

PAVEMENT MANAGEMENT STUDY EXECUTIVE SUMMARY

The City of Medford, in November 2020, retained Nitsch Engineering and Stantec, to develop and implement a Pavement Management System (PMS) for its roadway system, which is currently in poor condition.

This comprehensive study was undertaken to continue the City's commitment to long-term capital improvement planning and further to develop a new, on-going preservation maintenance plan with its PMS. The PMS contains an extensive roadway database describing actual pavement conditions and roadway characteristics in Medford to better understand future roadway conditions and needs at various funding levels. The report is designed to be a network level planning tool and intended to provide a foundation for managing the City's roadway resources by combining technology, local knowledge, and professional engineering input.

PMS is used to create an optimal long-term spending plan and allocate cost effective road budgets, by identifying existing deterioration levels and accurately predicting accelerated roadway deterioration and prioritizing timely and cost-effective maintenance repairs, thereby averting the need for far more expensive structural repairs. The goal is to save money in both the short and long run by developing a road repair program that minimizes expenditures.

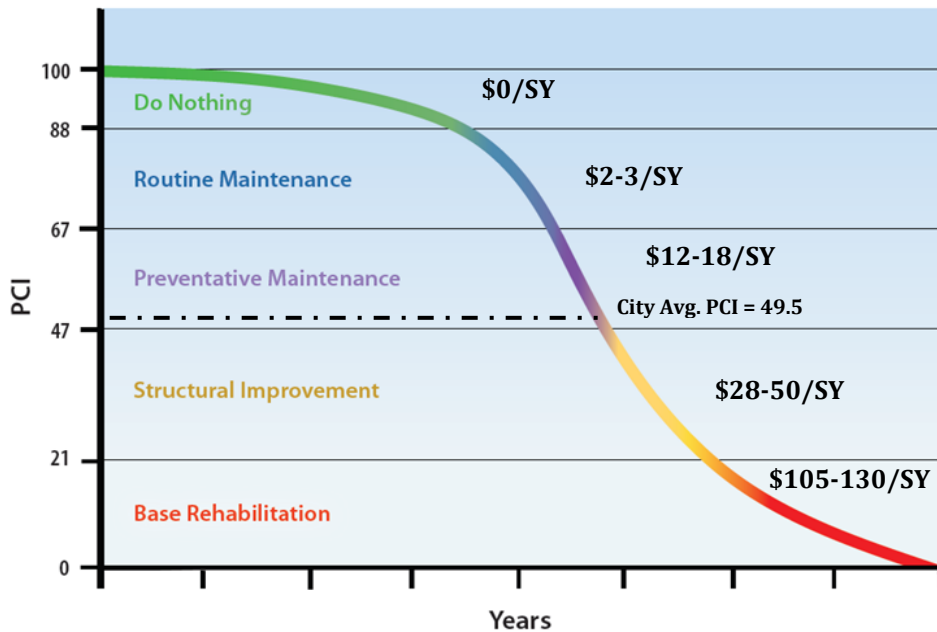


For analyzing the City's public roadway system, Stantec's RT3000 developed a Pavement Condition Index (PCI) to serve as the primary condition index to compare roadway serviceability and performance. The severity and extent of major pavement distresses were calculated using computer software. The distresses included: potholes or non-utility patching, alligator cracking, distortion, rutting, block cracking, transverse or

longitudinal cracking, bleeding or polished aggregate, surface wear or raveling, and shoving, slippage or corrugations. The pavement surface type throughout the City is "Hot Mix Asphalt" or "bituminous concrete".

Five broad category ranges were used to group the calculated PCI numbers into five major repair bands:

- Band #1 - Do Nothing,
- Band #2 - Routine Maintenance,
- Band #3 - Preventive Maintenance,
- Band #4 - Structural Improvement, and
- Band #5 - Base Rehabilitation.



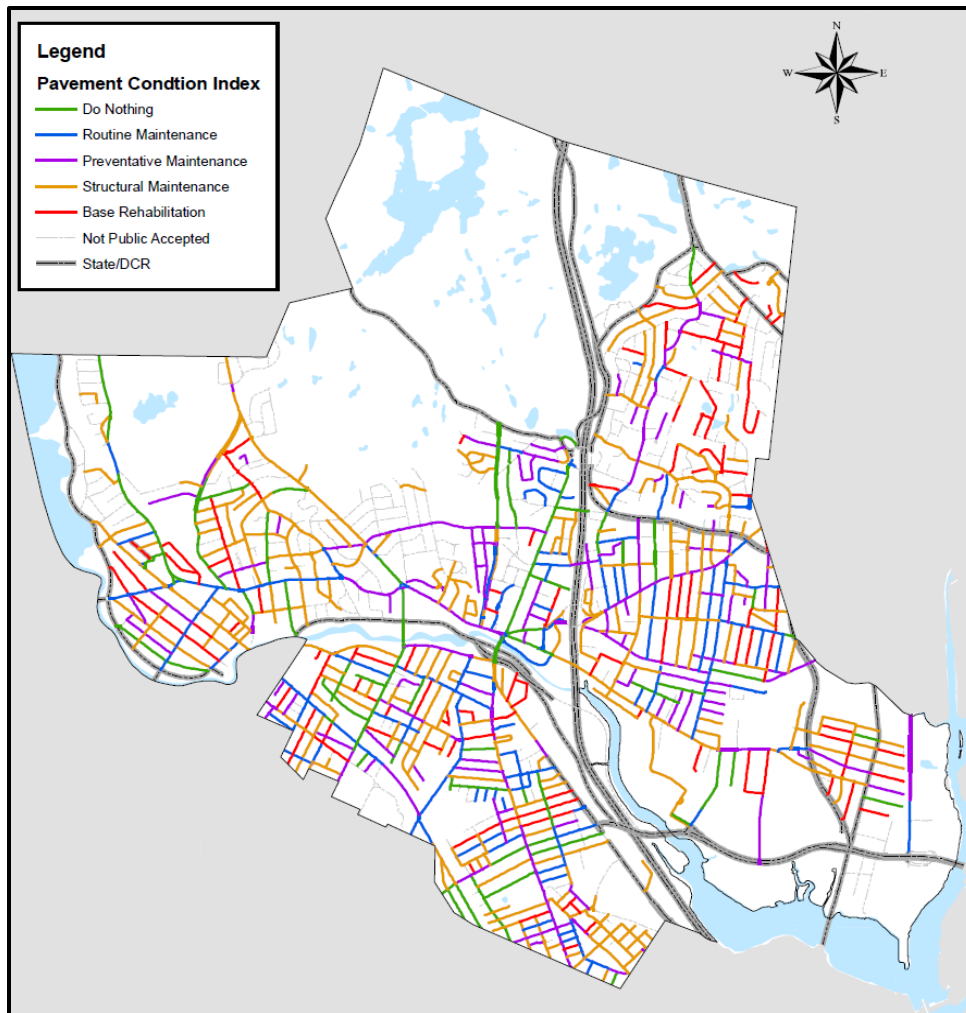
After all pavement segment repairs were assigned, the software prioritized needed system repairs based on the highest projected Network Priority Ranking (NPR). The NPR value uses variables representing functional classification, pavement type, PCI, and traffic volume. For the City's roadways, generated NPR favors cost-effective repairs that improve and/or maintain salvageable pavement segments.

To make the financial determinations and projections, five budget/planning scenarios were modeled:

- Zero Budget Scenario,
- Chapter 90 (Worst First),
- Chapter 90 (Pavement Management Strategy),
- Equilibrium (Maintain PCI) Funding Scenario, and
- Progressive Funding Scenario.

The findings in this report illustrate current funding levels are low and will not prevent expected roadway deterioration unless additional funding beyond Chapter 90 apportionment is budgeted. Future roadway funding levels need to be increased, as the City of Medford's annual budget needs to include an aggressive capital paving program for its streets needing structural improvement while also maintaining its routine maintenance. Additionally, it is recommended that roadways be reviewed each year to confirm that deterioration is occurring at the expected computer model rates. Based on these reviews and inspections, an update to the pavement management software will provide the City with a better understanding of its roadway degradation and confirmation of appropriate funding needs to prevent it.

If preemptive action is not taken, approximately half of the network in need of structural improvement will rapidly digress to needing base rehabilitation, which will require higher repair costs. Today's roadway network currently sits at a "critical point" where the window of opportunity to perform cost-effective and major capital roadway repairs is presented. The unit cost price for repairing segments increases drastically as the treatment bands worsen. For example, it is almost twice as expensive to repair segments in the 'Base Rehabilitation' band compared to those in the 'Structural Improvement' band. An optimum pavement management strategy was considered in which segments are treated at the most ideal time within each treatment band. This strategy recognizes which segments are on the verge of multiplying in repair expense and treats them to maximize taxpayer dollars. In executing this strategy, it was recognized that the City's current budget is not sufficient to treat enough of these segments and too many are in the most expensive treatments, accounting for 87% of the backlog. **Therefore, the Nitsch/Stantec Team recommends that the City should strive to secure between \$3,500,000 and \$9,500,000 per year for the next five years, to address its roadway backlog and gain control of its deteriorating roadways.** Also, Medford should continue keeping abreast of the latest developments in pavement restoration technology that might offer a more cost-effective alternative to pavement maintenance or rehabilitation over the pavement's life cycle.



Pavements are a community's single largest asset, and Medford has a major investment in its 95.4-mile public roadway network. Pavements are not perpetual, they are one of the City's fastest deteriorating assets, due to environmental effects, increased traffic loading, and utility cuts.

Additional roadway funding will protect the City's pavement assets, resulting in better overall roadway conditions, and satisfaction that taxpayer dollars have been well spent. PMS needs the long-term commitment of City decision-makers

and the support of practitioners to serve as a valuable tool to the City of Medford and to decision-makers in their proactive approach to managing the City's roadways.