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MEMORANDUM

Date: October 1, 2024

To: Brad Chapulis – City Administrator
Trevor Walter – Public Work Director/City Engineer

From: Bryan Drown, PE

Subject: Review of City Pavement Management Plan (PMP) and Capital Improvement Plan (CIP)
City of Baxter, MN
Project No.: OB1.132798

In 2013 the City of Baxter adopted a Pavement Management Plan (PMP) with the purpose of the program to:

- 1) Preserve and perpetuate existing City owned local and MSA street pavements in a fiscally responsible manner
- 2) Correct pavement deficiencies and slow the rate of pavement deterioration
- 3) Consider immediate and long-term needs of existing local street pavements
- 4) Coordinate pavement maintenance and rehabilitation with utility repairs and redevelopment efforts
- 5) Provide information for better informed and involved decision making

The PMP utilizes the PASER Pavement Management System (PMS) to assist in identifying and tracking street pavement performance and condition at a network level of management (Street Pavement Database). This system is able to objectively evaluate the condition of a street, establish a pavement rating condition, and estimate its maintenance / rehabilitation needs. The PASER methodology is based on a consistent numeric rating scale ranging from 10 for a newly surfaced street to 1 for a failed surface. Ratings are obtained from a field inspection of the entire street surface based on the quantity, type, and severity of distresses in the pavement. This evaluation is done in a manner to assure that similar sections consistently receive similar ratings. The PASER PMS methodology “predicts” what a typical life cycle might be for a bituminous surfaced street. Naturally, any individual street’s life can vary significantly depending on the volume and weight of traffic, soil conditions, etc. However, using the “predicted” life cycle experiences of similar pavements resulted in the following PASER recommended pavement management strategies:

Pavement Rating Condition	Typical Recommended Management Strategy	
	Category	Strategy
9 - 10	Maintenance	Chip Sealing
6 - 7 - 8	Maintenance	Crack Rout & Seal, Patching, Chip Sealing
5 - 6	Rehabilitation	Mill & Overlay
3 - 4	Rehabilitation	Full Depth Reclamation & Paving
1 - 2	Rehabilitation	Full Depth Reconstruction

The PMP was initiated with Chip Sealing utilized as the pavement maintenance strategy and Rehabilitation projects primarily focused on commercial and industrial streets. From 2014 to 2017, 24.4 miles of city streets were chip sealed. In 2016 chip sealed pavements started to exhibit stripping which is the separating of the pavement surface creating potholes that over time extend vertically into the pavement surface. Below are photos of example of pavement stripping:



As the damage from chip seal stripping was analyzed and researched no pavement maintenance projects were completed from 2018 to 2020. In 2021 the City of Baxter Pavement Management Plan was updated to include Micro Surfacing as a pavement maintenance strategy in lieu of the chip seal program that was discontinued in 2017 due to pavement degradation due to pavement stripping. The Micro Surfacing Program utilizes an eight-year rotation or cycle. The age of pavements is utilized to determine the timing of maintenance and rehabilitation with the goal to follow rehabilitation activities with micro surfacing at year eight. An eight-year cycle was chosen based on preventive maintenance research which shows that roads, in good condition, should be micro surfaced within 7 to 10 years following rehabilitation or reconstruction. Overall, the Pavement Management Program utilizes the following Strategies:

Pavement Rating Condition	Typical Recommended Management Strategy	
	Category	Strategy
9 - 10	Maintenance	Crack Rout & Seal
6 - 7 - 8	Maintenance	Patching, Micro Surfacing
5 - 6	Rehabilitation	Mill & Overlay
3 - 4	Rehabilitation	Full Depth Reclamation & Paving
1 - 2	Rehabilitation	Reconstruction

In 2021, 1.5 miles were micro surfaced on Inglewood Drive from Excelsior Road to Wolda Road and Clearwater Road from Kimberlee Drive to Inglewood Drive. In 2022, 3.6 miles of residential streets were micro surfaced in the neighborhood north of TH 210, west of Memorywood Drive, and south of Travine Drive. In 2023, 3.0 miles of streets were micro surfaced including Inglewood Drive from Fairview Road to Excelsior Road, Deerwood Road, Travine Drive, and Paper Birch Circle north of the 2022 project and residential streets west of Inglewood Drive and north of Excelsior Road. A map of streets that have been micro surfaced is attached. The streets micro surfaced from 2021 to 2023 were chosen as test sections as the majority of them had not been chip sealed or rehabilitated since the inception of the pavement management program in 2014. The pavements were 17 to 19 years old and were in relatively good

condition with PASER ratings of 6 and 7. Included in the 2023 project were Travine Drive, Atwater Road, and Jewelwood Drive which were chip sealed and exhibited a limited amount of stripping. These streets are being reviewed annually and are currently not exhibiting stripping showing through the micro surfacing. In 2024, 6.2 miles were micro surfaced in the Southdale neighborhood, Fairview Road from Memorywood Drive to Inglewood Drive, Maplewood Drive, and residential neighborhood east of Inglewood Drive, west of Glenwood Drive, and south of Excelsior Road. These streets are the first iteration of micro surfacing streets at year eight following rehabilitation and have PASER ratings of 7 and 8.

Clearwater Road and Inglewood Drive micro surfaced in 2021 have been visually reviewed the past 2 years and subsequent streets reviewed this year. Currently these street segments are not exhibiting stripping, existing transverse cracking have shown through after year 2 and have been crack sealed, and minor surface scuffing is exhibited at driveways due to turning movements. We are monitoring the micro surfacing in areas on new residential building in the Rock Rose Drive and Kimberlee Drive area as construction equipment has driven on the micro surfacing. To date approximately 15% of the city street system has been micro surfaced.

Street Rehabilitation

The goal of the program is to achieve a minimum pavement life cycle of 20 years for commercial streets and 25 years for residential streets between rehabilitation. The city was previously divided into 7 management areas of comparable size and divided along physical boundaries where possible. Rehabilitation and pavement maintenance activities have now been grouped by pavement age and area with age weighted more heavily than location. In projecting commercial street rehabilitation out 20 years and residential street rehabilitation out 25 years the overall timing of improvements within the system is out of balance and concentrated within short periods of time. This can be attributed to these factors:

- City growth in the late 1990's and early 2000's
- Lack of street improvements due to the economy from 2008 to 2013
- PMP initiated in 2014 and many rehabilitations and new street improvements completed from 2014 to 2020.
- Pavement degradation from chip sealing and maintenance activities not completed from 2018 to 2020.
 - The current CIP and PMP have chip sealed streets exhibiting stripping to be rehabilitated (Mill and Overlay or Full Depth Reclamation) by 2029.
 - Residential streets proposed for rehabilitation are reviewed annually and pavements exhibiting stripping greater than 1.5-inches have been moved to full depth reclamation.

Street & Utility Projects

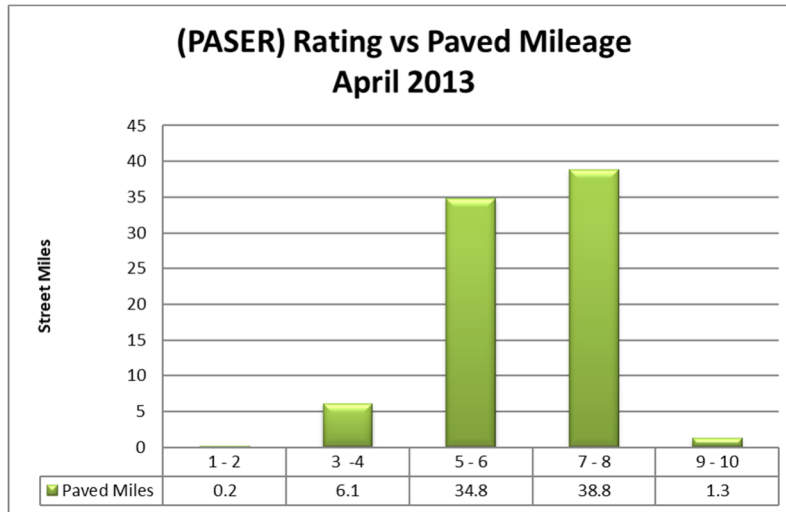
The city identified nine residential neighborhoods where homes are served by on-site sewer systems and wells to extend city sanitary sewer and watermain into. In 2020 the North Forestview Project, in 2022 the Foley Road Project, and in 2024 the South Forestview Project were completed. Subsequent street and utility projects are planned to be completed every other year. The proposed Street & Utility Project schedule in the CIP is:

- 2026 – North Lyndale and Clearwater Road area, and Brentwood Circle (water only)
- 2028 – Jadewood and Jewelwood area and Olivewood Drive Area
- 2030 – Ashley Road, Welton Road, Baywood Road, Black Oak Road, and Springwood Drive

- 2032 – Eagle Ridge area

Summary of PASER Ratings

PASER ratings are completed every three years to document and evaluate the status of the city’s pavements. The original ratings were completed in 2013 and the system had an overall weighted average of 5.89 on a scale of 1 to 10. The weighted average is calculated by multiplying the PASER rating of each street segment by its pavement area, summing that value for all segments and dividing by the total system pavement area. The 2013 ratings reflect growth seen in the late 1990’ and early 2000’s and no pavement projects completed from 2008 to 2013 due to the recession.



The following is a summary of system wide PASER ratings completed every three years. The 2025 values are a projected value based reflecting rehabilitation and micro surfacing completed from 2022 to 2024.

PASER Rating Summary Table									
Street	Area	2013 Ave	2016 Ave	2019 Ave	2022 Ave	2025* Projected Ave			
Residential Streets (Total Area = 859,103 Sq Yd)									
Local Streets - Residential Only	1	6.76	6.36	6.84	6.53	7.16			
Local Streets - Residential Only	2	6.48	6.48	6.55	6.26	7.45			
Local Streets - Residential Only	3	6.36	6.73	7.11	6.69	7.20			
Local Streets - Residential Only	4	4.96	6.48	7.14	6.40	5.90			
Local Streets - Residential Only	5	6.35	6.22	6.02	6.50	7.03			
Local Streets - Residential Only	6	4.77	4.56	4.97	6.69	7.74			
Local Streets - Residential Only	7	6.16	6.97	7.05	6.55	7.64			
	Ave	6.05	6.25	6.47	6.53	7.22			
Municipal State Aid Streets (Total Area = 421,477 Sq Yd)									
MSA	1	5.88	4.85	10.00	10.00	9.00			
MSA	2	6.64	6.84	8.01	7.74	7.58			
MSA	3	5.07	7.77	9.25	8.18	8.07			
MSA	4	5.58	7.94	7.92	7.83	7.86			
MSA	5	4.94	4.99	8.43	9.47	8.56			
MSA	6	0.00	0.00	0.00	0.00	0.00			
MSA	7	5.46	4.90	4.29	3.44	9.57			
	Ave	5.46	6.83	8.25	8.09	8.16			
Citywide	Ave	5.89	6.40	6.94	6.94	7.47			

The above values reflect an initial increase due to the rehabilitation projects that began in 2014 and pavement stripping from chip sealing not being prevalent. The overall rating remained steady particularly on residential streets from 2016 to 2022 as the chip seal program was discontinued and no maintenance projects completed from 2018 to 2020. The projected increase in rating for 2025 is

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reflective of rehabilitation projects continuing and micro surfacing projects being completed from 2021 to 2024.

CIP and PMP Status

Attached please find a city-wide map identifying projects proposed to be completed from 2025 to 2029. The proposed projects reflect the street and utility projects identified above, projects identified for 2027 in response to the TH 371 and TH 210 overpass project, and the PMP Rehabilitation Projects. Based on our discussions the residential pavement rehabilitation projects (Mill and Overlay and Full Depth Reclamation) proposed for 2025 to 2029 earlier this year have been moved back a year.

The micro surfacing completed from 2021 to 2023 on streets with PASER ratings of 6 and 7 and pavement ages of 17 to 19 years appears to be performing well. While industry guidance is to micro surface pavements 7 to 10 years following rehabilitation (mill & overlay or full depth reclamation) it appears pavements, particularly in residential areas, are in a condition past year 10 that micro surfacing could be successfully applied. Extending the placement of micro surfacing to year 12 following rehabilitation could further extend the pavement life and would further space out the amount of micro surfacing programmed each year.

The current CIP and PMP have chip sealed streets exhibiting stripping to be rehabilitated (Mill and Overlay or Full Depth Reclamation) by 2029. With commercial streets scheduled to be rehabilitated every 20 years the PMP reflects rehabilitation in 2034 of the first commercial streets improved in 2014 as part of the pavement management program. Instead of mill and overlay at 20 years on the commercial streets and 25 years on the residential streets we are hopeful that micro surfacing extends the timeline closer to 25 years for commercial streets and 30 years on the residential streets. It is too early to know exactly how the micro surfacing will help so it is important to constantly monitor and document the street segments through the PASER rating system and annual inspections.