City of Capitola

2022 PMP Update

Final Report

May 2022

Table of Contents

Section I
Executive Summary

EXECUTIVE SUMMARY

The City of Capitola currently maintains approximately 27.05 centerline miles of roads representing 4,690,430 square feet of pavement with a replacement value of approximately $96,762,000 as calculated by StreetSaver®.

Pavement Engineering Inc. (PEI) updated all the streets in the City's Pavement Management System, using the Metropolitan Transportation Commission's (MTC) StreetSaver® program. The purpose of a Pavement Management System is to track inventory, store work history and furnish budget estimates to optimize funding for improving the city's pavement system.

INTRODUCTION

A Pavement Management System has several distinctive uses:

- As a budgeting tool, a Pavement Management System uses treatment costs that are based on recently bid projects, by the participating agency, so that budgets reflect historical costs for the area.
- As an inventory tool, a Pavement Management System provides a quick and easy reference for pavement areas and use.
- As a pavement condition record, a Pavement Management System provides age, load-related, non-load related and climate-related pavement condition and deterioration information. The Pavement Management System uses pavement deterioration curves, based on nationwide research, which allow the program to predict a pavement's future condition.

A Pavement Management System is not capable of providing detailed engineering designs for a street. The Pavement Management System instead helps the user identify candidate streets for potential repair and maintenance. Project level pavement analysis and engineering is an essential feature of future pavement maintenance and rehabilitation projects. Additional investigation, or project level analysis, can optimize the City's pavement management dollars. Project level engineering examines the pavements in significantly more detail than the visual evaluation required for the Pavement Management System Update and optimizes designs for all of the peculiar constraints of a set of project streets.

WORK PERFORMED

Pavement Distress Survey and Database Update

For this update, PEI performed inspections on approximately 27.05 centerline miles of road. Field inspections were completed in February 2022.

PEI measured the following distress types as part of our review: alligator cracking (fatigue), block cracking, distortions, longitudinal & transverse cracking, patching & utility cut patching, rutting / depressions, weathering, and raveling. All the collected data was entered into the City's StreetSaver® database.

As part of our field review, all the streets were measured to confirm lengths and widths. Lengths were measured using a vehicle-mounted electronic measuring device and widths were measured using a hand-held measuring wheel. Measurement discrepancies were tabulated and reviewed with the City to determine if corrections were needed.

PEI performed a quality control (QC) check on our work. PEI's QC check consists of performing a field review of any street segment where the PCI showed a decrease of 3 or more points per year, or an increase of 1 PCI without a documented M&R treatment, when compared to the last inspection for the same road segment in the StreetSaver® database. Each segment in the QC process was visually reviewed to determine if the StreetSaver® calculated PCI was representative of the observed overall pavement condition for that road segment.   Variations found were re-inspected by a Senior Engineering Technician, or the Project Manager, and the segments' PCI was recalculated.

FINDINGS

The updated Pavement Management System showed that the City's overall average PCI is **54**.

The breakdown by functional classification is as follows:

Functional Classification	Centerline Miles	Lane Miles	Pavement Area (sq. ft.)	Percent of System	Average PCI
Arterial	8.94	19.41	1,699,023	36.22%	61
Collector	4.53	9.06	793,121	16.91%	52
Residential	13.58	26.50	2,198,286	46.87%	49
Totals	27.05	54.97	4,690,430	100.00%	54

The pie graph below shows the percentage of each functional classification, by area.

Residentials
2,198,286
47%

Arterials
1,699,023
36%

Collectors
793,121
17%
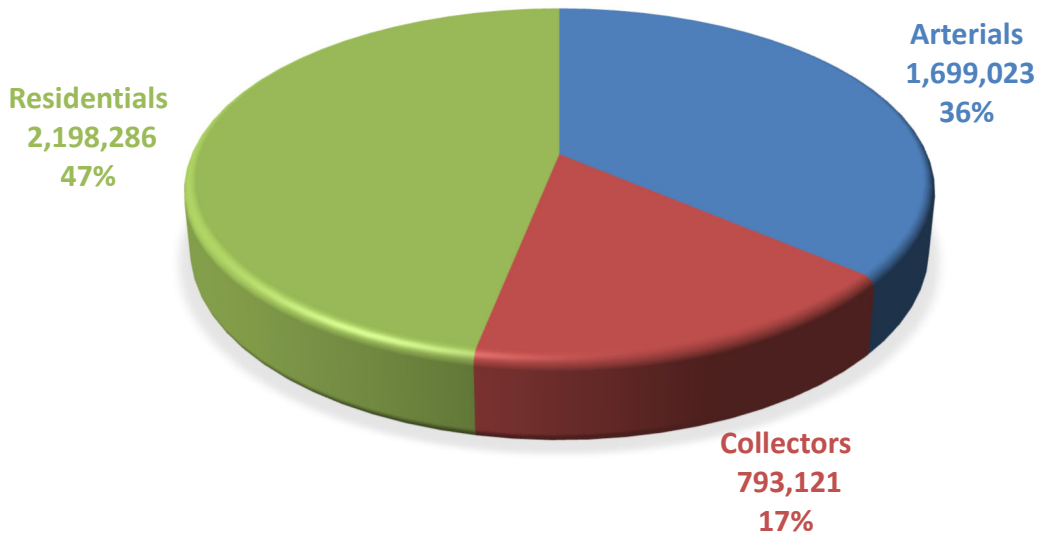
The bar graph below shows the City's street system broken down into 10-point PCI ranges.

Total System by Functional Class by PCI

- Arterials
- Collectors
- Residentials

PCI Range	Values
100-91	6.38% 299,386
90-81	6.20% 290,923
80-71	15.21% 713,334
70-61	15.70% 736,552
60-51	7.58% 355,464
50-41	15.84% 743,113
40-31	14.97% 702,383
30-21	14.88% 697,831
20-11	3.23% 151,444
10-0	

Area (SqFt)
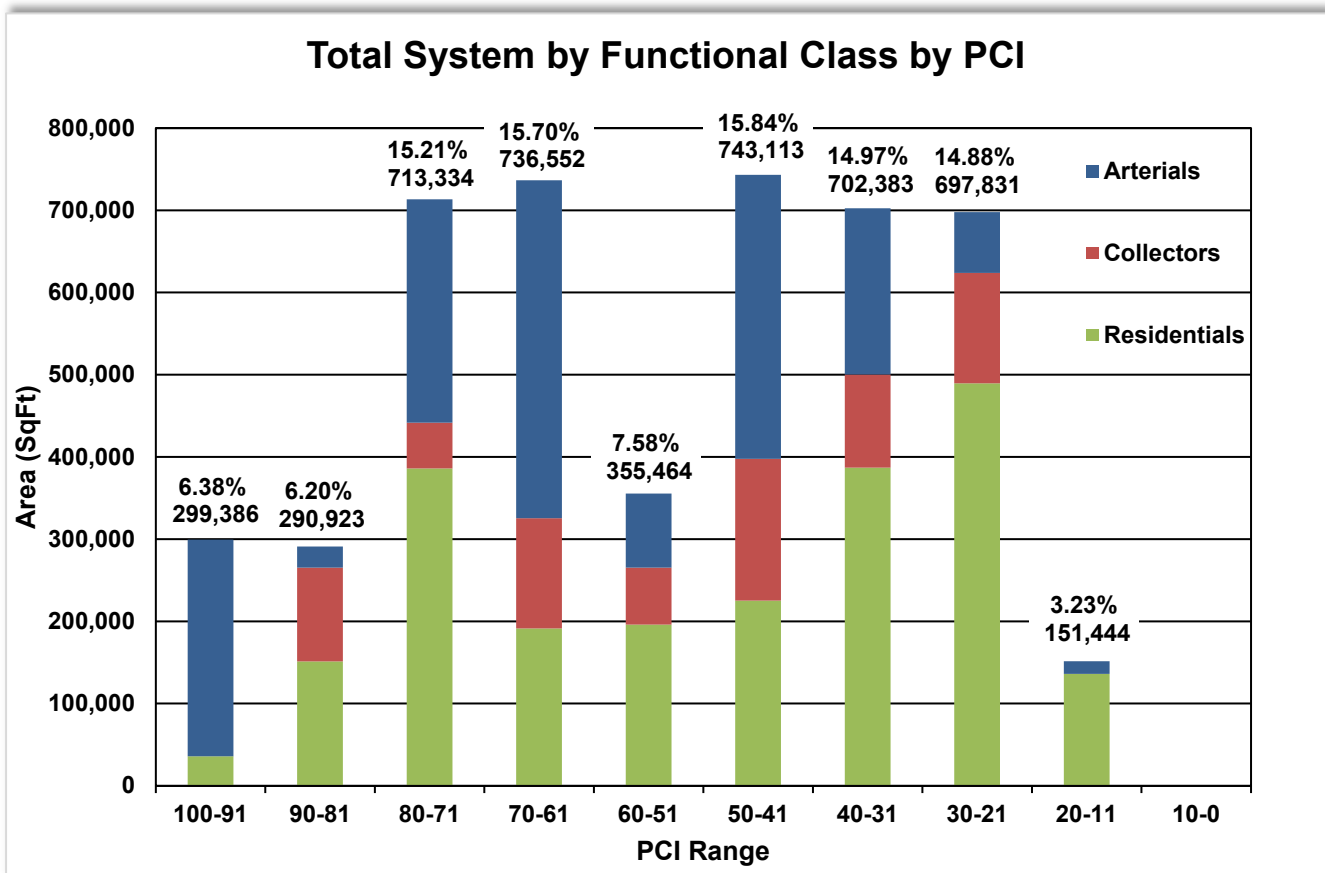
The breakdown by Condition Category and corresponding PCI range is shown below:

Condition Category Breakdown			
Condition	PCI Range	% Of Total	Square Feet
Excellent	100-91	6.38%	299,386
Good	90-71	21.41%	1,004,257
Fair	70-51	23.28%	1,092,016
Poor	50-31	30.82%	1,445,496
Failed	30-0	18.11%	849,275

The analysis shows that **54.1%** of the City's pavement are in **Fair** to **Poor** condition. Details of each street segment are provided in ***Section IV: Reference Reports***.

BUDGET ANALYSIS

StreetSaver® uses a decision tree to model the decision-making process that agencies follow to select a maintenance or rehabilitation strategy. The decision tree contains "branches" for each functional classification, surface type and condition category. Jurisdictions can outline their maintenance and rehabilitation strategy by choosing a treatment for each branch.

The treatments listed in the decision tree are generalized to provide a range of treatments. Typical treatments within each generalized treatment range are listed below. The exact treatment would need to be determined during the design phase of the project.

StreetSaver® assigns a treatment action and estimated cost to each street segment based on the pavement's current PCI.

Treatment Category	Typical Treatment
Light Maintenance	• Slurry Seal or Micro-Surface • Fog Seal or Scrub Seal
Heavy Maintenance	• Chip Seal, Cape Seal • Slurry Seal or Micro-Surface with Digouts • Thin Maintenance Overlay (TMO)
Light Rehab.	• Overlay (2" and under) or Thin Mill and Fill
Heavy Rehab.	• Overlay (greater than 2") or Thick Mill and Fill • Cold-In-Place Recycling • Full Depth Reclamation • Pulverize and Resurfacing
Reconstruct	• Full Section Reconstruction

Decision Tree Unit Prices

As a minimum, recent bid tabulations should be used to determine the appropriate unit costs. Further, the unit costs include other costs such as design, construction management, contingencies or other related construction costs (ADA ramps, curb & gutters, striping etc.) to form a more comprehensive unit cost for the selected treatments.

For the City of Capitola, the unit costs on the following table were used:

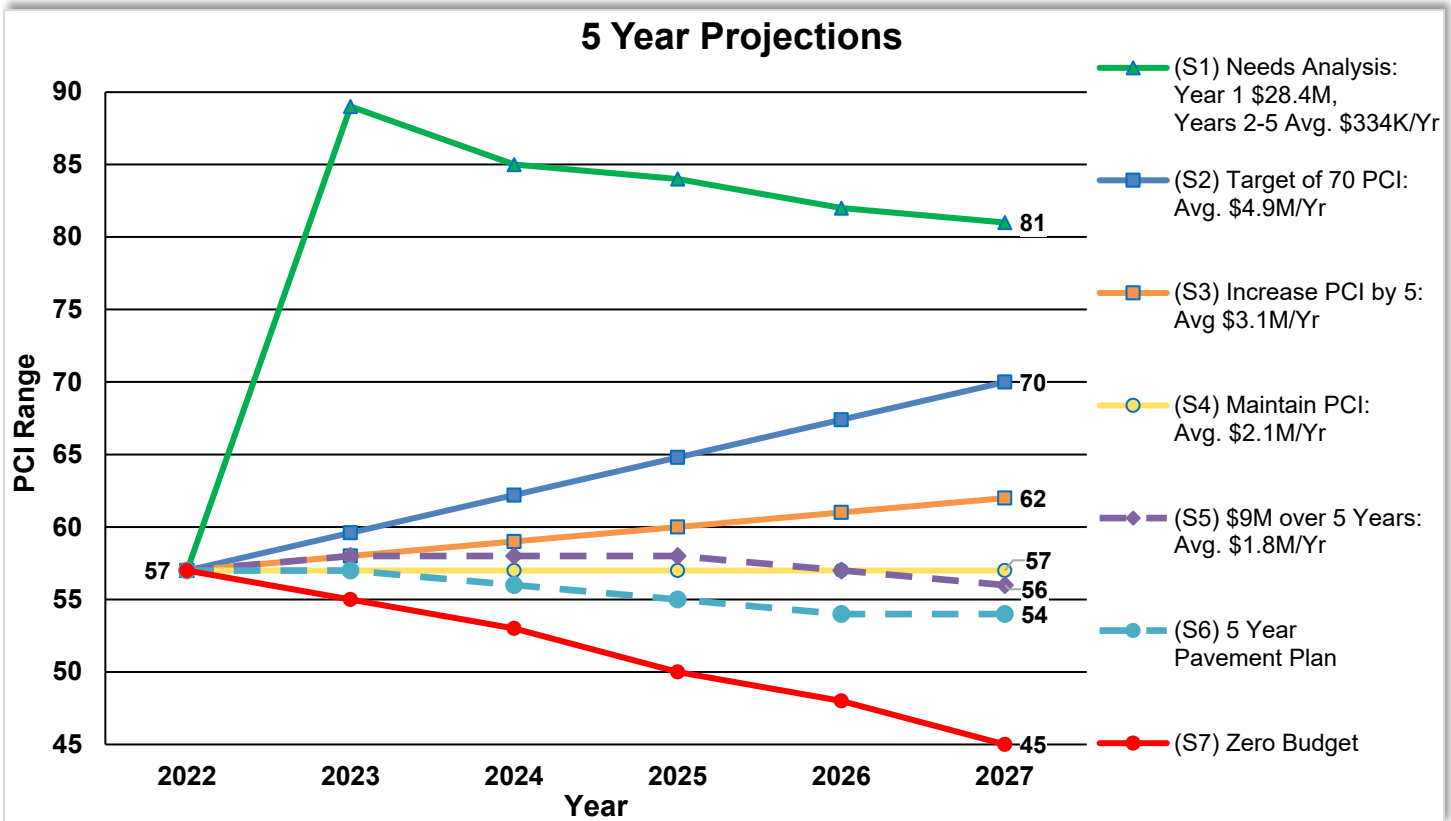| Treatment	Arterial	Collector	Residential
Cost/ Sq Yd			
Crack Seal (**$$/LF**)	$2.60	$1.95	$1.95
Light Maintenance	$5.85	$5.27	$4.68
Heavy Maintenance	$15.84	$14.40	$14.40
Light Rehab	$57.60	$50.40	$50.40
Heavy Rehab	$119.66	$100.80	$86.40
Reconstruct	$201.60	$187.20	$172.80

For this update, PEI analyzed several scenarios, which are summarized below. It should be noted that the following projections include the planned maintenance and rehabilitation work that will be completed by the end of 2022.

Budget Scenario Projections

PEI generated Seven (7) scenario projections which are represented graphically below:

5 Year Projections

Legend:
- (S1) Needs Analysis: Year 1 $28.4M, Years 2-5 Avg. $334K/Yr
- (S2) Target of 70 PCI: Avg. $4.9M/Yr
- (S3) Increase PCI by 5: Avg $3.1M/Yr
- (S4) Maintain PCI: Avg. $2.1M/Yr
- (S5) $9M over 5 Years: Avg. $1.8M/Yr
- (S6) 5 Year Pavement Plan
- (S7) Zero Budget

A summary of each of the scenario projections are as follows:

Scenario 1:   System Needs Analysis/ Unconstrained Budget: Year 1 $28.4M, Years 2-5 Avg. $334K/Yr.

Scenario 2:   Amount of funding to reach a Target of 70 PCI (Avg. $4.9M/Yr.)

Scenario 3:   Amount of funding to increase PCI by 5 (Avg. $3.1M/Yr.)

Scenario 4:   Amount of funding to maintain PCI of 57 (Avg. $2.1M/Yr.)

Scenario 5:   Impact of the funding amount of $9M over 5 years, the PCI would decline from 57 to 56, a 1-point overall drop.

Scenario 6:   Impact of the 5 Year Pavement Plan, the PCI would decline from 57 to 54, a 3-point overall drop.

Scenario 7:   Represents the impact to the PCI if Zero dollars are spent

The full report for the various budget scenarios can be found in **Appendix B**.

Budget Consequences

The following graphs illustrate the consequences to the City's overall weighted PCI and Deferred Maintenance Amount, based on the scenario projections:

With the Current 5 Year Pavement Plan, the PCI of the entire system will deteriorate from 57 to 54, a 3 PCI point drop over the next 5 years. In addition, the backlog of deferred maintenance grows from $22 million to $32.4 million, an increase of 47%.


Scenario 6 - 5 Year Pavement Plan
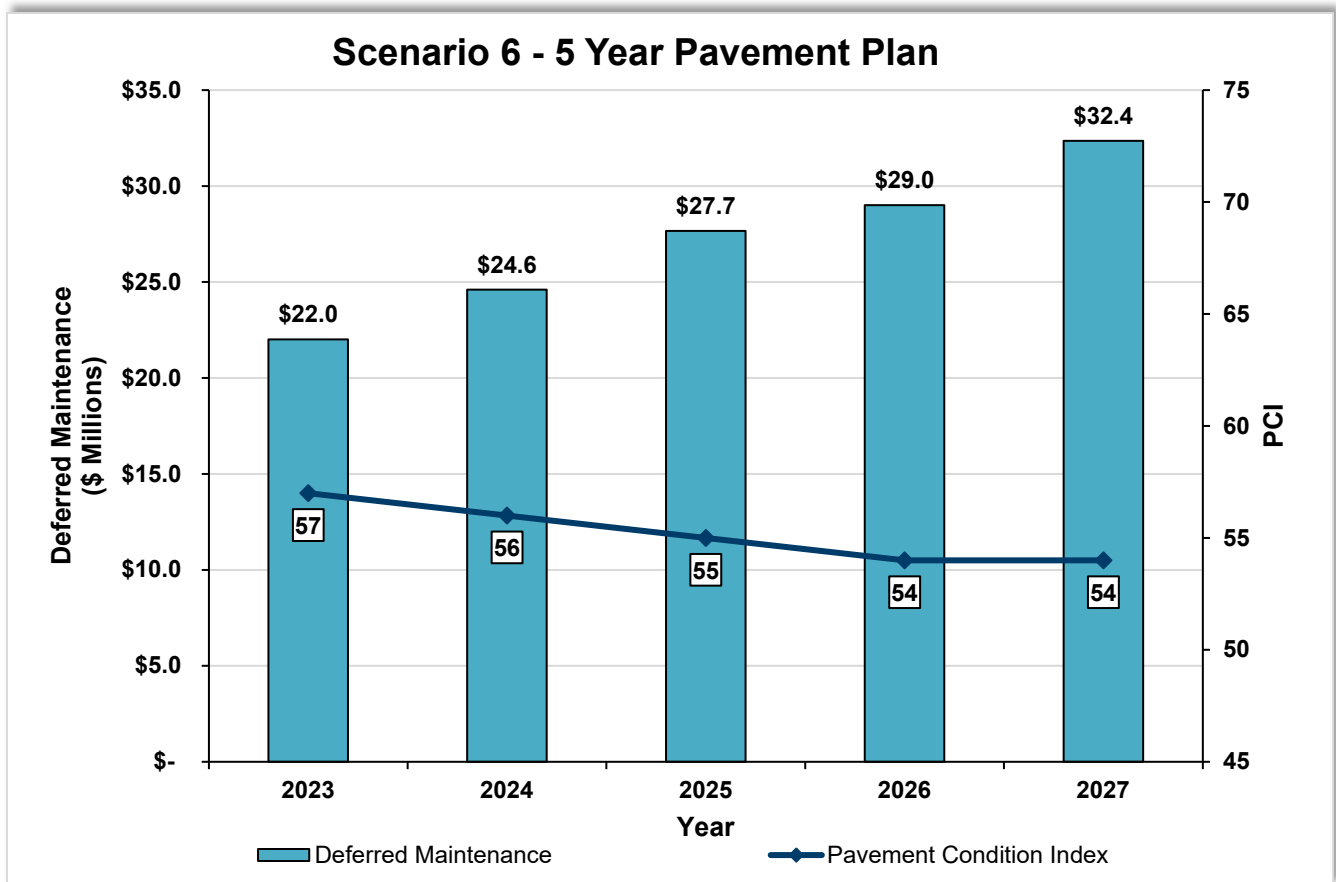
To maintain the PCI at a 57 (the PCI the system is estimated to be at the end of 2022), it is projected that an average funding level of $2.1M/Yr. would be necessary. At this funding level the backlog of deferred maintenance grows from $27.6 million to $31.1 million, an increase of 13%.

Scenario 4 - Maintain PCI
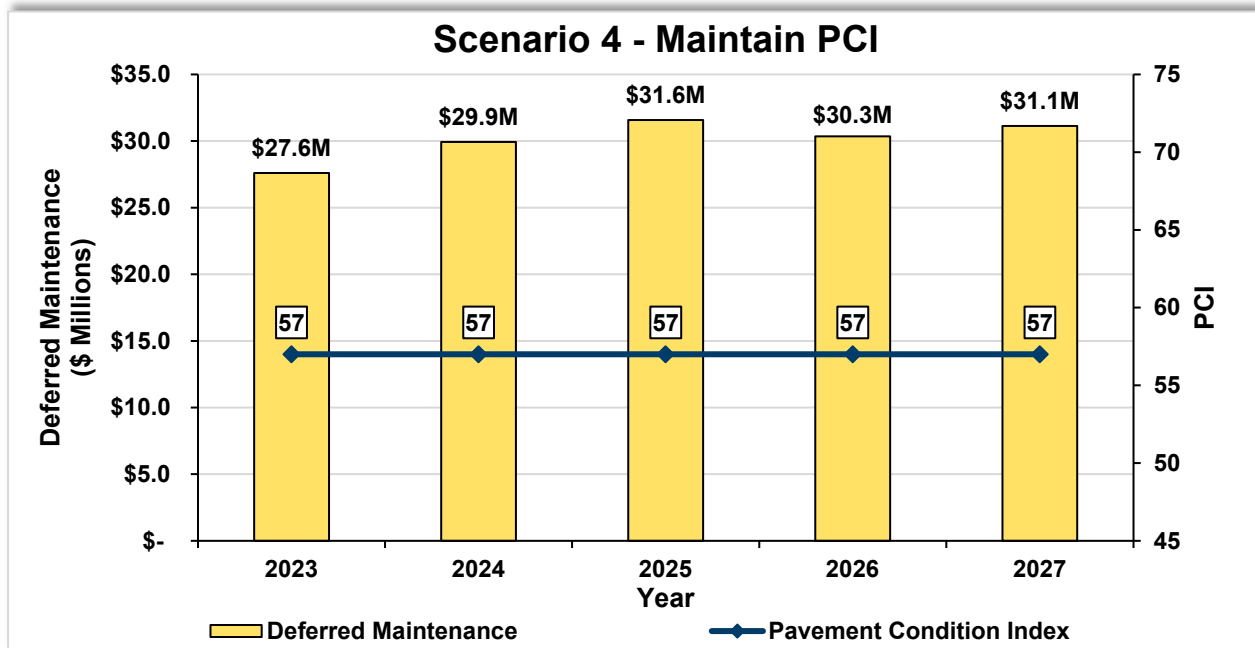
To increase the PCI 5 points, from 57 to 62, it is projected that an average funding level of $3.1M/Yr. would be necessary. At this funding level the backlog of deferred maintenance shrinks from $26.8 million to $26 million, a decrease of 3%.

Scenario 3 - Increase PCI by 5
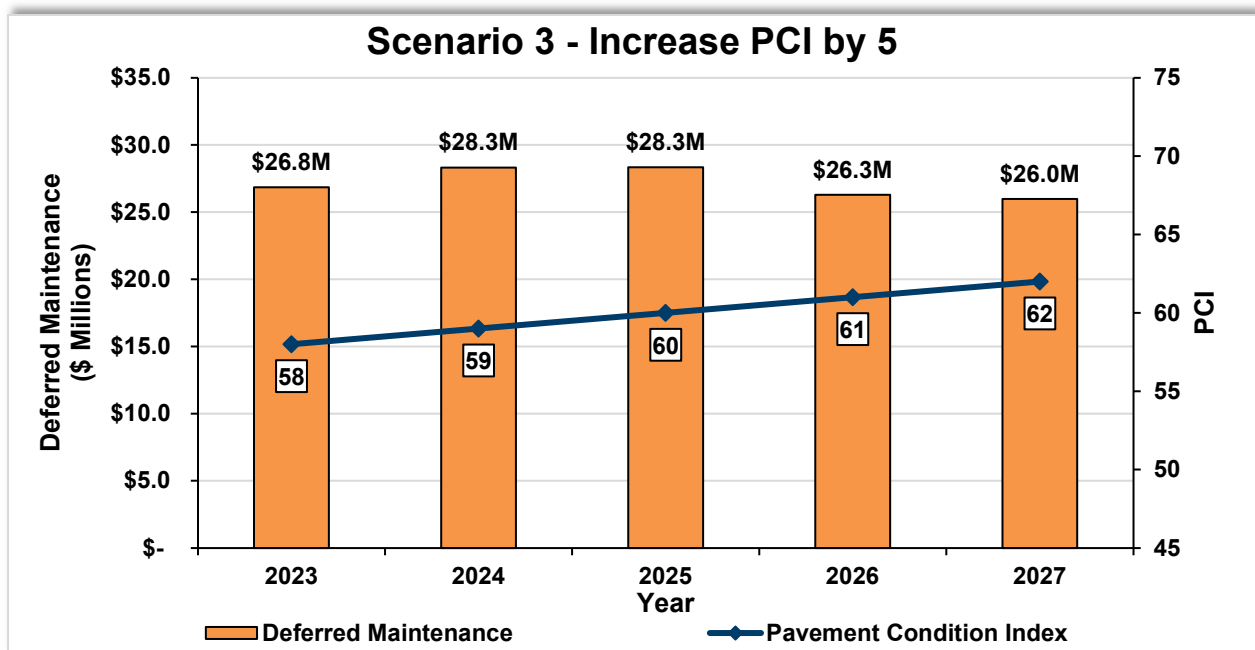
CONCLUSIONS AND RECOMMENDATIONS

This Executive Summary provides a review of the 2022 Pavement Management System Update performed by PEI. PEI inspected all road segments in the City of Capitola. The average overall PCI for the City is **54**. 54.1% of the City's pavement is in Fair to Poor condition.

After the completion of the currently planned Maintenance and Rehabilitation work for 2022, the system wide PCI is estimated to be at 57. To maintain the system at that PCI level, the city will need to spend an average of $2.1 million annually over the next 5 years. With the current 5-year pavement plan, it is projected that the PCI will decrease from 57 to 54 by the end of the 5 years.

A review of the City's Street system, by functional classification, shows that the Arterial streets have the highest average PCI of 61, the Collector streets have an average PCI of 52, and the Residential streets have an average PCI of 49. As a general rule, agencies typically try to keep their arterials in the best condition because they carry the bulk of the traffic and loading, followed by collectors, then the residential/ local streets.

Moving forward, PEI recommends the City carefully evaluate the overall annual budget to determine the amount it wants to commit to pavement maintenance and rehabilitation projects. We recommend the City set priorities for each functional classification and perhaps certain streets within each classification.

This Pavement Management System will assist the City in its efforts to monitor treatments and track their effectiveness and help the City in setting future priorities and treatment policies. To ensure the city is evaluating accurate data, PEI suggests the City update its Pavement Management System on a regular basis and review the entire system every three years, this includes a thorough review of the Decision Tree and the unit costs contained within. As the City maintains and updates its Pavement Management System, the program will become a valuable tool in its efforts to maximize performance and minimize the spending for pavements.