Audit of the Department of Public Works Residential Street Paving Program

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City Comptroller

Issued: December 2008

DPW Residential Street Paving Audit

Audit Objectives

1) Develop a descriptive inventory and condition profile the City's residential streets.

2) Evaluate DPW's program for assessing street condition and determining maintenance, repair and replacement needs.

3) Evaluate DPW's program for planning and scheduling work.

4) Evaluate the City's residential street project approval process.

5) Evaluate the impact of City budgets on the preservation of residential streets and potential consequences of under funding.

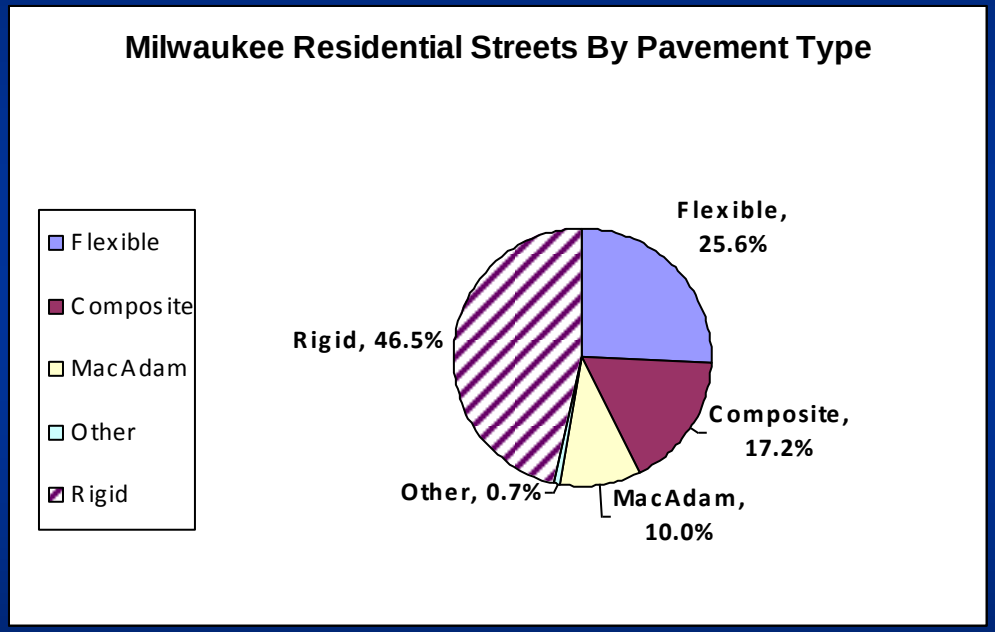
6) Identify cost effective alternatives for managing and operating the City's residential street paving program.

DPW Residential Street Paving Audit

Background

There are roughly 1,415 miles of roads in the City of which approximately 969 are residential streets.

Residential streets consist of concrete (rigid), flexible (asphalt), composite (concrete & asphalt) and Macadam pavement types.



DPW Residential Street Paving Audit

Background

Street resurfacing and reconstruction is funded through the City's capital budget.

Table 1: City and State Street Program Funding

Year	Non-Assessable Borrowing/Cash	Assessable	Total Capital	LRIP	Total Program
2002	$2,692,000	$1,125,000	$3,817,000	$2,134,892	$5,951,892
2003	3,640,000	2,460,000	6,100,000	0	6,100,000
2004	2,565,000	1,435,000	4,000,000	2,114,474	6,114,474
2005	4,184,000	1,968,700	6,152,700	0	6,152,700
2006	3,636,454	1,126,946	4,763,400	2,135,000	6,898,400
2007	4,954,556	1,387,494	6,342,050	0	6,342,050
2008	5,500,000	1,000,000	6,500,000	2,305,000	8,805,000

Source: DPW capital budgets

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Background

Maintenance expenditures are largely funded through the City's operating (General Fund) budget.

Table 2: City Street Maintenance Expenditures

Year	General Fund	CDBG	Borrowing	Total Program
2002	$1,002,098	$0	$12,152	$1,014,250
2003	638,009	3,168	11,969	653,146
2004	922,225	0	6,950	929,175
2005	1,333,504	0	323,976	1,657,480
2006	1,423,508	0	124,152	1,547,660
2007	1,247,089	0	424,008	1,671,097

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Objective 1: *Inventory*, Condition & Age Profile

The audit found a discrepancy in DPW's inventory of streets, between the Road Life database (969 miles) and the Pavement Management Application (1,024 miles).

Recommendation 1: Establish an accurate total of residential street miles, in part, to accurately compute street replacement cycles.

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Objective 1: Inventory, *Condition* & Age Profile

The audit consultant evaluated a random stratified sample of residential streets and confirmed that DPW's condition data is accurate. The average street condition is "fair" with a Pavement Quality Index of 6.33.

Residential Street Profile

	Good	Fair	Poor	Total	Type %
Rigid	177.1	252.8	46.6	476.5	46.5%
Flexible	83.2	90.3	88.6	262.1	25.6%
Composite	64.2	60.9	50.6	175.7	17.2%
Macadam	32.7	44.4	25.2	102.3	10.0%
Other	3.9	0.1	3.4	7.4	0.7%
Total	361.1	448.5	**214.4**	1,024.0	100.0%
Condition	35.3%	43.8%	20.9%	100.0%	

Good = PQI of 7.21 to 10.0
Fair = PQI of 4.51 to 7.20
Poor = PQI of 0.0 to 4.50

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Objective 1: Inventory, Condition & *Age* Profile

The overall weighted average age of residential streets is 41.7 years, but this varies by pavement type.

Average Age of Residential Streets

Pavement Type	Average Years	DPW Service Life	Consultant Service Life
Rigid	42.5	70	50-60
Flexible	32.4	55	25-35
Composite	35.7	45	30-50
Macadam	72.2	100	85
Total Ave	41.7		

The consultants estimated service are based on street design standards and audit observations, and are consistent with industry standards and standards used by the former City Capital Improvements Committee.

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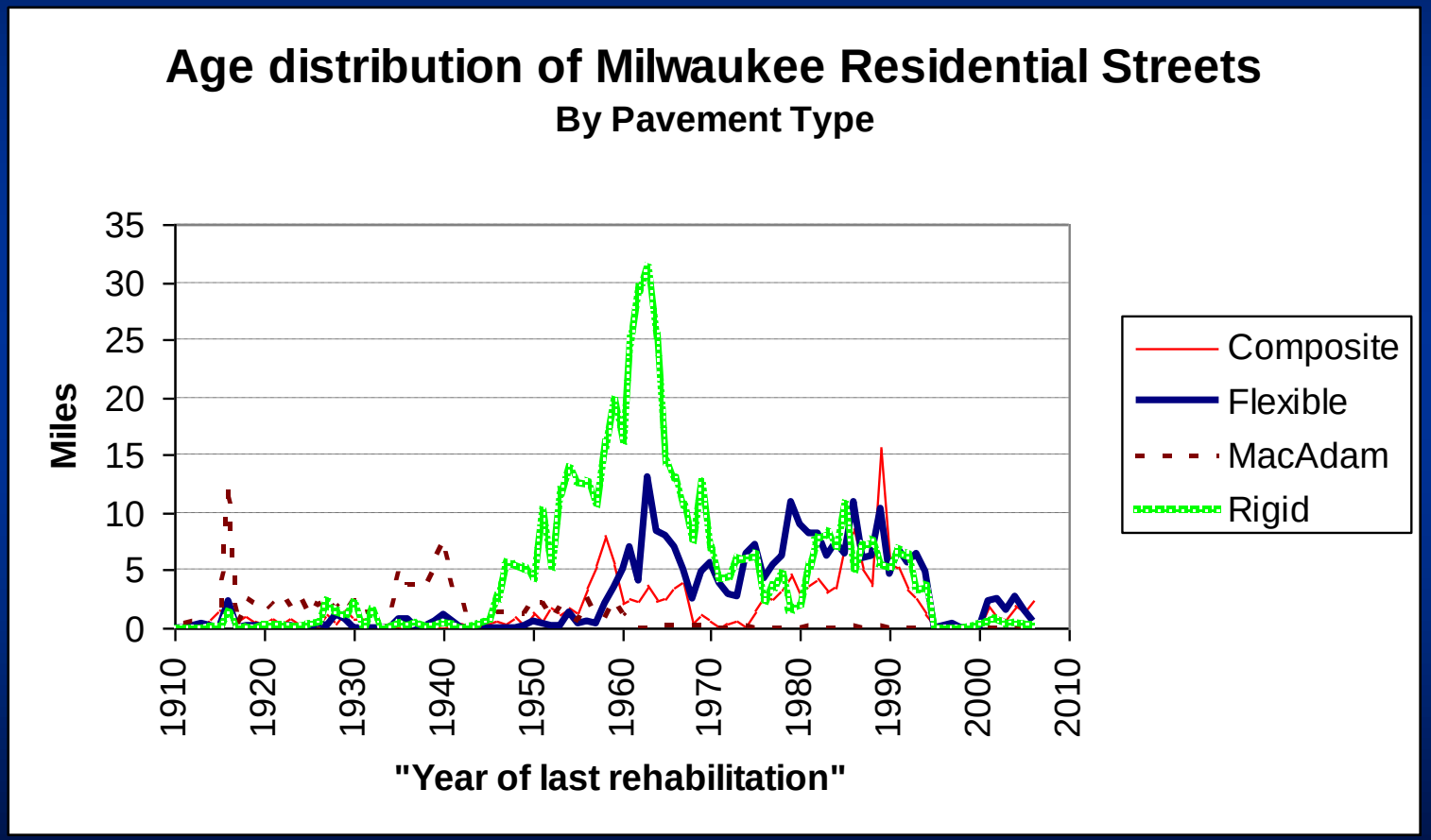
Objective 1: Inventory, Condition & *Age* Profile



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Objective 2: Street Condition and Needs Assessment

DPW's Pavement Management Application is a tool for managing the paving program at a system wide level and contains accurate condition ratings down to the street segment level.

The PMA has reporting and analysis capabilities that can identify street condition, appropriate treatment and estimated treatment costs.

The audit found that none of DPW's engineering and construction sections rely on the PMA as their primary data source.

The audit could not substantiate DPW's independent street assessment and project selection process from reports and records provided by DPW.

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Objective 2: Street Condition and Needs Assessment

Overall, the audit found an insufficient link between paving conditions measured in the PMA and DPW's candidate project list.

The audit also found a lack of reporting of the true maintenance and replacement needs for policymakers to determine whether the street network is being appropriately maintained and replaced.

Recommendation 2: Expand use of the Pavement Management Application (PMA) to develop a cost-effective paving strategy.

Recommendation 3: Implement a paving performance monitoring and reporting process.

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Objective 5: Evaluate City Budgets and Funding

The audit found that the City's per mile street replacement cost of $910,000 is in line with State of Wisconsin guidelines and industry standards.

Based on PMA data, the audit consultant determined that in order to maintain the current condition of the street network, 28 miles of streets would need to be replaced annually.

Based on $910,000 per mile replacement costs, the annual funding need for 28 miles annual is $25.5 million, assuming DPW's current paving strategy.

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Objective 5: Evaluate City Budgets and Funding

The 28 mile replacement need and $25.5 million funding requirement does not address the current 214 mile backlog of poor streets.

Addressing the 214 mile "backlog" of poor rated streets in addition to funding the ongoing annual 28 mile replacement need, would require annual funding of $42 million to $52 million.

All of these funding needs estimates assume DPW continues with its current "worst first" pavement strategy which prioritizes the repair of pavement segments in the worst condition.

However there is an alternative …

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Objective 6: Identify Possible Cost Effective Alternative

In order to optimize available funding, the audit recommends DPW move to a "Preserve First" pavement management strategy, which prioritizes maintenance of better rated streets to prevent them from deteriorating into poor quality streets.

Implementing this strategy would require shifting resources from DPW's paving section to the maintenance section for pavement preservation.

This strategy could allow the City to "catch-up" on the 214 mile backlog of poor quality streets.

Industry studies have shown that "Preserve First" pavement strategies could reduce overall life cycle costs by approximately one-third over 25 years.

Recommendation 4: Develop and fund "Preserve First" pavement strategy.

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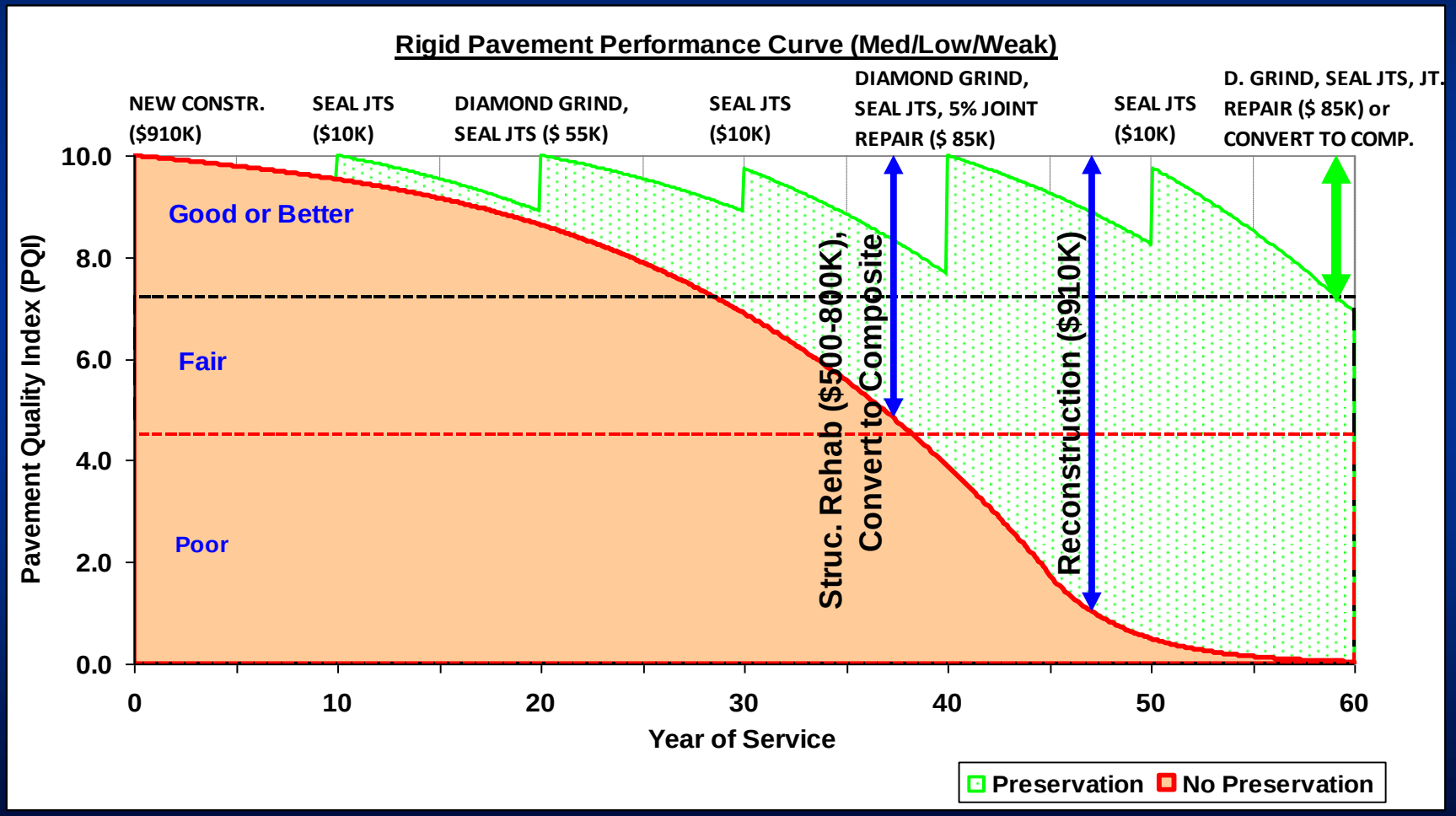
Objective 6: Identify Possible Cost Effective Alternative



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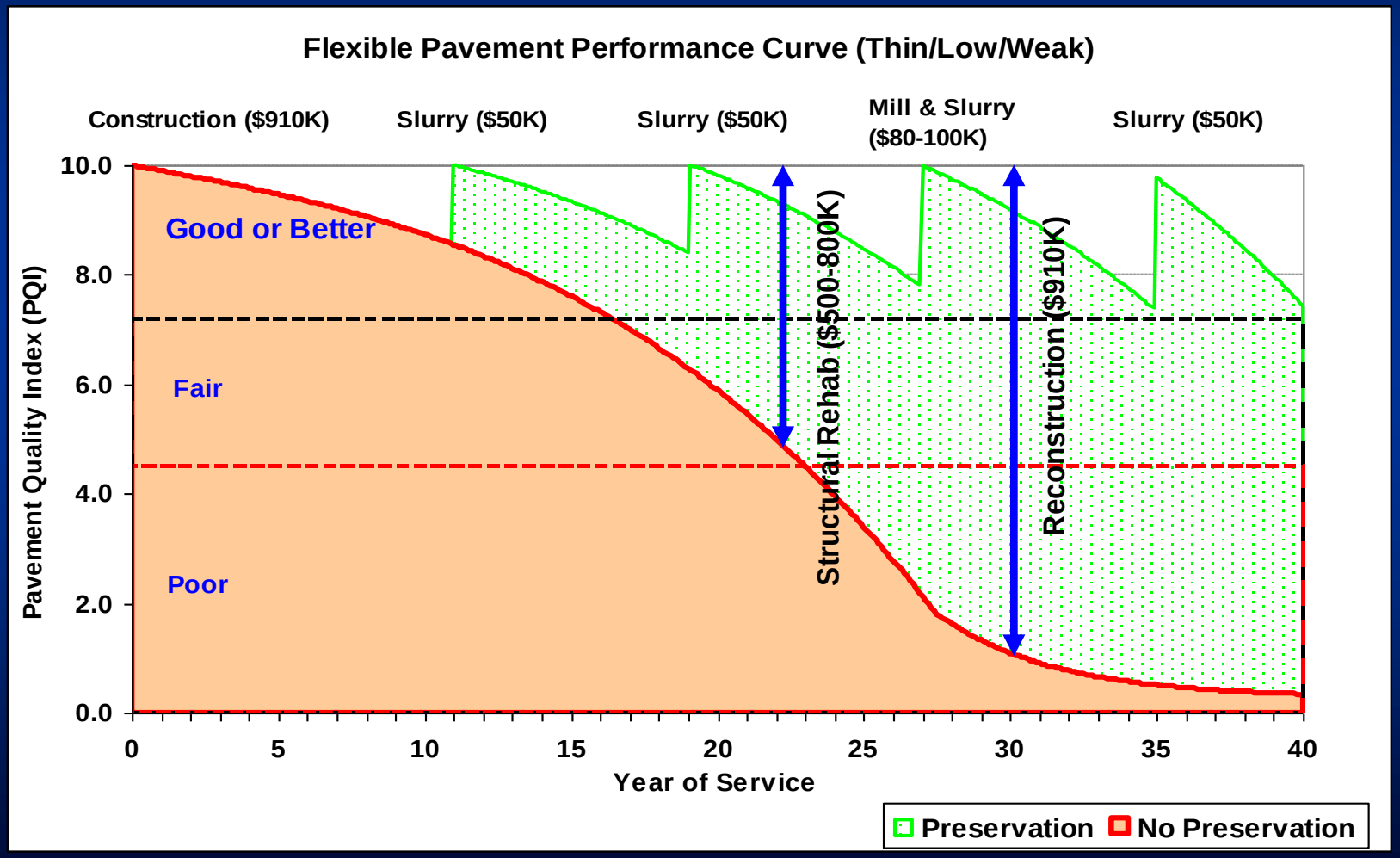

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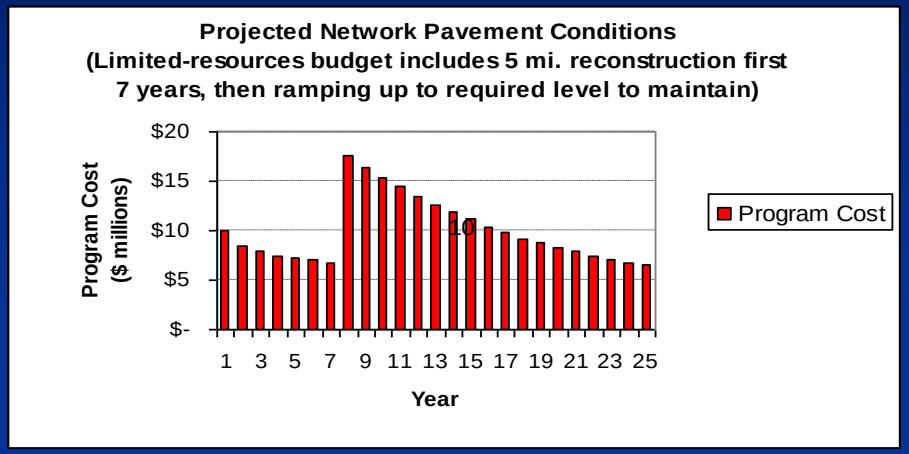

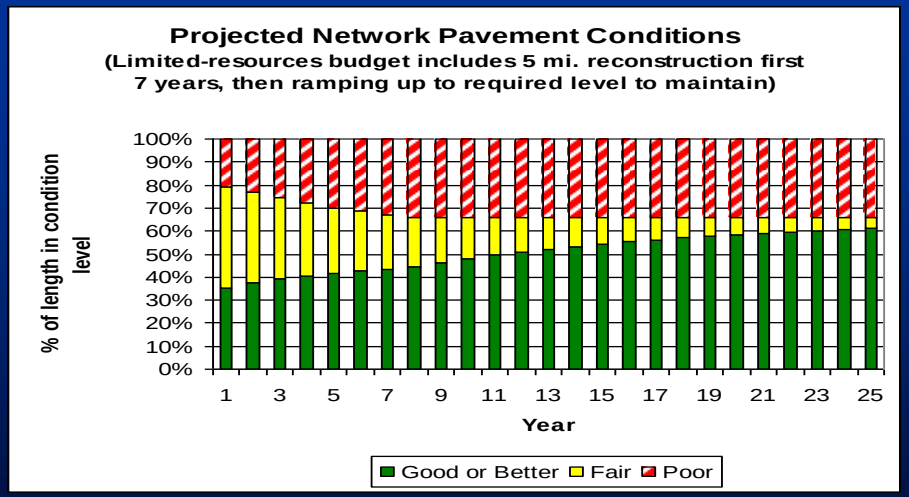

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Objective 6: Identify Possible Cost Effective Alternative

Given the complexity of the paving program, the funding required and long time horizons for strategy implementation, the audit recommends oversight by policymakers to ensure proper maintenance and replacement of City streets.

Recommendation 5: Establish ongoing paving program oversight.

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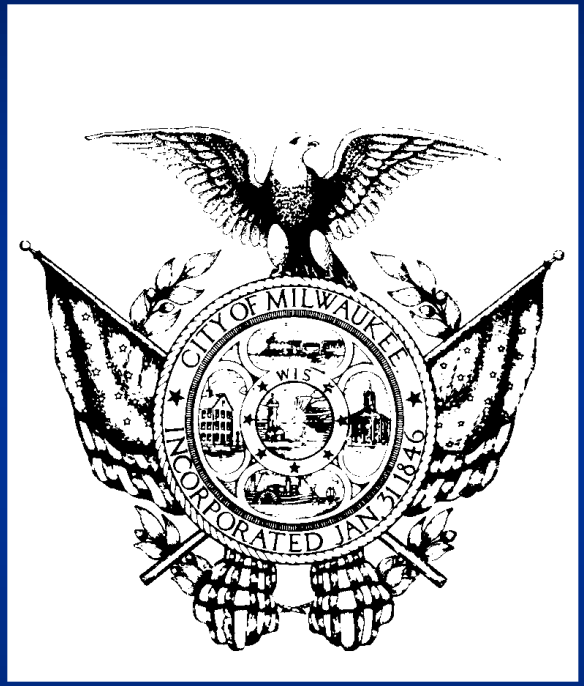

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