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PAVEMENT MANAGEMENT FINAL PROJECT REPORT

Wyoming, OH

Thursday, April 03, 2025

Pavement Management Group

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EXECUTIVE SUMMARY

Pavement Management Group (PMG) proudly presents the final project report for the City of Wyoming, OH. Our mission at PMG is to empower municipalities to maximize their roadway investments by leveraging advanced technology and data-driven insights. This project exemplifies our commitment to delivering high-quality, turn-key pavement management solutions.

2025 ROADWAY NETWORK SUMMARY

- 35 centerline miles
- 67 lane miles (lane = 12 feet wide)
- 4,950,140 square feet
- 329 management sections
- Average network PCI is 58
- Average condition category of FAIR
- 3 PCI point decrease from the 2022 finalized condition assessment and previous report

The City of Wyoming engaged PMG to implement a comprehensive Pavement Management Program (PMP) utilizing our state-of-the-art RoadINsights™ platform. This project included a detailed assessment of the city's 35 centerline miles of roadways, encompassing approximately 5 million square feet and 329 management sections.

Our advanced technology, RoadINsights™, played a crucial role in this project, providing high-definition video capture and AI-driven distress detection to ensure accurate and efficient pavement condition assessments. The average network PCI of 58 indicates that, although the roadways are in a "fair" condition, there is significant room for improvement, as the city has identified and is preparing for substantial improvement projects over the next two years. Our analysis revealed specific areas that require immediate attention, as well as others where preventive maintenance can extend the life of the roadway and enhance safety.

PMG's turn-key PMP, underpinned by our team's pavement management expertise, equips the City of Wyoming with powerful tools for pavement modeling, maintenance decision-making, and budget optimization. By generating targeted, prioritized maintenance and rehabilitation plans, we help maximize the return on investment from available funds.

The outcome of this project is a clear, actionable roadmap for enhancing the city's road network, building upon current project plans, and ensuring safer and more reliable roadways for the community. We look forward to continuing our partnership with the City of Wyoming, helping to pave the way toward a more sustainable and efficient roadway infrastructure.

INTRODUCTION

Project Background

Like all municipalities, the City of Wyoming faces an ongoing challenge in maintaining and improving its roadway infrastructure to ensure safe and efficient transportation for its residents, businesses, and visitors. Recognizing the critical importance of a well-maintained roadway network, the city engaged the Pavement Management Group (PMG) to implement a comprehensive Pavement Management Program (PMP).

Objectives

The primary objective of this project was to assess the current condition of the city's roadways and develop a strategic recommendation plan for maintenance and rehabilitation. Specific goals included:

- Conducting a thorough pavement condition assessment of the city's 35 centerline miles of roadways.
- Utilizing PMG's RoadINsights™ technology to capture high-definition video and distress detection.
- Calculating the Pavement Condition Index (PCI) for each roadway segment to provide an accurate overview of the network's health.
- Identifying areas needing immediate repair and sections that would benefit from preventive maintenance to extend their lifespan.
- Providing the City with a prioritized maintenance and rehabilitation plan that aligns with upcoming project plans, supported by budget-driven scenarios, to maximize the return on investment from available funds.

Scope of Work

The scope of work for this project included several key components:

- Organization of the Roadway Network: The network was divided into logical sections, facilitating detailed and manageable assessments.
- Complete Inventory of Attributes: An extensive inventory was created for each pavement section, capturing all relevant attributes for accuracy.
- High-Definition Streaming Video: Each pavement section was recorded in high-definition video, allowing for detailed visual inspection and analysis.
- Industry Standard Distress Identification: Distress types were identified in accordance with ASTM Standard D6433, ensuring consistency and accuracy in the assessment process.
- Pavement Condition Index (PCI) Calculation: The PCI for each pavement section was calculated, providing a quantitative measure of the roadway condition.
- Geographic Information System (GIS) Mapping and Integration: GIS technology was used to map and integrate roadway data, enabling spatial analysis and visualization of the network conditions.
- Data Analysis and Reporting: A comprehensive analysis of the roadway network inventory and conditions was conducted, and the findings were presented in detailed reports.
- RoadINsights Dashboard: An intuitive and strategic dashboard was developed to provide insights and facilitate decision-making, leveraging the full capabilities of the RoadINsights™ platform.
- Collaborating with the Public Works Directory to develop a comprehensive maintenance and repair schedule and project plan to enhance the overall condition of the roadways over the next decade.

Through these efforts, PMG aimed to deliver a robust and actionable plan for the city, ensuring that its roadway network is well-maintained and capable of supporting the community's needs well into the future.

METHODOLOGY

Data Collection

The tools used for this project included a combination of legacy data provided by the City and PMG's proprietary data analysis resources. To develop an accurate and robust inventory, PMG's data capture vehicle traversed all pavement sections, capturing high-definition video footage essential for subsequent data analysis.

Data Analysis

PMG has developed proprietary data analysis tools leveraging our internal expertise and advanced AI technologies. The high-definition video captured by our data capture vehicle is processed to extract single image frames. Each frame is meticulously analyzed to identify and locate all distresses within each pavement section. The system documents and quantifies all identified distress, ensuring a comprehensive understanding of the roadway conditions.

A critical part of our methodology involves Quality Assurance (QA). Our QA team reviews all distress data, providing necessary remediation actions to ensure accuracy and reliability. This rigorous QA process finalizes the data analysis phase and prepares the data for condition assessment.

Pavement Distress Definition

There are 20 possible distress types for asphalt-based surfaces, while concrete surfaces can exhibit 19. The U.S. Army Corps of Engineers publishes the Asphalt and Concrete Distress Manuals, which describe each distress type, the criteria for determining its severity level (low, medium, or high), and the methods for measuring it. These manuals serve as essential references for our condition assessment process.

By adhering to these rigorous standards and utilizing advanced technologies, PMG ensures that the condition assessment is thorough, accurate, and reliable, providing the Town of Warwick with valuable insights into its roadway network.

Condition Assessment

PMG adheres to the ASTM D6433-23 standard for assessing the condition of asphalt and concrete surfaces. This standard, developed by the U.S. Army Corps of Engineers and endorsed by the American Public Works Association, serves as a globally recognized benchmark for assessing roadway surface conditions.

Our skilled Condition Assessment team facilitates the input of all quality-checked distress data into the PAVER™ Pavement Management System (PMS) to calculate the Pavement Condition Index (PCI). The PCI is a numerical indicator ranging from 0 to 100, with 0 representing the worst possible condition and 100 representing the best. This process results in a PCI score for each management section within the network, providing a precise and quantitative measure of the roadway condition.

Maintenance and Repair Planning

PMG leverages the final calculated PCI scores and our condition categories, along with city input, to develop a maintenance and repair strategy and deployment cadence. Through this planning process, preparing roadways for a proper mill and overlay by performing partial and full-depth repairs is the first step in the maintenance and repair process. Upon completion of the necessary localized repairs, the roadway section is milled and overlayed following the specifications outlined by the City Engineer. After the mill and overlay have been completed, the road will be treated with the Reclamite asphalt rejuvenator as part of the overall project to achieve maximum effectiveness and extended life. In year four, these roadways will receive another application of Reclamite,

followed by crack sealing those climate-related distresses that have appeared within the first four years. Then, in year 10, another crack seal application will be applied. This preventive and preservation approach to all roadways after their scheduled mill and overlay repair will yield an additional ten years of service life, with optimal conditions and rideability maintained throughout its service life.

By categorizing maintenance and repair activities this way, PMG ensures a systematic and practical approach to managing the city's roadway network. This strategic qualification process maximizes the return on investment for maintenance funds, enhancing the overall performance and longevity of the roadway network.

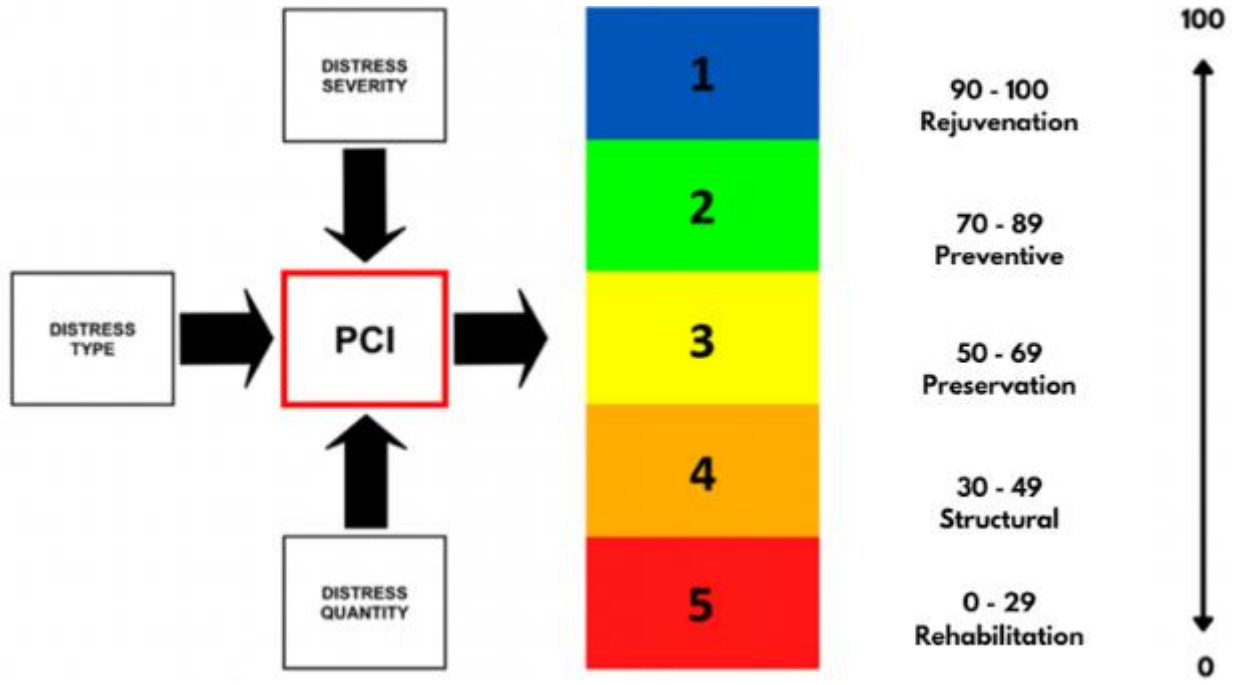


Figure 1. PCI, Condition Categories, and Correlating Treatment Categories

FINDINGS

After completing the 2025 pavement management project, PMG has determined that the average PCI for the city's 35 centerline-mile roadway network is 58, representing a 3-point decline from the 2022 condition assessment project. This places the overall network average condition in the "Fair" category. This assessment clearly understands the overall health of the town's roadways. It highlights areas that require immediate attention and those that need preventive maintenance to extend their service life.

Table 1 presents the condition summary data by category across the network, providing a comprehensive overview of key performance indicators, including the total number of sections, miles, and the area or percentage of roadways in each category. Figure 2 further illustrates these conditions in a graphical format, providing a clear visual representation of the data for more straightforward interpretation.

As part of this project's delivery, a comprehensive Inventory and Condition Report was provided in an Excel spreadsheet, ensuring that all data is accessible and can be utilized for future planning and maintenance activities.

CONDITION CATEGORY	SECTIONS	CENTERLINE MILES	LANE MILES	PAVEMENT AREA (SF)	PERCENT AREA	AVERAGE CONDITION
EXCELLENT	20	3.25	6.12	452,181	9.13%	99
GOOD	81	6.89	15.52	1,146,953	23.17%	80
FAIR	84	8.55	16.26	1,201,817	24.28%	60
POOR	131	15.14	26.73	1,975,734	39.91%	40
FAILED	13	1.31	2.35	173,455	3.50%	26
TOTALS	329	35	67	4,950,140	100%	

Table 1: Condition Summary Data by Category

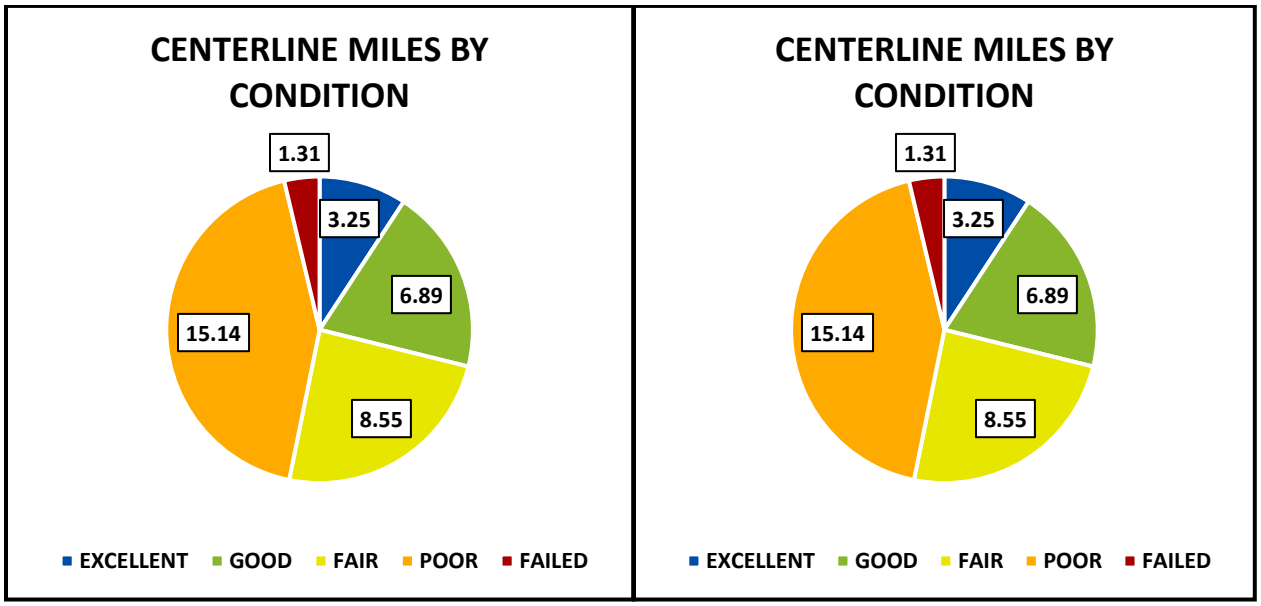


Figure 2. Charts of Number of Centerline miles and Sections by Condition Category

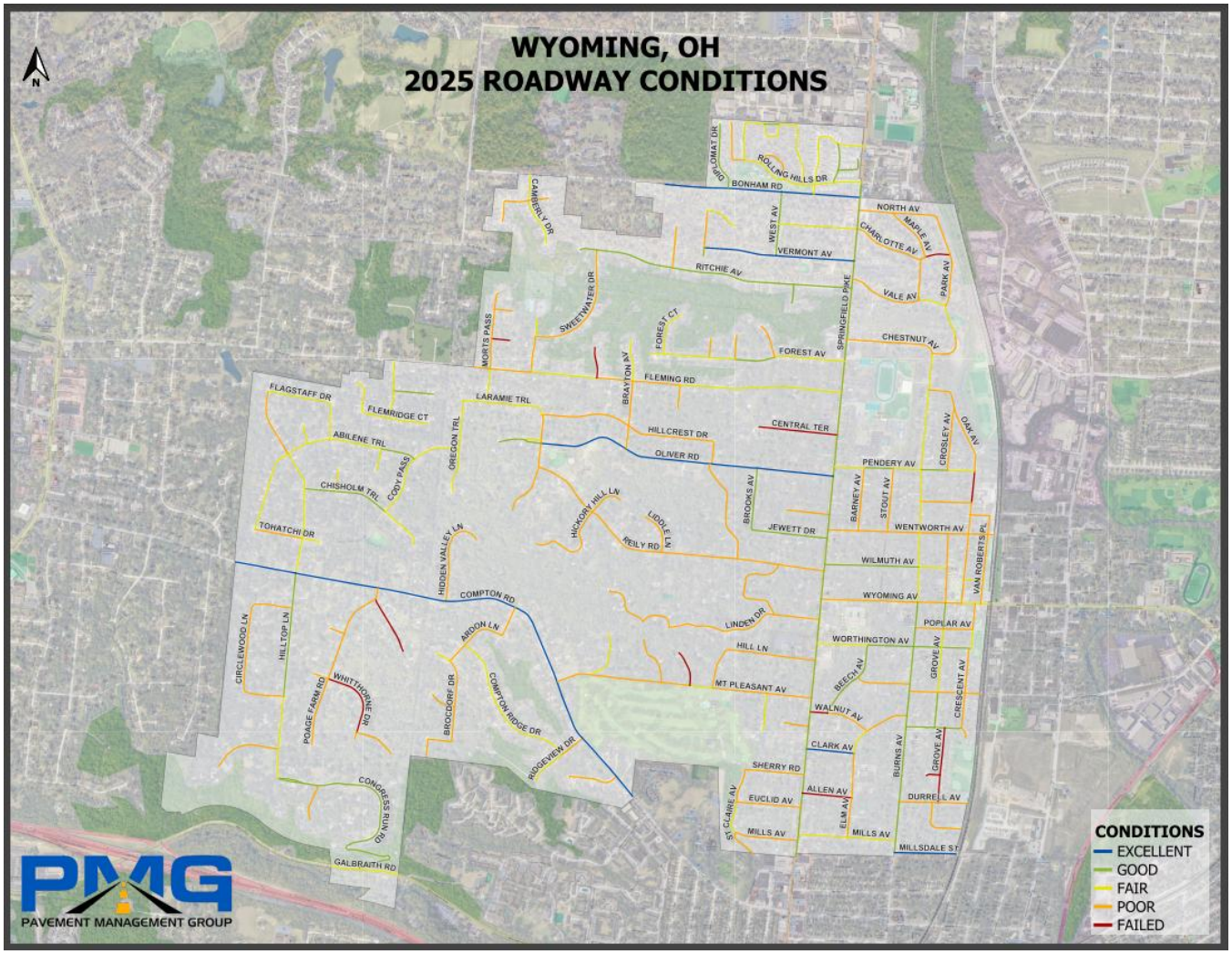


Figure 3. GIS Condition Map of all Current Conditions by Section

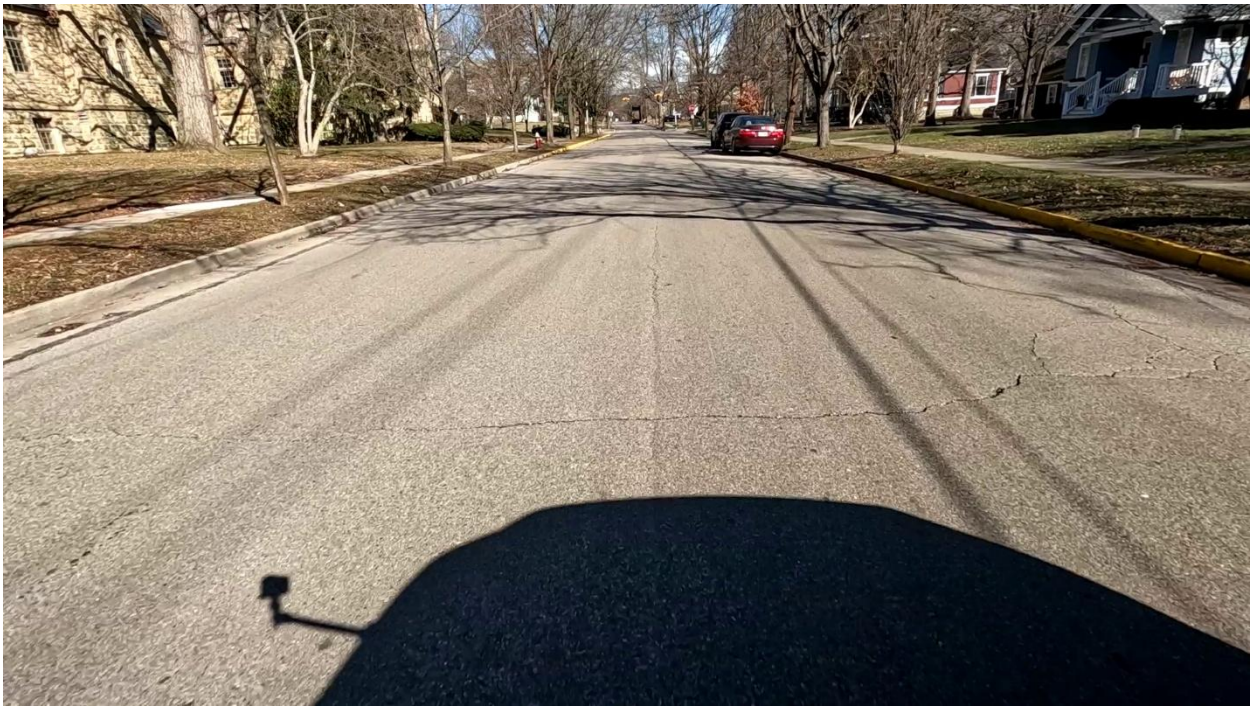
EXAMPLES OF ROADWAY CONDITIONS

A high-resolution video was captured for each management section during the inspection process. A snapshot from several videos has been selected to provide documentation for this report on the inspected section location and serves as a visual identification of the types of distress occurring within the pavement section. The following 2025 images of pavements from within the Roadway Network provide a sense of what various PCI levels look like:

EXCELLENT CONDITION

BONHAM RD | SECTION 02 | PCI 100

GOOD CONDITION



BURNS AV | SECTION 09 | PCI 77

FAIR CONDITION

PARK AV | SECTION 01 | PCI 55

POOR CONDITION

DURRELL AV | SECTION 03 | PCI 30

FAILED CONDITION

COMPTON HILLS DR | SECTION 01 | PCI 18

HISTORICAL CONDITIONS

As outlined in the Executive Summary, the city's average Pavement Condition Index (PCI) has decreased by 3 PCI points since the previous assessment. This decline occurred despite an investment of approximately $2.6 million in roadway improvements, including work completed on Bonham Road, Compton Road, Oliver Road, and Vermont Avenue.

The primary contributing factor to this network-wide deterioration has been the impact of the recent harsh winter seasons. The increased frequency of freeze-thaw cycles has accelerated pavement degradation, affecting an estimated 1–2% of the network during this period.

These conditions underscore the importance of the upcoming project phases and the need for enhanced funding efforts. If implemented as planned, these initiatives are projected to reverse the downward trend and yield significant improvements to the overall network over the next decade. Details on the projected outcomes are presented in the following section.

The map below, in Figure 4, highlights recent project locations, and the chart that follows, in Figure 5, illustrates the overall trend line of the condition.

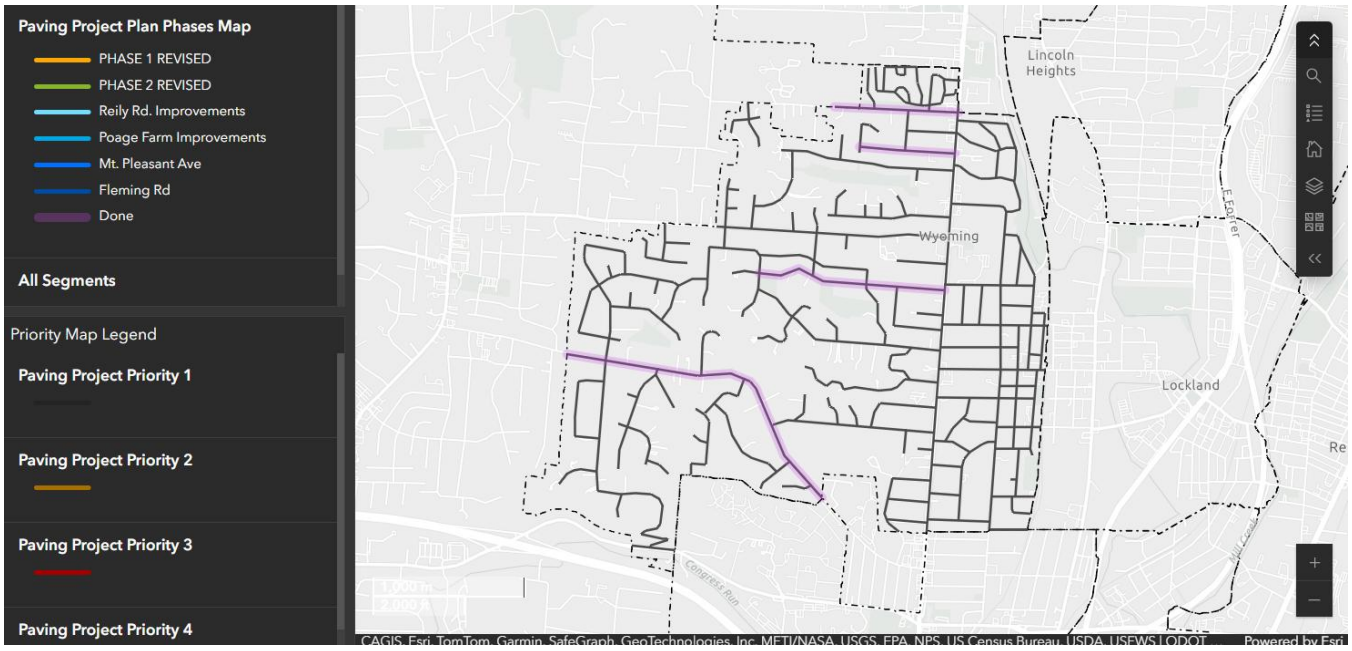


Figure 4. GIS Condition Map of Recent Project Repairs

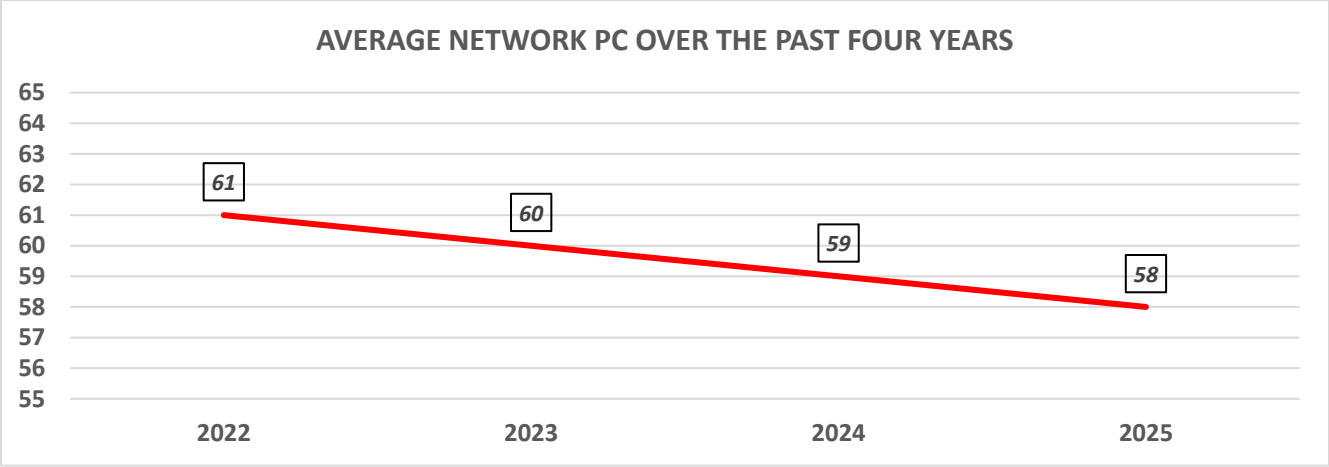


Figure 5. Historical Average Network Conditions

FUTURE PROJECT PLAN

Capital Improvement Plan and Roadway Treatment Strategy

The City has established a comprehensive Capital Improvement Plan aimed at enhancing the overall health and condition of the roadway network. This plan will launch in two initial phases—Phase 1 (2025) and Phase 2 (2026/2027)—targeting over 37% of the City's roadway network. The Public Works Director has carefully selected the roadways included in these phases based on current priorities and the immediate need for major maintenance and rehabilitation.

Each phase will implement a four-step treatment process designed to deliver long-term performance and extend roadway life:

1. Partial/Full Depth Repairs: Localized structural repairs will be conducted to address base failures and ensure a strong foundation.
2. Milling: Once the base is stabilized, the roadway will be milled to a depth specified by the Public Works Director, aligned with future performance goals.
3. Asphalt Overlay: A new surface course of asphalt will then be applied, providing a smooth and durable riding surface.
4. Asphalt Rejuvenator Application: To protect the new asphalt surface from climate-related deterioration—including weathering, raveling, and cracking—a rejuvenator will be applied as the final treatment.

This comprehensive four-part process provides a solid foundation for achieving optimal roadway performance and longevity.

Preventive Maintenance Plan (Years 4–10)

To sustain the benefits of the initial improvements and maximize pavement life, a forward-looking preventive maintenance strategy has been developed:

- Year 4: Each treated roadway will receive a second asphalt rejuvenator application, reinforcing protection against environmental stressors and slowing the onset of cracking.

- Year 4 or 5: Based on observed levels of cracking, the roadway will undergo its first crack-sealing treatment. This critical preventive maintenance measure seals climate-related cracks, preventing water and debris infiltration that can weaken the pavement structure.
- Year 10: A second crack sealing application will be conducted, further extending the pavement's service life.

These scheduled maintenance activities are designed to preserve roadway conditions over the entire 10-year period, maintaining a Pavement Condition Index (PCI) above 60 and ensuring continued value from the City's investment. Furthermore, the compound effect of this strategy over the ten-year plan, with all roads improving each year, will help the city achieve an overall network PCI average of 70 or above, a 12-point improvement from the current network average PCI of 58.

Figure 6 illustrates the preliminary initiative planned for 2025, while Figure 7 outlines the proposed improvements for 2026 and 2027. Figure 8 provides a consolidated view, combining recently completed repairs with the planned projects for 2025 through 2027.

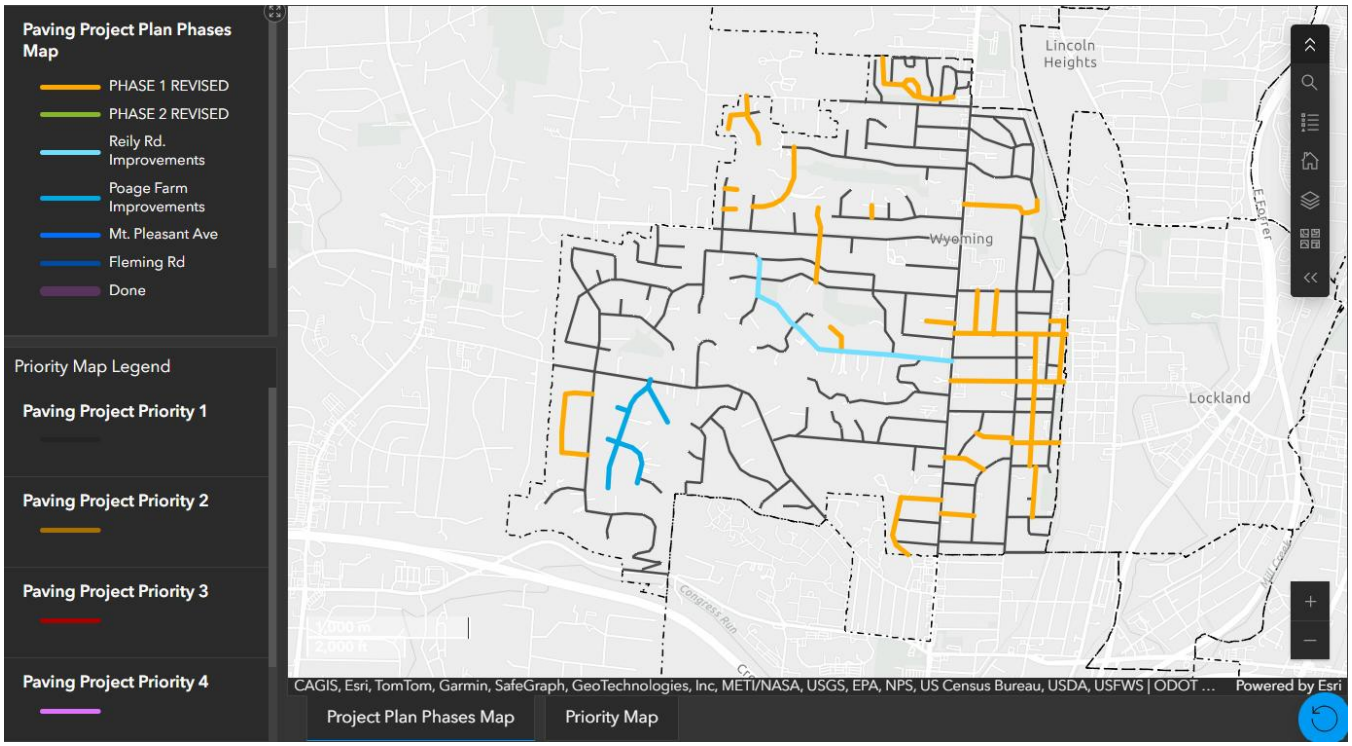


Figure 6. Phase 1 Project Plan, Including Poage Farm and Reily Road Improvements

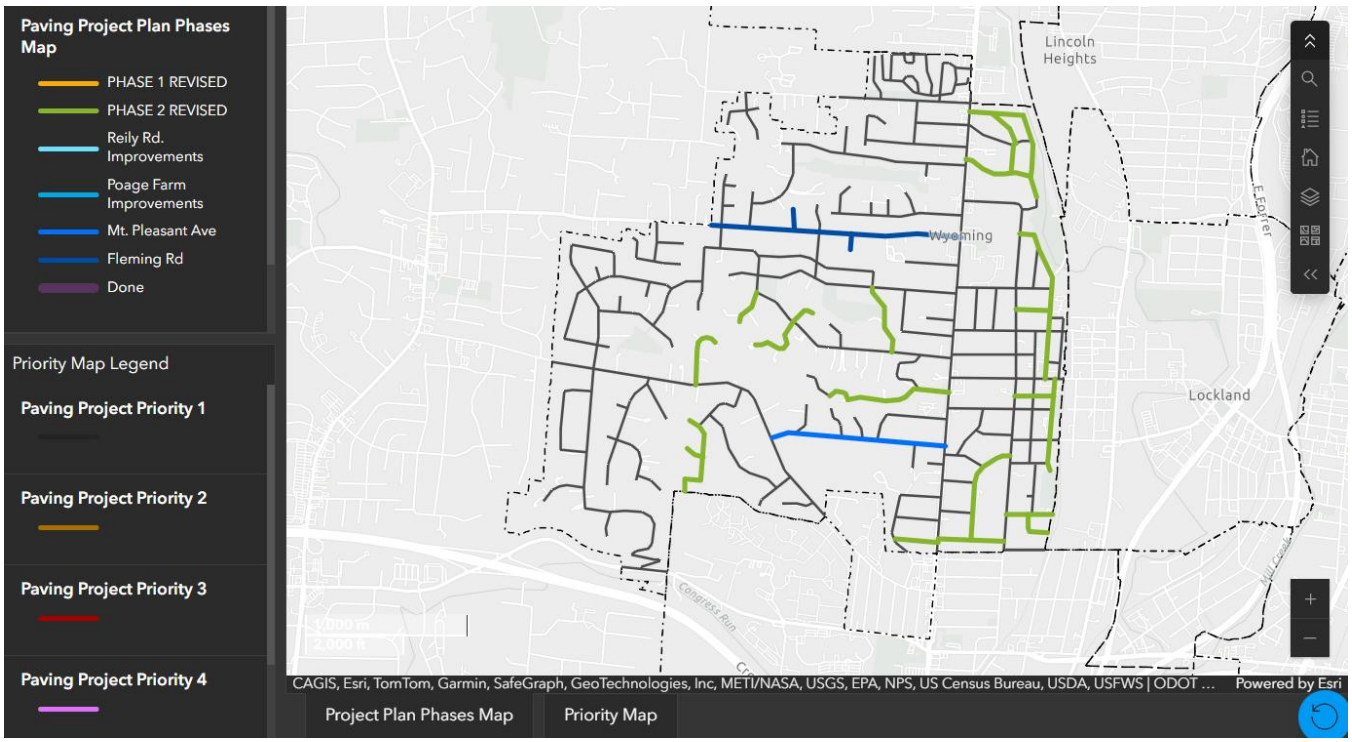


Figure 7. Phase 2 Project Plan, Including Mt. Pleasant Avenue and Fleming Road Improvements

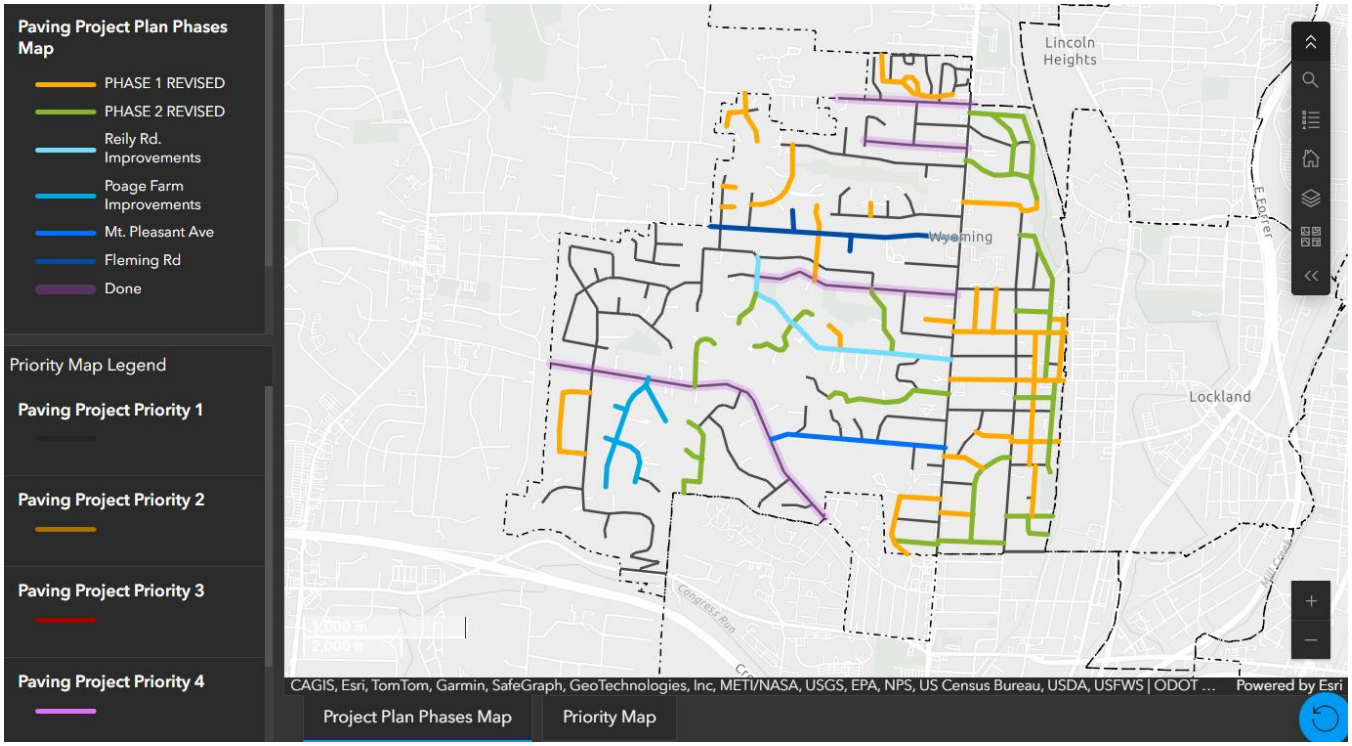


Figure 8. Phase 1 and Phase 2 Combined Project Plan

Upon completion of the Phase 1 project plan, the City is projected to see a notable improvement in overall roadway conditions. The average network PCI is expected to rise from the current score of 58 to 71 by the end of the 2025 construction season. Following this, the Phase 2 project plan is anticipated to deliver an additional 7-point gain, increasing the network average PCI from 71 to 78.

Looking ahead, the City's long-term objective over the next 8 to 10 years is to provide a healthy, safe, and reliable network while sustaining an average network PCI of 70 through the end of 2034. Achieving and maintaining this level offers a high level of service to the community, surpassing Ohio's state average PCI of 65, as stated in the American Society of Civil Engineers' bi-annual Infrastructure Report Card, and ensures a longer pavement lifespan with fewer reactive maintenance demands.

Figure 9 illustrates the projected 10-year PCI trend, incorporating both Phase 1 and Phase 2 improvements, followed by a Reclamite plus crack seal treatment strategy after the mill and overlay phases. To support this vision, PMG estimates that an annual budget of $1 million is required, starting in 2027, to continue implementing preventive and preservation-focused strategies, in addition to milling and overlay operations, to eliminate failed roadways each year. PMG also recommends that the city closely monitor projected inflation and the costs of maintenance and repair activities on an annual basis. With this sustained investment, the city can expect to achieve a total network improvement impact exceeding 77% by year 10, as shown in Figure 10.

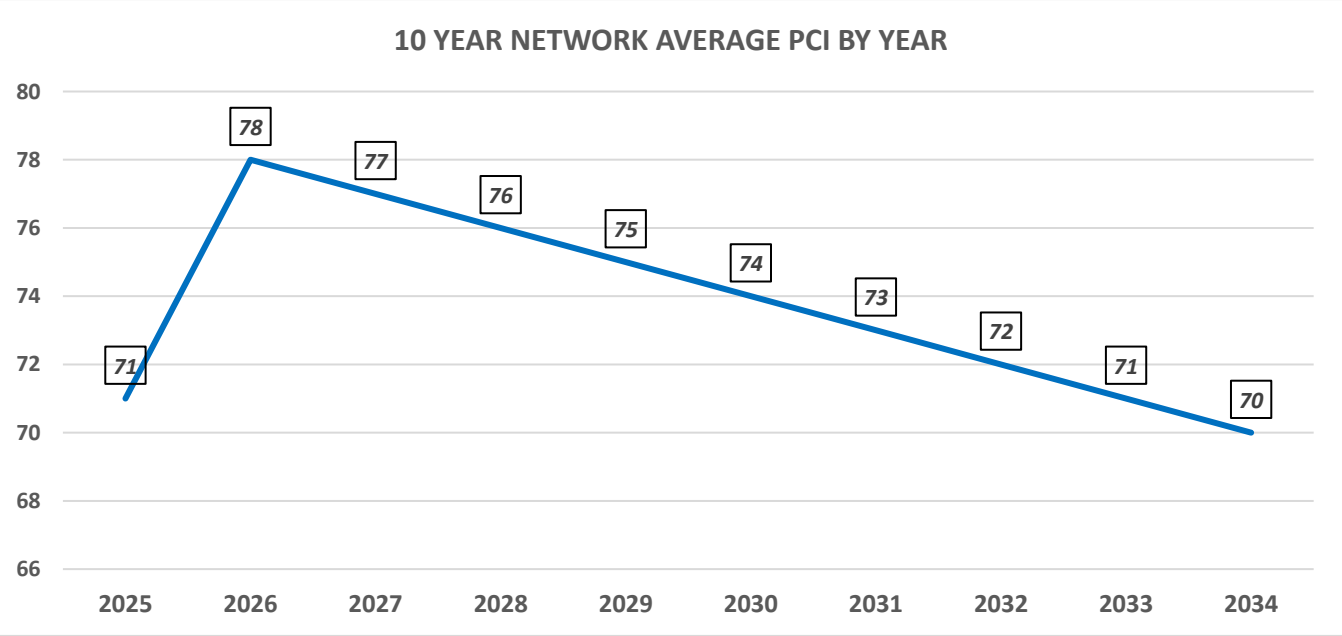


Figure 9. 10-Year Network Average Conditions

PROJECT YEAR	TOTAL AREA IMPROVED	PERCENT AREA IMPACT
2025	1,030,829	20.82%
2026	790,606	15.97%
2027	Estimated 250,000	5.05%
2028	Estimated 250,000	5.05%
2029	Estimated 250,000	5.05%
2030	Estimated 250,000	5.05%
2031	Estimated 250,000	5.05%
2032	Estimated 250,000	5.05%
2033	Estimated 250,000	5.05%
2034	Estimated 250,000	5.05%
TOTAL AREA IMPACT		***3,821,435***
TOTAL NETWORK AREA		***4,950,140***
TOTAL PERCENT NETWORK IMPACT		***77.20%***

Figure 10. 10-Year Network Impact Data Table

SUMMARY CONCLUSION

The findings of this comprehensive pavement management project clearly illustrate both the challenges and opportunities facing the City of Wyoming's roadway network. With a current average network PCI of 58 and nearly 44% of pavements rated in Poor or Failed condition, there is a critical need for immediate investment and long-term strategic planning.

Despite a recent decline in average PCI, mainly driven by harsh winter conditions and a more aggressive freeze-thaw cycle, the city has taken proactive steps by commissioning a detailed condition assessment and developing an ambitious, data-driven improvement plan. The Phase 1 and Phase 2 project initiatives, set for 2025 and 2026/2027, respectively, are projected to raise the average PCI to 78 while eliminating failed roadways and significantly increasing the percentage of pavements in Good or Excellent condition.

Looking ahead, the City of Wyoming remains committed to its 10-year capital improvement plan, which is supported by consistent annual investments of $1 million. This strategic plan leverages timely treatments, including partial/full depth repairs, milling and overlay, rejuvenation, and crack sealing, to establish a solid foundation for the long-term success of the pavement network. By maintaining a Pavement Condition Index (PCI) of 70 or higher through 2034, the City is projected to outperform the State of Ohio's average PCI of 65 by at least 5 points. As a result, motorists, including residents, businesses, and visitors, can expect a safer, smoother, and more dependable roadway system well into the future.

This report provides the city with a robust roadmap—built on high-definition video inspections, AI-enhanced distress detection, and ASTM-standard condition assessments—to maximize the value of every roadway dollar. Pavement Management Group remains committed to supporting Wyoming in the successful implementation of its pavement management strategy and applauds its forward-thinking leadership in prioritizing infrastructure sustainability.

James Golden

Chief Executive Officer