

2020

Lakes Highway District State of Roads Report



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2019 STATE OF OUR ROADS REPORT

Executive Summary

This summary is an update to the District's previous State of Roads Report in 2012 and 2107, in addition to the 2010 Pavement Management Plan. Based on work previously completed Lakes Highway District estimates the following:

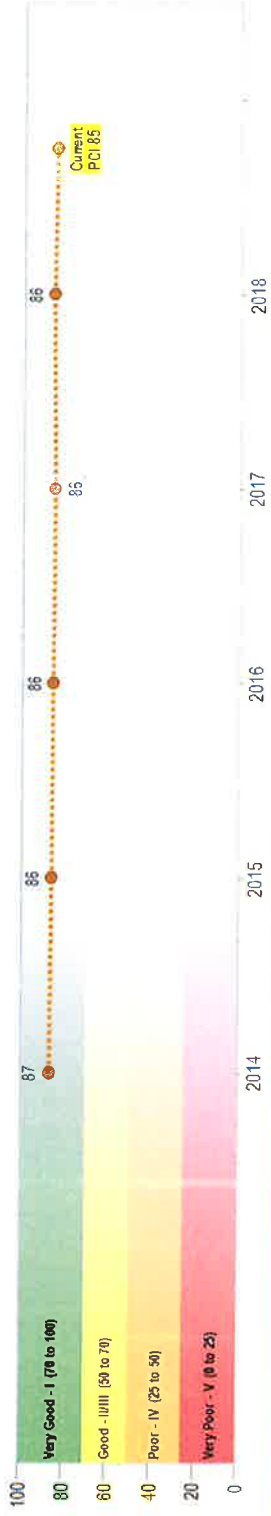
Year	Pavement Condition Category (PCI)	Budget Allocation to Road Maintenance		
Goal	Maintain PCI at 2012 levels, 81	Road Maintenance (RM) = \$2,225,000 w/inflation		
2018-19	85	CPI: \$2,225,000 in January of 2012 has same buying power as: \$2,518,437 in August of 2019		
2010-11	N/A	Road Maintenance \$623,451	Reconstruction \$1,572,849	Total = \$2,196,300
2011-12	81	Road Maintenance \$1,327,282	Reconstruction \$828,200	Total = \$2,155,482
2012-13	85	Road Maintenance \$2,400,557	Reconstruction \$86,632	Total = \$2,487,189
2013-14	87	Road Maintenance \$2,083,100	Reconstruction \$214,363	Total = \$2,297,463
2014-15	86	Road Maintenance \$2,057,922	Reconstruction \$139,518	Total = \$2,197,440
2015-16	85	Road Maintenance 2,158,643	Reconstruction \$103,000	Total = \$2,261,643
2016-17	86	Road Maintenance \$2,710,257	Reconstruction \$154,000	Total = \$2,864,257
2017-18	86	Road Maintenance \$2,790,335	Reconstruction \$0	Total = \$2,790,335
2018-19	85	Road Maintenance \$1,431,900 w/\$366,500 chip seal	Reconstruction \$1,309,500	Total = \$2,741,400

The table above represents target goals originally set in 2012 in comparison of annual actual Pavement Condition Index (PCI) and actual dollars spent. Previous analysis in 2017 indicated that the average dollars spent on Road Maintenance between yrs. 2012-2017 was approximately \$2,123,100 each year within the 6-year period. With 2-additional years included in this analysis, the average dollars spent on Road Maintenance over the 8-year period is now approximately \$2,120,000, nearly the same.

Of importance as it relates to dollars spent over the 8-year analysis period between 2012 and 2019, the Pavement Condition Index (PCI) has remained relatively consistent. The PCI being the true indicator of value shows that the dollars being allocated in the manner guided by the Districts pavement management program is proving effective in achieving the Districts goal set back in 2012.

A full Executive Performance Summary of the Districts Road Network is shown on the following page.

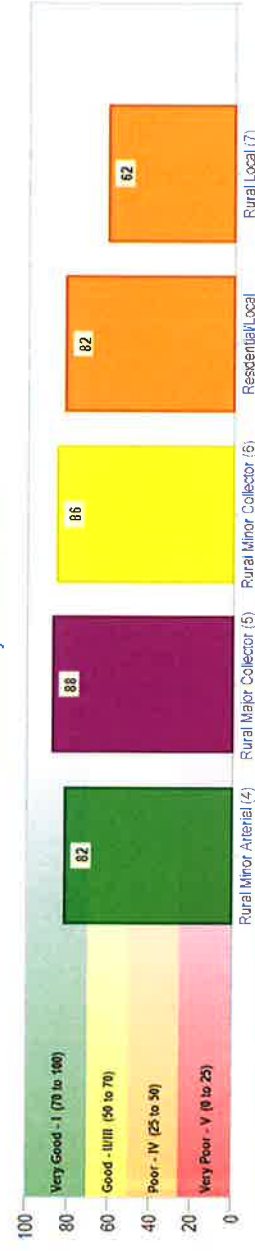
*Historical Pavement Condition Trends



*Current PCI



*Current PCI by Functional Class



Network Inventory

Area: **1.44**
(square miles)

Miles: **278.11**

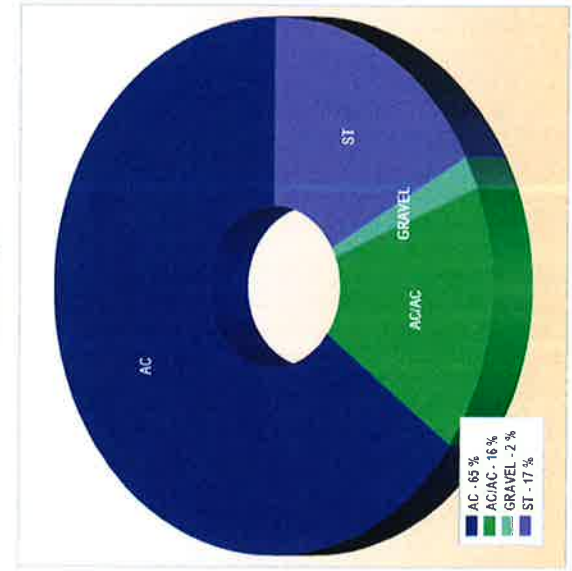
Lane Miles: **566.88**

Sections: **664**

Remaining Service Life (years)



Surface Type



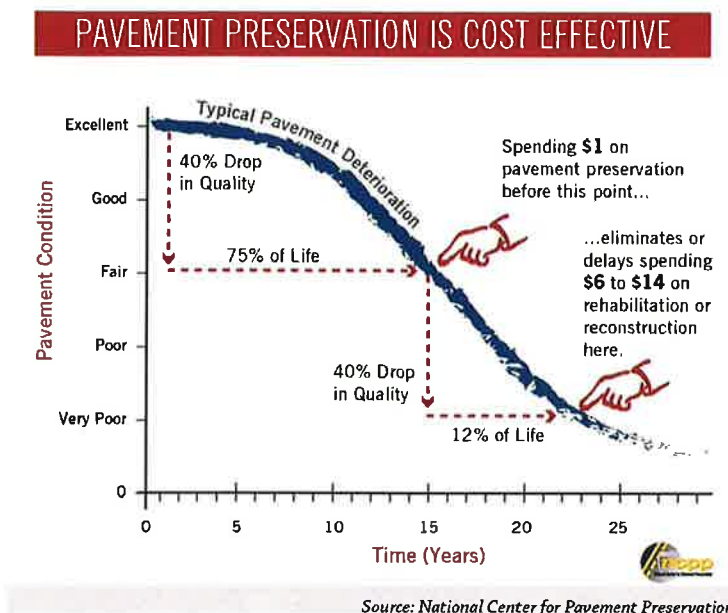
Historical Network Condition Trends



Lakes Highway District's Pavement Management Program

As we've emphasized in previous reports, Lakes Highway District recognizes the importance of the investment in its road inventory. We believe an investment this important should be carefully preserved and maintained for our constituents. Lakes Highway District's Pavement Management Program does just that.

The Pavement Management Program seeks to balance preservation with replacement of existing surfaces. The most cost-efficient way to correct any pavement surface problem is to address issues when they first appear. That is why funds are targeted at roads rated in fair-to-good condition. Without this preventive maintenance, these roads would quickly deteriorate and be much more costly to fix. The following "pavement deterioration curve," illustrates this point.



Pavement may appear to be in good condition for a long time. However, when it fails, it fails quickly and repair costs increase dramatically. Preventative maintenance, such as crack sealing, chip seals and thin overlays extend the life of our valuable road system. In addition to lowering costs over time, other advantages of our Pavement Management Program include: more predictable funding needs, fewer premature pavement failures, safer road conditions and reduced time spent in traffic due to construction.

In order to understand what is happening to District Roads, staff performs visual distress inspections and ratings each year. Inspections on District Roads are cyclical with half of the Districts Roads inspected each year. The two areas divided for inspection are generally divided by Chilco Road projected east/west. A full inspection cycle is completed every two years.

Inspections of each road are broken down into 1,000 segments. At every 1,000 foot segment interval, 100-feet of road is inspected. This to provide a consistent representative sample of the road and to ensure the same sample area is repetitively inspected from one inspection to the next. Special inspections are added if areas of the road are found to inaccurately represent the segment roadway condition.

Inspections include an analysis and measurement of roadway cracking, rutting, distortions,

patching, weathering and raveling. Staff training and inspection procedures are based on guidance from the National Association of County Engineers, Northwest Pavement Management Association and the Metropolitan Transportation Commission.

Inspection data for each roadway segment is input into the Districts Pavement Management Software, every time the segment is inspected. A review of each inspection is performed to evaluate accuracy of the inspection and calculation of the pavement condition index. Upon completion of the inspection review calculations are made to determine the average PCI for the roadway segment. In general, PCI's are determined by deducting points from 100 (new road) associated with types of distress observed (i.e. alligator cracking deducts min of 10 pts from score).

Based on current visual distress ratings and analysis of those ratings the Districts pavement condition ratings have increased according to the following tables.

PCI	Pavement Condition Category	
100 90 2019 LHD 86	Very Good I	
70 50	Good – non load related II	Good – load related III
25	Poor IV	
0	Very Poor V	

Year	PCI
2012	81
2013	85
2014	87
2015	86
2016	85
2017	86
2018	86
2019	85

Given the completed distress rating of the District's roads, the resulting average Pavement Condition Index ("PCI") is now 85. Using a 0-100 PCI scale, with 100 being the most favorable, a rating of 85 classifies the District's road network in the lower 'Very Good' condition category (Condition Category I). In comparison to the analysis completed in 2012, the PCI has improved, up from 81, which is attributed to road improvements. We also attribute the increase in Pavement Condition over the last 5-years to refining of the data collection from distress ratings and budget allocations for projects that focus on maintaining existing pavements in good condition.

How do we Plan to Meet Our Target PCI – Keep Good Roads Good?

To meet the goal/target of maintaining a PCI of 81 (yr. 2012 goal), it was determined in previous analysis that an average annual investment of \$2,225,000 dollars (adjusted for inflation) was needed to maintain our existing pavements. \$2.225 million adjusted has approximately the same buying power of \$2.5 million in 2019. Currently the Districts Network PCI is 85, while allocating approximately \$3,000,000 per year towards road maintenance. Therefore, the District is exceeding its 2012 funding goal.

The following table shows multiple funding scenarios using the current base funding budget and how these are expected to impact the Pavement Condition Index (PCI).

Description of Funding Scenario	Base Budget \$ & 1 st Year Increase	Current Network PCI, yr. 2019	Anticipated Network PCI w/Treatment +5, +10, +15 yrs	Anticipated Network PCI Wo/Treatment +5, +10, +15 yrs
\$3.0 mil to Full Road Network, w/16% PM and approx. 0% budget growth, 2% inflation	\$3.0 mil \$0	85	85/83/81	77/67/55
\$3.0 mil to Full Road Network, w/16% PM and approx. 1% budget growth, 2% inflation	\$3.0 mil \$30,000	85	85/83/81	77/67/55
\$3.0 mil to Full Road Network, w/16% PM and approx. 2% budget growth, 2% inflation	\$3.0 mil \$60,000	85	85/83/82	77/67/55
\$3.0 mil to Full Road Network, w/16% PM and approx. 3% budget growth, 2% inflation	\$3.0 mil \$90,000	85	85/84/83	77/67/55
\$3.0 mil to Full Road Network, w/16% PM and approx. 4% budget growth, 2% inflation	\$3.0 mil \$120,000	85	85/84/83	77/67/55
\$3.0 mil to Full Road Network, w/16% PM and approx. 6% budget growth, 2% inflation	\$3.0 mil \$180,000	85	85/84/84	77/67/55

The budget allocation used as a baseline for this analysis was \$3,000,000 in yr. 2020 with approximately 16% of the 3.0 mil allocated to Preventative Maintenance (crack seal, chip seal and thin overlays). The remainder of approximately \$2.5 mil represents typical budget allocations for other road maintenance work generally consisting of thick overlays and rehabilitation (heavy maint) projects.

It is important to note that over the analysis periods that the PCI does not stay constant, but instead fluctuates or even decreases with the road network in good condition. A downward trending PCI in the 80's will occur to trigger different types of maintenance in the lower cost to treat category. These lower cost treatments are not structural in nature and eventually provide

less return. An example would be with a new pavement. When a road is newly paved, the PCI is 100 and normal aging will cause a decrease of approximately 10 points in the first few years of life associated with environmental conditions. As the road begins to age due to environmental conditions and loading, the first phases of preventative maintenance typically include crack sealing (every 1-3 years), chip sealing (every 5-10 years) and then thin overlays following two to three chip seal cycles. Each time one of these treatments are applied, the PCI increases back toward 100, relative to the type of treatment.

As a very general rule, if the condition rating (PCI) is between 80 and 100, normal maintenance operations such as crack sealing, pothole repair, or chip seals are usually all that is required. If the condition rating falls below 80, it is likely that an overlay will be necessary. Further, if the condition rating approaches 30-40, chances are that major reconstruction is necessary.

With this in consideration, one might ask how to do we slow the decrease in network PCI? To answer this question, it is again important to recognize that the network PCI will vary over time. This depending on time between treatments and age. Its also important to recognize that there's a limited number of non-structural treatments (chip sealing) over time that you can apply to a road before the wheel loading begins to cause the pavement to yield (wheel rutting). This concept is about applying the right treatment to the right road at the right time. This to maintain roads at the lowest costs based on cost of treatments shown on the pavement deterioration curve.

Applying the Districts experience to the pavement management philosophy means typically applying chips seals within the first 3-years of life on a newly paved road and then approximately at approximate intervals of 5-10 years thereafter. This ultimately depending on environmental conditions, grouping of projects for efficiency and traffic loading. Upon receiving new pavement, roads will typically obtain 2-3 chip seals before an overlay is needed, with overlays occurring at 15-25 years of the pavements age. Timing as a rule of thumb is verified in the field through our distress inspection and ratings.

The biggest impact on the condition rating will be related to traffic loading. As traffic loading increases, pavements which are flexible will eventually begin to yield to the repetitive wheel loading which then causes rutting and alligator cracking. That said, with the District's current inspection frequency, high severity loading failures can be caught early and addressed in the overlay phase on the Pavement Deterioration Curve at a lower cost. This, as stated in previous reports, is the concept of *keeping our good roads in good condition as it is less expensive to maintain roads that are in good condition.*

Ultimately, given the fact that the District's Network Pavement Condition Index is very good, for this reason and those stated above, the PCI is expected to trend downward towards the Districts original target goal of 81 (network PCI, some roads high, some roads lower). Understanding that the effectiveness of treatments such as chip seals decrease over time due to pavements yielding over time. Chip seals are non-structural and do not address yielding pavement under repetitive loading.

Conclusions and Recommendations

Considering the District's original goal set in 2010, to maintain roads in an equivalent condition that they are in today (in 2010); the District is exceeding this goal without additional tax burdens being placed on its constituency. The condition of our pavement is very good.

Lakes Highway District has not taken a tax increase since 2015. However, the District has seen a 115% growth in its budget over this same time period. The District's budget growth is associated with new construction and user fee increases; all while the increase in population has resulted in a lower tax levy rate within Lakes Highway District. From 2018 to 2019 we are expecting a 104% increase in revenue (L-2 Appendix). This while residents are paying less for their roads in 2019 (\$57/100k) than what they were paying in 2015 (\$78/100k) and their roads are better (PCI of 85 vs. 81), see appendix for levy rates. This with inflation decreasing the buying power of \$1.00 in 2015 to approximately a \$1.10 in August of 2019 (see appendix). Basically, there are more people contributing towards maintenance of our roads.

A typical stretch of asphalt in Lakes Highway District shows minor weathering and will likely only require lower cost maintenance techniques such as chip sealing and overlays, over time. To continue optimizing the quality of LHD's roads, as its proven effective, our needs to follow its current program of "keep our good roads in good condition" approach that was adopted in 2010. When considering budgets, the District should at least try to keep up with inflation – maintenance budget growth equal to inflation.

Additional considerations should be regarding area growth. This as traffic loading is the primary cause of pavement distress requiring more expensive forms of treatment. With that said, its important to also be mindful of the fact that is inevitable, pavements will still gradually become more expense to maintain over time.

Funding Considerations

Based on our current pavement management practices, LHD's current average budget allocation is allowing the District to attain its original goal set in 2010. This with development growth to help address the 2012 established base funding growth needed to maintain PCI levels. Additionally, with our States recent changes to the transportation user based fees (HB312 Revenue) has greatly improved the Districts ability to fund necessary road work without increasing property taxes. A careful eye on the Districts Pavement Condition Index will be the best guide when considering future funding needs, while those needs will continually be impacted by construction costs and inflation.

2020-2024 Capital Improvement Program List

Bureau of Labor Statistic, Inflation CPI

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The CPI inflation calculator uses the [Consumer Price Index](#) for All Urban Consumers (CPI-U) U.S. city average series for all items, not seasonally adjusted. [This data](#) represents changes in the prices of all goods and services purchased for consumption by urban households.

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