



PAVING THE WAY TO SUCCESS

21st Century

Street Preservation Strategies
for Kansas City, Missouri

INTRODUCTION

The Kansas City Public Works Department takes the city's roads seriously.

Public Works is responsible for the maintenance of more than six thousand miles of roadways, including two thousand miles of arterial streets. Street maintenance and reconstruction are managed by a wide range of entities within Public Works, ranging from district maintenance crews deployed to deal with acute road failures to street preservation inspectors and engineers who work to strategically maintain and improve the City's existing road system.

Public Works Street Preservation engineers use data-driven analysis in order to forecast road conditions. Road data provided by road surveys conducted every three years is used to inform our Cartegraph asset management and tracking software. Using Cartegraph, our street preservation engineers are able to rate each individual street and pinpoint optimal methods to maintain peak road conditions throughout the system (Appendix 1.)

Currently, almost half of our road system is classified with an Overall Condition Index (OCI) of Poor to Failed (Appendix 2.) This is a 10 percent shift to poorer or lower from only three years ago when we maintained a bell curve that tended toward a healthier road network.

This year's \$12.4 million street preservation contracts allow for 190 lane miles of resurfacing and 70 lane miles of microsurfacing, a fraction of what is needed to successfully stay ahead of road deterioration.

Kansas City has the tools to turn this situation around if adequate funding was provided. Through improved use of our existing resources, innovative uses of best practices, reaffirmation of our priorities, and optimization of funding provided, we will be able to rejuvenate our road network and establish methods to maintain our roadways into the future.

CHALLENGES

Street preservation efforts in Kansas City face several distinct challenges that limit the efficacy of our operations.

Budget

Due to the wide array of other City programs and activities, the street preservation and maintenance need is often out of reach with realistic budget allocations. Staff must then make decisions on a limited budget, knowing the funding is not sufficient to strategically and sustainably repair our roadway network.

Backlog

This year, Public Works crews received more than six times the number of 311 requests for potholes than were submitted the previous year. The increase workload resulted in a significant backlog, months of six-day work weeks and delays in getting potholes patched. Consistent low funding for street preservation has created a backlog for resurfacing projects. The list of streets in need of resurfacing regularly exceeds the resurfacing budget, causing roads to be pushed to subsequent years or removed from the list entirely.

Personnel

Kansas City Public Works currently has around 30 openings for maintenance workers. These

crews are responsible for activities like pothole patching and spot repair. A shortage of crews not only decreases the amount of work that can be done on a daily basis, but also puts a higher demand on our current work force.

Equipment

Public Works maintains 90 dump trucks, 215 snow plows, 160 salt spreaders and 120 pieces of construction equipment like tractors, forklifts and asphalt trucks. As our existing fleet sees continual use year after year, we have to maintain, upgrade and even replace aging equipment.

System Size

Public Works is responsible for maintaining more than six thousand lane miles of roadway. By virtue of this fact, our road resurfacing list far exceeds the budget available.

Although these challenges exist, Public Works is committed to finding strategic, responsible solutions that will effectively provide safe road access to the public.

CURRENT RESOURCES

The Public Works Department utilizes many existing resources when it comes to street preservation and maintenance.

This year's **budget** provides about \$50 million for street-related activities:

- Maintenance: \$23 million split between pothole patching, spot repairs, snow removal, alleyway cleaning and rural mowing)
- GO Bonds: \$4-6M available for roadway reconstruction projects annually
- Other sources: \$3-5M available annually through federal funds, county funds, etc.
- Street Preservation: \$17 million
 - ◇ \$16 million for resurfacing— mill and overlay, microsurfacing and crack sealing
 - ◇ \$500,000 for Parks roadways
 - ◇ \$500,000 for Complete Streets

Personnel continue to be our most versatile and important asset:

Public works retains 120 maintenance workers spread between three districts. When fully staffed, we can deploy 12 crews to perform spot repairs in addition to their other maintenance responsibilities.

Our Street Preservation team consists of five full-time staff members— a program manager and four senior engineering technicians. Seasonal inspectors and graduate engineers help during the resurfacing season.

More than a dozen contractor crews mobilize on active capital, roadway projects during the height of construction season.

This year's unforeseen challenges have provided **insight** and helped us establish innovative new

practices:

Winter weather and potholes:

- Relying on contractors to supplement City crews with filling potholes sped the repair process at a cost of \$500,000 this season.
- Public Works is experimenting with a four-inch mill and overlay process. This provides a thicker layer of new asphalt on the roadway, which is ideal for deeper surface failures and is considered a major rehabilitation repair.
- This year's pothole events were a wakeup call to the state of our road system's surface conditions and the impact of severe weather on oxidized, unsealed pavement. Without additional, accelerated funding, to seal exposed and damaged roadways, we can and should expect multiple surface-level failures in the future.

NW 68th Street:

Public Works maintenance crews identified NW 68th Street as a failing arterial roadway suffering from completely failed concrete joints. Existing funds did not allow the work to be contracted out, so City maintenance crews rented and operated the milling and paving equipment. This was the quickest and best approach using the resources we had to keep the roadway traversable.

The implications of this approach resulted in a lengthy repair, rental equipment challenges and diversion of maintenance staff from other duties. We are currently examining longer-term repair strategies to support the roadway.

These existing resources combined with data available through Cartegraph and decades of professional experience among Public Works staff allows us to fine-tune our processes to best serve the public.

STREET PRESERVATION PLAN—An overview

The Kansas City Public Works Department has identified a number of tools and tactics to improve our Street Maintenance program. In many cases, our staff have already identified opportunities for improvement and are in the process of implementing them:

Improved use of asset management software

- Focus on institutional knowledge for assessment of Cartegraph data and overall strategy rather than identifying locations
- Improved coordination between departments
- Coordinated online mapping function between Water Services and Public Works – in progress, scheduled for completion in Summer 2019

Improved data integration

- Updating roadway classifications
- Integration of annual daily traffic data
- Creating criticality factor

Increased engagement with the public

- Notification to neighborhoods and adjacent property owners prior to work beginning
- Timely updates of resurfacing map as work is completed

- Keep public informed about the program through up-to-date website and full transparency

We have been charged by Council to improve the arterial road system's OCI rating from an average OCI of 57 to a classification of Fair, identified as an OCI number of 60. While program improvements can assist with this effort, increased funding is vital to expand our contracting capacity and work proactively. We have examined a number of options, from maintaining our current budget to the full goal of a 60 OCI (Appendix 4.) We have also examined the benefit of increasing our street preservation budget to a consistent level of \$25 million, our highest previous street preservation budget.

Ultimately, we welcome the Council's support in prioritizing road maintenance. To that end, we recommend the following legislative action:

- A resolution limiting resurfacing based on road status
- Legislation preserving and maintaining street preservation funds
- Resolution signaling support of aggressive triage of roadways

CONCLUSION

Over the next several months, we look forward to implementing what we see as a fundamental shift in how we manage and maintain Kansas City's road network. These changes will be systematic, well-conceived and based on professional expertise and hard-won experience:

- Improved use of data
 - ◇ Updated roadway classifications
 - ◇ Integration of annual traffic data
 - ◇ Use of criticality factor in road planning
- Improved inter-department coordination
 - ◇ Coordinated online mapping function between Water Services and Public Works
 - ◇ Improved outreach to utilities
- Increased public engagement
 - ◇ More vigorous notification at start of work to neighborhoods and adjacent property owners
 - ◇ Increased transparency and access to data by the public

While these changes will assist with the goal of an average overall OCI of 60, we would be irresponsible to ignore the value of wider policy changes and Council support. Preservation and maintenance of street preservation funds and resolutions focusing our resurfacing efforts to more effectively maintain our roadways would allow us to use the right tools at the right time while reaffirming our elected officials' dedication to sound infrastructure management.

We are deeply appreciative of the support that the Mayor and Council have shown and applaud your dedication and advocacy for the City's infrastructure. We welcome the opportunity to work with you to change the state of Kansas City's road network for the better. With our expertise and your support, the road forward can only get smoother.

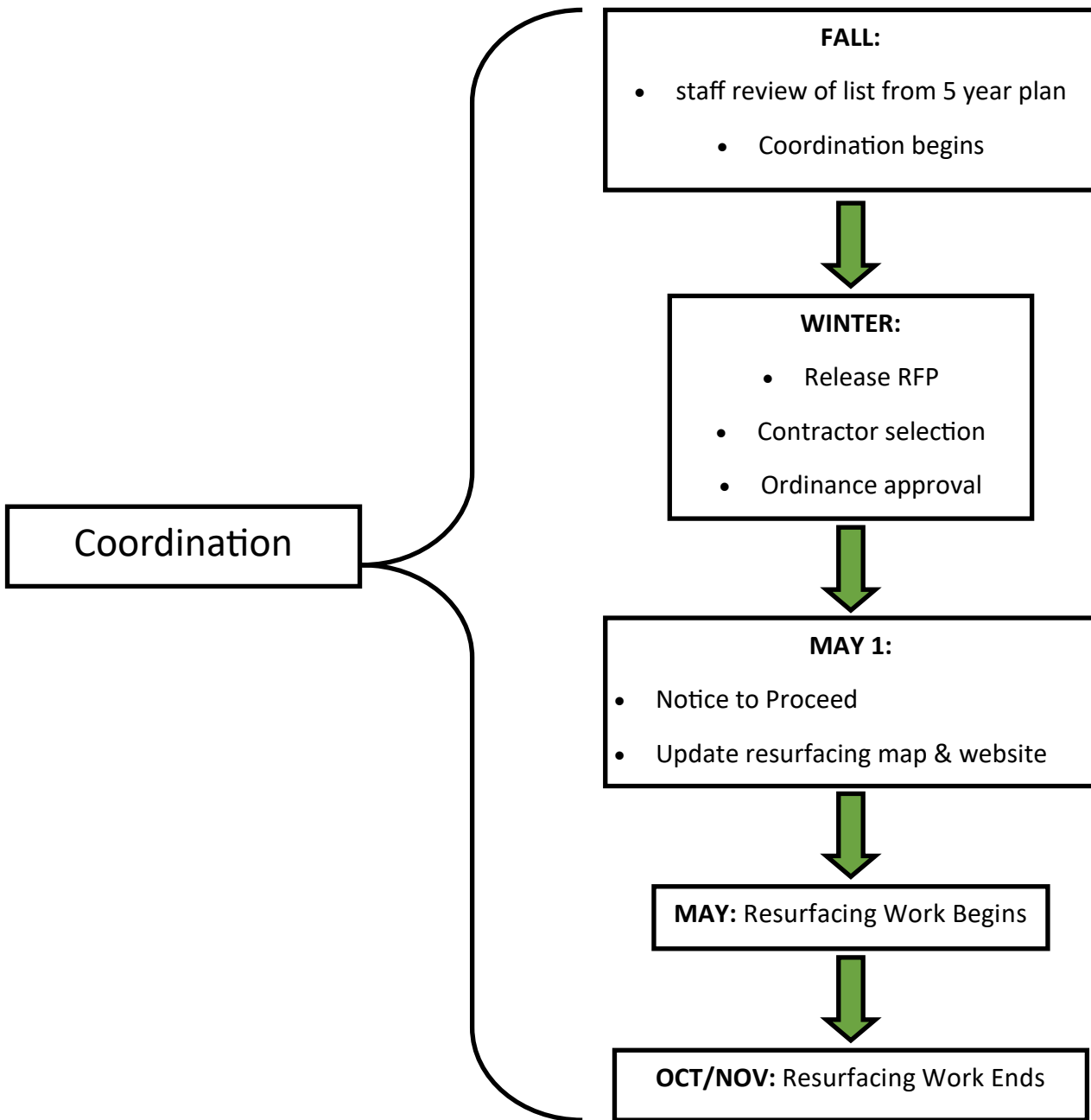
A stylized logo featuring the letters 'E' and 'N' in a grey, serif font. The 'E' is on the left and the 'N' is on the right. Two thick, light green arrows are overlaid on the letters. One arrow starts at the top of the 'E' and curves to the right, ending at the top of the 'N'. The second arrow starts at the bottom of the 'E' and curves to the right, ending at the bottom of the 'N'.

PAVING THE WAY TO SUCCESS

Appendices

APPENDIX ONE

Street Preservation Program Timeline



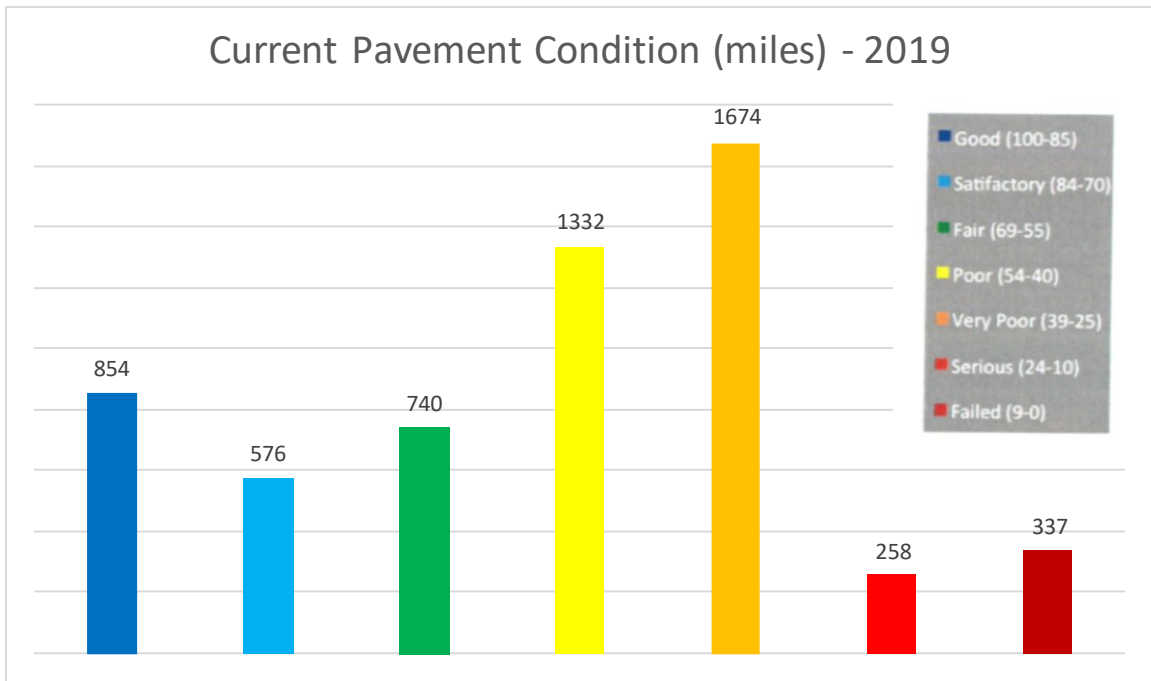
This graphic shows the ideal timeline for the street preservation program.

Each year, program deadlines depend on a variety of factors: ordinance approval of contracts, weather, notice to proceed approval, contractors schedules, etc.

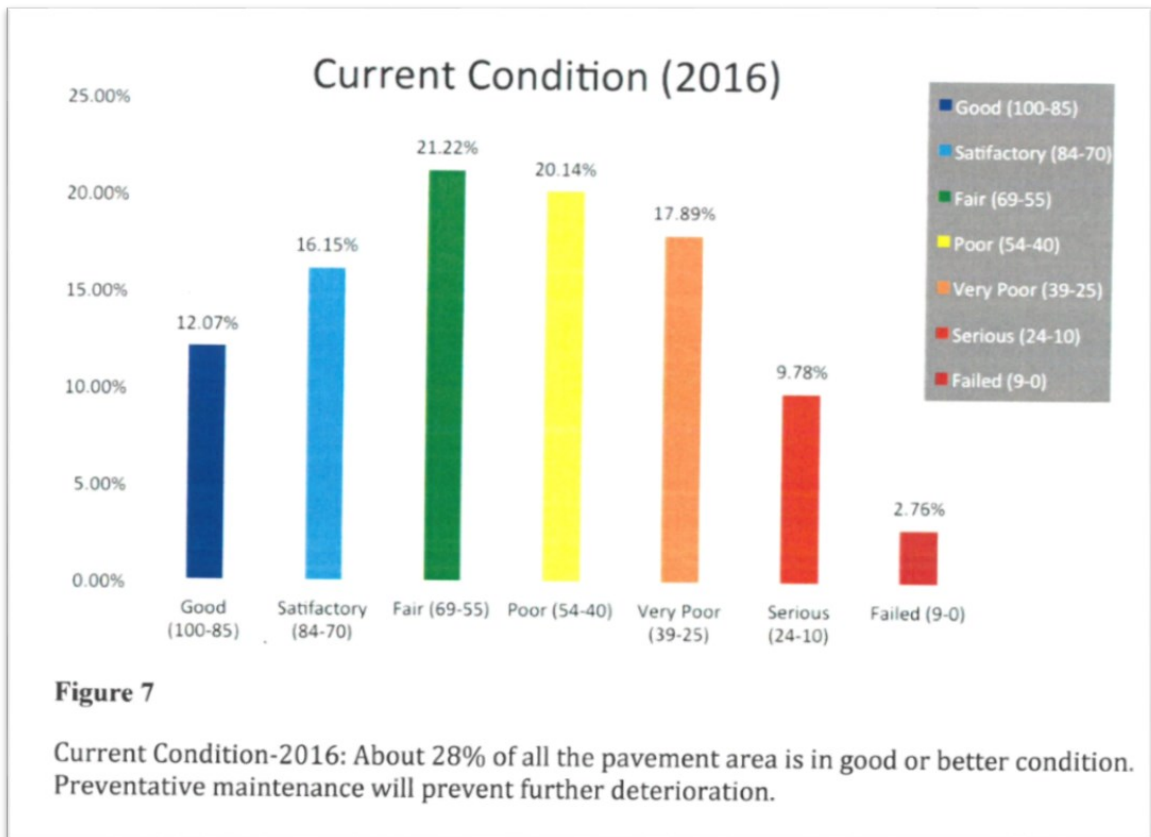
Coordination of the street preservation program occurs throughout the year with various other programs and entities: utility work, other capital projects, Complete Streets projects, etc.

APPENDIX TWO

Graphs: Current System Condition



Number of lane miles in each OCI rating category.



APPENDIX THREE

Table: Average Lifespan of Resurfacing

Activity	Average Lifespan in Years	
	Residential Roadway	Arterial Roadway
4" Mill & Overlay	N/A	12 years
2" Mill & Overlay	15 years	8 years

This table outlines the average pavement lifespan of common resurfacing activities.

- A two-inch mill and overlay application lasts an average of fifteen years on a residential roadway and eight years on an arterial roadway.
- The four-inch mill and overlay application is a new activity Public Works is utilizing this year. Because our street preservation plan is arterial focused, we do not have local data available that demonstrates the impacts of four-inch overlay on residential streets. We anticipate this activity to last an average of twelve years on arterial roadways.

APPENDIX FOUR

Table: Comparing Budget Scenarios

	Scenario 1:	Scenario 2:	Scenario 3:
Total 5-year budget:	\$80M	\$125M	\$831M
Per year:	\$16M/year (expected)	\$25M/year (highest historical (included federal funding))	Avg: \$166.2M/year (getting our network to fair condition)
Current Network OCI:	53	53	53
Current Arterial OCI:	57	57	57
Resulting Network OCI:	40	45	60
Resulting Arterial OCI:	59	70*	60*

This table compares three funding scenarios for the street preservation program.

- First, if the program is funded at the current level of \$16M with a focus on the entire network for 5 years, we expect the overall network OCI rating to decrease to a rating of 40. When the program focuses on arterials-only, arterial OCI will gain 2 points.
- Second, if the program is funded at \$25M each year for 5 years, the highest historical budget received, we expect the overall network OCI rating to decrease to 45. As the program focuses on arterials-only in this same scenario, arterial OCI will gain 17 points.
- Finally, if we want to raise the OCI rating of our network to fair condition (OCI = 60), we need a total of \$831M, which is an average of \$166.2M/year for 5 years.
- **Our recommended approach optimizes scenario 1, with a focus on arterials and a goal to obtain an arterial OCI of 60.**

*Scenario 1 & 2 assumes reconstruction as defined in the GO KC Bond Program and is not included. Scenario 3 includes unrestrained reconstruction activity in the total budget.