EXECUTIVE SUMMARY

In February 2005, Harris & Associates updated the Pavement Management Program (PMP) for the City of Lakeport. The PMP provides a management tool to inventory street pavement, assess pavement condition, record historical maintenance, forecast budget needs, and view impacts of funding on City-wide pavement condition over time. Pavement condition evaluations were performed on all the City's streets by Harris inspectors.

The PMP is also a software-based tool for analyzing pavement conditions and recommending rehabilitation strategies based on funding levels. The software focuses on providing cost effective recommendations that enhance the overall system Pavement Condition Index (PCI). In general, asphalt pavement deteriorates over time by both traffic loading and weathering. The MTC software recommends that 19% of the budget be put to preventable maintenance treatments such as seal cracks or chip seals. The remaining budget is programmed for more expensive asphalt overlays and reconstruction. Why is preventive maintenance important? Preventive maintenance treatments sustain a street's PCI at a high level and at relatively low cost. Preventive maintenance treatments can be applied to many streets (large pavement area) with a positive effect of raising the system PCI for a fraction of the cost to asphalt overlay one street (small pavement area).

- **Pavement mileage & replacement value**

  The City of Lakeport has approximately 29 miles of paved streets, divided into 171 pavement management segments. The following is the breakdown of Lakeport's street pavement mileage grouped by functional class:

CLASSIFICATION	Miles
Arterial	7.2
Collector	9.7
Residential	11.9
TOTALS	28.8

  It is important to consider the overall investment the City has in its pavements. The unit cost for a surface reconstruction (consisting of moderate base failure repair, removal of existing surface, and pavement overlay) is $10 to $14 per square yard. The cost to reconstruct all streets is over $6.1 million. This is a minimal reconstruction approach. Full replacement of the pavement, base, and structure of the streets would cost substantially more.

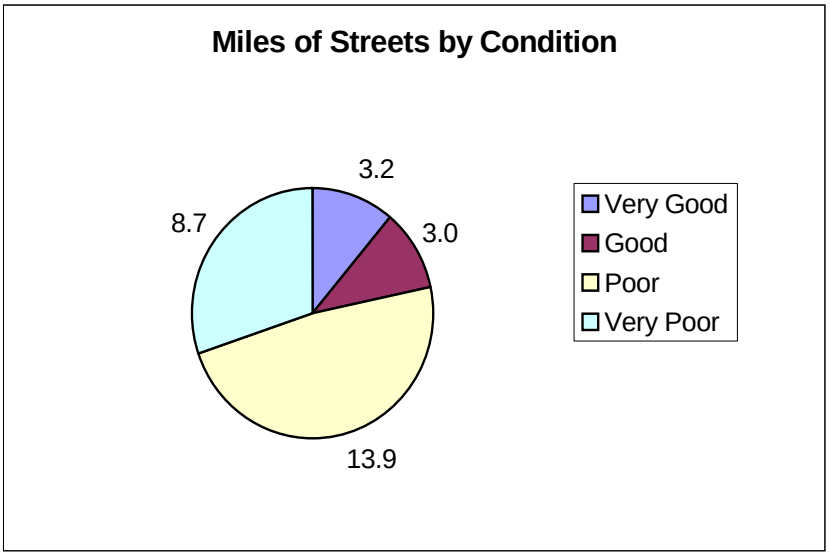
♦ **Condition of Lakeport's Street Asphalt Pavement**

The City's average Pavement Condition Index (PCI) is 43 on a 100-point scale, with 100 being a new street. PCIs for the City's pavement network are based on a visual distress rating system‡. The overall condition of the City of Lakeport's street pavement is in the higher range of MTC's designation "Poor". The 2003 MTC State of Repair report states, "approximately 75 percent of a pavement's serviceable life has been expended by the time its PCI rating falls to 60." Lakeport's average PCI (43) suggests that most portions of its streets are due for rehabilitation maintenance work soon. Lakeport's average PCI condition value by street classification is as follows:

CLASSIFICATION	2005 PCI*
Arterial	52
Collector	35
Residential	38
TOTAL SYSTEM	43

The following figure i-2 shows the City's total pavement mileage by condition category. Figure i-3 describes the condition categories, their equivalent PCI range, and typical prescribed maintenance treatments:

Figure i – 2



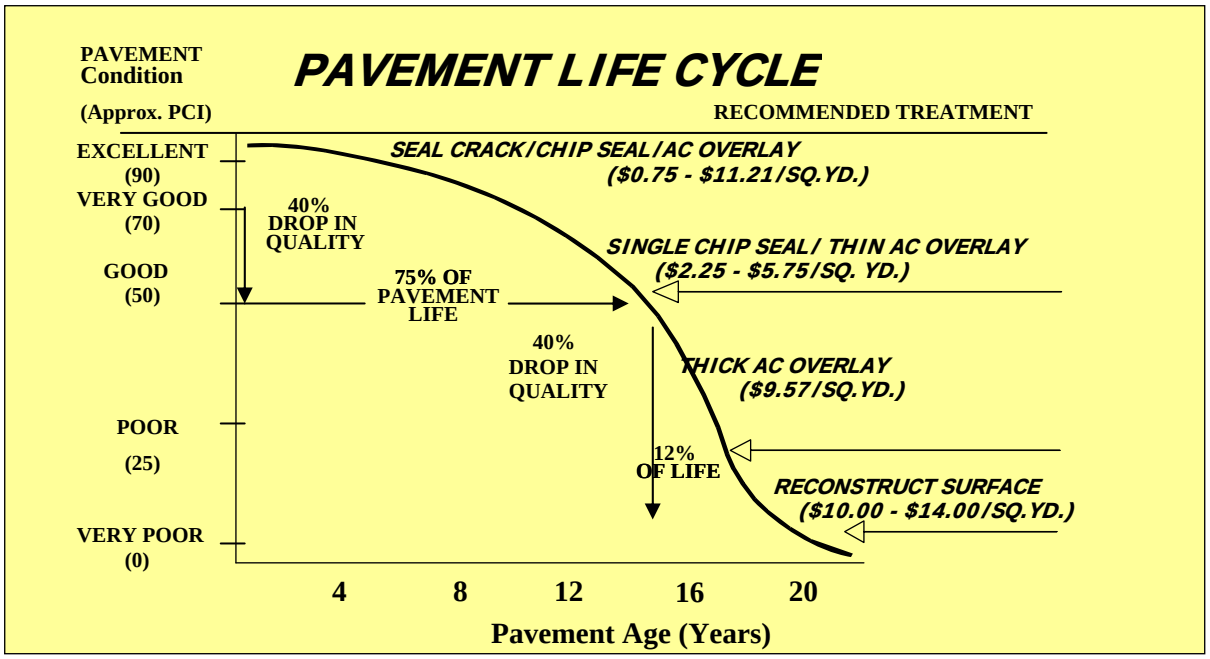
‡Note: PCI weighted by area.
*Calculated by an algorithm developed by the Army Corps of Engineers.

Figure i – 3

Condition	PCI Range	Typical Maintenance Treatment
Excellent	90-100	Do Nothing.
Very Good	70-89	General preventative maintenance such as Seal Cracks or Single/Double Chip Seals or AC Overlay.
Good	50-69	Single Chip Seal or Thin AC Overlay (1.5 Inches).
Poor	25-49	Thick AC Overlay (2.5 Inches).
Very Poor	0-24	Reconstruct Surface.

- **Budget Analysis**

Following the treatment strategy described in the table above and an inflation rate of 5%, the MTC PMP software generates a Budget Needs analysis. The Budget Needs analysis projects the total budget needed to bring the City's pavement system to a condition where most pavement sections require only minor preventive maintenance (i.e., PCI = 70 or higher). The following chart illustrates the cost effectiveness of keeping the pavement condition index above 70 for a typical street.



The current PCI is reduced annually based on this deterioration curve. Maintenance activities increase the PCI value as they are applied to the segment. The overall program is dynamic in that each strategy consists of a cyclic series of actions that simulates the pavement's anticipated life cycle. As shown in the above picture, a typical pavement section will deteriorate approximately 40% in the first 75% of its lifespan. However, that same pavement section, if untreated, will experience another 40% reduction in overall quality in only the next 12% of lifespan, effectively deteriorating an equivalent amount in only one-sixth (1/6) the time. As a result of this continued

deterioration, the quantity and cost of the maintenance activities needed to rehabilitate the pavement will increase in both scope and costs. In other words, it is not simply "pay today or pay tomorrow", but rather a "pay today or pay more tomorrow" proposition. Overall pavement maintenance cost is reduced by the timely application of crack sealing, slurry seals and pavement overlays before the subgrade fails and requires a total pavement reconstruction.

To reach that level of minor preventative maintenance in ten (10) years, the Budget Needs analysis determined a total need of approximately $6.17 million for the years 2005-2014. See section IV-A for the Needs - Projected PCI/Cost Summary.

After Budget Needs, Budget Scenarios are run to determine the funding levels required to maintain and/or improve the current PCI level and generate a list of street maintenance for the next ten (10) years. The software analyses each pavement section and picks specific maintenance to maximize the improvement of the entire pavement system. Maintenance treatments are allocated to as many streets as the annual budget will allow. For the City of Lakeport, five annual budgets, $100,000 (Test Budget I), $150,000 (Test Budget II), $200,000 (Expected Budget), $275,000 (Required to maintain current PCI of 43) & $617,244 (Needs Average) per MTC's requirement were tested, with 19 percent of the annual budget applied towards preventative maintenance. The MTC PMP software recommends spending 19 percent of the budget toward preventative maintenance because it is the optimum level according to the specific conditions of the City's system. This means that 19 percent of the annual budget is spent on chip seals or crack sealing while the remainder of the budget is spent on overlays and reconstruction. These budgets do not account for stopgap maintenance repairs, such as emergency pothole repair.

♦ **Budget Analysis Results**

After the MTC PMP software analyzes the pavement system according to the specified annual budget over a period of ten (10) years, trends are evident in the PCI and Deferred Maintenance backlog (the amount of necessary reconstruction and overlays not performed each year due to budget constraints). An increase in deferred maintenance shows that necessary rehabilitation is not being performed. The total deferred maintenance in 2005 before any suggested maintenance is around $1.7 million. The following PCI values reflect the average PCI and deferred maintenance after suggested treatments are applied.

- $100,000 Annual Funding Level (Test Budget I).
  PCI Trend: Decreases from a 43 PCI in 2005 to a 25 PCI in 2014.
  Deferred Maintenance Trend: Increases from $1.7 million in 2005 to $6.7 million in 2014.

- $150,000 Annual Funding Level (Test Budget II).
  PCI Trend: Decreases from a 43 PCI in 2005 to a 30 PCI in 2014.
  Deferred Maintenance Trend: Increases from $1.7 million in 2005 to $6.0 million in 2014.

- $200,000 Annual Funding Level (Expected Budget).
  PCI Trend: Decreases from a 43 PCI in 2005 to a 35 PCI in 2014.

Deferred Maintenance Trend: Increases from $1.7 million in 2005 to $5.5 million in 2014.

- $275,000 Annual Funding Level (Budget required to maintain current PCI of 43).
  PCI Trend: From a 43 PCI in 2005 to a 43 PCI in 2014.
  Deferred Maintenance Trend: Increases from $1.7 million in 2005 to $4.9 million in 2014.

- $617,244 Needs Average.
  PCI Trend: Increases from a 43 PCI in 2005 to a 77 PCI in 2014.
  Deferred Maintenance Trend: Decreases from $1.7 million in 2005 to $1.3 million in 2014.

Scenario charts showing the impact of the five budgets on street condition and deferred maintenance backlog over a ten (10) year period is shown on the following pages and in Sections IV-B and IV-C. The Cost Summary Reports, which provide information on pavement funding distribution by pavement condition, and the Network Condition Summary Reports, which project pavement condition trends, can be found in Section IV-D.

♦ **Recommendations**

Harris & Associates recommends that, at a minimum, annual budgets for asphalt pavement work alone should be increased to $525,000. Raising the budget to $525,000 will begin an increasing trend in overall pavement condition while slowing the growth of the deferred maintenance backlog. At this budget level, the overall PCI will increase from a 43 PCI in 2005 to a 70 after treatments are applied in 2014, placing the PCI in "Very Good" condition category.

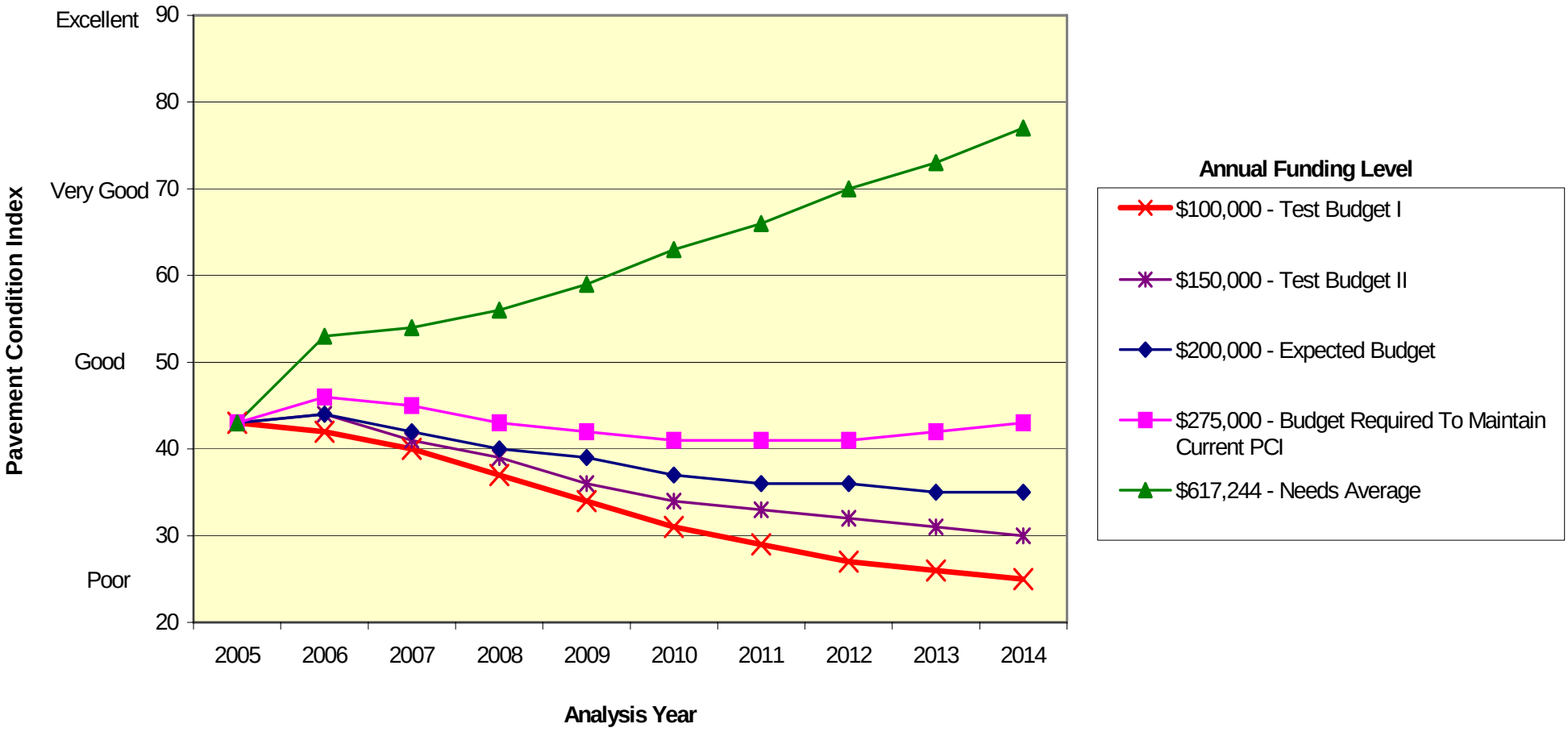
The City should continue its effort to utilize cost effective treatments where appropriate, such as crack sealing and chip seals and evaluate emerging cost effective techniques like thin-bonded wearing courses, rubberized chip seals, rubberized overlays and polymer modified asphalt emulsions. Maintenance and rehabilitation performed annually must also be recorded in the MTC PMP software. The software allows the City to track the performance of past treatment strategies to determine their effectiveness.

Harris & Associates also recommends that the City maintain its pavement management program to be eligible for grants and state gas tax funding. All collector routes should be re-inspected every two years and all residential streets every five years. The costs for the re-inspection should be included in the annual pavement management budget.

Lakeport's overall street system is currently in the higher range of MTC's "Poor" condition. To help maintain and improve the current condition, certain projects have been recommended within the context of this program. An annual work program for the $200,000 budget level can be found in Section IV-E. This report provides detailed listings of suggested maintenance projects for the City of Lakeport based on the overall PMP suggested needs funding and base annual budgets. This report provides a first step in identifying segments to be repaired under Lakeport's annual work program.

Although these project listings are recommendations generated by the PMP, they are for planning purposes only and are not intended to replace sound engineering judgment. Final project recommendations should be weighed against the actual approach the City wishes to utilize in scheduling the workloads for contracting purposes. Once a street segment is identified for repair, a closer site inspection and detailed project repair scope is required.

Pavement Condition Index by Annual Funding Level



Deferred Maintenance Trend by Annual Funding Level