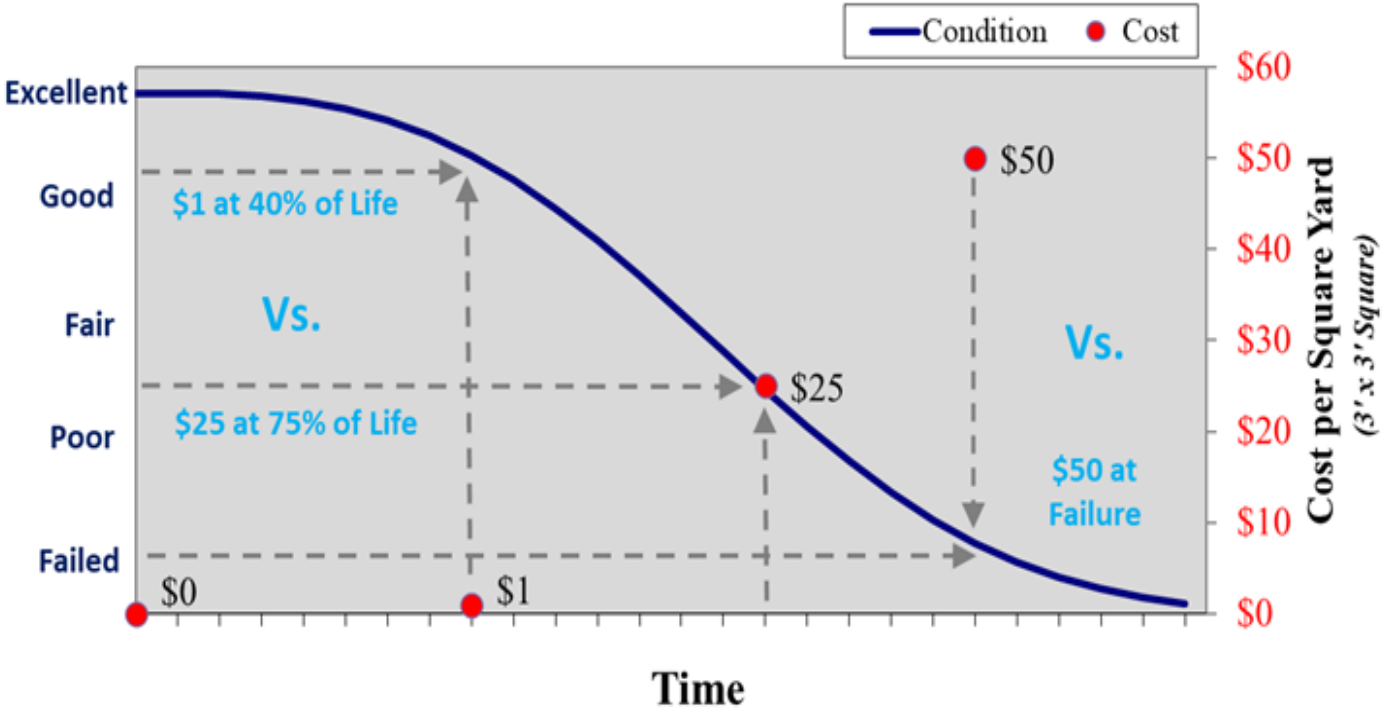
Pavement Management Concepts

The Process

- Pavement Section Inventory
- Pavement distress identification and quantification *(Visual Inspection Only)*
- Pavement Condition Index (PCI) calculation on a 0 - 100 scale
- Define Treatment Options and Costs
- Test various Budget Scenarios
- Develop list of candidate projects
- Apply engineering and local judgment to define annual road program

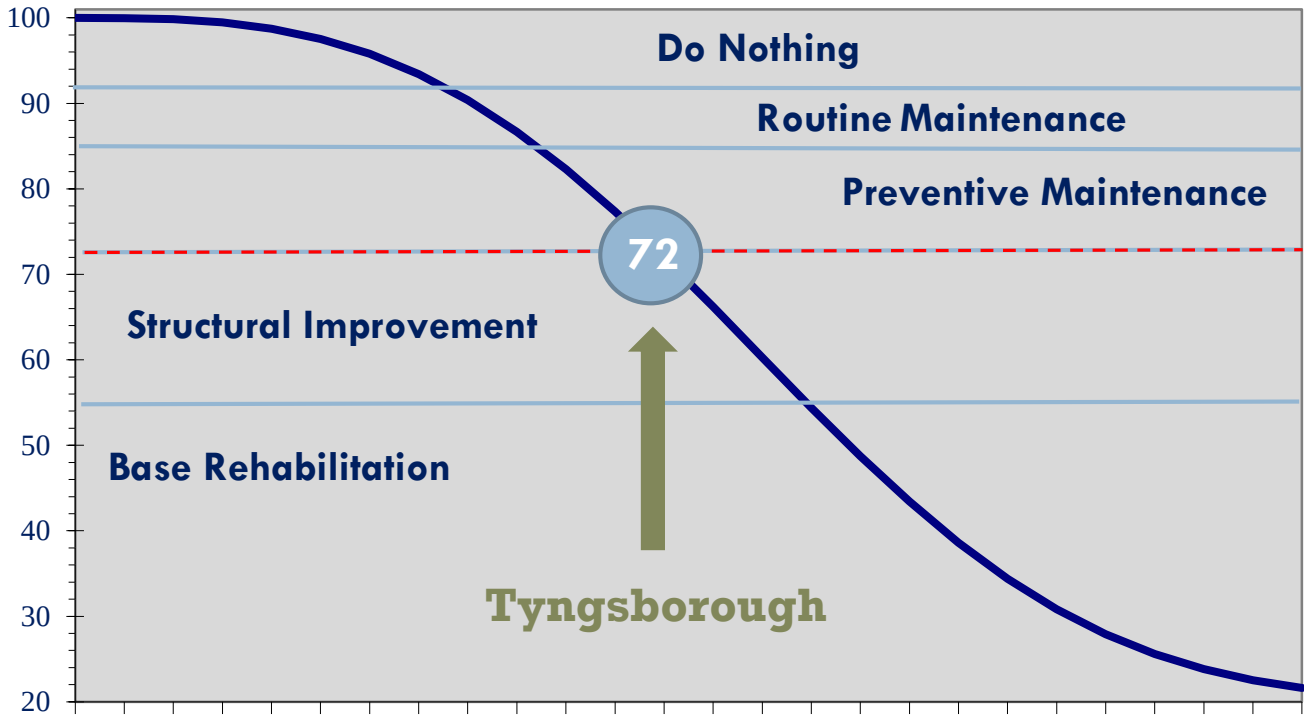
Pavement Management Concepts

Pavement Deterioration Curve



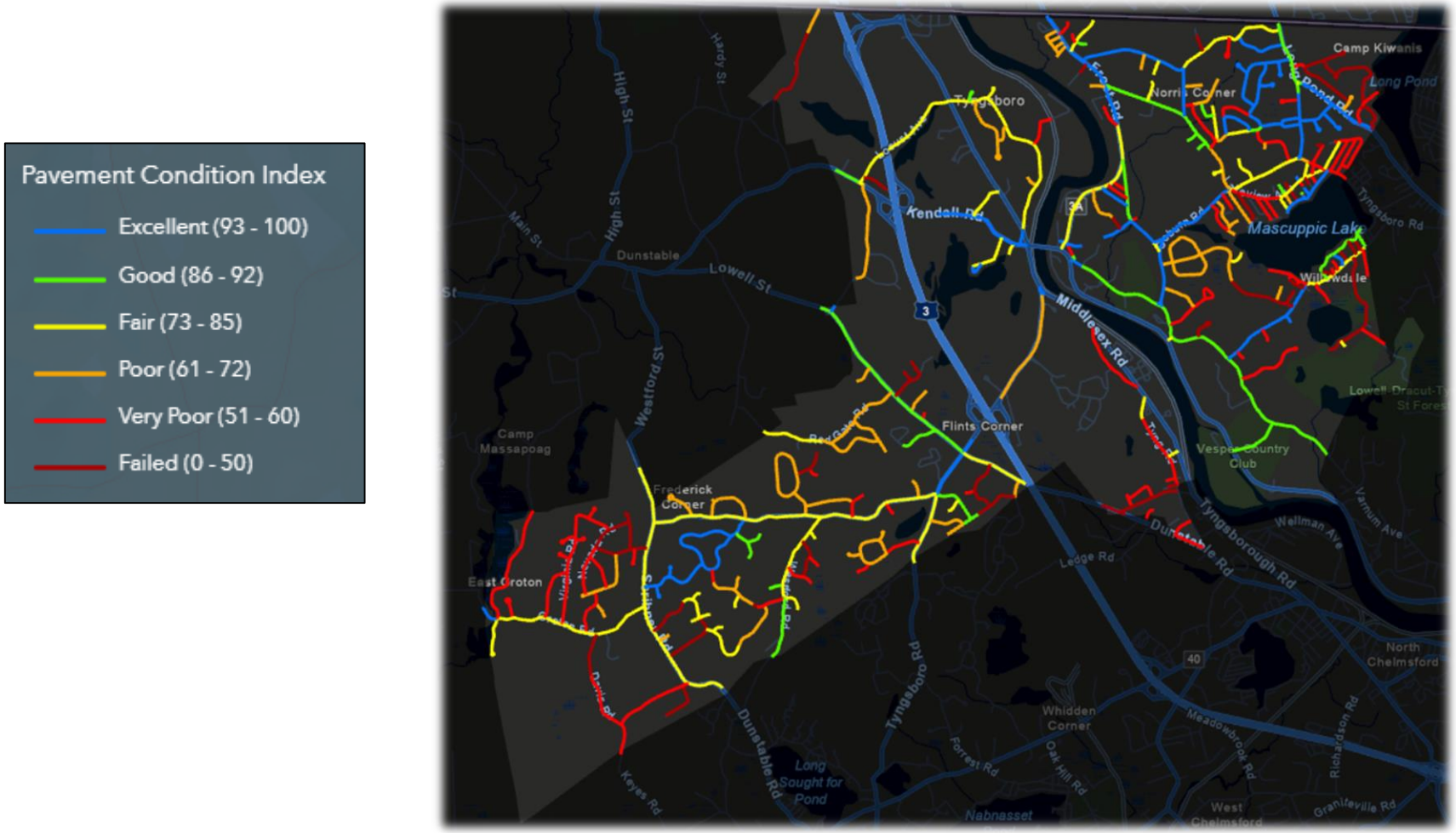
Pavement Management in Tyngsborough

Average Roadway Pavement Condition Index = 72



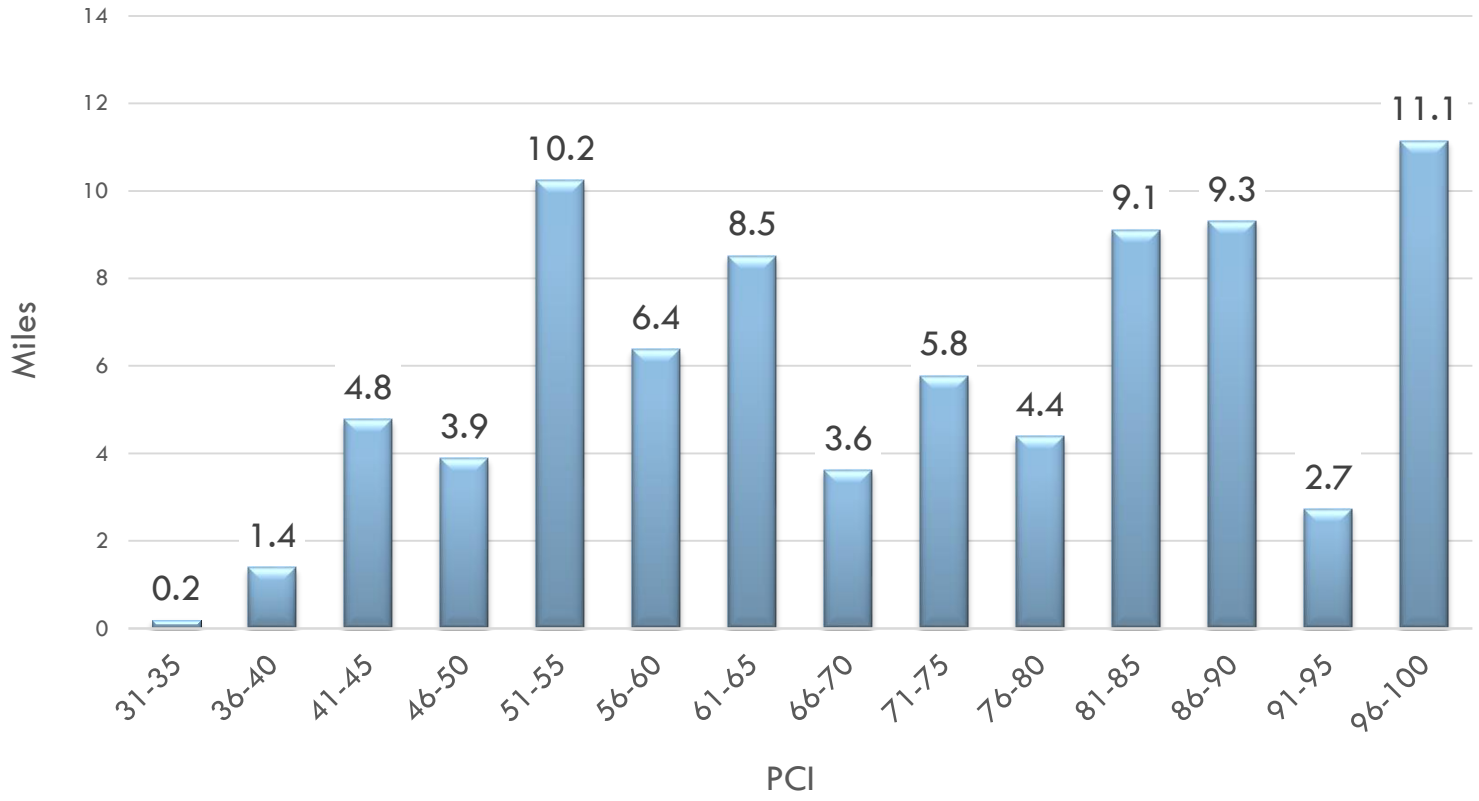
Pavement Management in Tyngsborough

GIS Integration



Pavement Management in Tyngsborough

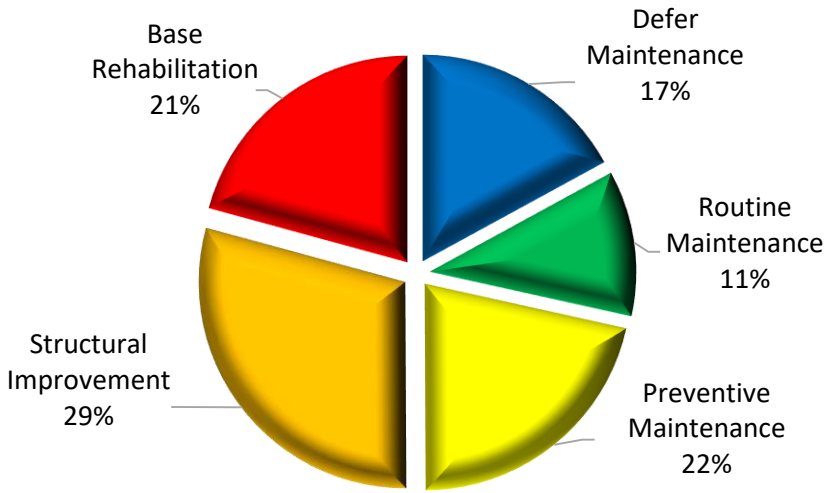
Distribution of Conditions



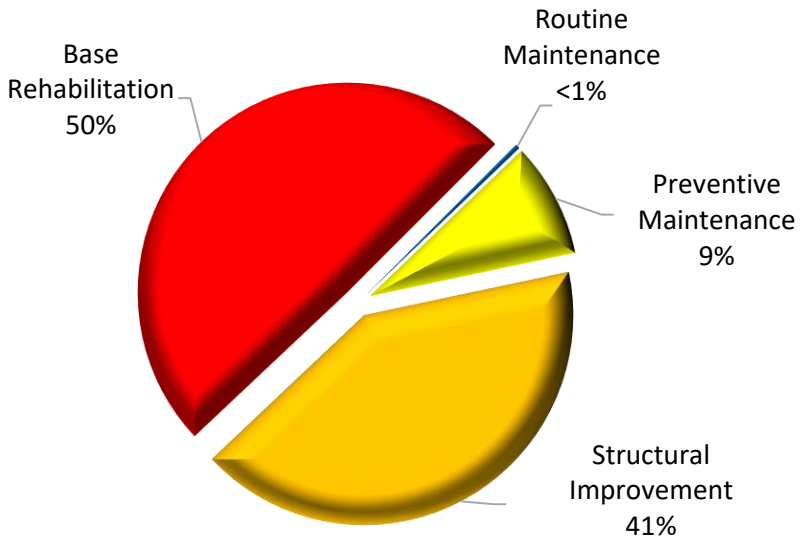
Pavement Management in Tyngsborough

Current Roadway Pavement Backlog Summary

Miles of Roadway
81.4 miles



Backlog in Dollars
$19,018,000



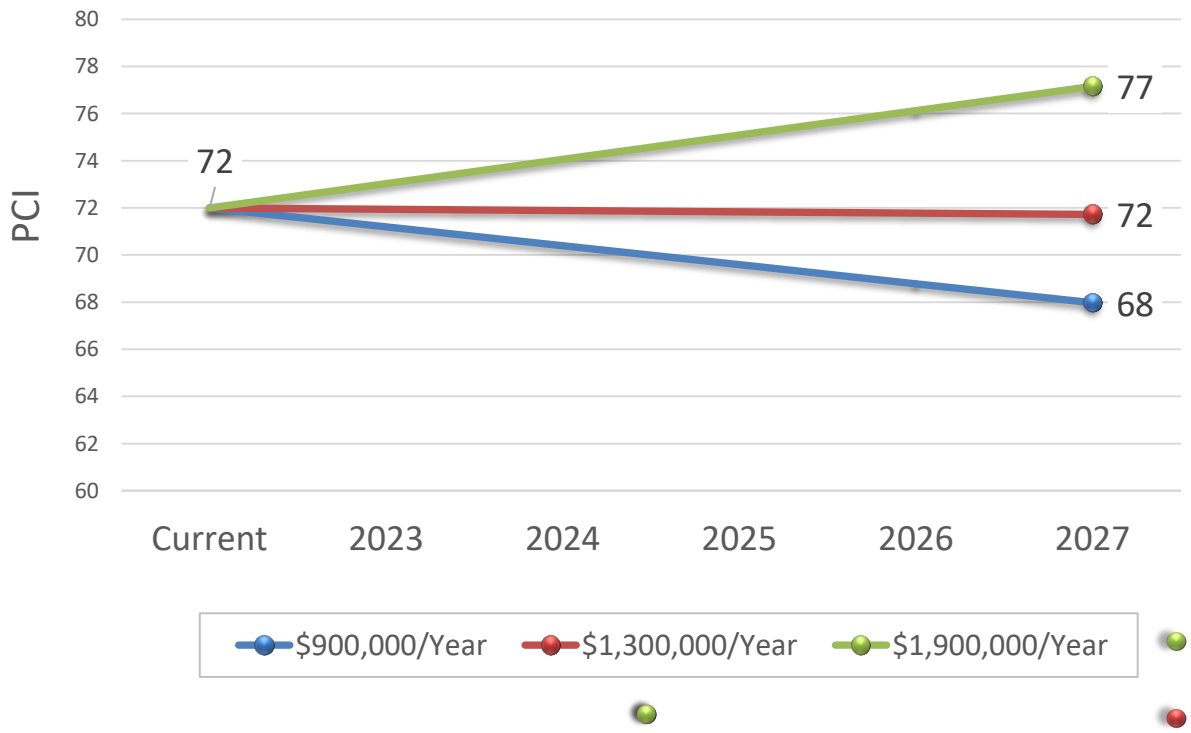
Budget Analysis

Scenarios Explored

- **Current Funding ($900,000 per year)**
- **Maintain PCI ($1,300,000 per year)**
- **Improve PCI ($1,900,000 per year)**

Pavement Management in Tyngsborough

Projected Pavement Condition



Current Funding is not projected to maintain road network at current conditions.

Recommendations

Pavement Management Recommendations

- Budget adequate funds to balance pavement funding needs with water and other infrastructure funding expenditures.
- Expand the maintenance program to make timely repairs using a variety of applicable treatments.
- Provide for construction inspection at the plant and in the field to ensure quality material is provided and quality work is being performed.

Recommendations

Annual Road Program Development

- Use System Output to Identify Candidate Projects
- Utilize GIS to Coordinate Projects Geographically
  - Reduce Mobilization cost for contractors
  - "Neighborhood" Planning
- Coordinate with Utility Companies
- Adapt to Funding Opportunities and Constraints

Recommendations

System Recommendations

- Update system to reflect work that has been done
- Evaluate funding levels periodically
- Develop multi-year road programs
- Track specific and overall conditions periodically - update pavement condition ratings at a minimum of every 4 years

FY2023-2027 Capital Planning

Tools in the toolbox

Current treatment methods

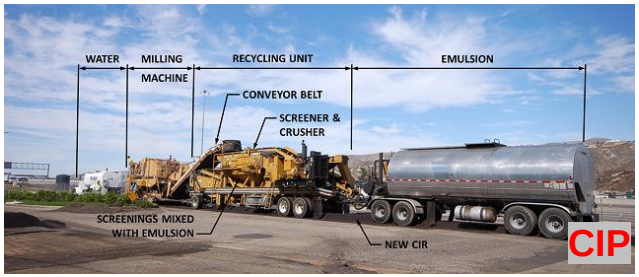
- Cracksealing
- Prep and overlay
- Mill and overlay
- Full-depth reconstruction (FDR)

FY2023-2027 Capital Planning

Tools in the toolbox

Exploring alternative treatment methods

- Rubberized chip seal
- Rubberized chip seal w/ micro-surface (cape seal)
- Isolated full-depth patching
- Bonded wearing course
- Traditional chip seal
- Cold in-place recycling



FY2023-2027 Capital Planning

Tools in the toolbox

- **Rubberized chip seal-** is a stress absorbing membrane type surface treatment which creates a highly durable wearing surface for demanding pavements. The innovative surface treatment
- **Rubberized chip seal w/ micro-surface (cape seal)-** It is the rubberized chip seal with a thin overlay of asphalt.
- **Isolated full-depth patching-** mill isolated pavement distresses and install asphalt pavement. The purpose of this treatment is to repair the worse sections of a roadway that is in good condition.
- **Bonded wearing course-** is a high performance thin overlay which uses a proprietary technology that seals the existing road surface and provides a new, skid-resistant, smooth & thin (5/8" to 3/4") HMA wearing course
- **Traditional chip seal-** also known as stone seals, combine an asphalt layer and cover aggregate to provide a skid resistant wearing surface. The asphalt renews aging surfaces, fills minor cracks, and seals and waterproofs the pavement.
- **Cold in-place recycling-** the top 2 to 5 inches of distressed asphalt are cold-milled to produce reclaimed asphalt pavement (RAP). The RAP is then mixed with strengthening additives and placed back onto the existing roadway.

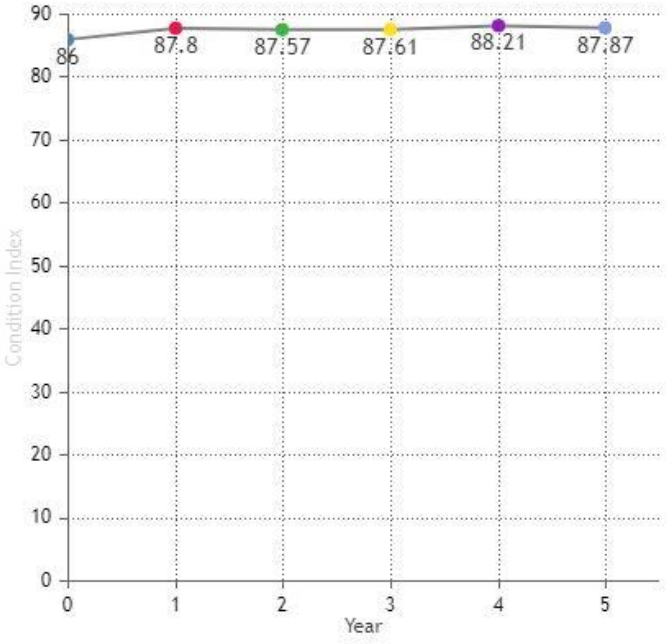
FY2023-2027 Capital Planning

Road Improvement Strategy

- Focus on maintaining good roads while chipping away at poor roadways
- This 5 year plan is broken into to categories
  - Pavement preservation
  - Road rehabilitation

Preservation

- Miles of good condition roads: 40 miles
- Allocate 25-30% of budge towards preservation/maintenance



Town of Tyngsborough - Pavement Management

FY2023-2027 Capital Planning

FY2023

- Crack sealing:
  - Roads: Dunstable Rd, Long Pond Rd, Frost Rd
  - Miles: 3.48 miles, Service life: 10.5yrs, **Cost: $25,000.00**
- Rubber Chip (Preservation)
  - Roads: Locust Avenue & Farwell Road
  - Miles: 2.24 miles, Service life: 22.4yrs, **Cost: $225,000.00**
- Rubber chip w/ micro (Preservation)
  - Roads: Appaloosa Cir, Morgan Way, Shetland Cir, Palomino Dr, Mustang Road, Arabian Way, Althea Ave
  - Miles: 1.8 miles, Service life: 26yrs, **Cost: $480,000.00**
- Full-depth Reclamation
  - Danforth Rd, Descheneaux Ln (place holder)
  - Miles: 0.88 miles, Service life: 19yrs, **Cost: $270,000.00**

Total cost: $1,000,000.00

FY2023-2027 Capital Planning

FY2024

- Crack sealing:
  - Roads: Sherburne Ave, Willowdale Rd, Parham Rd, Independence Dr, Trinity Dr, and Ridge Rd
  - Miles: 5 miles, Service life: 15yrs, **Cost: $30,000.00**
- Rubber chip/ Bonded wearing course (Preservation)
  - Roads: Parham Rd, Lakeview Ave, Frost Rd
  - Miles: 2 miles, Service life: 20yrs, **Cost: $230,000.00**
- Full-depth Reclamation
  - Patriot Road
  - Miles: 1 mile, Service life: 23yrs, **Cost: $700,000.00**

Total cost: $960,000.00

FY2023-2027 Capital Planning

FY2025

- Rubber chip seal (Preservation)
  - Roads: Westford Road
  - Miles: 2.78 miles, Service life: 28yrs, **Cost: $359,000.00**
- Full-depth Reclamation or Cold in-place recycling
  - Oregon Road and Nevada Road
  - Miles: 1 mile, Service life: 22yrs, **Cost: $682,000.00**

Total cost: $1,040,000.00

FY2023-2027 Capital Planning

FY2026

- Crack sealing:
  - Roads: Lawrence Rd, Lawndale Rd, Coburn Rd, Lakeview Ave, Beverlee Rd, Washington Rd, Rock Rd, Makos St
  - Miles: 5.25 miles, Service life: 16yrs, **Cost: $40,000.00**
- Rubber chip (Preservation)
  - Roads: Christine Ave, Gloria Ave, Robert Rd, Bryants Ln, Coburn Rd and Norris Rd
  - Miles: 2 miles, Service life: 20yrs, **Cost: $264,000.00**
- Full-depth Reclamation
  - Roads: Lincoln Drive, Bridget Ave, Elm St, Oak St, and Pine St ($175,000.00 carried for drainage improvements)
  - Miles: 1 mile, Service life: 23yrs, **Cost: $550,000.00**

Total cost: $854,000.00

FY2023-2027 Capital Planning

FY2027

- Cape seal(Preservation)
  - Roads: Chestnut Rd, Scribner Rd
  - Miles: 3.1 miles, Service life: 31yrs, **Cost: $322,000.00**
- Full-depth Reclamation
  - Roads: Joco Drive, Tower Rd, and Belfair Ln
  - Miles: <1 mile, Service life: 23yrs, **Cost: $660,000.00**

Total cost: $982,000.00

Questions & Answers