

Council Agenda Report

Date: February 13, 2017
Prepared by: George W. Hyde, PE, City Engineer
Submitted by: Oden C. Wheeler Jr., Director DPW
SUBJECT: Street Maintenance Assessment

Recommendation: That Council:

- A. Receive a report on services available and approximate cost to hire a consultant to complete a street maintenance assessment;
- B. If Council wishes to proceed with a Street Maintenance Assessment:
 - 1) Appropriate \$25,000 from the Appropriated Reserve and increase the Public Works Engineering Budget by \$25,000 and
 - 2) Direct staff to develop and issue an RFP for a Street Maintenance Assessment Study and Recommendations

Discussion:

At the 11/28/16 Council meeting, staff was directed to research and report to Council the services available and costs of hiring a consultant to assess the condition of City streets, their levels of usage, and possible cost effective surfacing alternatives and strategies and recommend short and long term goals for paving and repair in order to assist the City in determining the best way to finance future street paving and to identify potential funding sources for such a study. After doing some research, we contacted Kercher Engineering, Inc. (KEI) who specializes in these type of studies and has worked for several other municipalities in Maryland.

After providing some basic information about our street network such as total length and GIS data availability, KEI provided an informal quote of \$24,000 to complete the assessment. Work would include a field survey to assess the current condition of all City maintained streets and a written report which would provide a priority rating, recommended type of maintenance treatment and associated costs. They would also make a presentation of their findings to the City Council. We have included a copy of a report from a recently completed study KEI performed for the Town of Woodsboro, MD to give you an idea of what the completed report would look like. Additional examples of reports from other consultants can be found online using the following links:

- http://www.northcastleny.com/sites/northcastleny/files/file/file/north_castle_pavement_report_6-6-2013.pdf
- http://www.spencerma.gov/pages/SpencerMA_highway/study.pdf

Fiscal Impact:

The costs to complete the street maintenance assessment will be approximately \$25,000. This money is not currently budgeted and would need to be appropriated.

Approved by: Sandra Tripp-Jones, City Manager





**KERCHER
ENGINEERING
INC.**

November 15, 2016

Gary Smith, Burgess
Town of Woodsboro
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Asset Management
Pavement Management
Civil Engineers
Municipal Engineers
Pavement Engineers
Traffic Engineers
Planners
Construction Services
GIS/GPS
Surveyors
CCR Reviews

Reference: Pavement Network Assessment Results
Town of Woodsboro, MD

Dear Mr. Smith:

Kercher Engineering, Inc. (KEI) has completed an assessment of the pavement network of the Town of Woodsboro. The following report documents the findings of the network level assessment including the establishment of a pavement network inventory, the Pavement Condition Survey (PCS) process followed, the pavement treatment definitions and costs, and the final results of the study. In addition, the report includes a Geographic Information Systems (GIS) map of the repair needs of the network as well as attached reference documentation.

The main purpose of a pavement management program is to provide an intelligent, systematic approach to making maintenance decisions. It is a "Network Level" management tool that analyzes the entire road network of the Town. The results from this analysis are intended to be used to identify which general pavement maintenance strategies should be applied to individual roads in the road network to improve network condition and identify short and long term budgetary needs.

Pavement management programs prioritize maintenance and preservation activities for the overall pavement network based on the realization that proper timing of maintenance is crucial. Research has shown that deterioration of a pavement accelerates dramatically as the pavement approaches the end of its design life. Delaying needed maintenance will allow the network to deteriorate unnecessarily, resulting in increasingly higher maintenance costs such as rehabilitation and reconstruction. Pavement management seeks to determine the proper timing and application of maintenance strategies to minimize the required annual cost of repairs while providing the traveling public with the highest level of service. While it can be appealing to address the worst roads in the network first, it is actually more fiscally responsible to maintain the good roads in a good state of repair first to keep them from deteriorating than it is to wait until roads fall into disrepair and then react. However, when a pavement network has roads that have already fallen into disrepair, there will need to be a funding avenue available to bring the roads back to a state of good structural and functional condition and then develop a long term plan to maintain the roads in the best condition possible. Therefore, it is most effective to develop a program that maintains a budget for maintenance and preservation of the higher condition roads while simultaneously funding the rehabilitation of lower condition roads.

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www.kercherai.com

A. Roadway Inventory Development

By utilizing a combination of aerial imagery, GIS, and field confirmation, KEI was able to develop the necessary roadway inventory that was used for the pavement condition survey. KEI began the inventory development using the Maryland SHA 2014 Mileage by Surface Type document provided by the Town. For each roadway segment managed by the Town, the inventory includes the street name, begin and end descriptions, length, width, and pavement type. When developing a network level pavement management assessment, these are minimum inventory elements required to estimate repair costs.

B. Pavement Condition Survey Process

KEI performed a PCS of all asphalt pavement street segments within the Town. This involved driving each segment and observing and quantifying the severity and extent of each pavement distress using the methodology employed by Frederick County. Below are the distresses, along with severity and extent levels. Attached to this document is a copy of the Frederick County PCS manual that defines these distresses in more detail.

- Structural (Alligator) Cracking – 3 Severities and 6 Levels of Extents
- Environmental Cracking – 3 Severities and 4 Levels of Extents
- Patching and Potholes – 3 Severities and 6 Levels of Extents
- Surface Defects (Oxidation/Raveling) – 3 Severities and 4 Levels of Extents
- Rutting and Roughness – 3 Severities and 4 Levels of Extents

C. Pavement Treatment Definitions

KEI has incorporated Treatment recommendations for each street segment as part of the analysis results. The Treatment definitions and unit costs used in this report align with the process followed by Frederick County in their 2016 Pavement Management Program. The following are the Treatments, Unit Costs, and Priority scores assigned to each treatment used in this assessment. Attached to this document is additional detail on the Treatment definitions and applicability to certain pavement conditions.

Treatment	Unit Cost (\$Y)	Priority Score
Monitor	\$0.00	10
Crack Seal	\$1.03	20
Patch (5%, 10%, and 25%)	\$2.76, \$5.87, \$11.07	30
Preventive Maintenance	\$6.07	40
Rehab - Minor	\$18.69	50
Rehab - Major	\$25.90	60
Reconstruction	\$33.07	70

D. Pavement Network Level Analysis Process

The analysis process followed by KEI includes utilizing a simplified prioritization of treatments based on the distresses measured on each street segment. Here is the step by step process followed.

- The pavement distresses are captured for each street segment in the network and their predominant severity level and extent measurement are captured for each distress.
- Each combination of distress, severity and extent has a corresponding Treatment that should be used to address the condition. See the attached Treatment Decision Matrix document for the detailed Treatment assignments.
- For each street segment, the distresses are logged and the corresponding treatment recommendation for each distress is identified.
- The Priority score assigned to each treatment shown in Section C of this report is then used to define the final recommended treatment for the street segment. The treatment with the highest priority of all distresses found on the section is recommended as it would represent the most robust treatment required to meet all distresses.
- Treatment Costs are then calculated based on the Length * Width of the street segment, multiplied by the Unit Cost of the recommended Treatment.
- Total Network Costs are then calculated as the sum of all treatment cost needs of the network.

E. Commentary

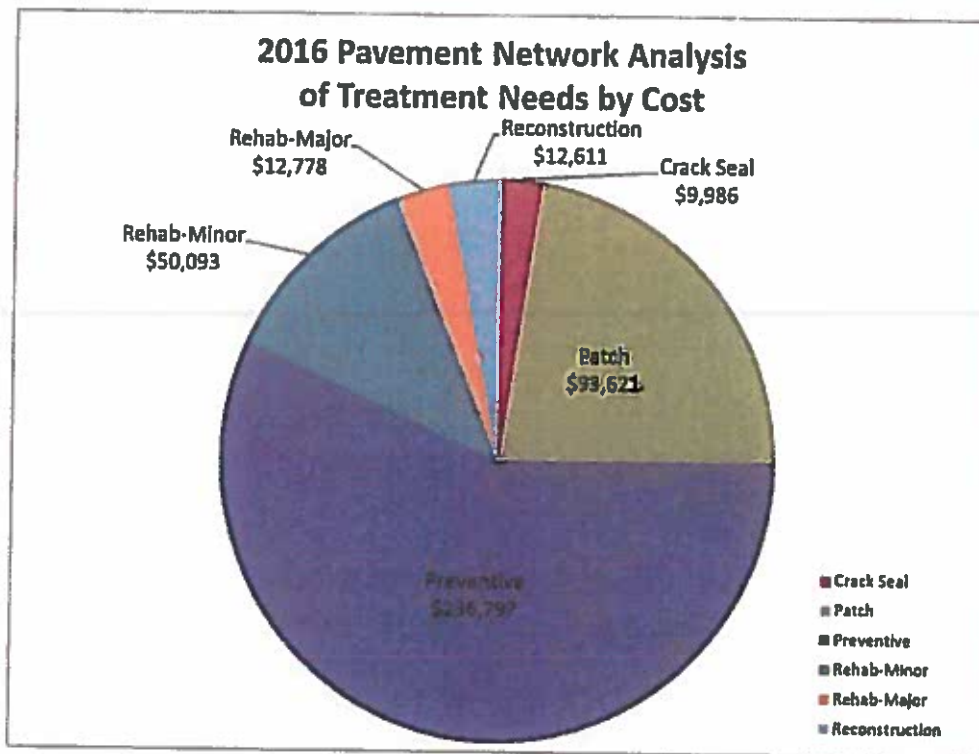
- The Maryland SHA 2014 Mileage by Surface Type document provided by the Town showed a total mileage managed by the Town to be approximately 8 centerline miles. Upon closer review, 1.34 miles listed are managed by SHA and are not part of the Town network. These sections were therefore not surveyed as part of this assessment.
- The Maryland SHA 2014 Mileage by Surface Type document provided by the Town has mileages by street name managed by the Town. However, further investigation into the actual centerline lengths of streets showed minor discrepancies. This report includes the actual measured mileages of the street network managed by the Town so that network level repair costs could be more accurately calculated. The Town should coordinate with SHA to determine if the document should be revised for future publication as it may impact funding availability from the State.
- The Maryland SHA 2014 Mileage by Surface Type document provided by the Town has mileages by pavement type managed by the Town. KEI did not assess any Unpaved or gravel pavement sections for condition and the costs to maintain these sections was not included in the assessment. However, these sections were identified in the Inventory. For street segments found to be partially paved and partially gravel, an assessment of the paved sections was carried out and is shown in the analysis results.

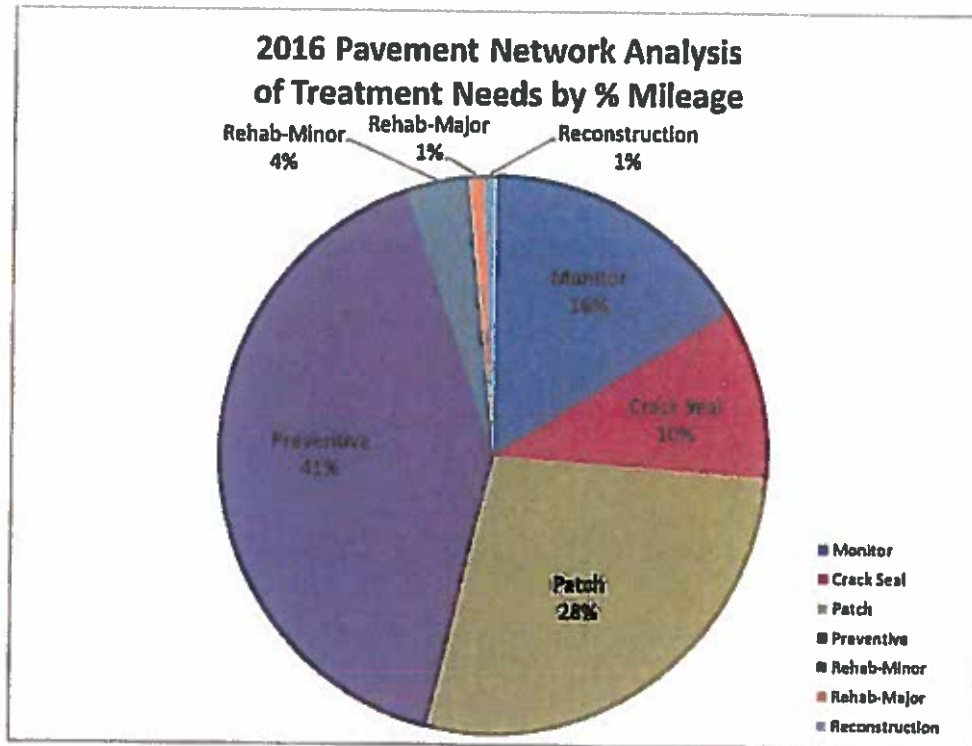
- KEI field verified the names and locations of the street segments managed by the Town. There are instances where the street segments found using aerial imagery or Google Maps differed either in name or location from what was found in the field. KEI has made every effort practicable to identify discrepancies and correct the inventory information based on the field observations. However, it is possible that the assessment did not accurately identify the names, locations, starting and ending points of all segments. Further coordination with the Town may be needed to ensure that the street segments shown in this report align with known limits of Town ownership.
- Treatment Unit Costs change regularly based on many factors including: the size and scope of work including composition of types of repairs (patching, crack sealing, milling, utility adjustments, etc.), number of bidders, time of year, cost fluctuations of raw materials, etc. Since this is a network level pavement assessment, the unit costs are very general and there are a number of assumptions made to define the costs. The next step in the pavement management process is to perform a more detailed project level investigation of each segment to be repaired including field measures which will improve the accuracy of the estimated costs. The unit costs used to calculate budgetary needs in this report represent the latest available costs in 2016 as defined by Frederick County for use in their network level pavement management program.
- It was noted during the PCS that many of the streets in the network appear to have received a Crack Seal treatment in recent years. Although Crack Sealing can be a viable maintenance option on pavements already in good condition with minimal amount of environmental cracking, this is not an effective Treatment option for streets exhibiting moderate to significant cracking as has been found in some cases on the network. This is especially true for streets exhibiting structural cracking in which Crack Sealing is not effective at treating this condition. When a PCS is performed and cracks are found to have received Crack Sealing, any sealed crack in good condition gets a rating of Low severity for the extent measured as an acknowledgement that the cracks are present but sealed. Crack Sealing is widely accepted by many road agencies across the nation to have a life expectancy of between 2-5 years. Assuming the Crack Sealing lasts this long, the Town can expect many of these roads to need a much more substantial Treatment with much higher costs in the next few years. This could have a significant impact on the amount of budget needed in the coming years to keep the network in a state of good repair.
- The Town should consider performing a periodic review of the network to stay up-to-date on the treatment needs, changes in condition, and changes in cost to manage the network. Typically, a PCS is performed every 2-3 years. For instance, Frederick County assesses the pavement network every 2 years, assessing a subset of the network every year.
- The Town should consider a broader assessment of assets managed by the Town to get a full understanding of the budgetary needs required to manage the infrastructure owned by the Town. Assets that are typically assessed periodically in addition to pavements include: bridges and culverts, sidewalks, ADA curb ramps, signs, vehicles and equipment, public buildings and facilities, stormwater facilities, sanitary sewer facilities, and water treatment and distribution facilities.

F. Conclusions

The total estimated cost of Treatments required to bring the network to a good state of repair would be approximately \$415,886. The actual length of the network that was surveyed was 6.69 miles of Town maintained paved roads. The following table shows the breakdown of the network by required Treatment activity.

Treatment	Cost	% of Total Cost	Length (miles)	% of Total Length
Monitor	\$0	0%	1.09	16%
Crack Seal	\$9,986	2%	0.66	10%
Patch	\$93,621	23%	1.85	28%
Preventive	\$236,797	57%	2.73	41%
Rehab-Minor	\$50,093	12%	0.25	4%
Rehab-Major	\$12,778	3%	0.06	1%
Reconstruction	\$12,611	3%	0.05	1%
Totals	\$415,886		6.69	





This report will provide the Town of Woodsboro with a viable starting point for planning purposes for determining short term budgetary needs for pavement maintenance. In addition to serving as a starting point for planning purposes, the total estimated cost will serve as a benchmark in the future to measure whether or not the Town is making headway in reducing the amount of required maintenance. Obviously, it is not expected that the Town can fix every street this year. However, it must be realized that in the years to come, other streets will continue to age and will also need repair. Therefore it is essential that a comprehensive, long-term maintenance plan be developed and adequate pavement maintenance funds be allocated to the network. Should you have any questions or require additional information, please contact me at your earliest convenience. I may be reached at (302) 894-1098 x309 and my email address is adg@kercherei.com.

Sincerely,

KERCHER ENGINEERING, INC.

Aaron D. Gerber, P.E.

Director of Infrastructure Asset Management

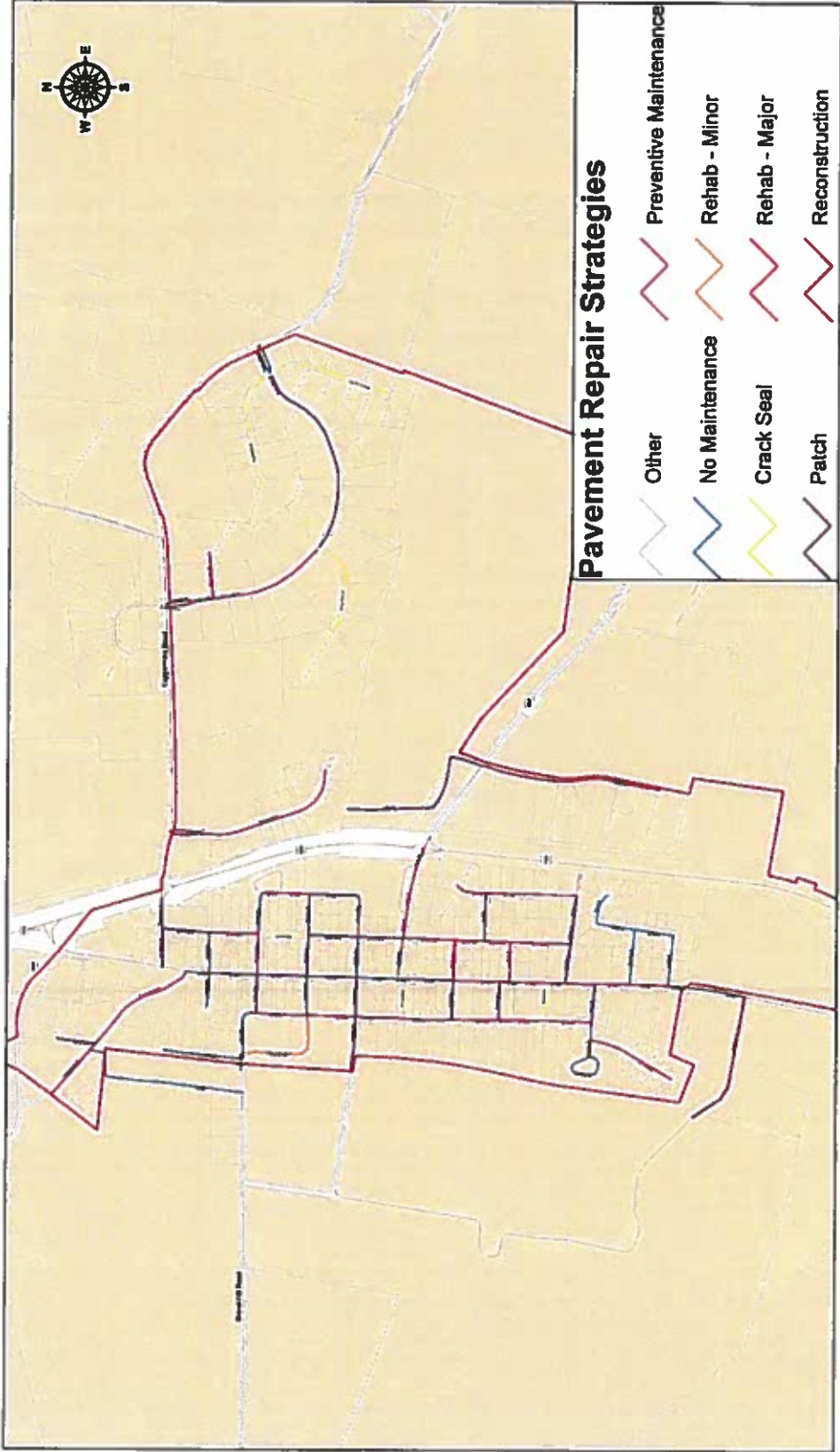
Enclosures:

Woodsboro Pavement Analysis Results_20161115.xlsx









Woodsboro Pavement Analysis Results Map_20161115.pdf

Pavement Treatment Tech Brief.docx

Frederick County Roadway Distress Data Collection Guide, Version 2.1.doc



Pavement Repair Strategies

-  Other
-  No Maintenance
-  Crack Seal
-  Patch
-  Preventive Maintenance
-  Rehab - Minor
-  Rehab - Major
-  Reconstruction



**2016 PAVEMENT CONDITION ASSESSMENT MAP
TOWN OF WOODSBORO, FREDERICK COUNTY, MARYLAND**



Prepared by
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