

# Pavement Condition Report

## Elkhart Municipal Airport

Project 15805741

**Prepared for:**

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## Executive Summary

### Background

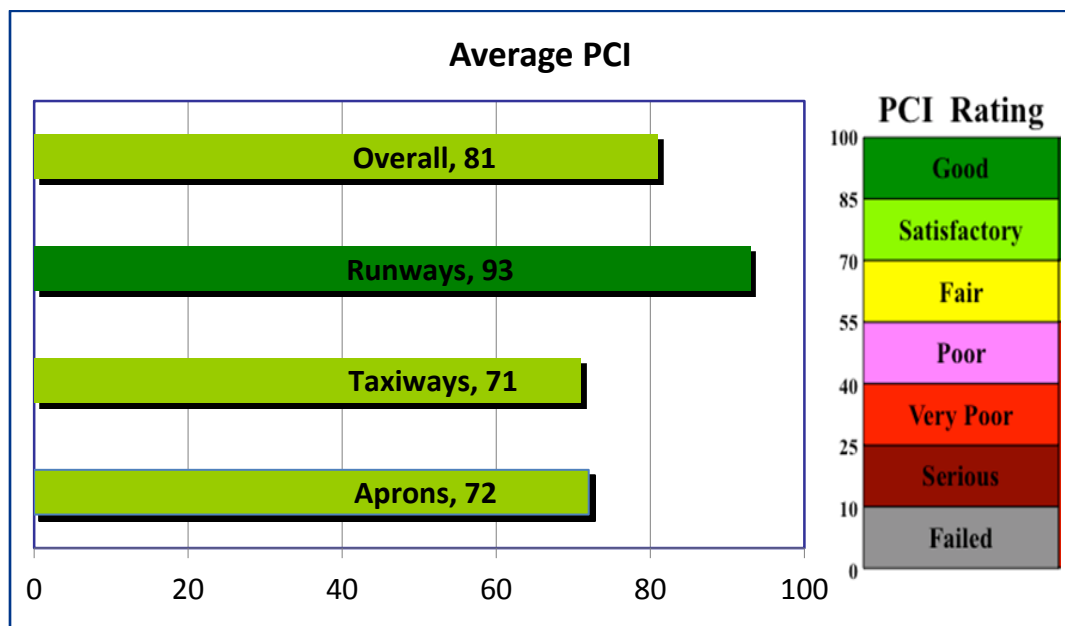
Since 1995, airports have been required to implement a pavement maintenance-management program to receive funding for any project constructed using Federal money. To assist individual airports in meeting this requirement and help improve airport pavement conditions statewide, the Indiana Department of Transportation, Office of Aviation contracted with Applied Research Associates, Inc. to provide pavement evaluation surveys at local airports. This report documents pavement condition at Elkhart Municipal Airport in August 2014.

A primary objective of the pavement management program is to determine maintenance and rehabilitation needs by comparing pavement condition to a standardized benchmark called the minimum service level (MSL), defined as the minimum pavement condition acceptable in managing Indiana's airfield pavements. The benchmark MSL values used to trigger rehabilitation are shown below.

Runway	Taxiway	Apron
60	55	55

### Pavement Condition

The average inspected Pavement Condition Index (PCI) for all the airfield pavements was 81. Runways had an average inspected PCI of 93 and were above the desired MSL of 60. Taxiways had an average inspected PCI of 71, and ramps had an average inspected PCI of 72.



## Capital Improvement Program

The table below provides a summary of the projected pavement rehabilitation needs for the next 5 years of the capital improvement program, starting in 2015. The estimated cost for the rehabilitation actions that provide the greatest increase in pavement service life is approximately \$553,000 in 2015 dollars. If no action is taken, the overall PCI is projected to drop from 81 to 73 by 2020.

Project Year	Calendar Year	Amount
Year 1	2015	324,827
Year 2	2016	-
Year 3	2017	63,844
Year 4	2018	105,210
Year 5	2019	58,852
<b>5-Year Total</b>		<b>\$ 552,733</b>

## Maintenance

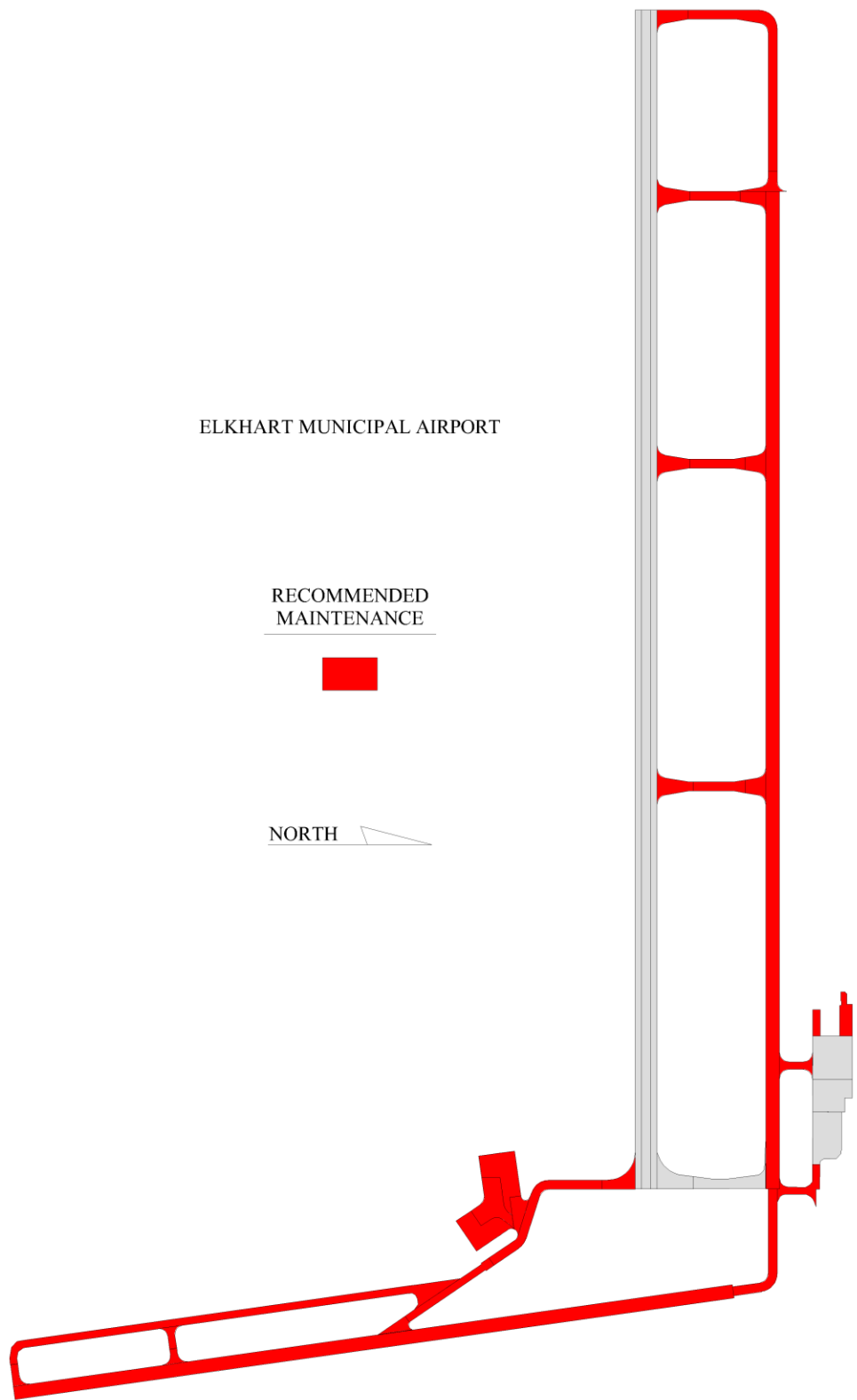
Analysis of potential maintenance projects identified approximately 5,400 square feet of patching needs and approximately 72,000 linear feet of crack sealing and crack repair needs, at an estimated total cost of approximately \$133,000.

Specific recommendations to help prioritize airfield maintenance are found in chapter 4 of this report. A summary of all identified maintenance needs is shown in the table below and in the figure on the following page.

Work Item	Quantity	Unit	Cost
AC SUSTAINING CRACK REPAIR	9,221	L.F.	7,978
AC RESTORATIVE CRACK REPAIR	62,755	L.F.	77,816
AC PATCH	5,405	S.F.	46,885
<b>Total:</b>			<b>\$132,679</b>

AC = asphalt concrete; PCC = portland cement concrete; S.F. = square feet; L.F. = linear feet





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## GLOSSARY OF ABBREVIATIONS

AC	- asphalt concrete
ACC	- asphalt overlay on existing asphalt
APC	- asphalt overlay on existing concrete
APMS	- airport pavement management system
ARA	- Applied Research Associates, Inc.
CADD	- computer-aided design and drafting
CIP	- capital improvement program
FAA	- Federal Aviation Administration
FOD	- foreign object damage
GIS	- geographic information system
INDOT	- Indiana Department of Transportation
L&T	- longitudinal and transverse
LTD	- longitudinal, transverse, and diagonal
M&R	- maintenance and rehabilitation
MSL	- minimum service level
PCC	- portland cement concrete
PCI	- Pavement Condition Index
PCN	- Pavement Classification Number
PDF	- portable electronic document

## 1. Introduction

### 1.1 Objective and Scope

The Indiana Department of Transportation, Office of Aviation (INDOT) retained Applied Research Associates, Inc., (ARA) to provide airfield pavement inspection, pavement evaluation, and pavement management services for Indiana's statewide network of airfield pavements. The pavement evaluations documented in this report were performed under purchase order number 15805741.

A primary objective of INDOT's ongoing pavement evaluation and management program is to determine maintenance and rehabilitation (M&R) needs by comparing the Pavement Condition Index (PCI) to a standardized benchmark called the minimum service level (MSL). The MSL is defined as the minimum pavement condition acceptable in managing INDOT's airside pavement. The benchmark MSL values used to trigger rehabilitation vary by airport classification and are shown in Table 1-1.

Table 1-1. Minimum Service Levels

Facility	Primary	Commercial Service	Large GA > 3600'Rwy	Small GA < 3600'Rwy
Runway	70	65	60	55
Taxiway	65	60	55	50
Apron	65	60	55	50

Additional goals of this project were to implement a software program to manage the pavement network, develop performance curves based on historical rates of pavement deterioration, forecast future pavement conditions, identify and recommend specific M&R actions to address the root cause of the documented pavement distress, and estimate the cost and ideal timing of the recommend M&R. The following tasks were performed in support of the project goals:

- Review record documents
- Define the pavement network
- Conduct an airfield condition survey
- Update the AIRPAV database & software
- Develop a 5-year airfield M&R work plan
- Report findings to INDOT

### 1.2 Description of Tasks Performed

#### 1.2.1 Records Review

A detailed records review was performed to determine the airport's construction history and the as-built cross section for each pavement feature. Plan sets for recent projects were provided to ARA in computer-aided design and drafting (CADD) format. Older plans sets were provided as hard copies or in portable electronic document (PDF) format.

### 1.2.2 Define Pavement Network

Prior to the field survey, a pavement network map was developed using available aerial photography and construction plans. The map was divided into facilities, features, and sample units. A facility is defined as a complete area of the airfield that is used for a particular type of operation. Facilities are typically named for complete functional elements of pavement, such as Runway 11-29, Taxiway A, or North Terminal Apron. After facilities are defined, they are divided into features based on pavement type, construction, structure, and usage. Note that the terms branch and section may be used interchangeably with facility and feature throughout this report.

Features are divided into sample units as prescribed by ASTM D5340-11, *Standard Test Method for Airport Pavement Condition Index Surveys*. A sample unit is a subdivision of a section used exclusively to aid in the inspection process and reduce the effort needed to determine distress quantities and the PCI. The specified sample unit size for an asphalt concrete (AC) pavement is  $5,000 \text{ ft}^2 \pm 2,000 \text{ ft}^2$ . Sample units on portland cement concrete (PCC) pavements contain  $20 \pm 8$  slabs.

To allow users to search, sort, and identify airport pavement quickly, a numbering system is used in conjunction with the facility, feature, and sample unit convention. The format starts with facility, then feature, and finally identifies the sample unit. The number 1605.300 is parsed as an example in Figure 1-1. Most pavement references in this report are presented in this format.

Using statistical sampling methods, the PCI procedure provides a high confidence level in evaluating overall pavement condition while sampling only a portion of the pavement surface. Table 1-2 shows the network-level inspection density used on this project. Where appropriate, “additional sample units” were identified and inspected to record pavement areas with distress patterns not representative of the overall pavement condition. The unique distress types documented in additional sample units are not extrapolated across the entire feature.

As the surveyors inspected the pavement, they were mindful to ensure that the pre-survey airfield map depicted the actual pavement, otherwise known as a “ground-truth” survey. Noticeable differences between what was present in the field and what was displayed on the maps were adjusted by a CADD technician.

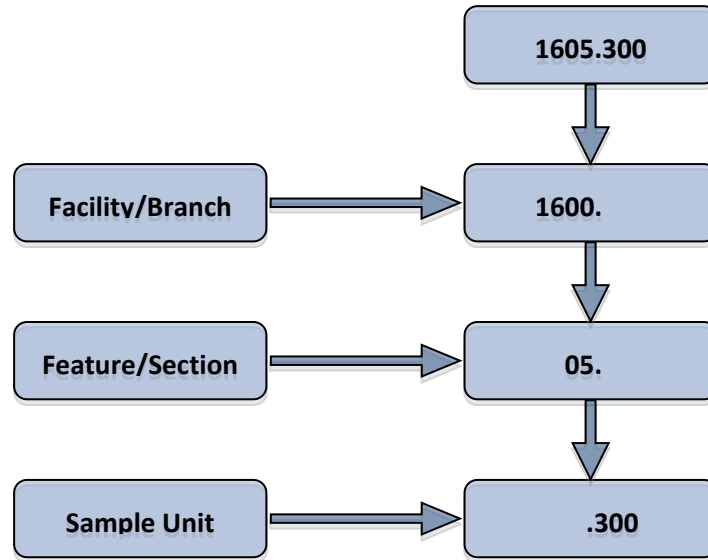


Figure 1-1. Pavement Numbering System

Table 1-2. Inspection Density

Sample Unit in Feature	Inspected Sample Units
1-2	ALL
3-4	2
5-7	3
8-10	4
11-14	5
15-19	6
20-25	7
26-30	8
31-37	9
38-45	10
46-55	11
56-80	12
> 80	15%



### 1.2.3 Conduct Airfield Condition Survey

The pavement condition surveys were performed in accordance with ASTM D5340-12. The procedure is based on the identification and measurement of visible distress at the pavement surface. Each PCI distress will deduct from the pavement's perfect condition of 100. Using pavement management software (or curves provided in ASTM D5340-12), a deduct value is determined for each combination of distress type, severity, and measured quantity. The PCI value is then determined from the unique combination of these variables.

A primary benefit of the PCI procedure is the ability to perform objective evaluations and compare pavement condition with an easy-to-understand numerical rating. Because the combined impact of multiple distresses is not cumulative, ASTM D5340-12 provides an additional family of curves to adjust for multiple distresses. The PCI is determined by applying the individual deduct value for each distress type along with any required correction factors to account for multiple distress types.

Figure 1-2 shows the relationship between PCI values and descriptive ratings. Generally, pavement maintenance is most cost-effective when the pavement is still in satisfactory condition. Rehabilitation, such as an asphalt mill and inlay, is typically performed for pavements with PCI values between 55 and 70. When the PCI value drops below 55, a mill an inlay may not provide the desired performance and complete reconstruction often becomes the most cost-effective means of repairing the pavement.

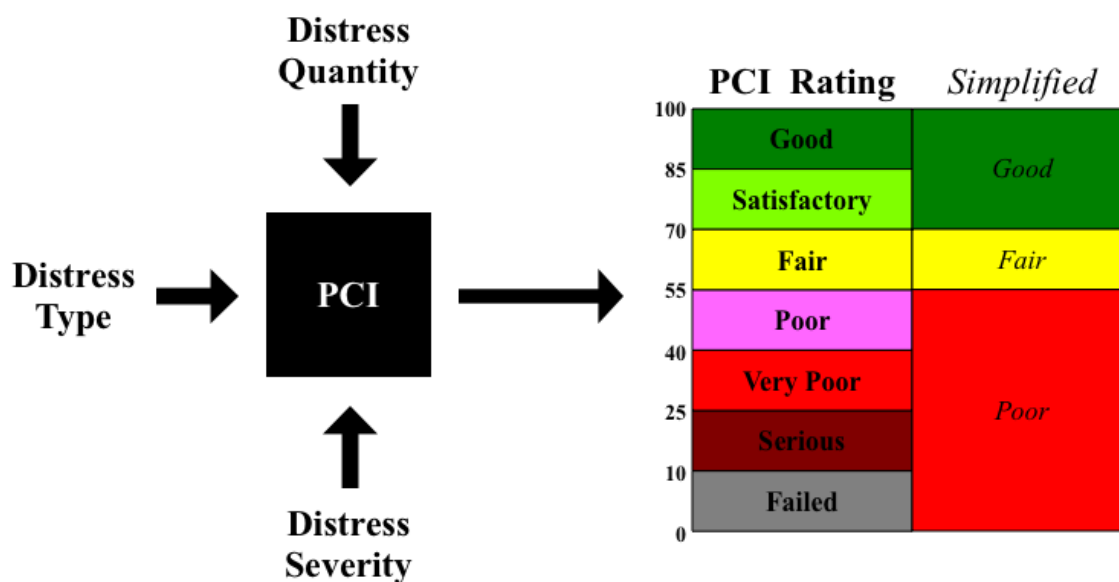


Figure 1-2. PCI Value and Descriptive Rating

#### **1.2.4 Update AIRPAV Database & Software**

The network definition, construction history, and data from the survey were entered into the AIRPAV pavement management system (APMS) software. After all data were entered, family curves were developed to model the change in pavement condition over time. These family curves are used to estimate future pavement condition. Typically, several curves are developed, with separate curves defined for different pavement surface types, such as AC, PCC, asphalt overlay on existing asphalt (ACC), and asphalt overlay on existing concrete (APC). The latest version of AIRPAV containing all survey data, deterioration curves, M&R policies, budgets, and construction history, was provided to INDOT on CD-ROM.

#### **1.2.5 Develop 5-Year Airfield M&R Work Plans**

A 5-year capital improvement program (CIP) was developed showing the year that each pavement feature was expected to fall below the MSL. The 5-year plan detailed in chapter 3 shows rehabilitation alternatives for each feature based on the PCI and the individual distress types observed during the pavement evaluation. The timing of each project is shown as the year that the PCI falls below the MSL and does not consider other important factors. Using reports like this for each airport in the State, INDOT engineers and planners develop a final 5-year statewide CIP plan that balances the sometimes conflicting priorities of pavement condition, operational constraints, construction staging considerations, and available funding.

#### **1.2.6 Report Finding to INDOT**

This report includes background information, PCI results and recommendations, and M&R budget scenarios. Photographs depicting typical pavement conditions observed during the survey are included in chapter 2. Appendix A contains general information about the AIRPAV pavement management software. Appendix B contains a summary of general maintenance techniques and best practices. Appendix C provides a detailed summary of the airfield pavement condition. Appendix D describes common airfield distress types. Appendix E provides an analysis of each pavement section based on recorded distress, and Appendix F contains exhibits to help the airport owner manage the airfield pavement system.



## 2. Pavement Condition Evaluation

### 2.1 Overview

Approximately 2.3 million ft<sup>2</sup> of airside pavement is represented herein. Using statistical sampling methods approximately 480,000 ft<sup>2</sup> of AC pavement and 170,000 ft<sup>2</sup> of PCC pavement was surveyed as part of this assessment. The average inspected PCI for all pavements was 81 (Satisfactory). The average inspected PCI for the runways, taxiways, and ramps were as follows: 93 (Good), 71 (Satisfactory), and 72 (Satisfactory). Table 2-1 provides a general description of the PCI rating categories, including a simplified rating scale of Good, Fair, and Poor. This table also shows the associated distress levels and general M&R requirements for each rating category.

Table 2-1. Definition and Distribution of PCI Ratings

Simplified PCI Rating	PCI Range	Definition	Pavement Area (ft <sup>2</sup> )	Pavement Area (%)
Good	86-100	GOOD: Pavement has minor or no distresses and requires only routine maintenance.	936,424	41%
	71-85	SATISFACTORY: Pavement has scattered low-severity distresses that need only routine maintenance.	808,360	35%
Fair	56-70	FAIR: Pavement has a combination of generally low- and medium-severity distresses. M&R needs are routine to major in the near future.	320,672	14%
Poor	41-55	POOR: Pavement has low-, medium-, and high-severity distresses that probably cause some operational problems. Near-term maintenance and repair needs may range from routine up to a requirement for reconstruction.	138,114	6%
	26-40	VERY POOR: Pavement has predominantly medium- and high-severity distresses that cause considerable maintenance and operational problems. Near-term maintenance and repair needs will be intensive in nature.	29,931	1%
	11-25	SERIOUS: Pavement has mainly high-severity distresses that cause operational restrictions; immediate repairs are needed.	47,829	2%
	0-10	FAILED: Pavement deterioration has progressed to the point that safe operations are no longer possible; complete reconstruction is required.	-	0%

The pavement within each of the PCI condition categories is shown in Figure 2-1. The inspected PCI is summarized by branch use in Figure 2-2, and the photographs in Figure 2-3 through Figure 2-7 provide examples of the condition categories.

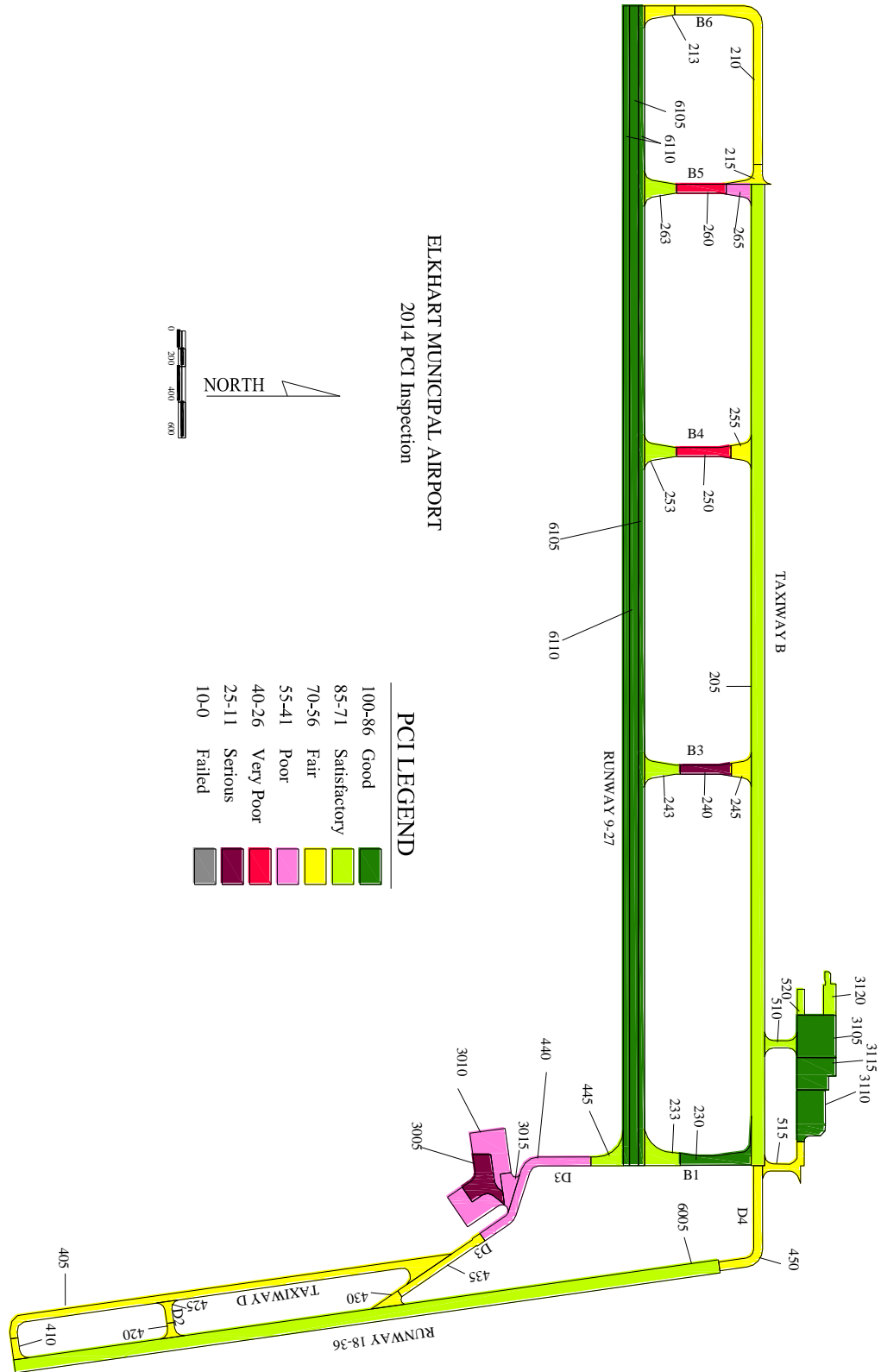


Figure 2-1. Inspected Pavement Condition

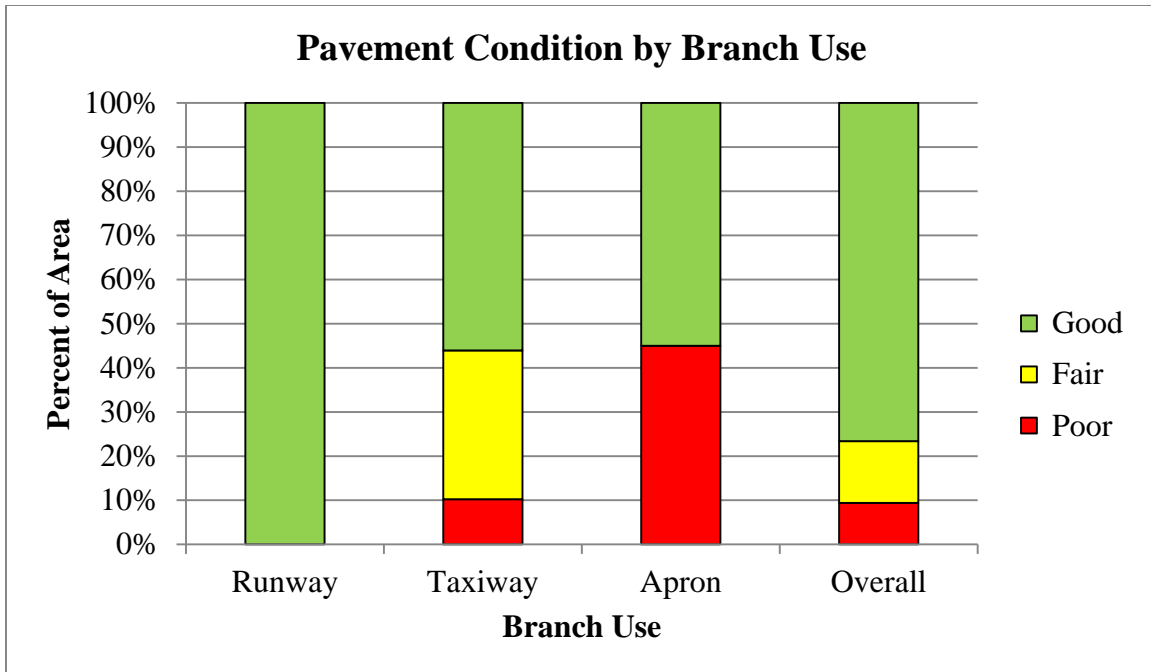


Figure 2-2. Pavement Condition by Branch Use



Figure 2-3. Typical Good PCC Pavement (Feature 3105)





Figure 2-4. Typical Good AC Pavement (Feature 230)



Figure 2-5. Typical Fair AC Pavement (Feature 515)





Figure 2-6. Typical Poor AC Pavement (Feature 265)



Figure 2-7. Typical Serious AC Pavement (Feature 240)

## 2.2 Distress Types and Frequency

The inspectors surveyed approximately 480,000 ft<sup>2</sup> of AC pavement. The frequency of each distress type is shown in Table 2-2. The most common distress types were longitudinal and transverse (L&T) cracking, alligator cracking, weathering, block cracking, ravelling and rutting. L&T cracking and block cracking are age-related distresses. Weathering and ravelling are climate-related distress and alligator cracking is a load related distresses.

Table 2-2. Distress Frequency in AC Pavement

Distress	Sample Units	% Inspected Sample Units
L&T CRACKING	103	96
ALLIGATOR CRACKING	32	30
WEATHERING	21	20
BLOCK CRACKING	16	15
RAVELING	11	10
RUTTING	9	8
DEPRESSIONS	7	7
PATCHING	1	1
SLIPPAGE CRACKING	1	1

The inspectors surveyed approximately 170,000 ft<sup>2</sup> of PCC pavement. The frequency of each distress type is shown in Table 2-3. The most common distress types were joint seal damage and shrinkage cracks.

Table 2-3. Distress Frequency in PCC Pavement

Distress	Sample Units	% Inspected Sample Units	Slabs	% Inspected Slabs
SHRINKAGE CRACKS	3	9	5	1
JOINT SEAL DAMAGE	1	3	24	3

## 2.3 PCI Summary

The branch and section PCI values are shown below, along with the surface type, area, and last year construction occurred.

Table 2-4. PCI Results

Branch ID	Branch PCI	Section	Surface	Area (sf)	Built	2011 PCI	2014 PCI
200	72	205	AC	412,170	1997	81	78
		210	AC	67,380	1991	70	63
		213	AC/AC	11,310	2007	90	65
		215	AC	8,999	1997	68	60
		230	AC	25,610	2006	100	93
		233	AC/AC	20,016	2009	98	80

Branch ID	Branch PCI	Section	Surface	Area (sf)	Built	2011 PCI	2014 PCI
		240	AC	15,061	1991	34	23
		243	AC/AC	15,825	2009	95	82
		245	AC	11,500	1997	68	60
		250	AC	15,850	1991	39	32
		253	AC/AC	14,825	2007	77	74
		255	AC	12,528	1997	68	60
		260	AC	14,081	1991	41	36
		263	AC/AC	15,110	2007	81	74
		265	AC	9,905	1997	64	46
400	66	405	AC	110,247	1996	72	70
		410	AC	5,415	1993	62	56
		420	AC	4,313	1993	67	63
		425	AC	5,683	1996	68	61
		430	AC	7,365	1993	71	65
		435	AC	22,925	1996	76	68
		440	AC	42,500	1993	55	54
		445	AC/AC	13,928	2007	84	72
		450	AC	36,557	1991	67	64
500	74	510	AC	9,561	2009	94	82
		515	AC	16,450	1997	70	66
		520	AC	6,525	2009	94	80
3000	42	3005	AC	32,768	1961	23	23
		3010	AC	73,155	1972	50	49
		3015	AC/AC	12,554	1993	50	50
3100	97	3105	PCC	52,097	2010	100	100
		3110	AC	42,009	2013	30	96
		3115	PCC	36,426	2012	96	100
		3120	AC	14,328	2009	96	85
6000	73	6005	AC	300,000	1993	77	73
6100	100	6105	PCC	325,118	2009	100	100
		6110	PCC	455,164	2009	100	100

## 2.4 Analysis Commentary

The following pages provide a brief overview of the 2014 inspected pavement conditions for each facility. Comments are based primarily on the AIRPAV analysis but also include field notes and remarks from the pavement condition inspectors. Where appropriate, individual pavement sections are referenced within the larger facility.

### 2.4.1 Runways

The runways consisted of 1 section of AC and 2 sections of PCC pavement. The runways had a total area of 1,080,282 ft<sup>2</sup> with an area-weighted average PCI of 93 (Good). Runway 9-27 had an average PCI of 100 and Runway 18-36 had a PCI of 73. The distribution of runway pavement by PCI range is shown in Table 2-5.

Table 2-5. Runway Condition Distribution

PCI Range	Rating	Number of Sections	Pavement Area (ft <sup>2</sup> )	Pavement Area (%)
100-71	Good	3	1,080,282	100%
70-56	Fair	-	-	0%
55-0	Poor	-	-	0%

### 2.4.2 Taxiways

The taxiways consisted of three branches containing 21 sections of AC and 6 sections of AAC pavement. The total area of the taxiways was 951,639 ft<sup>2</sup>. The area-weighted average PCI was 71 (Satisfactory). The distribution of taxiway pavement by PCI range is shown in Table 2-6.

Table 2-6. Taxiway Condition Distribution

PCI Range	Rating	Number of Sections	Pavement Area (ft <sup>2</sup> )	Pavement Area (%)
100-71	Good	9	533,570	56%
70-56	Fair	13	320,672	34%
55-0	Poor	5	97,397	10%

### 2.4.3 Aprons

The aprons consisted of four sections of AC, one section of AAC, and two sections of PCC pavement. The total area of apron pavements was 1,451,825 ft<sup>2</sup>, and the area-weighted average PCI was 72 (Satisfactory). The distribution of pavement area and sections by PCI range are shown in Table 2-7.

Table 2-7. Apron Condition Distribution

PCI Range	Rating	Number of Sections	Pavement Area (ft <sup>2</sup> )	Pavement Area (%)
100-71	Good	4	144,860	55%
70-56	Fair	-	0	0%
55-0	Poor	3	118,477	45%



### **3. Capital Improvement Program**

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#### **3.1 Analysis**

The individual feature analyses shown in appendix E document viable rehabilitation projects that address the causes of each pavement section failure while restoring the pavement to a condition above the desired MSL. The recommended timing of each improvement action is defined as the year that the pavement condition is projected to reach the MSL. By establishing benchmark MSL targets, it is possible to plan objectively for future needs against a standard set of performance criteria. This section categorizes the identified viable options into CIP strategies based on cost and expected service life.

The airport may find it desirable to adjust the timing of projects detailed in the CIP to meet fiscal and operational constraints. For example, if different sections of a runway were projected to reach the MSL in various years ranging from 2016 to 2018, it is not operationally feasible to stage rehabilitation over a 3-year period. Instead, runway rehabilitation would be programmed in a manner that balanced the need to minimize the length of the runway closure while maximizing the remaining service life.

#### **3.2 Cost Estimates**

Project costs were estimated based on the pavement area and the unit costs shown in Table 3-1 for specific M&R activities. Project costs are presented so planners and managers can compare the relative magnitude of funding required for various alternatives. The two-page AIRPAV feature analysis (see appendix E) provides cost estimates for each identified project. These cost estimates are for planning purposes only and do not constitute an engineering estimate.

Furthermore, these cost estimates represent the improvement of existing pavement structures and associated incidental work only. Other potential project line items, such as lighting, navigational aids, and drainage modifications are not included, and estimates for those items must be developed separately and incorporated into an overall project cost.

Typical examples of work that might be included in alternatives evaluated by AIRPAV are outlined on the following pages. These example projects would meet the requirements for each selected option; however, the descriptions are not intended to imply required, or even preferred, design configurations. Rehabilitation decisions, such as overlay thickness design, should be made in conjunction with engineering design analysis.

Table 3-1. Unit Costs

Rigid Pavement (PCC)	
Reconstruction	\$12.90 /sf
Slab Replacement & Full Depth Patching	\$12.48 /sf
Patching (Partial Depth)	\$16.70 /sf
Slab Repair & Overlay	\$4.69 /sf + \$0.41 /sf/in > 4"
Joint Seal Replacement	\$2.24 /lf
Joint Seal Repair	\$0.87 /lf
Undersealing	\$4.16 /sf
Flexible Pavement (AC)	
Reconstruction	\$5.36 /sf
Resurfacing	\$1.44 /sf
Structural Overlay	\$2.25 /sf + \$0.41 /sf/in > 4"
Surface Treatment	\$0.39 /sf
Patching	\$9.78 /lf
Crack Repair (Restorative)	\$1.24 /lf
Crack Repair (Sustaining)	\$0.85 /lf

### 3.2.1 Rigid Pavement Work Descriptions

The following descriptions provide additional information about the typical work items covered by the unit costs shown in Table 3-1.

#### 3.2.1.1 Reconstruction

Reconstruction is recommended when the pavement defects would not be corrected by less extensive measures. Unit prices assume removal of the existing pavement to the subgrade and reconstruction with 8 inches of high strength PCC pavement on 6 inches of aggregate subbase.



#### 3.2.1.2 Repair and Overlay

This procedure usually consists of a rubblize or a crack and seat process, where the existing pavement is broken into segments of approximately 2 ft on a side by dropping a heavy breaker bar onto the pavement. Properly done, aggregate interlock between pavement segments is retained and reflective cracking is reduced. A flexible surface is then placed over the recycled PCC base.



### 3.2.1.3 Slab Replacement

Slab replacements are typically required for high-severity blow ups, scaling, and shattered slabs. Unit prices assume removal of the selected slab to the subgrade. Prepare subgrade to bearing strength equivalent to surrounding subgrade. Provide subbase support equivalent to existing and install load transfer steel as required. Place PCC pavement level with existing surface.



### 3.2.1.4 Patching (Partial Depth)

While partial depth patching is most commonly used to repair joint and corner spalls, it is effective for a wide variety of distress types. Saw cut and remove area of pavement to sound concrete above reinforcing steel. Treat existing concrete to ensure firm bond. Place PCC level with existing surface.



### 3.2.1.5 Joint Seal Replacement

Rout joints and cracks to a depth of at least 1-1/4 inches, clean joint wall surfaces to expose fresh vital concrete, install backing rope, and apply rubberized sealant meeting ASTM D3405 specification, or equivalent.



### 3.2.1.6 Joint Seal Repair

Press existing sealant into joint for use as backer material; apply joint sealant meeting ASTM D3405 specification, or equivalent.

### 3.2.1.7 Undersealing

Undersealing is used to repair faulting between slabs or when corner breaks have settled relative to the slab. High-pressure injection is used to force material into the underlying voids and continues until the settled pavement is restored to its original elevation. Several materials have been used for undersealing, including cement grout, asphalt slurries, and proprietary formulations of expansive Styrofoam.





### 3.2.2 Flexible Pavement Work Descriptions

#### 3.2.2.1 Reconstruction

Reconstruction is recommended when the pavement defects would not be corrected by less extensive measures. Unit prices assume removal of existing pavement to subgrade. Scarify and compact subgrade to 6-inch depth. Construct 4 inches of P401 AC surface course on 8 inches of aggregate base course.



#### 3.2.2.2 Resurfacing

Resurfacing assumes a nominal 2-inch asphalt mill and inlay on existing prepared pavement.



#### 3.2.2.3 Structural Overlay

Structural overlays are used to address load related distress or to increase pavement load bearing capacity. Apply a 4-inch AC overlay on existing prepared pavement. Add additional thickness as needed to achieve required strength.

#### 3.2.2.4 Surface Treatment

Apply a high-quality, penetrating rejuvenating sealer



#### 3.2.2.5 Patching

High-performance cold patching products can be used for short term repairs. Long-term patches should be made with plant mixed hot asphalt meeting FAA P401 specs.

#### 3.2.2.6 Crack Repair (Restorative)

Rout existing crack to a minimum depth of 1-1/4 inches, install backing rope and apply rubberized crack filler meeting ASTM D3405 specification.

#### 3.2.2.7 Crack Repair (Sustaining)

This is typically spot repairs of existing crack sealant.



### 3.3 Capital Improvement Strategies

Figure 3-1 shows a projection of the overall airport pavement condition for the next 10 years based on implementing one of three capital improvement strategies:

- No Action: No capital improvement action is undertaken
- Longest Life: The most comprehensive repair and longest life rehabilitation option
- Lowest Cost: The rehabilitation option with the projected lowest annual cost

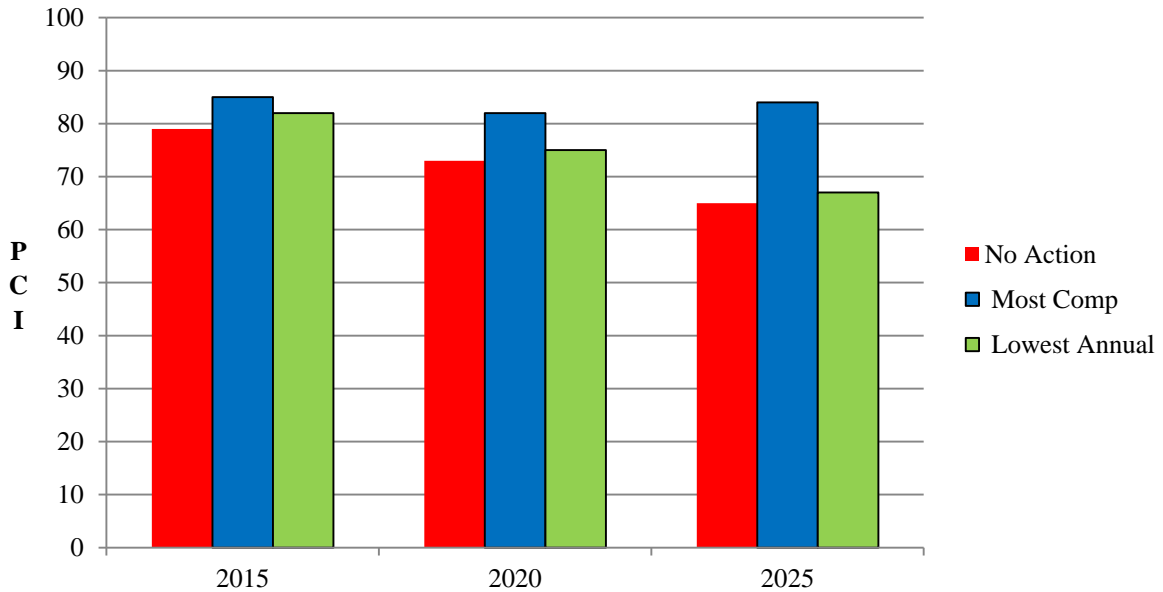


Figure 3-1. Programmed CIP

The longest life CIP scenario for all of the pavement projected to fall below the MSL is projected to cost approximately **\$1.4 million** over the next 10 years. The corresponding lowest annual cost scenario is projected to cost approximately **\$1.1 million** over the next 10 years. Examples of each capital improvement strategy and a complete listing of all viable capital projects are presented in Table 3-2 through

Table 3-2. Most Comprehensive Repair

Feature	Built	Description	Action Yr	Work Item	Cost, \$
210	1991	TAXIWAY B	2018	Resurfacing	97,027
213	2007	TAXIWAY B	2017	Resurfacing	16,286
215	1997	TAXIWAY B	2017	Resurfacing	12,958
233	2009	TAXIWAY B-1	2024	Resurfacing	28,823
240	1991	TAXIWAY B-3	2015	Structural Overlay	27,862
245	1997	TAXIWAY B-3	2017	Resurfacing	16,560
250	1991	TAXIWAY B-4	2015	Resurfacing	22,824
253	2007	TAXIWAY B-4	2023	Resurfacing	21,348
255	1997	TAXIWAY B-4	2017	Resurfacing	18,040
260	1991	TAXIWAY B-5	2015	Resurfacing	20,276
263	2007	TAXIWAY B-5	2023	Resurfacing	21,758
265	1997	TAXIWAY B-5	2015	Resurfacing	14,263
405	1996	TAXIWAY D	2023	Structural Overlay	203,956

Feature	Built	Description	Action Yr	Work Item	Cost, \$
410	1993	TAXIWAY D	2015	Resurfacing	7,797
420	1993	TAXIWAY D-2	2019	Resurfacing	6,210
425	1996	TAXIWAY D-2	2018	Resurfacing	8,183
430	1993	TAXIWAY D-3	2020	Resurfacing	10,605
435	1996	TAXIWAY D-3	2022	Resurfacing	33,012
440	1993	TAXIWAY D-3	2015	Resurfacing	61,200
445	2007	TAXIWAY D-3	2021	Resurfacing	20,056
450	1991	TAXIWAY D-4	2019	Resurfacing	52,642
510	2009	TAXIWAY	2025	Resurfacing	13,767
515	1997	TAXIWAY	2021	Resurfacing	23,688
520	2009	TAXIWAY	2023	Resurfacing	9,396
3005	1961	TERMINAL RAMP	2015	Resurfacing	47,185
3010	1972	TERMINAL RAMP	2015	Resurfacing	105,343
3015	1993	TERMINAL RAMP	2015	Resurfacing	18,077
6005	1993	RUNWAY 17-35	2022	Resurfacing	432,000
<b>Total</b>					<b>1,371,142</b>

Table 3-3. Lowest Annual Cost Repair

Feature	Built	Description	Action Yr	Work Item	Cost, \$
210	1991	TAXIWAY B	2018	Crack Repair	5,551
213	2007	TAXIWAY B	2017	Crack Repair	820
215	1997	TAXIWAY B	2017	Surface Treatment	3,793
233	2009	TAXIWAY B-1	2024	Resurfacing	28,823
240	1991	TAXIWAY B-3	2015	Structural Overlay	27,862
245	1997	TAXIWAY B-3	2017	Crack Repair	1,951
250	1991	TAXIWAY B-4	2015	Resurfacing	22,824
253	2007	TAXIWAY B-4	2023	Resurfacing	21,348
255	1997	TAXIWAY B-4	2017	Crack Repair	1,643
260	1991	TAXIWAY B-5	2015	Resurfacing	20,276
263	2007	TAXIWAY B-5	2023	Resurfacing	21,758
265	1997	TAXIWAY B-5	2015	Resurfacing	14,263
405	1996	TAXIWAY D	2023	Structural Overlay	203,956
410	1993	TAXIWAY D	2015	Resurfacing	7,797
420	1993	TAXIWAY D-2	2019	Crack Repair	437
425	1996	TAXIWAY D-2	2018	Crack Repair	674
430	1993	TAXIWAY D-3	2020	Crack Repair	633
435	1996	TAXIWAY D-3	2022	Crack Repair	2,068
440	1993	TAXIWAY D-3	2015	Resurfacing	61,200
445	2007	TAXIWAY D-3	2021	Resurfacing	20,056
450	1991	TAXIWAY D-4	2019	Crack Repair	4,538
510	2009	TAXIWAY	2025	Crack Repair	595
515	1997	TAXIWAY	2021	Crack Repair	1,951
520	2009	TAXIWAY	2023	Crack Repair	400
3005	1961	TERMINAL RAMP	2015	Resurfacing	47,185
3010	1972	TERMINAL RAMP	2015	Resurfacing	105,343
3015	1993	TERMINAL RAMP	2015	Resurfacing	18,077
6005	1993	RUNWAY 17-35	2022	Resurfacing	432,000
<b>Total</b>					<b>1,077,822</b>

Table 3-4. All Viable Options

Feature	Built	Description	Action Yr	Work Item	Cost, \$
210	1991	TAXIWAY B	2018	Crack Repair	5,551
210	1991	TAXIWAY B	2018	Resurfacing	97,027
210	1991	TAXIWAY B	2018	Surface Treatment	27,702
213	2007	TAXIWAY B	2017	Crack Repair	820
213	2007	TAXIWAY B	2017	Resurfacing	16,286
215	1997	TAXIWAY B	2017	Crack Repair	1,099
215	1997	TAXIWAY B	2017	Resurfacing	12,958
215	1997	TAXIWAY B	2017	Surface Treatment	3,793
233	2009	TAXIWAY B-1	2024	Resurfacing	28,823
240	1991	TAXIWAY B-3	2015	Structural Overlay	27,862
240	1991	TAXIWAY B-3	2015	Surface Treatment	15,265
245	1997	TAXIWAY B-3	2017	Crack Repair	1,951
245	1997	TAXIWAY B-3	2017	Resurfacing	16,560
250	1991	TAXIWAY B-4	2015	Resurfacing	22,824
250	1991	TAXIWAY B-4	2015	Surface Treatment	15,729
253	2007	TAXIWAY B-4	2023	Crack Repair	1,886
253	2007	TAXIWAY B-4	2023	Resurfacing	21,348
255	1997	TAXIWAY B-4	2017	Crack Repair	1,643
255	1997	TAXIWAY B-4	2017	Resurfacing	18,040
260	1991	TAXIWAY B-5	2015	Resurfacing	20,276
260	1991	TAXIWAY B-5	2015	Surface Treatment	13,112
263	2007	TAXIWAY B-5	2023	Crack Repair	1,708
263	2007	TAXIWAY B-5	2023	Resurfacing	21,758
265	1997	TAXIWAY B-5	2015	Crack Repair	2,823
265	1997	TAXIWAY B-5	2015	Resurfacing	14,263
405	1996	TAXIWAY D	2023	Crack Repair	12,431
405	1996	TAXIWAY D	2023	Structural Overlay	203,956
410	1993	TAXIWAY D	2015	Crack Repair	1,409
410	1993	TAXIWAY D	2015	Resurfacing	7,797
420	1993	TAXIWAY D-2	2019	Crack Repair	437
420	1993	TAXIWAY D-2	2019	Resurfacing	6,210
420	1993	TAXIWAY D-2	2019	Surface Treatment	1,718
425	1996	TAXIWAY D-2	2018	Crack Repair	674
425	1996	TAXIWAY D-2	2018	Resurfacing	8,183
430	1993	TAXIWAY D-3	2020	Crack Repair	633
430	1993	TAXIWAY D-3	2020	Resurfacing	10,605
435	1996	TAXIWAY D-3	2022	Crack Repair	2,068
435	1996	TAXIWAY D-3	2022	Resurfacing	33,012
440	1993	TAXIWAY D-3	2015	Crack Repair	18,583
440	1993	TAXIWAY D-3	2015	Resurfacing	61,200
445	2007	TAXIWAY D-3	2021	Crack Repair	1,158
445	2007	TAXIWAY D-3	2021	Resurfacing	20,056
450	1991	TAXIWAY D-4	2019	Crack Repair	4,538
450	1991	TAXIWAY D-4	2019	Resurfacing	52,642
510	2009	TAXIWAY	2025	Crack Repair	595
510	2009	TAXIWAY	2025	Resurfacing	13,767
515	1997	TAXIWAY	2021	Crack Repair	1,951
515	1997	TAXIWAY	2021	Resurfacing	23,688

Feature	Built	Description	Action Yr	Work Item	Cost, \$
515	1997	TAXIWAY	2021	Surface Treatment	7,109
520	2009	TAXIWAY	2023	Crack Repair	400
520	2009	TAXIWAY	2023	Resurfacing	9,396
3005	1961	TERMINAL RAMP	2015	Resurfacing	47,185
3005	1961	TERMINAL RAMP	2015	Surface Treatment	17,444
3010	1972	TERMINAL RAMP	2015	Crack Repair	9,199
3010	1972	TERMINAL RAMP	2015	Resurfacing	105,343
3010	1972	TERMINAL RAMP	2015	Surface Treatment	36,895
3015	1993	TERMINAL RAMP	2015	Crack Repair	2,911
3015	1993	TERMINAL RAMP	2015	Resurfacing	18,077
6005	1993	RUNWAY 17-35	2022	Crack Repair	35,065
6005	1993	RUNWAY 17-35	2022	Resurfacing	432,000

## 4. Maintenance Management Program

### 4.1 General Comments

Most pavement distress is classified by severity (low, medium, or high). As a general rule, high-severity distresses should be patched, and medium-severity distress should be sealed. A detailed matrix of recommended maintenance policies to address various distress types is provided near the end of this section.

#### 4.1.1 Inspected Crack Severity

Of the inspected pavement, 50 percent of the cracks were rated at low severity and require no maintenance beyond ongoing inspection and spot repair. About 22 percent of the cracks were rated at medium severity and would benefit from sealing and repair. Two percent of the cracks were rated at high severity and may warrant patching to help maintain safe operations.

#### 4.1.2 Other Distress

The inspected asphalt pavement area measured distresses such as rutting, depressions, fatigue cracks, and raveling were recorded as follows: 28 percent at low severity, 72 percent at medium severity, and none at high severity.

Joint seal damage was recorded in 3 percent of inspected PCC sample units. When identified, joint seal damage was recorded at low severity 100 percent of the time.

### 4.2 Recommended Maintenance Actions

The following illustrations and tables show pavement areas that have maintenance and repair needs. Ongoing development of capital improvement projects may address some of these maintenance needs. To help budgeting and prevent duplication of effort, all pavement features recommended for maintenance should be compared to planned improvements prior to finalizing a maintenance program strategy.

Table 4-1. Recommend Maintenance Actions

Work Item	Quantity	Unit	Cost
AC SUSTAINING CRACK REPAIR	9,221	L.F.	7,978
AC RESTORATIVE CRACK REPAIR	62,755	L.F.	77,816
AC PATCH	5,405	S.F.	46,885
<b>Total:</b>			<b>\$ 132,679</b>

In the following tables, pavement features shown in **grey** text cannot be raised above MSL via maintenance alone, and need only be included in a maintenance plan to provide continued safety or serviceability until their programmed major rehabilitation is implemented. Pavement features such as 240, 250, and 265 are not shown in **grey**, but would require such extensive maintenance to restore them to the MSL that major rehabilitation may provide a more cost-effective long term solution.



#### 4.2.1 Patching

Table 4-2. Recommend AC Patching

Feature	Work Item	Amount	Insp. PCI	Change	Est. PCI
205	AC PATCH	466	78	3	81
210	AC PATCH	423	63	16	79
213	AC PATCH	95	65	8	73
215	AC PATCH	124	60	3	63
240	AC PATCH	626	23	21	44
250	AC PATCH	95	32	10	42
260	AC PATCH	21	36	4	40
265	AC PATCH	14	46	1	47
405	AC PATCH	199	70	3	73
410	AC PATCH	87	56	6	62
420	AC PATCH	19	63	6	69
425	AC PATCH	21	61	9	70
430	AC PATCH	15	65	9	74
435	AC PATCH	113	68	12	80
440	AC PATCH	15	54	4	58
445	AC PATCH	74	72	6	78
450	AC PATCH	227	64	12	76
3005	AC PATCH	443	23	9	32
3010	AC PATCH	1,441	49	16	65
3015	AC PATCH	73	50	3	53
6005	AC PATCH	810	73	2	75
	TOTAL:	5,404	S.F.		
EQUIPMENT: SAW, AIR COMPRESSOR, HEATING KETTLE, HAND TOOLS					
EST. MATERIALS: 66 TONS ASPHALT PATCH					
EST. MATERIAL COST: \$6,737					
EST. CREW HOURS: 154.4					
EST. CREW COST: \$40,147					
<b>EST. PROJECT COST: \$46,885</b>					

#### 4.2.2 Crack Seal

Table 4-3. Recommend AC Restorative Crack Repair

Feature	Work Item	Amount	Insp. PCI	Change	Est. PCI
213	AC RESTORATIVE CRACK REPAIR	630	65	14	79
240	AC RESTORATIVE CRACK REPAIR	4,250	23	20	43
245	AC RESTORATIVE CRACK REPAIR	1,416	60	11	71
250	AC RESTORATIVE CRACK REPAIR	4,111	32	17	49
255	AC RESTORATIVE CRACK REPAIR	1,325	60	11	71
260	AC RESTORATIVE CRACK REPAIR	3,320	36	17	53
263	AC RESTORATIVE CRACK REPAIR	1,378	74	4	78
265	AC RESTORATIVE CRACK REPAIR	2,277	46	16	62
510	AC RESTORATIVE CRACK REPAIR	479	82	3	85
515	AC RESTORATIVE CRACK REPAIR	1,574	66	4	70
520	AC RESTORATIVE CRACK REPAIR	322	80	5	85



Feature	Work Item	Amount	Insp. PCI	Change	Est. PCI
3005	AC RESTORATIVE CRACK REPAIR	5,135	23	8	31
3010	AC RESTORATIVE CRACK REPAIR	6,458	49	15	64
3015	AC RESTORATIVE CRACK REPAIR	2,299	50	19	69
6005	AC RESTORATIVE CRACK REPAIR	27,779	73	4	77
	TOTAL:	62,755	L.F.		
EQUIPMENT: AIR COMPRESSOR, HEATING KETTLE, HAND TOOLS					
EST. MATERIALS: 12,551 POUNDS ASTM D3405 SEALANT OR EQUIVALENT					
EST. MATERIAL COST: \$12,551					
EST. CREW HOURS: 313.8					
EST. CREW COST: \$65,265					
<b>EST. PROJECT COST: \$77,816</b>					

Table 4-4. Recommend AC Sustaining Crack Repair

Feature	Work Item	Amount	Insp. PCI	Change	Est. PCI
205	AC SUSTAINING CRACK REPAIR	3,787	78	-	N/A
210	AC SUSTAINING CRACK REPAIR	629	63	-	N/A
215	AC SUSTAINING CRACK REPAIR	120	60	-	N/A
243	AC SUSTAINING CRACK REPAIR	147	82	-	N/A
253	AC SUSTAINING CRACK REPAIR	228	74	-	N/A
405	AC SUSTAINING CRACK REPAIR	1,503	70	-	N/A
410	AC SUSTAINING CRACK REPAIR	161	56	-	N/A
425	AC SUSTAINING CRACK REPAIR	81	61	-	N/A
430	AC SUSTAINING CRACK REPAIR	75	65	-	N/A
435	AC SUSTAINING CRACK REPAIR	241	68	-	N/A
440	AC SUSTAINING CRACK REPAIR	1,482	54	-	N/A
445	AC SUSTAINING CRACK REPAIR	140	72	-	N/A
450	AC SUSTAINING CRACK REPAIR	536	64	-	N/A
3120	AC SUSTAINING CRACK REPAIR	84	85	-	N/A
	TOTAL:	9,221	L.F.		
EQUIPMENT: AIR COMPRESSOR, HEATING KETTLE, HAND TOOLS					
EST. MATERIALS: 1,844 POUNDS ASTM D3405 SEALANT OR EQUIVALENT					
EST. MATERIAL COST: \$1,844					
EST. CREW HOURS: 40.1					
EST. CREW COST: \$6,134					
<b>EST. PROJECT COST: \$7,978</b>					

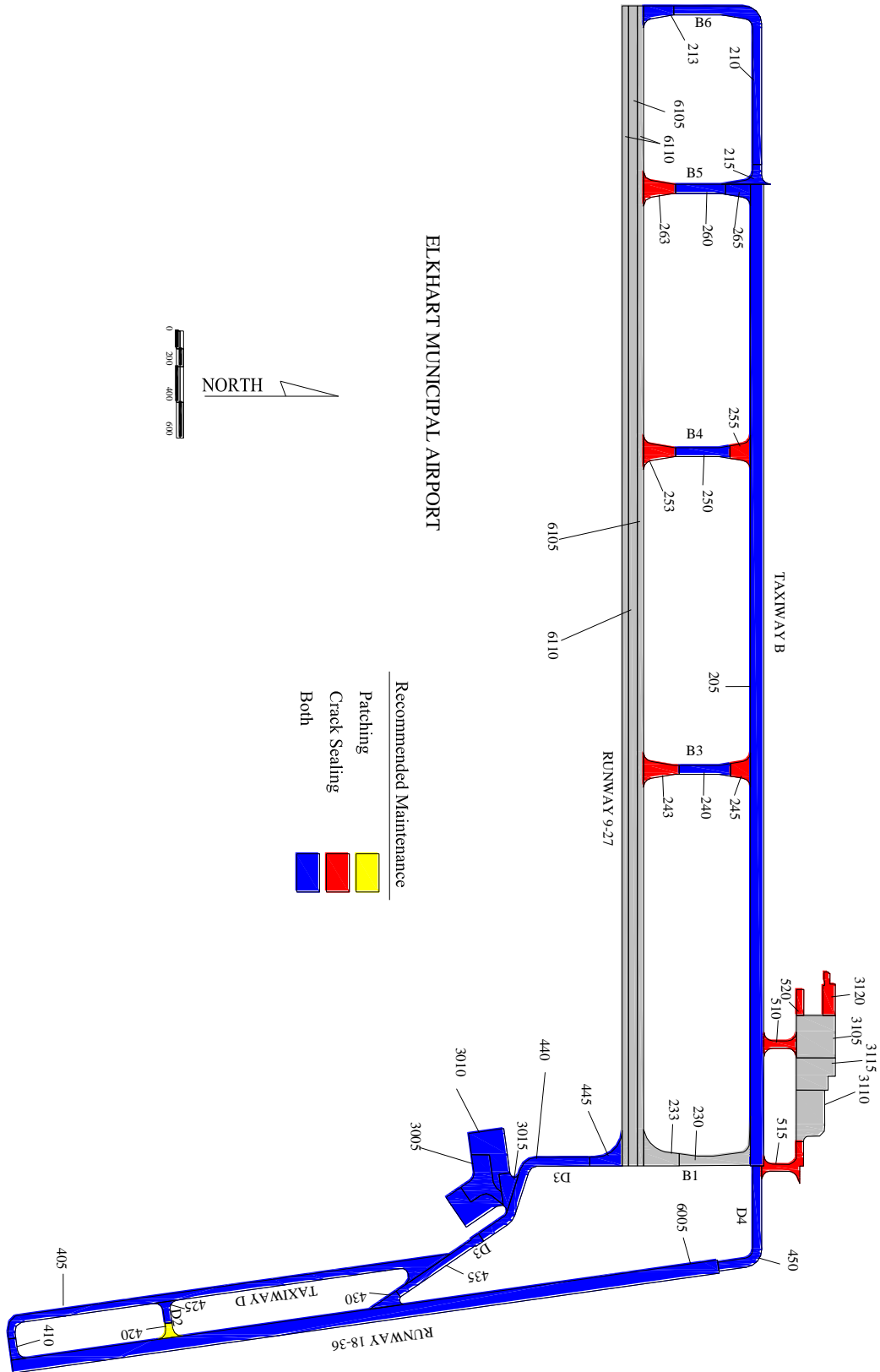


Figure 4-1. Recommended Maintenance

## **4.3 Pavement Deterioration**

Before attempting maintenance and repairs, it helps to understand pavement performance and pavement deterioration. The factors that contribute most to deterioration are environmental, materials, and/or load related. Brief discussions of each are presented in the following sections.

### **4.3.1 Environmental/Age-Related Deterioration**

Seasonal and daily temperature changes cause expansion and contraction of the pavement materials. The shear stresses created by expansion and contraction can cause transverse cracking in flexible pavement and mid-slab cracking in rigid pavement. Further, expansion and contraction will cause cracks, and rigid pavement joints, to open and close with changes in temperature.

Flexible pavement oxidizes as it ages, losing its lighter, volatile, components and becoming brittle with time. Surface treatments and seal coats are designed, in part, to provide a protective barrier and prevent this type of oxidation.

Subsurface water can have the greatest impact on pavement deterioration. A wet subgrade greatly reduces the ability of a pavement to support wheel loads, and the results often show up as rutting and cracking of flexible pavement. The fine materials in a wet base can be pumped up through the cracks and eventually result in a loss of support. This loss of support can be evidenced as corner breaks and faulting in rigid pavement. Moisture inside a pavement system expands when it freezes, creating stresses that cause the pavement surface to heave. Subsequent freeze-thaw cycles leave voids in the pavement structure that enable further rutting and breaking. Repeated freeze-thaw cycles eventually cause the pavement to disintegrate. Freeze-thaw deterioration requires frost-susceptible material, sub-zero temperatures, and water. If one of these factors is removed, freeze-thaw damage will not occur. One of the best ways to ensure pavement longevity is to provide drainage and keep it dry.

### **4.3.2 Materials-Related Deterioration**

The pavement thickness and type of subgrade play a large role in the formation and spacing of transverse cracks. If the subgrade and base materials are smooth or rounded and allow for relatively free movement of the pavement surface, transverse cracks will often be spaced far apart (>60 feet). If the subgrade and base material are rough or angular and provide greater resistance to movement of the pavement surface, transverse cracks will be spaced more closely (<40 feet). The distance between transverse cracks also depends on the pavement thickness, as a thicker pavement can resist cracking for longer lengths. At general aviation airport pavements, around 50 feet is typical transverse crack spacing.

Aggregate is the biggest component of any pavement structure, and it is the contact between the aggregate particles that actually transfers the load and provides the strength. Aggregate durability and shape are major factors affecting pavement performance. Durability is the ability of the aggregate to perform satisfactorily over time and resist deterioration. Sharp, well-angled aggregates that interlock, compact densely, and resist movement are the most desirable.

In flexible pavement, the selection of asphalt cement can have a significant impact on pavement performance. Asphalt is visco-elastic, which means it is stiff at low temperatures and flows at high temperatures. With this in mind, asphalt pavement should be designed to remain stiff on hot summer days to resist plastic deformation (rutting and shoving). In addition asphalt pavement should have sufficient cold temperature flexibility on cold winter days to resist transverse cracking. The proper selection of asphalt cement grade and maintaining adequate mix volumetrics (air voids, voids in the mineral aggregate, etc.) are key factors in the performance of flexible pavement.

As water freezes, it expands and occupies a greater volume than in a liquid state. In PCC pavement, interconnected, well-distributed air voids are required to allow for expansion of moisture with the PCC. PCC mixes with insufficient air entrainment are susceptible to freeze-thaw damage, as the expansive forces have been shown to cause concrete deterioration. Small, closely spaced, interconnected air voids provide the greatest degree of protection.

Asphalt paving mixes also require air voids, but for reasons different than for PCC pavement. When a well-constructed asphalt pavement is subjected to vehicle loading, it will nevertheless experience some minor secondary consolidation. Air voids allow for the safe movement of the asphalt binder within the mix. With insufficient air voids, the asphalt binder will migrate to the surface of the pavement—it will in essence, get squeezed out of the mix. This phenomenon is called flushing. In addition, these mixes become unstable and are prone to rutting in the wheel paths.

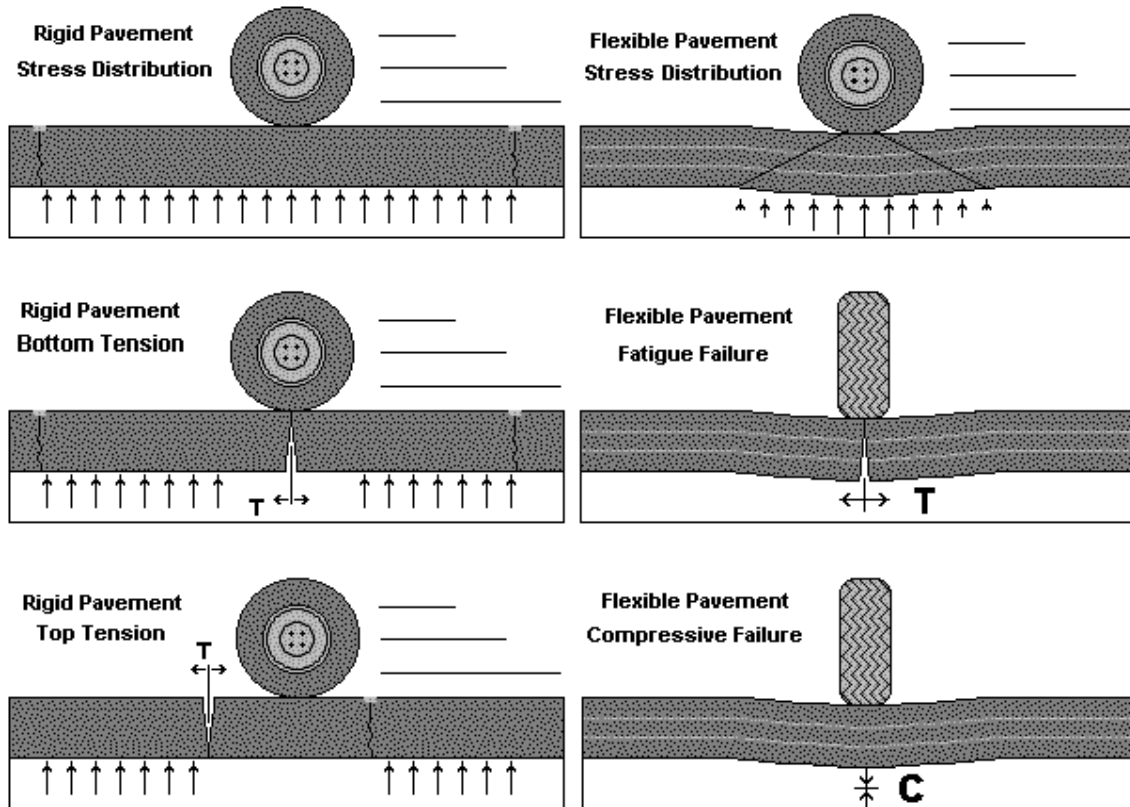
However, if the air voids become too high, air and water can penetrate the pavement, reducing both durability and flexibility. Air infiltration will accelerate oxidization of the binder, while water penetration will increase the moisture susceptibility of the mix (i.e., stripping of the asphalt cement from the aggregate). Air voids in flexible pavement should be kept low enough to prevent water and air from penetrating the asphalt layers, but high enough to minimize the potential of plastic deformation.

Regardless of whether the pavement binder is AC or PCC, binder materials are mixed with aggregate to coat all aggregate particles with a thin binder film. Durability of flexible asphalt pavement is increased with a thicker binder film, and the pavement becomes more resistant to age hardening; however, if the film is too thick, the asphalt acts like a lubricant, promoting ruts, shoving, and bleeding. Each asphalt mix should be customized for materials available locally.

With a concrete pavement, aggregate interlock supports the wheel loads, and the hydrated cement binder further interlocks the aggregate particles to inhibit all movement. “Hydration” is the term for the chemical reaction of portland cement with water. In the hydration process, dry cement particles react with water to form gels, and then crystals, that grow and bond with the aggregate and form a rigid interlocking structure. Hydration can continue for years, but much of the ultimate strength will be reached within 28 days. Hydration is a sensitive chemical process. Typically, any admixtures used to accelerate the hydration process will reduce durability, and admixture use should be considered carefully or avoided.

### 4.3.3 Load-Related Deterioration

As illustrated below, rigid and flexible pavements differ in the way loads are distributed. A concrete slab resists bending and transfers loads evenly, while an asphalt pavement is designed to bend, gradually spreading loads over wider areas.



Load-related cracks can start at the top or bottom of a pavement section. In asphalt sections, load-related (fatigue) cracks start at the bottom. If a load-related crack reaches the surface, it usually indicates structural deficiency. In rigid pavement, corner breaks are caused by tensile forces at the top of the slab, and the crack propagates downward. Mid-slab LTD cracks are distress examples resulting from tensile forces at the bottom of the slab.

Both wheel loads and environmental factors can cause spalls anytime there is movement between adjacent slabs. If non-compressible material (such as a small rock) is allowed into a joint, stresses will build up between adjacent slabs and can cause a spall. Keeping joint and crack sealant intact can help to reduce the infiltration of non-compressible material and minimize spalling.

## 4.4 Best Practices

### 4.4.1 Flexible Pavement

L&T cracks at medium severity should be filled with a good quality crack sealant material. High-severity cracks normally must be patched.

Cracks rated at low severity may be narrow unsealed cracks or sealed cracks up to 3 inches wide. The PCI procedure does not distinguish between narrow unfilled cracks and wider filled cracks. Some L&T cracks at low severity are included in the estimated sealing quantities and costs in this maintenance plan. In general, when medium- or high-severity cracking constitutes less than 25 percent of the total crack quantity, sustaining maintenance usually is more cost-effective. When 25 percent or more of the total crack quantity is at medium or high severity, a restorative program typically becomes more cost-effective.

Existing patches rated as medium and high severity should be replaced with new patches. Small areas (usually less than 100 square feet per patch) of alligator cracking and rutting at medium and high severity also may be repaired cost-effectively by patching. Larger patches should be considered if equipment can be made available to accomplish the work. Patching to repair up to 10 percent of the surface of a pavement feature that is otherwise serviceable can result in significant cost savings as compared to rehabilitation of the entire feature.

An example maintenance policy treatment matrix for flexible pavement is shown in Table 4-5. Examples of various maintenance techniques are provided in appendix B.

### 4.4.2 Rigid Pavement

Joint seal damage rated at medium and high severity should be repaired. If medium- and high-severity damage is limited to less than about 25 percent of the total joint length, sustaining maintenance is recommended. If medium- and high-severity damage exceeds 25 percent of the total joint length, the joint sealant should be removed and replaced under a restorative repair project.

LTD cracks at low and medium severity should be considered for sealing as part of the joint sealing project. High-severity LTD cracks require sealing, patching, or slab replacement, depending on the extent of deterioration.

Small patches are typically used to repair medium- and high-severity spalls or to replace deteriorated older patches. Restorative small patches are typically partial-depth repairs, usually to a maximum depth of 1/3 the slab thickness. Large patches and corner breaks at medium and high severity should be repaired by full-depth large patches.

High-severity LTD cracks and shattered slabs are candidates for patching and slab replacement. Low-severity shattered slabs can be left in place pending further deterioration.

An example maintenance policy treatment matrix for rigid pavement is shown in Table 4-5. Examples of various maintenance techniques are provided in appendix B.

Table 4-5. General Maintenance Policy (AC)

Distress Type	Distress Severity	Maintenance Action
Alligator Cracking	Low	Crack Sealing - AC
	Medium	Patching - AC Deep
	High	Patching - AC Deep
Bleeding	N/A	Monitor
Depression	Low	Monitor
	Medium	Patching - AC Shallow
	High	Patching - AC Deep
Jet Blast	N/A	Patching - AC Shallow
Longitudinal, Transverse, Joint Reflective, & Block Cracking	Low	Monitor
	Medium	Crack Sealing - AC
	High	Patching - AC Deep
Oil Spill	N/A	Patching - AC Shallow
Patching	Low	Monitor
	Medium	Crack Sealing - AC
	High	Patching - AC Deep
Polished Aggregate	N/A	Monitor
Weathering / Raveling	Low	Monitor
	Medium	Surface Treatment
	High	Patching - AC Shallow
Rutting, Corrugation and Swell	Low	Monitor
	Medium	Patching - AC Deep
	High	Patching - AC Deep
Shoving	Low	Monitor
	Medium	Patching - AC Shallow
	High	Patching - AC Deep
Slippage Cracking	N/A	Patching - AC Shallow

Table 4-6. General Maintenance Policy (PCC)

Distress Type	Distress Severity	Maintenance Action
Blow Up	Low	Patching - PCC Partial Depth
	Medium	Slab Replacement - PCC
	High	Slab Replacement - PCC
Longitudinal, Transverse & Diagonal Cracking	Low	Monitor
	Medium	Crack Sealing - PCC
	High	Patching - PCC Full Depth
Durability Cracking	Low	Monitor
	Medium	Patching - PCC Full Depth
	High	Slab Replacement - PCC
Large Patch & Corner Break	Low	Monitor
	Medium	Patching - PCC Full Depth
	High	Patching - PCC Full Depth
Popout / Shrinkage Cracks	N/A	Monitor
Scaling	Low	Monitor
	Medium	Patching - PCC Partial Depth
	High	Slab Replacement - PCC
Faulting	Low	Monitor
	Medium	Grinding (Localized)
	High	Grinding (Localized)
Shattered Slab	Low	Monitor
	Medium	Crack Sealing - PCC
	High	Slab Replacement - PCC
Joint Spall, Corner Spall & Small Patch	Low	Monitor
	Medium	Patching - PCC Partial Depth
	High	Patching - PCC Partial Depth
Alkali Silica Reaction	Low	Monitor
	Medium	Slab Replacement - PCC
	High	Slab Replacement - PCC



## **4.5 Pavement Repair Materials**

New pavement repair materials are introduced and improved regularly. This section provides information on products compatible with airport needs.

### **4.5.1 Joint and Crack Sealer**

Hot-poured, pressure-injected, polymeric rubberized asphalt sealant meeting ASTM D3405 specifications is suitable for most sealing requirements. This product is relatively inexpensive, durable, and suitable for both rigid and flexible pavements. Other, more expensive, hot-applied sealants that promise longer life are being developed for specialty applications. Twin component cold applied sealants also have been used with success. Contact your local distributor.

### **4.5.2 Flexible Pavement Patch**

High-performance plant mixed cold patching products that can be stockpiled on-site can be used for short term repairs to maintain safety. Long-term patches should be made with high-quality plant mixed hot asphalt having a  $\frac{3}{4}$ -inch maximum aggregate size and meeting Federal Aviation Administration (FAA) P401, or highest quality highway specifications. Low-quality packaged materials available from local hardware type stores should be avoided.

### **4.5.3 Rigid Pavement Patch**

Permanent patches in rigid pavement should be made with air-entrained concrete with 1-inch maximum size aggregate. If the area must be quickly opened to traffic, high early concrete should be considered. Concrete should have zero slump and a coarse texture. As with asphalt patches, low-quality packaged materials should be used only as temporary patches to maintain safety and service until a more permanent repair can be made.

## **4.6 Pavement Repair Equipment**

Many pavement repair and sealing products are available. Specialized tools and equipment help ensure high-quality repairs. This section discusses equipment compatible with airport needs.

### **4.6.1 Air Compressor**

Used to remove non-compressible sand and debris from prepared cracks and joints, the compressor should have a sustained capacity of 120 cubic feet per minute with a nozzle velocity of 100 psi. Trailer-mounted compressors typically have capacities in this range.

### **4.6.2 Concrete Saw**

A saw capable of making a minimum 3-inch-deep cut is required. The saw should be capable of making cuts in both asphalt and concrete. Gasoline-powered 5- to 25-hp wheel-mounted saws typically are preferred for this type of work, but electric and pneumatic tools also are available.

#### **4.6.3 Heating Kettle**

Applying sealant is the most time-consuming operation, and a sealing machine with heating and pressure application capabilities is a critical item in a successful sealing program. The capacity of the sealing equipment dictates the rate at which a crew progresses. For large sealing projects, a minimum 100-gallons/hour sustained capacity is recommended. The unit should be a double boiler type, with mechanical agitators or continuous recirculation. Kettle temperature must be monitored to ensure that the sealant is not “burned.” Overheating the sealant will prematurely age harden the material.

#### **4.6.4 Router**

A concrete saw can be used to prepare joints, but for random cracking, a mechanical router with a vertical impact mechanism is preferred. When cracks are being routed, this activity will dictate the speed of the crew. Crack routers in the 25-hp range are commonly used and are available from a variety of manufacturers.

#### **4.6.5 Sand Cleaner**

A sand blaster helps to clean loose particles and dust from prepared cracks. The unit must have sufficient force to expose fresh, vital pavement to bond with sealant and patching materials.

#### **4.6.6 Vibratory Roller or Plate Compactor**

Required to compact plant mixed and packaged patching materials properly. Small rollers are best for pothole type applications; plate compactors are best for large areas.

#### **4.6.7 Other Equipment**

Other general use equipment that can be helpful in a maintenance program includes bucket loaders, dump trucks, water tanks, and a power sweeper unit.

## Appendix A. AIRPAV Software

### The Software

Data analysis was performed using the AIRPAV pavement evaluation and management software. In addition to calculating and documenting PCI values, AIRPAV evaluates the collected inspection data and recommends rehabilitation actions that address the cause of pavement distress. AIRPAV can incorporate traffic and structural capacity evaluations into the pavement evaluation matrix, and AIRPAV also performs preliminary life cycle cost analysis of the various rehabilitation alternatives, providing guidance on the lowest annual cost repair strategy.



A complete database, along with an updated version of AIRPAV, is provided on INDOT computers for ongoing management of the INDOT pavement systems.

### Capital Improvements

AIRPAV creates interactive CIPs, providing the user with the ability to input unit costs, develop new projects, move projects between years, and even increase or decrease the scope and cost of individual projects.

## Maintenance

AIRPAV calculates and develops maintenance work orders organized by type of work. Maintenance work orders can be printed and issued directly to maintenance crews.

## Traffic

AIRPAV provides the ability to model aircraft ground movements. Traffic can be sorted by airline, aircraft type, destination gate or ramp, and runway used. The program graphically displays each taxi path, accumulates total operations, automatically determines design aircraft, and calculates structural overlay requirements for each pavement feature. The software can provide Pavement Classification Numbers (PCN) for each pavement feature or report results directly as inches of overlay required.

## Maps

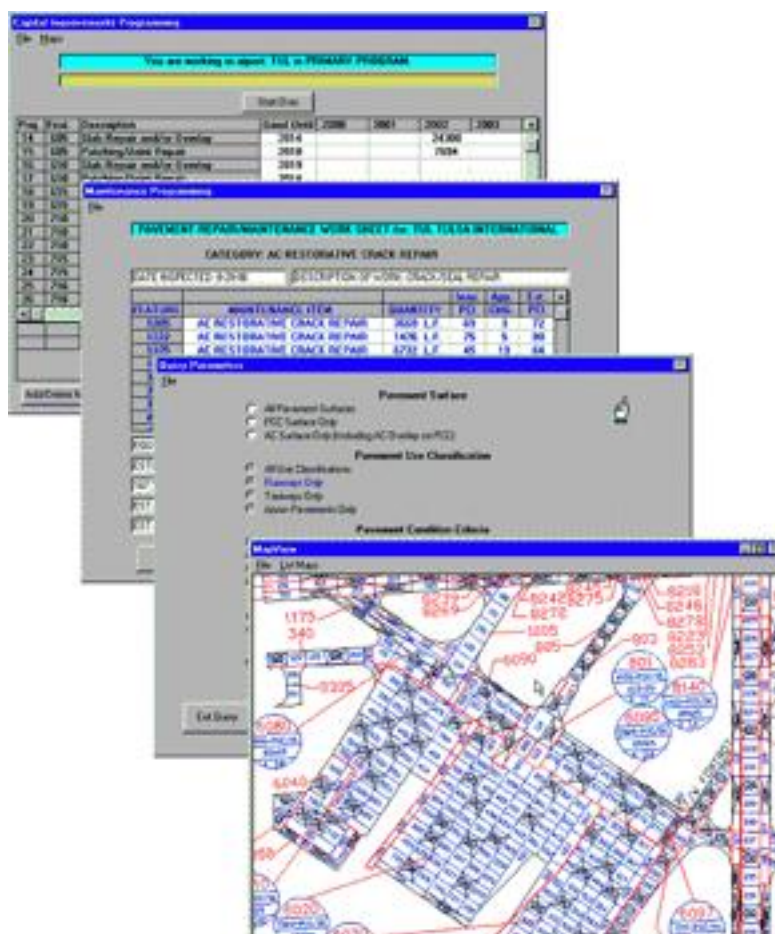
AIRPAV permits viewing and printing of PCI maps. Inspection layout, pavement condition, and other views are available from within the software.

## Query

The AIRPAV query function is a powerful search tool that allows users to extract useful reports meeting various criteria. For example, lists can be created for taxiway pavement, asphalt pavement, or areas below MSL at the time of inspection.

## Global Information System (GIS) Integration

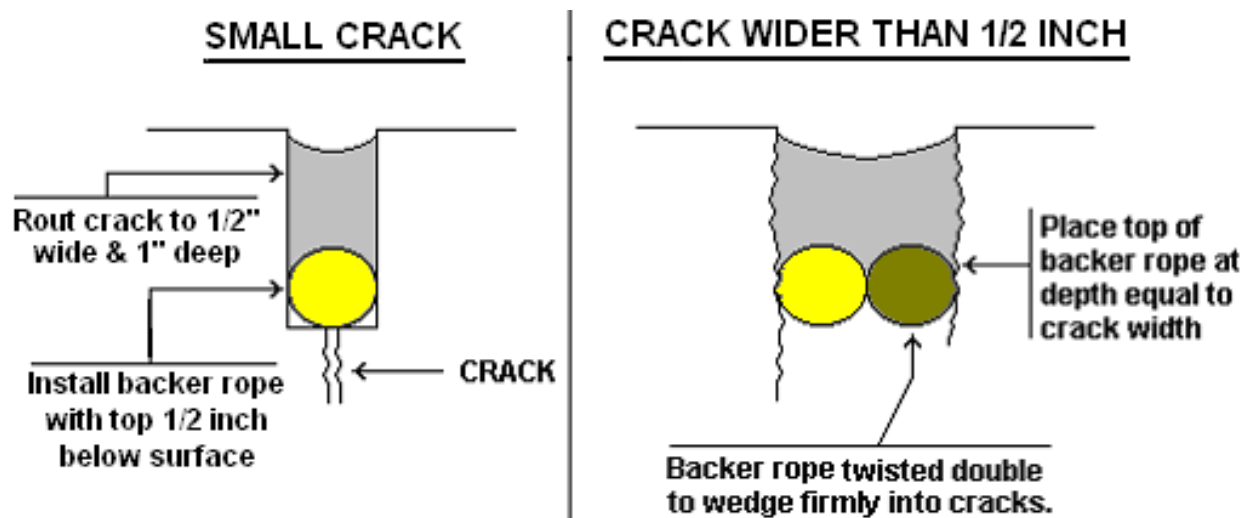
AIRPAV is fully GIS-enabled. A single click in AIRPAV exports all data to an MS Access database that can be linked to shape files used in an ESRI product. In this way, virtually all data in the pavement management database can be accessed in GIS format.



## Appendix B. General Maintenance Techniques

### Crack Sealing

- Cracks over ¼ inches wide should be sealed.
- Cracks wider than 3 inches should be patched.
- Sealant depth above the backer rope should be equal to the width of the reservoir, or as recommended by the manufacturer.
- Routed cracks should be sand blasted, to prepare for bonding with the sealant.
- Clean cracks with compressed air prior to sealing.
- Backing material should always be placed into the cracks. Commercial products are available. Several sizes of rope should be available to accommodate various crack sizes.
- Apply sealant after placing the backer rope. Follow the manufacturer's instructions. Sealant should be applied to within ¼ inch of the pavement surface.
- The final activity is to clean the surrounding pavement areas. A vacuum sweeper works well for this. Allow the sealant time to set before using a broom.
- Consider hot-applied, pourable patch material for cracks > ½ inch and any subsidence or depressions.



## Overband Technique

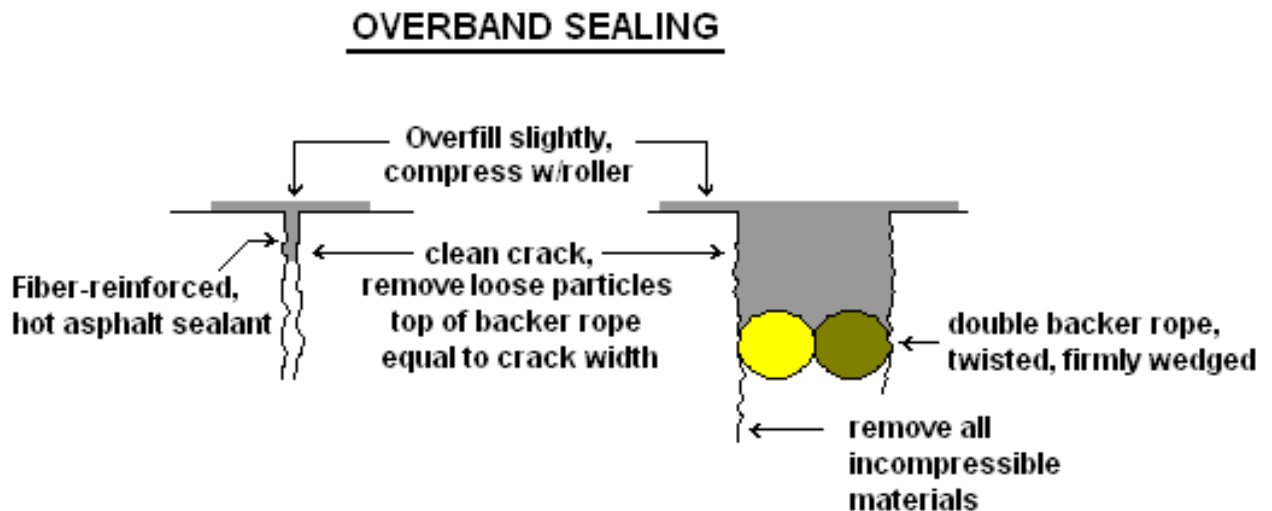
An alternate crack sealing technique using the procedures outlined below.

### Material

- Blend grade 20 or equivalent asphalt cement and latex rubber at 5 percent by weight asphalt.
- Again, at 5 percent by weight of asphalt, add polyester fibers into agitator tank.
- Maintain blended asphalt temperature at least 20 degrees below flash point.
- Continuously recycle hot blended asphalt through pumps and hoses when heating kettle is in standby mode.

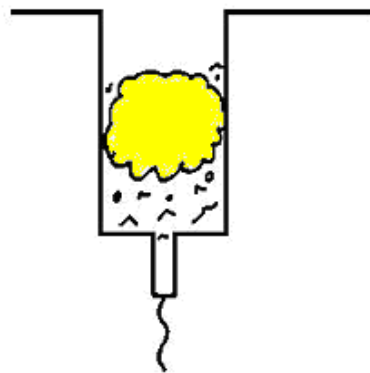
### Application

- Sealant should be applied to dry pavement, with ambient temperatures above 40 degrees.
- Cracks should be sand cleaned and blown free of debris immediately before sealing.
- Application of sealant immediately follows cleaning of the crack.
- Sealant should be pressure applied from a wand-type applicator with “overband” nozzle.
- Seat the sealant with a steel-wheeled roller immediately after placement.
- In wider cracks, a backer rope is recommended to limit material quantities required.

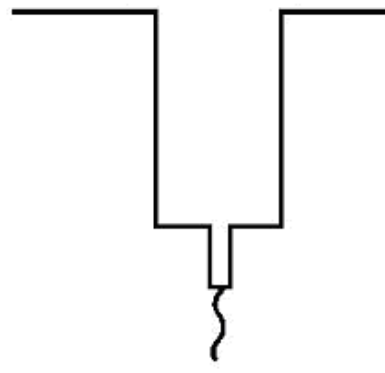


## Joint Repair (portland cement)

- Rout a reservoir for the sealant  $\frac{1}{2}$  inch wide and 1 inch deep.
- Cracks wider than  $\frac{1}{2}$  inch should have reservoirs  $\frac{1}{4}$  inch wider than the crack. Reservoir height above backer rope should be less than reservoir width, or as recommended by manufacturer.
- Routed cracks should be cleaned to expose fresh, vital pavement on the vertical crack edge.
- Cracks should be cleaned to remove all sand, debris, and other materials from the crack.
- Backing material should be placed into the crack.
- Apply sealant to within  $\frac{1}{4}$  inch of pavement surface, following manufacturer's instructions.
- Clean the surrounding pavement area.

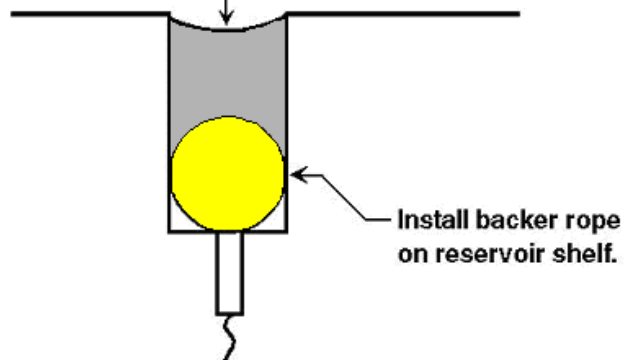


Typical failed joint sealant, w/  
debris and incompressibles.



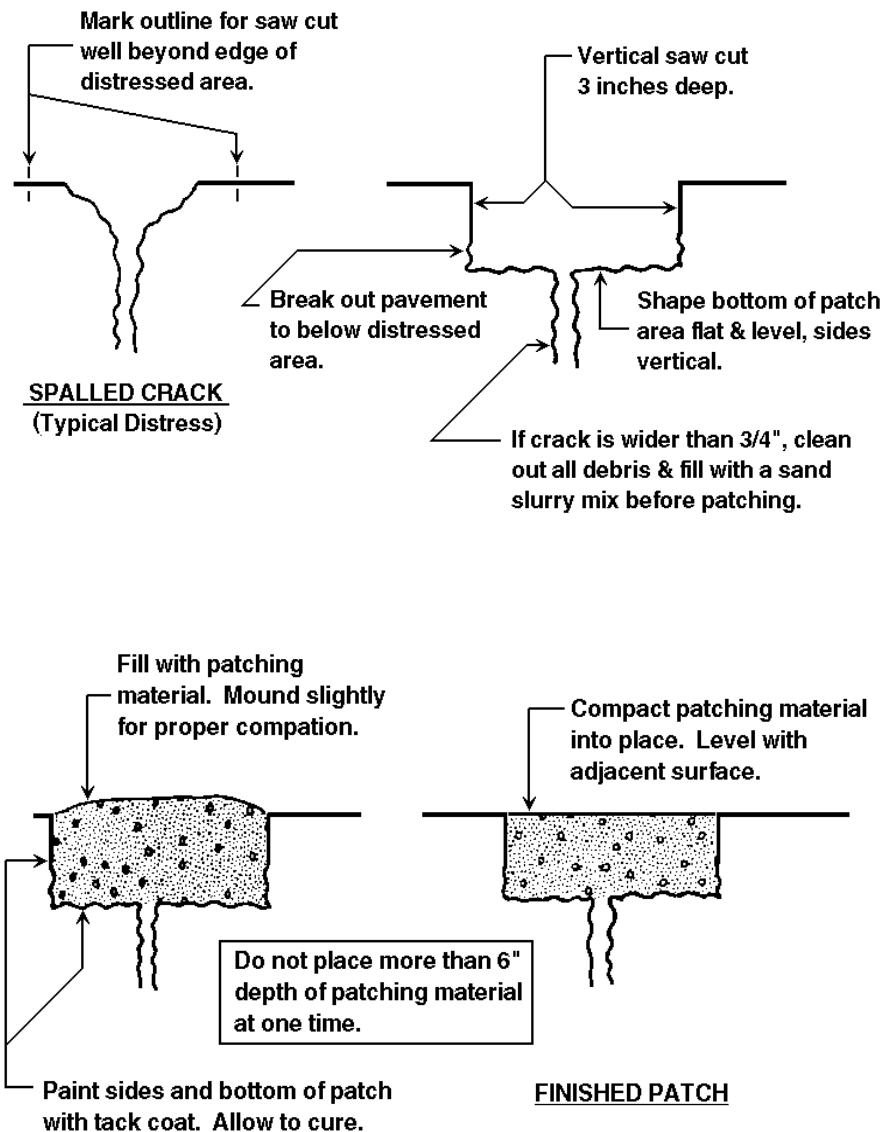
Clean joints exposing fresh,  
clean concrete and stone.  
Retain existing resevoir shape.

Fill to  $\frac{1}{8}$ " below surface.  
Do not overfill.



## Patching (bituminous material)

- Examine distressed area and mark patch outline.
- Cut patch area with saw, no less than 3 inches deep.
- Remove enclosed pavement, leaving the vertical sawed edges undamaged.
- Clean sides and bottom and blow out with compressed air
- Paint sides and bottom with rapid curing asphalt tack coat. Prevent pooling on bottom.
- Allow tack coat to cure until it reaches a gummy consistency.
- Place hot mixed asphalt concrete and mound slightly, allowing for compaction.
- Compact with vibratory roller or plate compactor, in layers no greater than 6 inches.

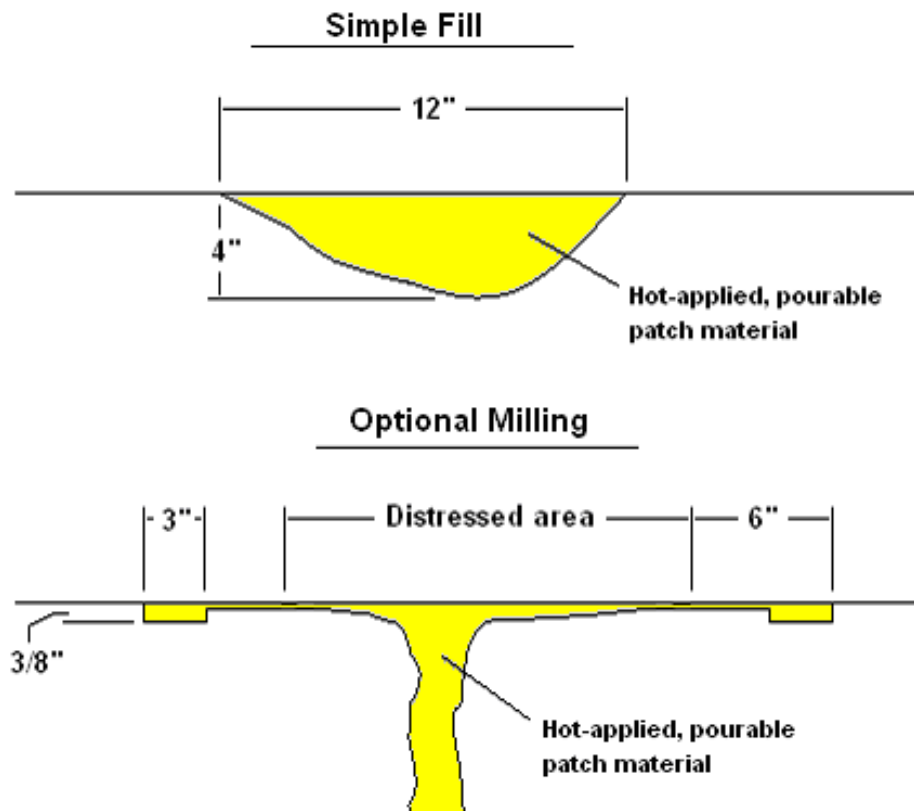




## Patching (pourable materials)

Hot-applied, pourable materials generally are used to repair deficiencies larger than can be repaired by sealants, but smaller than those where traditional techniques would be required. Suggested uses for this type of repair include cracks over 2 inches wide, potholes less than 4 inches deep, as a leveling for small depressions, as a cap for settled utility cuts, and as a skin patch for areas of alligator cracking.

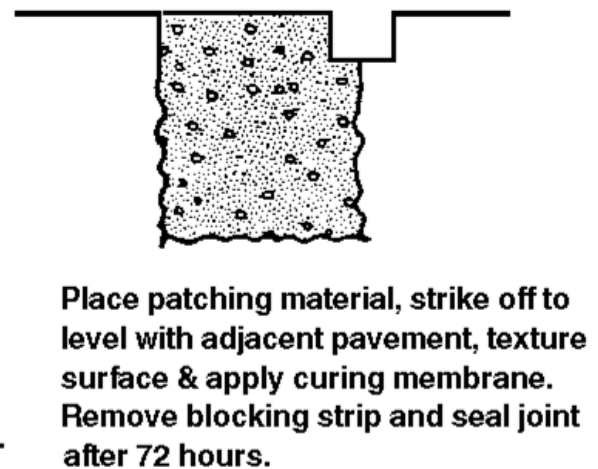
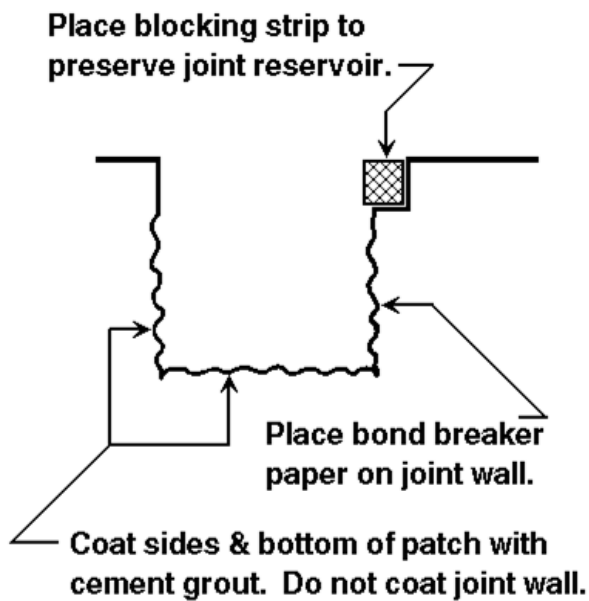
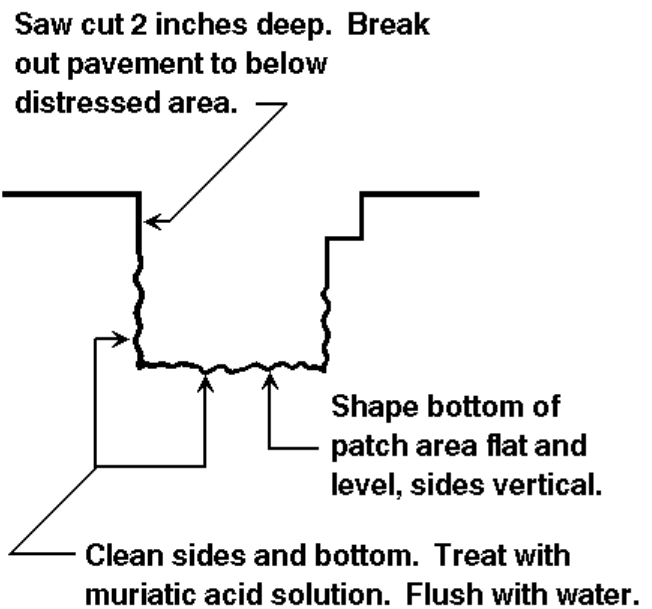
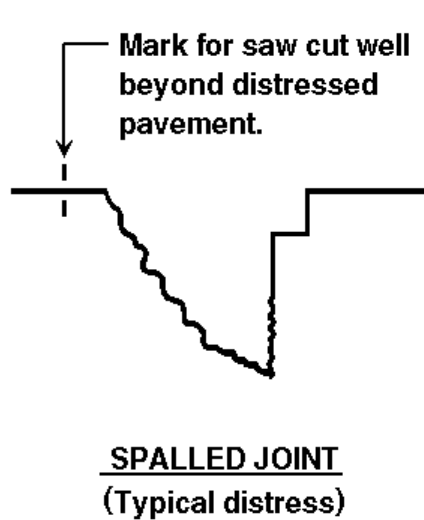
- Examine and mark the patch outline. Boundaries should extend to sound pavement.
- Apply patch material to clean, dry surfaces.
- A heating lance to preheat or dry existing pavement is recommended in cold or wet conditions.
- Patch material should be poured into the area to be repaired and leveled as appropriate.
- Patch edges should be sealed after application to assure good adhesion, preventing surface moisture from migrating under patch edges.



## Patching (PCC)

The technique outlined here simulates a thin bonded PCC overlay. This procedure has been proven effective in service throughout the country.

- Examine and mark patch outline.
- Saw cut area to a depth of 2 inches. The enclosed area is then chipped or jack hammered to solid pavement, but not less than a 2-inch nominal depth.
- The sides and bottom are sand cleaned and air-blasted to expose vital, clean concrete.
- A 25 percent solution of muriatic acid is applied to all exposed surfaces within the patch.
- The muriatic acid solution is thoroughly flushed from the patch area with water.
- Compressed air is used to remove excess water from the area, but exposed concrete must be maintained in a moist condition.
- The sides and bottom of the area are then coated with approximately a 1/16-inch layer of cement grout applied at the consistency of paste. The grout acts as an adhesive to bond the fresh concrete to existing concrete.
- If the patch is adjacent to joints, the continuity of the joint must be maintained by placing inserts approximately the shape of the desired joint against the wall of the patch.
- Before concrete grout begins to dry, concrete is placed in the patch area and is compacted into position with hand tampers or a vibrating plate tamper.
- When the patch has been struck to the proper slope and elevation, a surface texture is applied to approximate the texture of adjacent pavement.
- Joint edges may be edged slightly to remove sharp edges. The patch should be covered with polyethylene or sprayed with a curing compound.
- Clean the surrounding pavement before concrete spillover has a chance to set up.
- The patch may be open to traffic in 72 hours.





## Appendix C. PCI Summary

The PCI summary provides an index of pavement conditions at the airport. The letter in the first column indicates the type of pavement, asphalt or portland cement. The last column lists the distress types found in each sample unit. The distress types are listed by a numbering code for each type of pavement, shown at the beginning of the summary.

AIRPAV

CONDITION SURVEY SUMMARY

AIRPORT: 417 GREENCASTLE-PUTNAM COUNTY

DATE: 12-30-2009

"A" FLEXIBLE PAVEMENT DISTRESS CODES

1. ALLIGATOR CRACKING
2. BLEEDING
3. BLOCK CRACKING
4. CORRUGATION
5. DEPRESSION
6. JET BLAST EROSION
7. JOINT REFL. CRACKING
8. LONG & TRANS. CRACKING
9. OIL SPILL
10. PATCHING
11. POLISHED AGGREGATE
12. RAVELLING/WEATHERING
13. RUTTING
14. SHOIVING FROM PCC SLAB
15. SLIPPAGE CRACKING
16. SWELLING

"P" RIGID PAVEMENT DISTRESS CODES

1. BLOW UP
2. CORNER BREAK
3. LTD CRACKING
4. "D" CRACKING
5. JOINT SEAL DAMAGE
6. SMALL PATCH
7. LARGE PATCH
8. POPOUTS
9. PUMPING
10. SCALING/MAP CRACKING/CRAZING
11. FAULTING
12. SHATTERED SLAB
13. SHRINKAGE CRACKING
14. JOINT SPALLING
15. CORNER SPALLING

FEATURE:	SAMPLE UNIT:	AREA:	DATE:	SURVEYED BY:	PCI:	DISTRESSES PRESENT:
105 A	105.100	3750	8-16-09	JB	83	8 12
105 A	105.103	3500	8-16-09	JB	79	8 12
105 A	105.105	3500	8-16-09	JB	63	5 8 10 12*
105 A	105.106	3500	8-16-09	AN	79	1 8
105 A	105.109	3500	8-16-09	AN	86	8
105 A	105.112	3500	8-16-09	AN	84	8 12
MEAN FEATURE PCI = 81 BASED ON A SAMPLED AREA OF 21250 SQUARE FEET - PCI SPREAD FOR FEATURE = 22.74 DESCRIPTION: TAXIWAY A						
110 A	110.102	3500	8-16-09	JB	100	
110 A	110.106	3500	8-16-09	JB	100	
110 A	110.110	3500	8-16-09	JB	100	
110 A	110.112	3500	8-16-09	JB	100	
110 A	110.114	3500	8-16-09	JB	100	
110 A	110.118	1750	8-16-09	JB	94	8
AVERAGE FEATURE PCI = 99 BASED ON A SAMPLED AREA OF 19250 SQUARE FEET - PCI SPREAD FOR FEATURE = 6.20 DESCRIPTION: TAXIWAY A						
115 A	115.118	1750	8-16-09	JB	94	8
115 A	115.122	3500	8-16-09	JB	95	8
115 A	115.126	3500	8-16-09	JB	96	8
115 A	115.130	3500	8-16-09	JB	96	8
115 A	115.134	3500	8-16-09	JB	96	8
115 A	115.136	3500	8-16-09	JB	94	8
115 A	115.138	3500	8-16-09	JB	96	8
115 A	115.142	3500	8-16-09	AN	93	8
AVERAGE FEATURE PCI = 95 BASED ON A SAMPLED AREA OF 26250 SQUARE FEET - PCI SPREAD FOR FEATURE = 3.38 DESCRIPTION: TAXIWAY A						
210 A	210.200	3500	8-16-09	AN	94	8
210 A	210.201	3500	8-16-09	AN	94	8
210 A	210.202	1190	8-16-09	AN	86	8
AVERAGE FEATURE PCI = 91 BASED ON A SAMPLED AREA OF 8190 SQUARE FEET - PCI SPREAD FOR FEATURE = 7.93 DESCRIPTION: CONNECTOR TAXIWAY B						

MEAN FEATURE PCI = 81

BASED ON A SAMPLED AREA OF 21250 SQUARE FEET - PCI SPREAD FOR FEATURE = 22.74

DESCRIPTION: TAXIWAY A

AVERAGE FEATURE PCI = 99

BASED ON A SAMPLED AREA OF 19250 SQUARE FEET - PCI SPREAD FOR FEATURE = 6.20

DESCRIPTION: TAXIWAY A

AVERAGE FEATURE PCI = 95

BASED ON A SAMPLED AREA OF 26250 SQUARE FEET - PCI SPREAD FOR FEATURE = 3.38

DESCRIPTION: TAXIWAY A

AVERAGE FEATURE PCI = 91

BASED ON A SAMPLED AREA OF 8190 SQUARE FEET - PCI SPREAD FOR FEATURE = 7.93

DESCRIPTION: CONNECTOR TAXIWAY B

PAGE 1

Sample units marked with an asterisk (\*) are additional sample units. Additional sample units do not represent the typical condition of surrounding sample units in the pavement features.

The PCI summary provides a quick overview of the pavement condition and consistency. Are the distress types similar? Do the individual sample units have consistent PCI ratings? Answering these questions is a start to understanding your dynamic pavement system.

## CONDITION SURVEY SUMMARY

AIRPORT: EKM ELKHART MUNICIPAL

DATE: 01-01-2015

## "A" FLEXIBLE PAVEMENT DISTRESS CODES

1. ALLIGATOR CRACKING
2. BLEEDING
3. BLOCK CRACKING
4. CORRUGATION
5. DEPRESSION
6. JET BLAST EROSION
7. JOINT REFL. CRACKING
8. LONG. & TRANS. CRACKING
9. OIL SPILL
10. PATCHING
11. POLISHED AGGREGATE
12. RAVELLING
13. RUTTING
14. SHOVING FROM PCC SLAB
15. SLIPPAGE CRACKING
16. SWELLING
17. WEATHERING

## "P" RIGID PAVEMENT DISTRESS CODES

1. BLOW UP
2. CORNER BREAK
3. LTD CRACKING
4. "D" CRACKING
5. JOINT SEAL DAMAGE
6. SMALL PATCH
7. LARGE PATCH
8. POPOUTS
9. PUMPING
10. SCALING/MAP CRACKING/CRAZING
11. FAULTING
12. SHATTERED SLAB
13. SHRINKAGE CRACKING
14. JOINT SPALLING
15. CORNER SPALLING
16. ALKALI SILICA REACTION

FEATURE:	SAMPLE UNIT:	AREA:	DATE:	SURVEYED BY:	PCI:	DISTRESSES PRESENT:
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205 A	205.102	3750	8-30-14	SM	71	8 17
205 A	205.106	3750	8-30-14	SM	80	8 17
205 A	205.109	3750	8-30-14	SM	88	8 17
205 A	205.116	3750	8-30-14	SM	78	8 10
205 A	205.123	3750	8-30-14	SM	81	8 17
205 A	205.130	3750	8-30-14	SM	88	8 17
205 A	205.137	3750	8-30-14	SM	78	8 17
205 A	205.144	3750	8-30-14	SM	79	8
205 A	205.151	3750	8-30-14	SM	78	8
205 A	205.154	3750	8-30-14	SM	87	8
205 A	205.158	3750	8-30-14	SM	83	8
205 A	205.165	3750	8-30-14	SM	80	8 17
205 A	205.172	3750	8-30-14	SM	63	5 8 12
205 A	205.179	3750	8-30-14	SM	79	8
205 A	205.186	3750	8-30-14	SM	71	8 13
205 A	205.193	3750	8-30-14	SM	84	8
205 A	205.200	3750	8-30-14	SM	63	1 8
205 A	205.207	3750	8-30-14	SM	74	5 8

AVERAGE FEATURE PCI = 78

BASED ON A SAMPLED AREA OF 67500 SQUARE FEET - PCI SPREAD FOR FEATURE = 24.43

DESCRIPTION: TAXIWAY B

210 A	210.214	5000	8-30-14	SM	60	5 8 13 17
210 A	210.218	5000	8-30-14	SM	53	1 8 13 17
210 A	210.222	5000	8-30-14	SM	64	8 13 17
210 A	210.226	5000	8-30-14	SM	61	8 13 17
210 A	210.232	5000	8-30-14	ABN	72	1 8 17
210 A	210.236	5000	8-30-14	SM	71	8 13 17

AVERAGE FEATURE PCI = 63

BASED ON A SAMPLED AREA OF 30000 SQUARE FEET - PCI SPREAD FOR FEATURE = 19.26

DESCRIPTION: TAXIWAY B

213 A	213.100	5000	8-30-14	SM	59	1 8
213 A	213.101	4000	8-30-14	SM	72	8

AVERAGE FEATURE PCI = 65

BASED ON A SAMPLED AREA OF 9000 SQUARE FEET - PCI SPREAD FOR FEATURE = 13.24

DESCRIPTION: TAXIWAY B



FEATURE:	SAMPLE UNIT:	AREA:	DATE:	SURVEYED BY:	PCI:	DISTRESSES PRESENT:
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215 A	215.210	7500	8-30-14	SM	60	8 15 17
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**AVERAGE FEATURE PCI = 60**  
**BASED ON A SAMPLED AREA OF 7500 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00**  
**DESCRIPTION: TAXIWAY B**

230 A	230.103	5000	8-30-14	ABN	93	8 17
230 A	230.104	5000	8-30-14	ABN	94	8 17

**AVERAGE FEATURE PCI = 93**  
**BASED ON A SAMPLED AREA OF 10000 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.58**  
**DESCRIPTION: TAXIWAY B-1**

233 A	233.100	5000	8-30-14	ABN	81	8
233 A	233.101	3750	8-30-14	ABN	78	8

**AVERAGE FEATURE PCI = 80**  
**BASED ON A SAMPLED AREA OF 8750 SQUARE FEET - PCI SPREAD FOR FEATURE = 3.43**  
**DESCRIPTION: TAXIWAY B-1**

240 A	240.102	5000	8-30-14	ABN	15	1 3 12
240 A	240.104	5210	8-30-14	ABN	31	3 8 12

**AVERAGE FEATURE PCI = 23**  
**BASED ON A SAMPLED AREA OF 10210 SQUARE FEET - PCI SPREAD FOR FEATURE = 15.75**  
**DESCRIPTION: TAXIWAY B-3**

243 A	243.100	5000	8-30-14	SM	86	8
243 A	243.101	4000	8-30-14	SM	78	8

**AVERAGE FEATURE PCI = 82**  
**BASED ON A SAMPLED AREA OF 9000 SQUARE FEET - PCI SPREAD FOR FEATURE = 7.55**  
**DESCRIPTION: TAXIWAY B-3**

245 A	245.105	11500	8-30-14	ABN	60	3 8
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**AVERAGE FEATURE PCI = 60**  
**BASED ON A SAMPLED AREA OF 11500 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00**  
**DESCRIPTION: TAXIWAY B-3**

250 A	250.102	5000	8-30-14	ABN	29	1 3 12
250 A	250.104	5600	8-30-14	ABN	35	1 3 8

**AVERAGE FEATURE PCI = 32**  
**BASED ON A SAMPLED AREA OF 10600 SQUARE FEET - PCI SPREAD FOR FEATURE = 5.33**  
**DESCRIPTION: TAXIWAY B-4**

253 A	253.100	5000	8-30-14	SM	76	8
253 A	253.101	5000	8-30-14	SM	72	8

**AVERAGE FEATURE PCI = 74**  
**BASED ON A SAMPLED AREA OF 10000 SQUARE FEET - PCI SPREAD FOR FEATURE = 4.15**  
**DESCRIPTION: TAXIWAY B-4**

255 A	255.105	12528	8-30-14	ABN	60	1 8
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**AVERAGE FEATURE PCI = 60**  
**BASED ON A SAMPLED AREA OF 12528 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00**  
**DESCRIPTION: TAXIWAY B-4**

260 A	260.102	5000	8-30-14	ABN	36	1 3 8 12
260 A	260.104	2800	8-30-14	ABN	37	1 3

**AVERAGE FEATURE PCI = 36**  
**BASED ON A SAMPLED AREA OF 7800 SQUARE FEET - PCI SPREAD FOR FEATURE = 1.56**  
**DESCRIPTION: TAXIWAY B-5**

263 A	263.100	5000	8-30-14	SM	76	8
263 A	263.101	4000	8-30-14	SM	72	8

**AVERAGE FEATURE PCI = 74**  
**BASED ON A SAMPLED AREA OF 9000 SQUARE FEET - PCI SPREAD FOR FEATURE = 3.77**  
**DESCRIPTION: TAXIWAY B-5**

FEATURE:	SAMPLE UNIT:	AREA:	DATE:	SURVEYED BY:	PCI:	DISTRESSES PRESENT:
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265 A	265.104	1750	8-30-14	DMY	45	8
265 A	265.105	5000	8-30-14	ABN	47	1 8

**AVERAGE FEATURE PCI = 46**  
**BASED ON A SAMPLED AREA OF 6750 SQUARE FEET - PCI SPREAD FOR FEATURE = 1.68**  
**DESCRIPTION: TAXIWAY B-5**

405 A	405.102	4000	8-30-14	ABN	74	8
405 A	405.105	4000	8-30-14	SM	74	8
405 A	405.108	4000	8-30-14	SM	74	8
405 A	405.111	4000	8-30-14	SM	71	8
405 A	405.114	4000	8-30-14	SM	63	1 8
405 A	405.118	4000	8-30-14	SM	58	1 5 8
405 A	405.121	4000	8-30-14	SM	78	8
405 A	405.124	4000	8-30-14	SM	66	1 8

**AVERAGE FEATURE PCI = 70**  
**BASED ON A SAMPLED AREA OF 32000 SQUARE FEET - PCI SPREAD FOR FEATURE = 20.28**  
**DESCRIPTION: TAXIWAY D**

410 A	410.100	5030	8-30-14	SM	56	8
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**AVERAGE FEATURE PCI = 56**  
**BASED ON A SAMPLED AREA OF 5030 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00**  
**DESCRIPTION: TAXIWAY D**

420 A	420.100	3900	8-30-14	SM	63	8 13 17
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**AVERAGE FEATURE PCI = 63**  
**BASED ON A SAMPLED AREA OF 3900 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00**  
**DESCRIPTION: TAXIWAY D-2**

425 A	425.101	5500	8-30-14	SM	61	1 8
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**AVERAGE FEATURE PCI = 61**  
**BASED ON A SAMPLED AREA OF 5500 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00**  
**DESCRIPTION: TAXIWAY D-2**

430 A	430.100	7160	8-30-14	SM	65	1 8
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**AVERAGE FEATURE PCI = 65**  
**BASED ON A SAMPLED AREA OF 7160 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00**  
**DESCRIPTION: TAXIWAY D-3**

435 A	435.102	4000	8-30-14	SM	70	5 8
435 A	435.104	4000	8-30-14	SM	76	1 8
435 A	435.105	4000	8-30-14	SM	58	1 5 8

**AVERAGE FEATURE PCI = 68**  
**BASED ON A SAMPLED AREA OF 12000 SQUARE FEET - PCI SPREAD FOR FEATURE = 17.73**  
**DESCRIPTION: TAXIWAY D-3**

440 A	440.107	4000	8-30-14	SM	55	3 8
440 A	440.109	4000	8-30-14	SM	58	3 8
440 A	440.111	4000	8-30-14	SM	60	3 8
440 A	440.113	4000	8-30-14	SM	44	1 3 8
440 A	440.115	4000	8-30-14	SM	53	1 3 8

**AVERAGE FEATURE PCI = 54**  
**BASED ON A SAMPLED AREA OF 20000 SQUARE FEET - PCI SPREAD FOR FEATURE = 15.64**  
**DESCRIPTION: TAXIWAY D-3**

445 A	445.116	4350	8-30-14	SM	82	8
445 A	445.117	5500	8-30-14	SM	61	1 8

**AVERAGE FEATURE PCI = 72**  
**BASED ON A SAMPLED AREA OF 9850 SQUARE FEET - PCI SPREAD FOR FEATURE = 20.65**  
**DESCRIPTION: TAXIWAY D-3**

FEATURE:	SAMPLE UNIT:	AREA:	DATE:	SURVEYED BY:	PCI:	DISTRESSES PRESENT:
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450 A	450.101	5000	8-30-14	ABN	71	8
450 A	450.103	5000	8-30-14	ABN	65	1 8
450 A	450.105	5000	8-30-14	ABN	57	1 8

**AVERAGE FEATURE PCI = 64**  
**BASED ON A SAMPLED AREA OF 15000 SQUARE FEET - PCI SPREAD FOR FEATURE = 13.29**  
**DESCRIPTION: TAXIWAY D-4**

510 A	510.100	4670	8-30-14	ABN	83	8
510 A	510.101	3950	8-30-14	ABN	81	8

**AVERAGE FEATURE PCI = 82**  
**BASED ON A SAMPLED AREA OF 8620 SQUARE FEET - PCI SPREAD FOR FEATURE = 1.64**  
**DESCRIPTION: TAXIWAY**

515 A	515.100	4000	8-30-14	ABN	72	1 8
515 A	515.101	3280	8-30-14	ABN	60	1 8 17

**AVERAGE FEATURE PCI = 66**  
**BASED ON A SAMPLED AREA OF 7280 SQUARE FEET - PCI SPREAD FOR FEATURE = 12.45**  
**DESCRIPTION: TAXIWAY**

520 A	520.100	4500	8-30-14	ABN	84	8
520 A	520.101	2025	8-30-14	ABN	76	8

**AVERAGE FEATURE PCI = 80**  
**BASED ON A SAMPLED AREA OF 6525 SQUARE FEET - PCI SPREAD FOR FEATURE = 7.99**  
**DESCRIPTION: TAXIWAY**

3005 A	3005.301	4000	8-30-14	DMY	25	1 3 8 12
3005 A	3005.302	5000	8-30-14	DMY	24	3 5 8 12
3005 A	3005.402	5000	8-30-14	DMY	21	3 8 12
3005 A	3005.503	4175	8-30-14	DMY	23	1 3 12 13

**AVERAGE FEATURE PCI = 23**  
**BASED ON A SAMPLED AREA OF 18175 SQUARE FEET - PCI SPREAD FOR FEATURE = 3.60**  
**DESCRIPTION: TERMINAL RAMP**

3010 A	3010.100	5000	8-30-14	SM	54	8 17
3010 A	3010.201	5000	8-30-14	SM	51	8 17
3010 A	3010.400	5000	8-31-14	SM	39	8 12
3010 A	3010.404	5100	8-30-14	SM	52	1 8 12
3010 A	3010.504	5000	8-30-14	SM	49	1 8 13 17

**AVERAGE FEATURE PCI = 49**  
**BASED ON A SAMPLED AREA OF 25100 SQUARE FEET - PCI SPREAD FOR FEATURE = 14.90**  
**DESCRIPTION: TERMINAL RAMP**

3015 A	3015.102	2270	8-30-14	SM	53	8
3015 A	3015.103	3800	8-30-14	SM	46	1 8

**AVERAGE FEATURE PCI = 50**  
**BASED ON A SAMPLED AREA OF 6070 SQUARE FEET - PCI SPREAD FOR FEATURE = 6.94**  
**DESCRIPTION: TERMINAL RAMP**

3105 P	3105.101	4050	8-30-14	ABN	100	
3105 P	3105.200	4050	8-30-14	ABN	100	
3105 P	3105.300	4050	8-30-14	ABN	100	
3105 P	3105.301	4050	8-30-14	ABN	100	
3105 P	3105.401	4050	8-30-14	ABN	100	

**AVERAGE FEATURE PCI = 100**  
**BASED ON A SAMPLED AREA OF 20250 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00**  
**DESCRIPTION: NORTH RAMP**

3110 A	3110.100	5000	8-30-14	ABN	95	8
3110 A	3110.102	4900	8-30-14	ABN	96	8
3110 A	3110.201	5000	8-30-14	ABN	95	8
3110 A	3110.300	5000	8-30-14	ABN	98	8

**AVERAGE FEATURE PCI = 96**  
**BASED ON A SAMPLED AREA OF 19900 SQUARE FEET - PCI SPREAD FOR FEATURE = 3.34**  
**DESCRIPTION: NORTH RAMP**

FEATURE:	SAMPLE UNIT:	AREA:	DATE:	SURVEYED BY:	PCI:	DISTRESSES PRESENT:
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3115 P	3115.101	4050	8-30-14	ABN	100	
3115 P	3115.200	4050	8-30-14	ABN	100	
3115 P	3115.301	4050	8-30-14	ABN	100	
3115 P	3115.400	4050	8-30-14	ABN	100	

**AVERAGE FEATURE PCI = 100**  
**BASED ON A SAMPLED AREA OF 16200 SQUARE FEET - PCI SPREAD FOR FEATURE = 0.00**  
**DESCRIPTION: NORTH RAMP**

3120 A	3120.100	7000	8-30-14	ABN	83	8
3120 A	3120.101	4200	8-30-14	ABN	87	8

**AVERAGE FEATURE PCI = 85**  
**BASED ON A SAMPLED AREA OF 11200 SQUARE FEET - PCI SPREAD FOR FEATURE = 4.02**  
**DESCRIPTION: NORTH RAMP**

6005 A	6005.107	3750	8-30-14	ABN	69	8
6005 A	6005.113	3750	8-30-14	ABN	71	8
6005 A	6005.119	3750	8-30-14	ABN	68	1 8
6005 A	6005.125	3750	8-30-14	ABN	75	8
6005 A	6005.131	3750	8-30-14	ABN	73	8
6005 A	6005.137	3750	8-30-14	ABN	68	1 8
6005 A	6005.143	3750	8-30-14	ABN	76	8
6005 A	6005.149	3750	8-30-14	ABN	78	8
6005 A	6005.155	3750	8-30-14	ABN	80	8
6005 A	6005.161	3750	8-30-14	ABN	67	8
6005 A	6005.167	3750	8-30-14	ABN	73	8
6005 A	6005.173	3750	8-30-14	ABN	74	8

**AVERAGE FEATURE PCI = 73**  
**BASED ON A SAMPLED AREA OF 45000 SQUARE FEET - PCI SPREAD FOR FEATURE = 12.50**  
**DESCRIPTION: RUNWAY 17-35**

6105 P	6105.101	5400	8-30-14	ABN	100	
6105 P	6105.107	5400	8-30-14	ABN	99	13
6105 P	6105.113	5400	8-30-14	ABN	99	13
6105 P	6105.119	5400	8-30-14	ABN	100	
6105 P	6105.125	5400	8-30-14	ABN	100	
6105 P	6105.131	5400	8-30-14	ABN	100	
6105 P	6105.137	5400	8-30-14	ABN	100	
6105 P	6105.143	5400	8-30-14	ABN	100	
6105 P	6105.149	5400	8-30-14	ABN	100	
6105 P	6105.155	5400	8-30-14	ABN	100	
6105 P	6105.161	5400	8-30-14	ABN	100	
6105 P	6105.167	5400	8-30-14	ABN	100	

**AVERAGE FEATURE PCI = 100**  
**BASED ON A SAMPLED AREA OF 64800 SQUARE FEET - PCI SPREAD FOR FEATURE = 1.45**  
**DESCRIPTION: RUNWAY 9-27**

6110 P	6110.301	5400	8-30-14	SM	100	
6110 P	6110.307	5400	8-30-14	SM	100	
6110 P	6110.313	5400	8-30-14	SM	99	13
6110 P	6110.319	5400	8-30-14	SM	100	
6110 P	6110.325	5400	8-30-14	SM	100	
6110 P	6110.331	5400	8-30-14	SM	98	5
6110 P	6110.337	5400	8-30-14	SM	100	
6110 P	6110.343	5400	8-30-14	SM	100	
6110 P	6110.349	5400	8-30-14	SM	100	
6110 P	6110.355	5400	8-30-14	SM	100	
6110 P	6110.361	5400	8-30-14	SM	100	
6110 P	6110.367	5400	8-30-14	SM	100	

**AVERAGE FEATURE PCI = 100**  
**BASED ON A SAMPLED AREA OF 64800 SQUARE FEET - PCI SPREAD FOR FEATURE = 2.00**  
**DESCRIPTION: RUNWAY 9-27**

<b>TOTAL NUMBER OF INSPECTED FEATURES = 37</b>	<b>TOTAL AREA OF INSPECTED PAVEMENT = 644,498 S.F.</b>
<b>TOTAL NUMBER OF INSPECTED SAMPLE UNITS = 140</b>	

\* INDICATES "ADDITIONAL" SAMPLE UNITS.

## Appendix D. Distress Identification

This chapter describes pavement distress types commonly identified during airport PCI inspections.

### Rigid Pavement Distress

#### *Longitudinal, Transverse & Diagonal Cracking*

LTD cracking is often a result of load or temperature deformations. External loads cause flexure. Temperature changes can cause curling. When any of these stresses exceed the slab strength, cracking occurs.

LTD cracking is recorded at low, medium, or high severity, depending on the width of crack opening and degree of deterioration.

At low severity, a crack is less than 1/8 inch wide with little spalling, and no corrective action is indicated. At medium severity, LTD cracks can be up to 1 inch wide with moderate spalling and should be repaired using procedures similar to joint sealing. At high severity, cracks exceed 1 inch in width and may be severely spalled. High-severity LTD cracking is evidence of serious load failure, and correction may require patching or slab replacement. If distress occurs in several adjacent slabs at medium or high severity, major rehabilitation of that area is indicated.

A slab divided into four or more pieces is said to be “divided” or “shattered.” Shattered slab is a separate distress category and indicates a significant structural failure. A shattered slab has lost its ability to distribute loads. Shattered slabs are rated in three severities, but the recommended action in any case is slab replacement.



### Shrinkage Cracking

Shrinkage cracks are small, non-working cracks visible at the pavement surface but not penetrating the full depth of concrete. Shrinkage cracks most commonly occur shortly after construction due to concrete shrinkage during the curing process.

Shrinkage cracks are usually so small that they are not visible until staining or loss of material at crack edges begins to take place. Shrinkage cracks do not represent structural weakness, and no corrective action is prescribed.



### Durability Cracking

Durability cracking (D-cracking) is caused by environmental factors, the most common being freeze/thaw. D-cracking usually appears as either a pattern of hairline cracks running parallel to a joint or crack, or in a corner, where water tends to collect. D-cracking eventually leads to disintegration of the pavement, creating foreign object damage (FOD) potential.

At low severity, D-cracking is evident, but no disintegration has occurred. Medium severity is evident over a significant area of the slab, and some disintegration and FOD potential exist. High-severity D-cracking is evidenced by extensive cracking with loose and missing pieces and significant FOD potential.





### *Joint Spall and Corner Spall*

Spalls at slab joints and corners are caused by excessive internal stress in the pavement. Spalls occur when these stresses exceed the shear strength of the concrete.

Spalling usually results from thermal expansion during hot weather when slabs push and expand against one another. If the joints are filled with incompressible material, such as sand, stresses can become severe, causing spalls. Spalling can be reduced significantly by maintenance of joint sealant.

Spall repair requires patching. The extent and severity of spalling suggests the appropriate action. At low severity, spalled concrete remains securely in place in the slab. A low-severity spall should be monitored closely for further deterioration and should be patched when spalled particles become loose, or during the next scheduled patching activity. Medium- and high-severity spalls should be repaired immediately to prevent FOD. If the pavement can be restored to serviceable condition, spalls should be patched for long-term service. If the pavement is beyond repair, temporary patching should be considered to control FOD.



### *Patches, Large and Small*

Large and small patches, by PCI inspection criteria, are distress conditions. Patches indicate deterioration and aging of pavement that contributes to shortened service life. However, patching also indicates that pavement is being maintained.

A patch that is performing well and shows no outward distress is recorded at low severity, and no corrective action is required. Medium-severity patches are serviceable but are beginning to deteriorate. Maintenance or replacement is indicated. At high severity, replacement is indicated.

By definition, small patches are smaller than 5 square feet in surface area, and they usually result from spall repair at slab joints and corners.

Large patches also may be the result of spall repair, but they often indicate more serious deficiencies, such as corner breaks or other full-depth failure smaller than panel size.



## Joint Seal Damage

When joint sealant is in perfect condition (no damage), there is no distress.

At low severity, at least 10 percent of the sealant is debonded but still in contact with the joint edges. Medium-severity joint seal damage is recorded when at least 10 percent of the sealant has visible gaps smaller than 1/8 inch and is an indicator that replacement should be programmed as soon as is practical. In the meantime, aggressive inspection and sustaining maintenance is recommended to minimize subsurface damage from moisture penetration. At high severity, visible gaps exceed 1/8 inch, and the amount and degree of joint seal damage typically requires complete removal and replacement of the existing sealant.

On serviceable pavement, deteriorated joint sealant should be repaired or replaced to preserve pavement and subgrade integrity and prolong service life. The issue is not so clear-cut with unserviceable pavement. Pavement that can be restored to serviceable condition by maintenance activities such as patching and joint seal repair, or by slab replacement, should be so maintained as long as the process is cost-effective. However, when age and condition preclude economical return to serviceable condition by such means, joint seal repair would no longer be cost-effective and should be suspended except for an interim maintenance program to control FOD potential.





## Flexible Pavement Distress

### *Longitudinal & Trans. Cracking*

L&T cracks are caused by age, construction, and subsurface conditions. Age-related cracking occurs as oxidizing pavement loses components to the atmosphere and becomes more brittle. Consistent application of seal coats can help to prevent age-related cracks.

Construction-related cracking often develops along paving joints. Ensuring that joints are made when both sides are still hot, and near the same temperature, is one of the best ways to mitigate this potential problem.

Seasonal movement caused by changes in subsurface moisture or temperature differences also can cause pavement cracking. Asphalt pavement placed over a PCC pavement or cement stabilized base course may evidence reflective cracking from the underlying material. Wheel loads do not cause L&T cracks, although traffic may worsen their condition.

Low-severity L&T cracks are less than  $\frac{1}{4}$  inch wide, or if sealed with suitable filler material in satisfactory condition can be any width less than 3 inches, if they are not spalled. Maintenance usually is not indicated for low-severity cracking. Moderately spalled cracks and cracks wider than  $\frac{1}{4}$  inch which are not satisfactorily sealed are at medium severity. Medium-severity cracks should be sealed with a high-quality crack filling material. Severely spalled cracks and cracks wider than 3 inches are at high severity. High-severity L&T cracks normally require patching.



## Alligator Cracking

Alligator cracks are a series of interconnected load-related cracks caused by fatigue of the asphalt surface. Alligator cracking is a significant structural distress and develops only in places subject to traffic loads. These cracks typically initiate at the bottom of the asphalt layer and propagate upward. Once a fatigue crack is visible at the surface, significant damage has already occurred.

At low severity, alligator cracks are evidenced by a series of parallel hairline cracks (usually in a wheel path). Medium-severity alligator cracking is a well-defined pattern of interconnected cracks, and some spalling may be present. High-severity alligator cracks have lost aggregate interlock between adjacent pieces, and the cracks may be severely spalled with FOD potential. Most likely, the pieces will move freely under traffic.

Alligator cracking is a serious structural failure that cannot be repaired with sealant. The proper repair is patching.



## Raveling/Weathering

Raveling and weathering are the wearing away of the pavement surface. Failure can be caused by the dislodging of aggregate particles or the loss of asphalt binder. These distresses are usually evident over large areas and may indicate that the asphalt binder has hardened significantly.

Raveling is the loss of coarse aggregate, weathering is the loss of fine aggregate or binder.

Raveling: At low severity, 5 to 20 coarse aggregate particles are missing per square yard. Medium severity is defined by 20 to 40 missing coarse aggregate particles per square yard. At high severity, more than 40 coarse aggregate particles are missing per square yard, and the top layer of aggregate has eroded away.

Weathering: At low severity, edges of coarse aggregate are exposed less than 1 mm. At medium severity, loss of fine aggregate is noticeable and edges of coarse aggregate are exposed up to 6 mm (1/4 inch). High severity weathering has edges of coarse aggregate exposed > 6 mm, with considerable loss of fine aggregate matrix and potential for loss of coarse aggregate.



## Rutting

Ruts are localized areas of pavement having elevations lower than the surrounding sections.

Rutting is due to base and subgrade consolidation caused by excessive wheel loads or poor compaction. Ruts indicate structural failure and can cause hydroplaning.

At low severity, ruts have an average depth of ¼ to ½ inches. At medium severity, ruts have an average depth of ½ to 1 inch. At high severity, ruts have an average depth greater than 1 inch. Patching is the appropriate repair for ruts.





## Appendix E. Feature Analysis

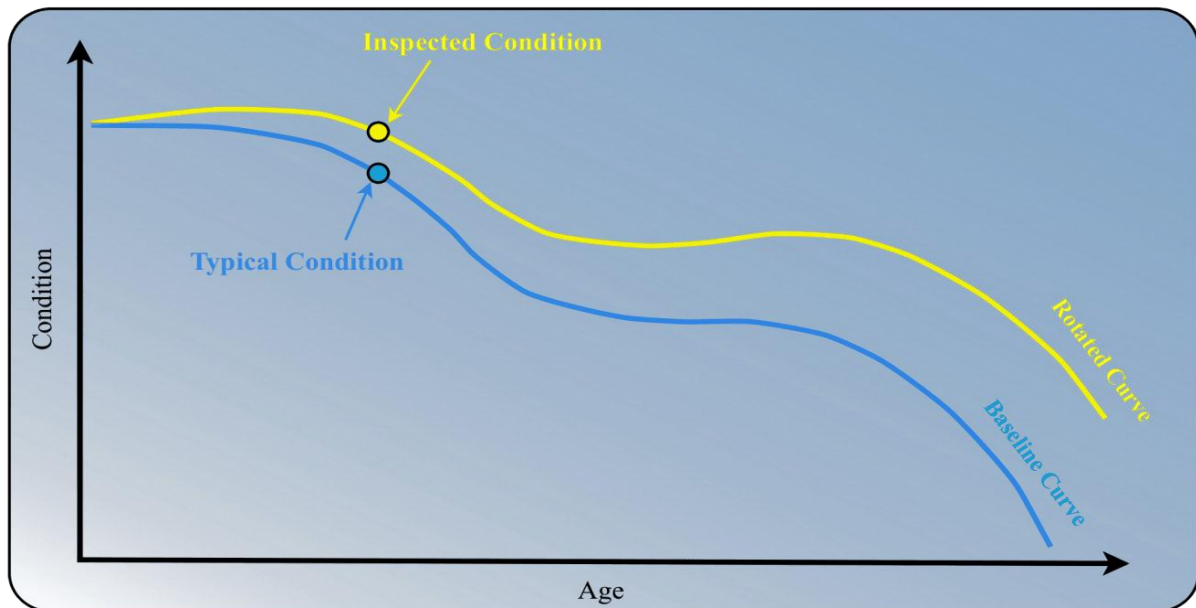
### Pavement Performance Models

Projected performance is determined by relating current pavement condition to expected pavement condition. Projected performance varies based on pavement type. There are four pavement types in Indiana: AC, PCC, ACC, and APC. Each pavement type has a unique deterioration curve, created by plotting all data for that group as PCI vs. age and then finding a performance curve to best fit the data. These curves represent the historic performance of pavement in the group and become the baseline for future projections. The baseline curves are modeled with a third order polynomial equation as shown below.

$$PCI = X(Age)^3 + Y(Age)^2 + Z(Age) + C$$

#### Current Condition (rotating the curves)

Starting with the baseline curve for comparison, current pavement condition is plotted, and the baseline curve is rotated to meet the current condition. The rotated curve provides the starting point for projecting the future pavement condition.

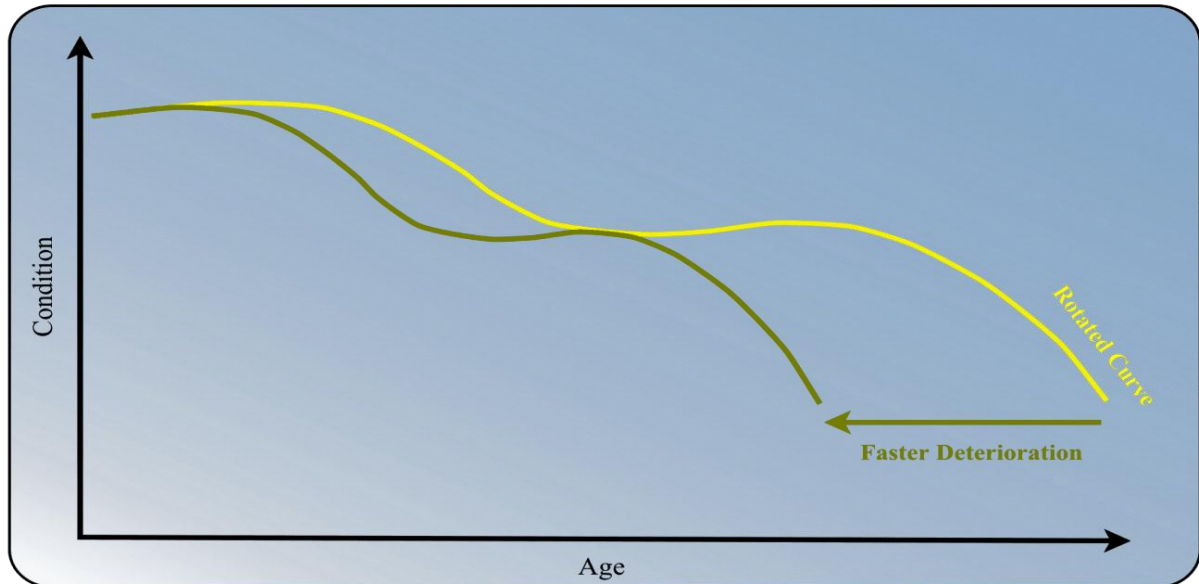


#### Advanced Analysis (accounting for distress)

Some types of pavement distress have a greater impact on pavement deterioration than others. Rutting and alligator (fatigue) cracking are major structural failures and can lead to rapid pavement deterioration. Other distress types, like L&T cracking, develop slowly over time and typically do not cause a significant deviation from the baseline curve.

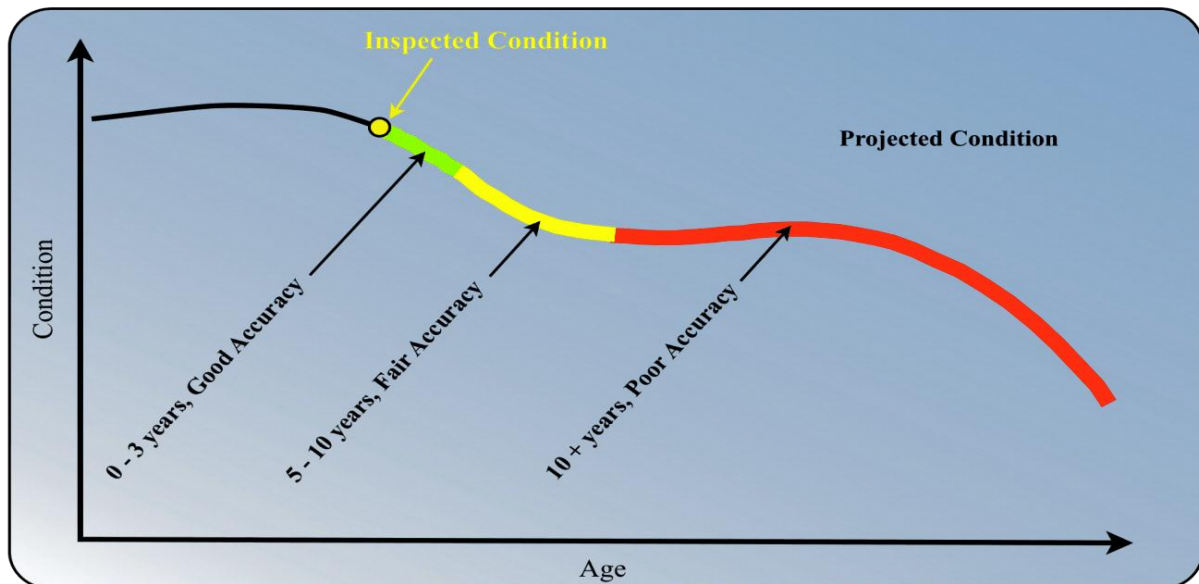


After current condition is accounted for with the curve rotation, pavement distress is addressed in the advanced analysis by compressing or expanding the baseline curve to account for the expected rate of pavement deterioration.



#### *Projected PCI (near term vs. longer term)*

Projecting pavement condition with advanced analysis is a combination of rotating, expanding, and contracting the baseline curves. This projection method provides good short-term results for all pavement sections and fair long-term projections on pavement sections with conditions near the baseline model. The long-term accuracy of outlier data is discussed on the following page.

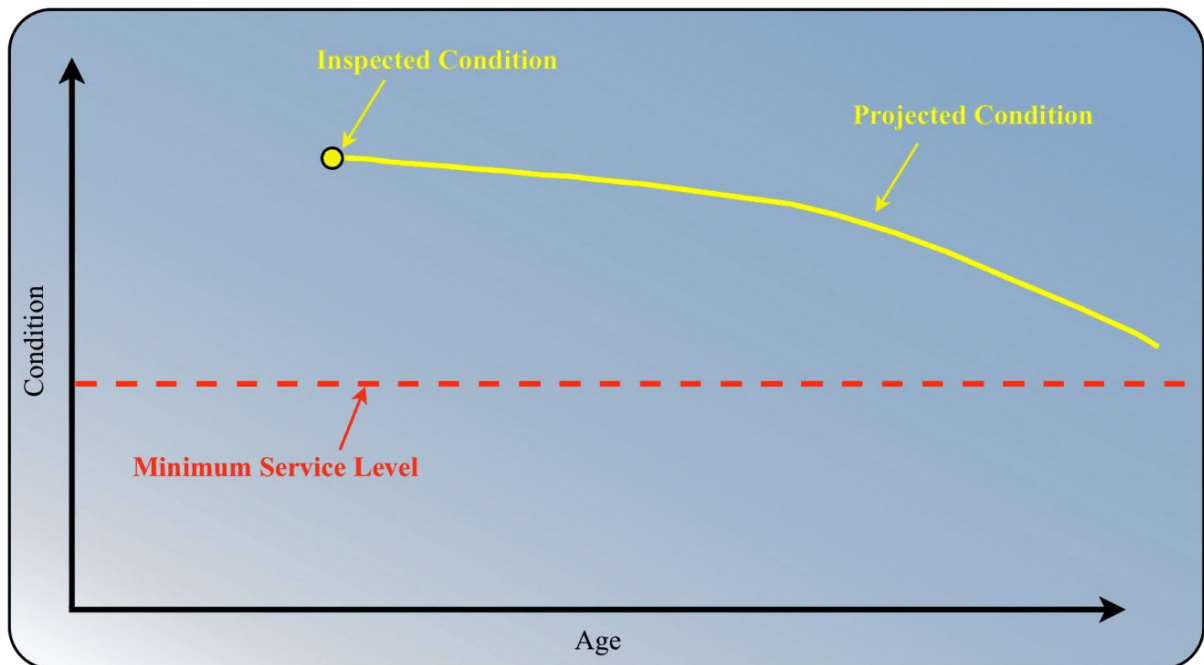


### *Projected PCI (why some features have unexpected projections)*

Long-term PCI projections can be very useful for planning purposes. However, projections in excess of 10 years are well beyond the intended scope of the PCI procedure. FAA Advisory Circular 150/5380-6B establishes a maximum 3-year interval between detailed PCI surveys.

Curve rotation, expansion, and contraction are performed to produce the best possible accuracy of future pavement condition over the next 3 to 5 years. This methodology can overemphasize certain performance trends in the long term. This is especially true for outlier data, such as pavement features that are performing much better or worse than is typical.

The curve below shows an example of a performance trend being overemphasized in the long-term projection. Because the pavement feature is performing much better than the baseline curve, the long-term projection shows the pavement lasting an additional 30+ years before reaching the MSL. Rotation of the curve to provide the most accurate projection over 3 to 5 years has resulted in a long-term projection that is likely unrealistic.



When long-term projections such as this are encountered, airport managers should not rely on projections in excess of 10 years. Managers can be confident that the pavement is performing much better than average and will not require rehabilitation within the current 5-year CIP planning window. As new distress develops over time, future PCI surveys will determine the ideal timing for rehabilitation.

## Feature Analysis

As part of the PCI evaluation, a detailed analysis is presented for each airside pavement feature using the two-page format depicted below.

### Page 1

The first page of the analysis is a feature summary. Located near the top left-hand corner is the feature number and pavement description. Construction history and inspector comments are listed below, along with a photo of the pavement section if available. Distress totals recorded during the PCI survey are listed next, and an approximation of the cause of the pavement deterioration is shown at the bottom. If the pavement is projected to fall below the desired MSL during the next 12 years, the analysis year will be shown along with the optimum year for pavement rehabilitation.

**Description & Feature #**

**Optimized Rehab Year**

AIRPAV

AIRPORT: BLOOMINGTON/MONROE COUNTY

AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 5007

ANALYSIS YEAR: 2011    OPTIMIZED FOR: 2019

PAVEMENT TYPE: AC

FEATURE AREA: 1,278,750

INSPECTED AREA: 40,000

MINIMUM SERVICE LEVEL: .65

DESCRIPTION: RUNWAY 17-35 KEEL

INSPECTION DATE: 8-11-11

FEATURE'S HIGH PCI: 72

FEATURE'S LOW PCI: 59

AVERAGE PCI: 69 GOOD

ESTIMATED PCI IN: 65 in 2019

COMMENTS/HISTORY FOR FEATURE 5007, RUNWAY 17-35 KEEL

1989: 4" P401 / 5" P401 / 13" P209

DISTRESS QUANTITIES FOR FEATURE 5007					
DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF ALL DISTRESS
ALLIGATOR CRACKING	LOW	66	2,109	S.F.	8.3
LONG & TRANS. CRACK	MED	995	31,808	L.F.	30.4
LONG & TRANS. CRACK	LOW	2,824	90,279	L.F.	34.8
RAVELING/WEATHERING	LOW	9,450	302,104	S.F.	26.3

BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS: 8 %

APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS: 52 %

APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS: 39 %

PAGE 1

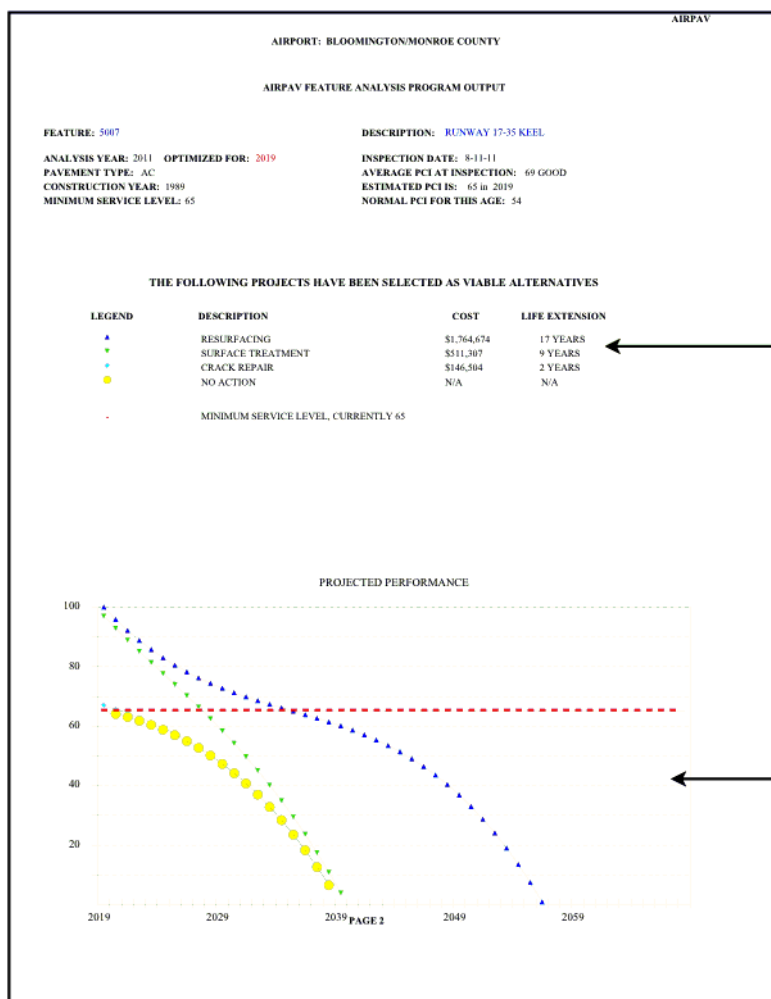
**Construction History**

**Distress Totals**

## Page 2

The second page is a graphic analysis of pavement deterioration. Pavement deterioration is forecast based on historic deterioration of similar Indiana pavement types. Remaining life is projected by stretching and rotating the baseline curves to fit the current condition determined from the PCI survey.

When pavement condition drops below the desired MSL, the software selects rehabilitation actions that address the cause of the pavement failure while restoring the pavement to a condition above the MSL. A NO ACTION recommendation indicates that the feature is expected to remain serviceable during the 12-year forecasting period without major repairs. NO ACTION recommendations do not diminish the need for regular maintenance.



**Recommended  
Actions**

**Graphic  
Analysis**

## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 205

DESCRIPTION: TAXIWAY B

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 88

FEATURE AREA: 412,170

FEATURE'S LOW PCI: 63

INSPECTED AREA: 67,500

AVERAGE PCI: 78 SATISFACTORY

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 77 in 2015

## COMMENTS/HISTORY FOR FEATURE 205, TAXIWAY B

1997: P401 Pavement

\*  
\*  
\*

## DISTRESS QUANTITIES FOR FEATURE 205

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
ALLIGATOR CRACKING	LOW	41	250	S.F.	4.3
DEPRESSION	LOW	32	195	S.F.	.8
LONG.& TRANS. CRACK	HIGH	51	311	L.F.	6.4
LONG.& TRANS. CRACK	MED	532	3,248	L.F.	27.1
LONG.& TRANS. CRACK	LOW	3,603	22,000	L.F.	52
PATCH & UTILITY CUT	LOW	500	3,053	S.F.	3.3
RAVELING	MED	10	61	S.F.	1.2
RUTTING	LOW	10	61	S.F.	2.2
WEATHERING	MED	525	3,205	S.F.	1.3

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	8 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	61 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	30 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 205

DESCRIPTION: TAXIWAY B

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 78 SATISFACTORY

CONSTRUCTION YEAR: 1997

ESTIMATED PCI IS: 77 in 2015

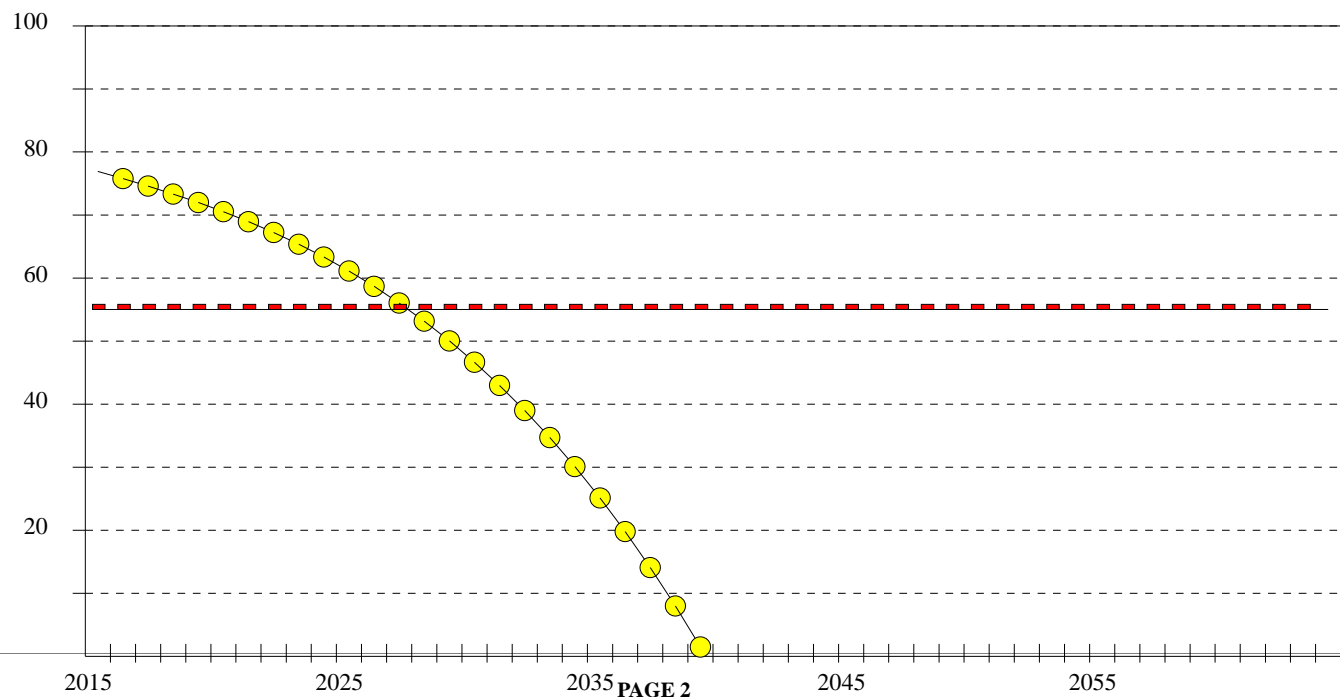
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 64

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE





## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 210

DESCRIPTION: TAXIWAY B

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2018

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 72

FEATURE AREA: 67,380

FEATURE'S LOW PCI: 53

INSPECTED AREA: 30,000

AVERAGE PCI: 63 FAIR

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 55 in 2018

## COMMENTS/HISTORY FOR FEATURE 210, TAXIWAY B

1991: 3.25" P401 / 3.5" P401 / 7.5" P209

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## DISTRESS QUANTITIES FOR FEATURE 210

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
ALLIGATOR CRACKING	LOW	136	305	S.F.	11.1
DEPRESSION	LOW	6	13	S.F.	0
LONG.& TRANS. CRACK	HIGH	126	283	L.F.	16.5
LONG.& TRANS. CRACK	MED	386	866	L.F.	20.7
LONG.& TRANS. CRACK	LOW	1,482	3,328	L.F.	25.1
RUTTING	LOW	130	292	S.F.	19.6
WEATHERING	MED	100	224	S.F.	.2
WEATHERING	LOW	13,500	30,321	S.F.	6.5

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	24 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	50 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	25 %





## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 210

DESCRIPTION: TAXIWAY B

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2018

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 63 FAIR

CONSTRUCTION YEAR: 1991

ESTIMATED PCI IS: 55 in 2018

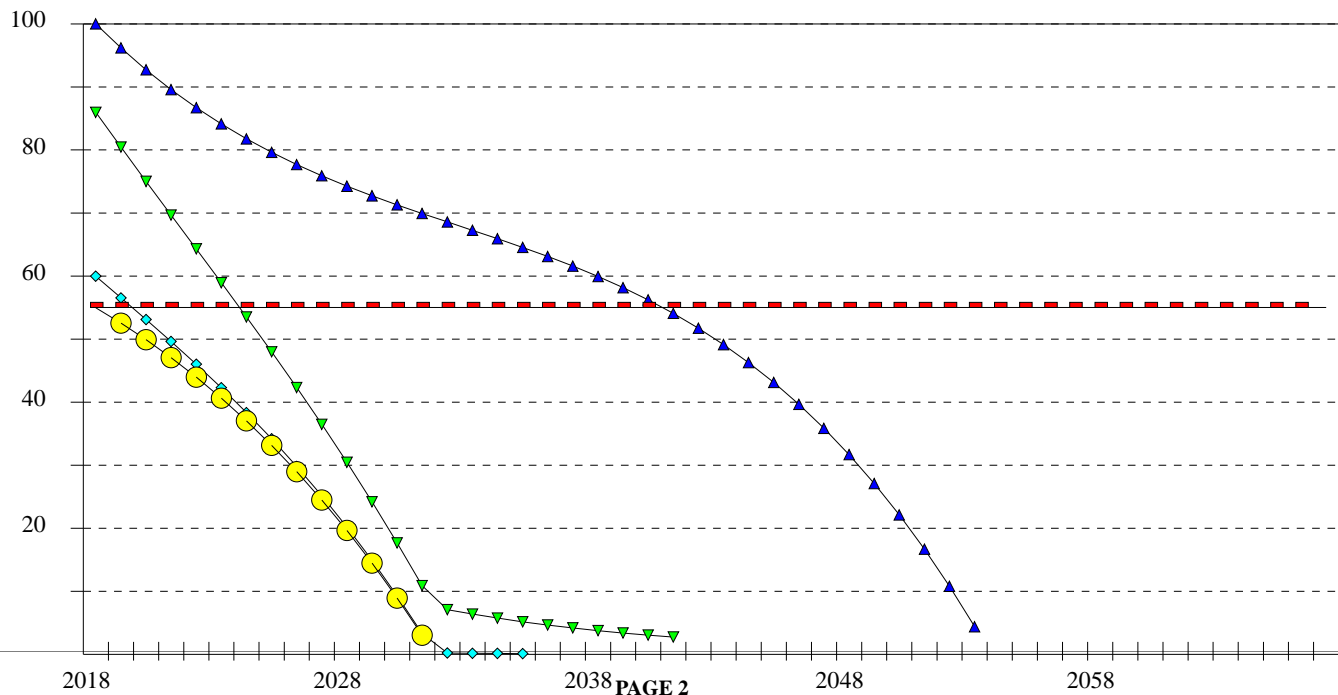
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 48

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$97,027	23 YEARS
▼	SURFACE TREATMENT	\$27,702	6 YEARS
◆	CRACK REPAIR	\$5,551	2 YEARS
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 213

DESCRIPTION: TAXIWAY B

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2017

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC OVERLAY

FEATURE'S HIGH PCI: 72

FEATURE AREA: 11,310

FEATURE'S LOW PCI: 59

INSPECTED AREA: 9,000

AVERAGE PCI: 65 FAIR

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 53 in 2017

## COMMENTS/HISTORY FOR FEATURE 213, TAXIWAY B

2007 AC Overlay est  
 2002: 1.5" Mill & Inlay /  
 1991: 3.25" P401 (1.75" Remaining / 3.5" P401 / 7.5" P209  
 \*

## DISTRESS QUANTITIES FOR FEATURE 213

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
ALLIGATOR CRACKING	MED	38	47	S.F.	27.2
LONG.& TRANS. CRACK	HIGH	26	32	L.F.	21.2
LONG.& TRANS. CRACK	MED	217	272	L.F.	32.7
LONG.& TRANS. CRACK	LOW	285	358	L.F.	18.8

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	27 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	49 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	24 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 213

DESCRIPTION: TAXIWAY B

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2017

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC OVERLAY

AVERAGE PCI AT INSPECTION: 65 FAIR

CONSTRUCTION YEAR: 2007

ESTIMATED PCI IS: 53 in 2017

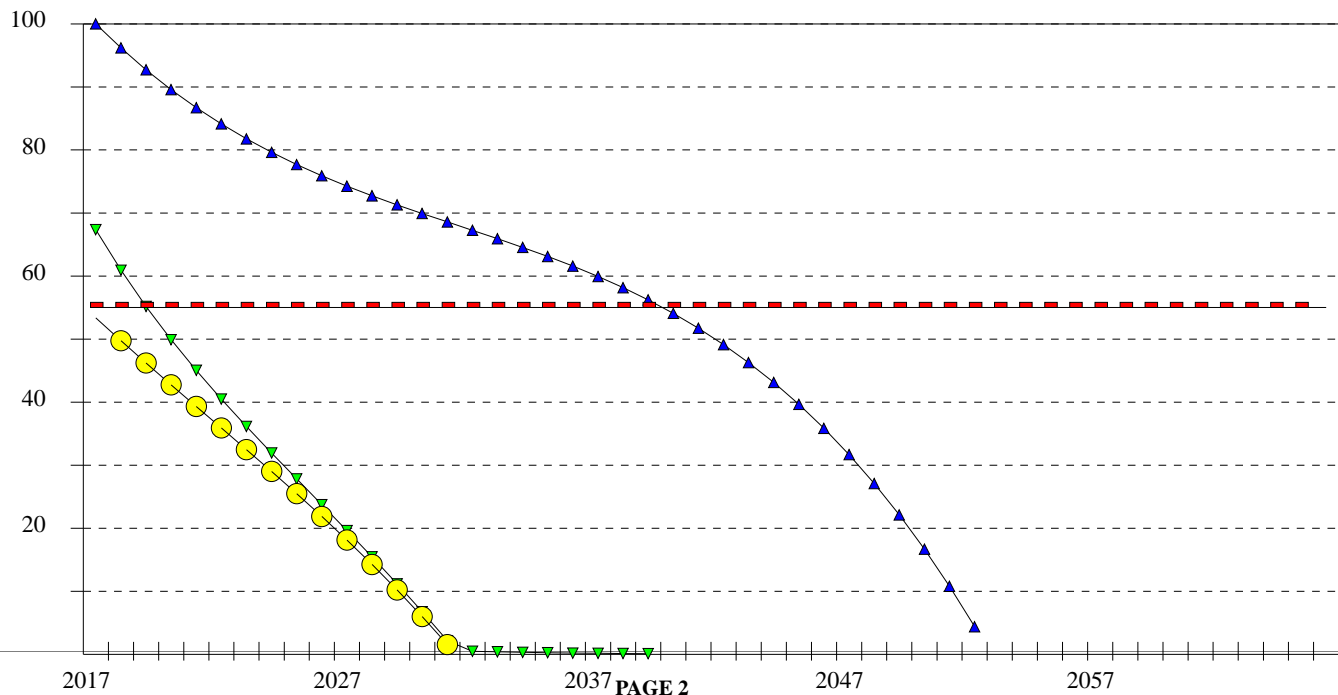
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 74

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$16,286	23 YEARS
▼	CRACK REPAIR	\$820	3 YEARS
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 215

DESCRIPTION: TAXIWAY B

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2017

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 60

FEATURE AREA: 8,999

FEATURE'S LOW PCI: 60

INSPECTED AREA: 7,500

AVERAGE PCI: 60 FAIR

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 54 in 2017

## COMMENTS/HISTORY FOR FEATURE 215, TAXIWAY B

1997: P401 Pavement

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\*

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## DISTRESS QUANTITIES FOR FEATURE 215

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
LONG.& TRANS. CRACK	HIGH	70	84	L.F.	26.7
LONG.& TRANS. CRACK	MED	121	145	L.F.	17.1
LONG.& TRANS. CRACK	LOW	549	658	L.F.	25.9
SLIPPAGE CRACKING	N/A	140	168	S.F.	28
WEATHERING	LOW	1,000	1,199	S.F.	2.2

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	75 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	25 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 215

DESCRIPTION: TAXIWAY B

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2017

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 60 FAIR

CONSTRUCTION YEAR: 1997

ESTIMATED PCI IS: 54 in 2017

MINIMUM SERVICE LEVEL: 55

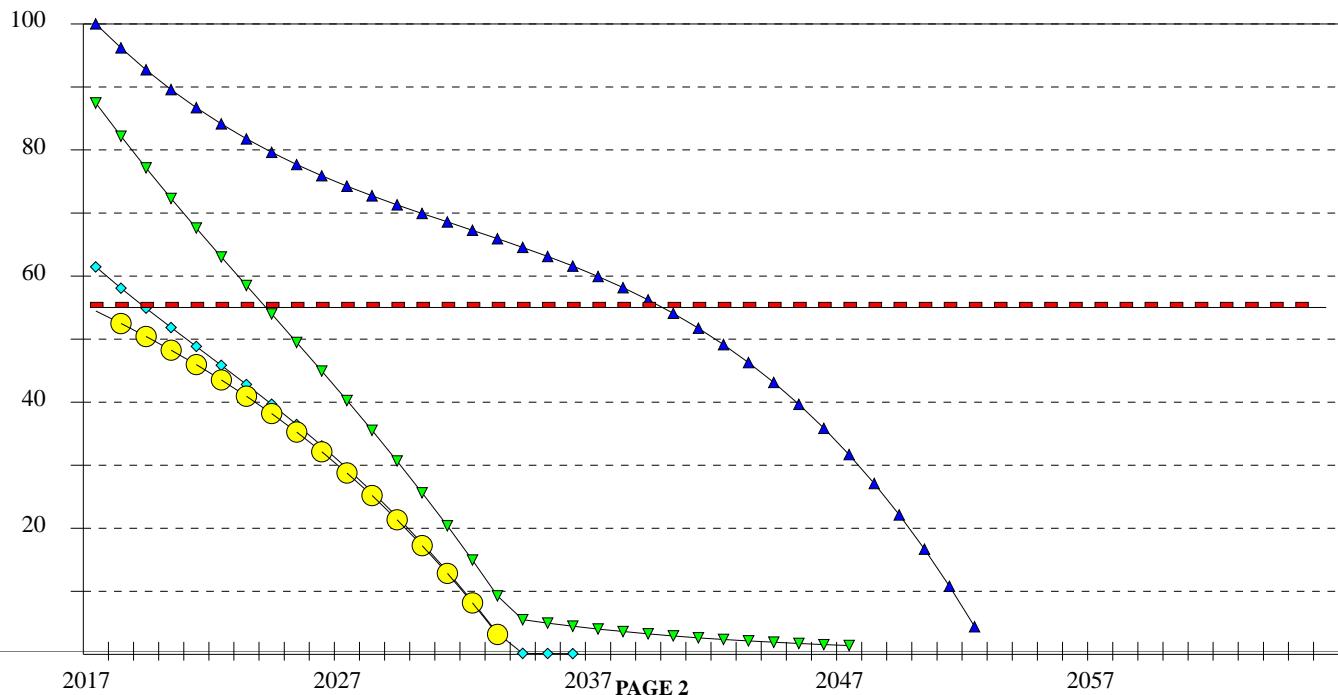
NORMAL PCI FOR THIS AGE: 61

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$12,958	23 YEARS
▼	SURFACE TREATMENT	\$3,793	7 YEARS
◆	CRACK REPAIR	\$1,099	2 YEARS
●	NO ACTION	N/A	N/A

- MINIMUM SERVICE LEVEL, CURRENTLY 55

## PROJECTED PERFORMANCE





## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 230

DESCRIPTION: TAXIWAY B-1

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 94

FEATURE AREA: 25,610

FEATURE'S LOW PCI: 93

INSPECTED AREA: 10,000

AVERAGE PCI: 93 GOOD

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 86 in 2015

## COMMENTS/HISTORY FOR FEATURE 230, TAXIWAY B-1

2006 AC 6" to 8" P-401/Crushed stone  
 1983 4" P401 ON 7" P208

\*

\*

## DISTRESS QUANTITIES FOR FEATURE 230

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
LONG.& TRANS. CRACK	LOW	135	345	L.F.	79.6
WEATHERING	MED	255	653	S.F.	20.3

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	60 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	40 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 230

DESCRIPTION: TAXIWAY B-1

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 93 GOOD

CONSTRUCTION YEAR: 2006

ESTIMATED PCI IS: 86 in 2015

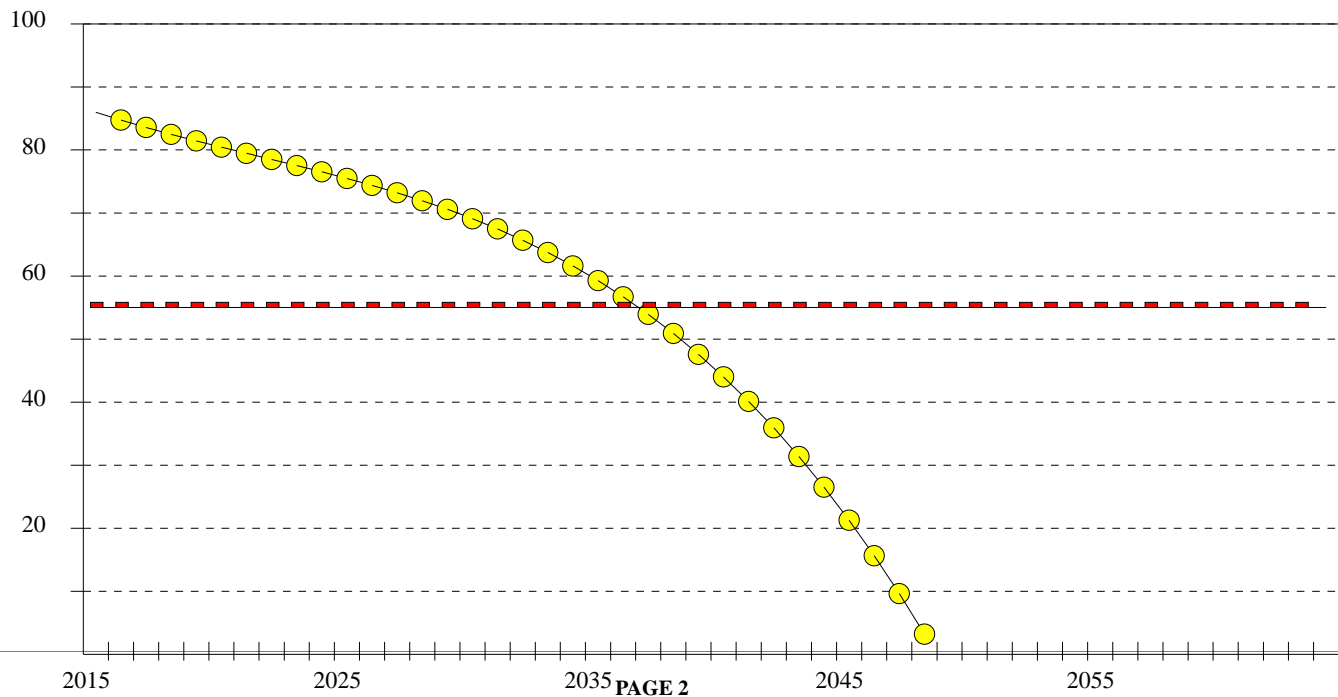
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 78

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE





## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 233

DESCRIPTION: TAXIWAY B-1

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2024

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC OVERLAY

FEATURE'S HIGH PCI: 81

FEATURE AREA: 20,016

FEATURE'S LOW PCI: 78

INSPECTED AREA: 8,750

AVERAGE PCI: 80 SATISFACTORY

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 55 in 2024

## COMMENTS/HISTORY FOR FEATURE 233, TAXIWAY B-1

2009 AC mill and inlay  
2006 AC 6" to 8" P-401/Crushed stone  
1983 4" P401 ON 7" P208  
\*

## DISTRESS QUANTITIES FOR FEATURE 233

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
LONG.& TRANS. CRACK	LOW	710	1,624	L.F.	100

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	67 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	33 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 233

DESCRIPTION: TAXIWAY B-1

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2024

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC OVERLAY

AVERAGE PCI AT INSPECTION: 80 SATISFACTORY

CONSTRUCTION YEAR: 2009

ESTIMATED PCI IS: 55 in 2024

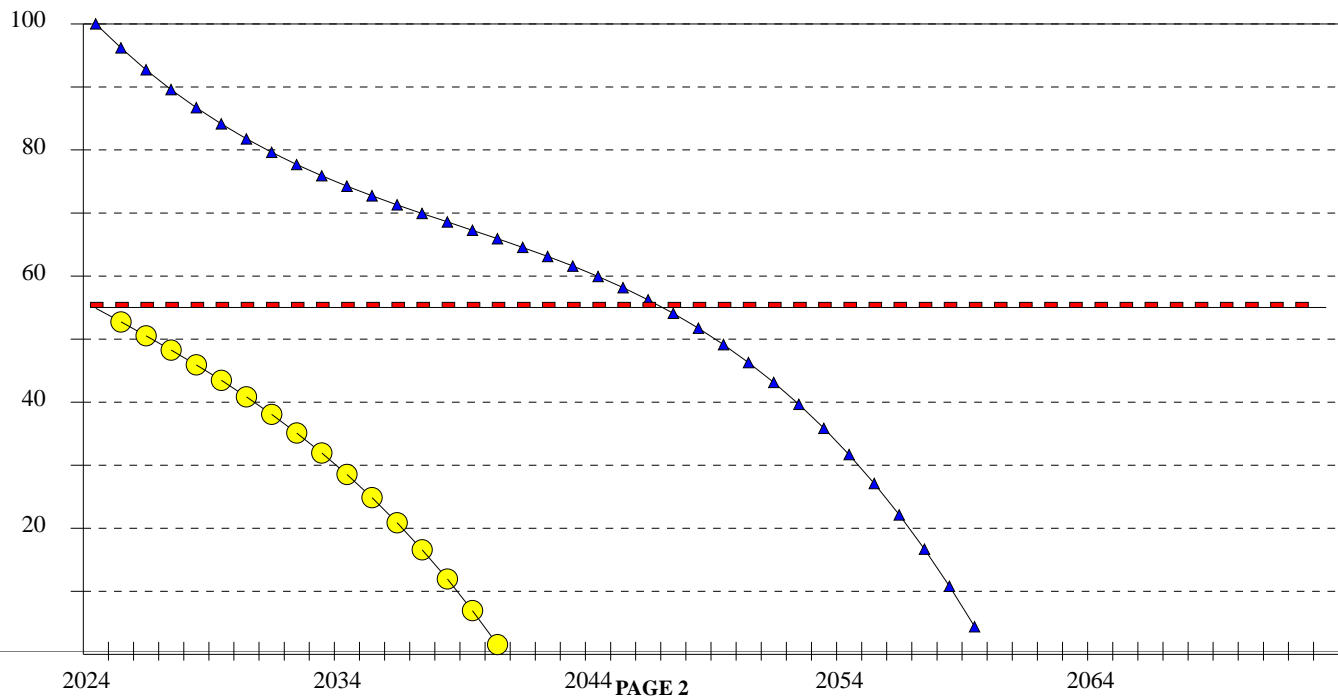
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 67

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$28,823	23 YEARS
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 240

DESCRIPTION: TAXIWAY B-3

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 31

FEATURE AREA: 15,061

FEATURE'S LOW PCI: 15

INSPECTED AREA: 10,210

AVERAGE PCI: 23 SERIOUS

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 20 in 2015

## COMMENTS/HISTORY FOR FEATURE 240, TAXIWAY B-3

1991 3.25" P401 ON 3.5" P401 ON 7.5" P209

\*  
\*  
\*

## DISTRESS QUANTITIES FOR FEATURE 240

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
ALLIGATOR CRACKING	HIGH	25	36	S.F.	11.4
ALLIGATOR CRACKING	MED	400	590	S.F.	21.1
BLOCK CRACKING	MED	8,475	12,501	S.F.	40.9
BLOCK CRACKING	LOW	800	1,180	S.F.	7.7
LONG.& TRANS. CRACK	MED	50	73	L.F.	4.2
LONG.& TRANS. CRACK	LOW	50	73	L.F.	1.9
RAVELING	HIGH	4	5	S.F.	2.7
RAVELING	LOW	1,600	2,360	S.F.	9.7

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	33 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	8 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	59 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 240

DESCRIPTION: TAXIWAY B-3

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 23 SERIOUS

CONSTRUCTION YEAR: 1991

ESTIMATED PCI IS: 20 in 2015

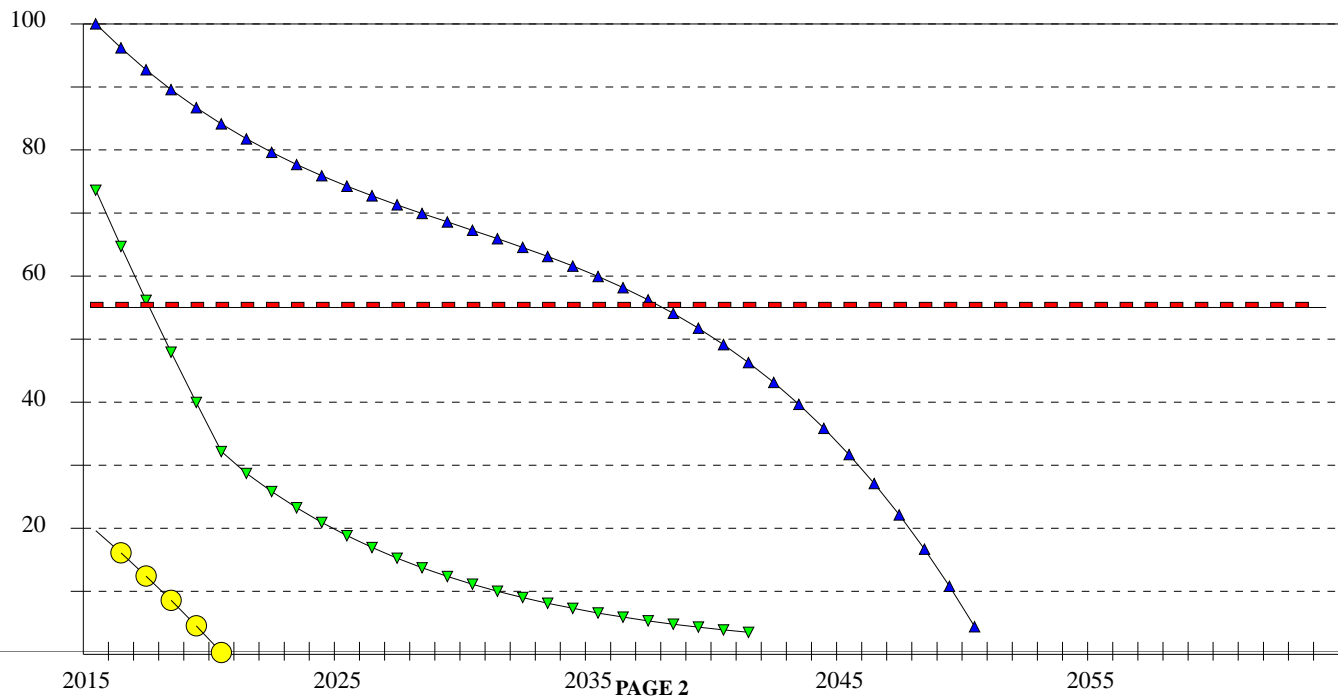
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 54

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	STRUCTURAL OVERLAY	\$27,862	23 YEARS
▼	SURFACE TREATMENT	\$15,265	3 YEARS
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 243

DESCRIPTION: TAXIWAY B-3

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC OVERLAY

FEATURE'S HIGH PCI: 86

FEATURE AREA: 15,825

FEATURE'S LOW PCI: 78

INSPECTED AREA: 9,000

AVERAGE PCI: 82 SATISFACTORY

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 79 in 2015

## COMMENTS/HISTORY FOR FEATURE 243, TAXIWAY B-3

2009 AC overlay est  
 2002: 1.5" Mill and Inlay  
 1991: 3.25" P401 (1.75" Existing) / 3.5" P401 Base / 7.5" P209  
 \*

## DISTRESS QUANTITIES FOR FEATURE 243

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
LONG.& TRANS. CRACK	MED	65	114	L.F.	28.8
LONG.& TRANS. CRACK	LOW	496	872	L.F.	71.1

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	67 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	33 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 243

DESCRIPTION: TAXIWAY B-3

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC OVERLAY

AVERAGE PCI AT INSPECTION: 82 SATISFACTORY

CONSTRUCTION YEAR: 2009

ESTIMATED PCI IS: 79 in 2015

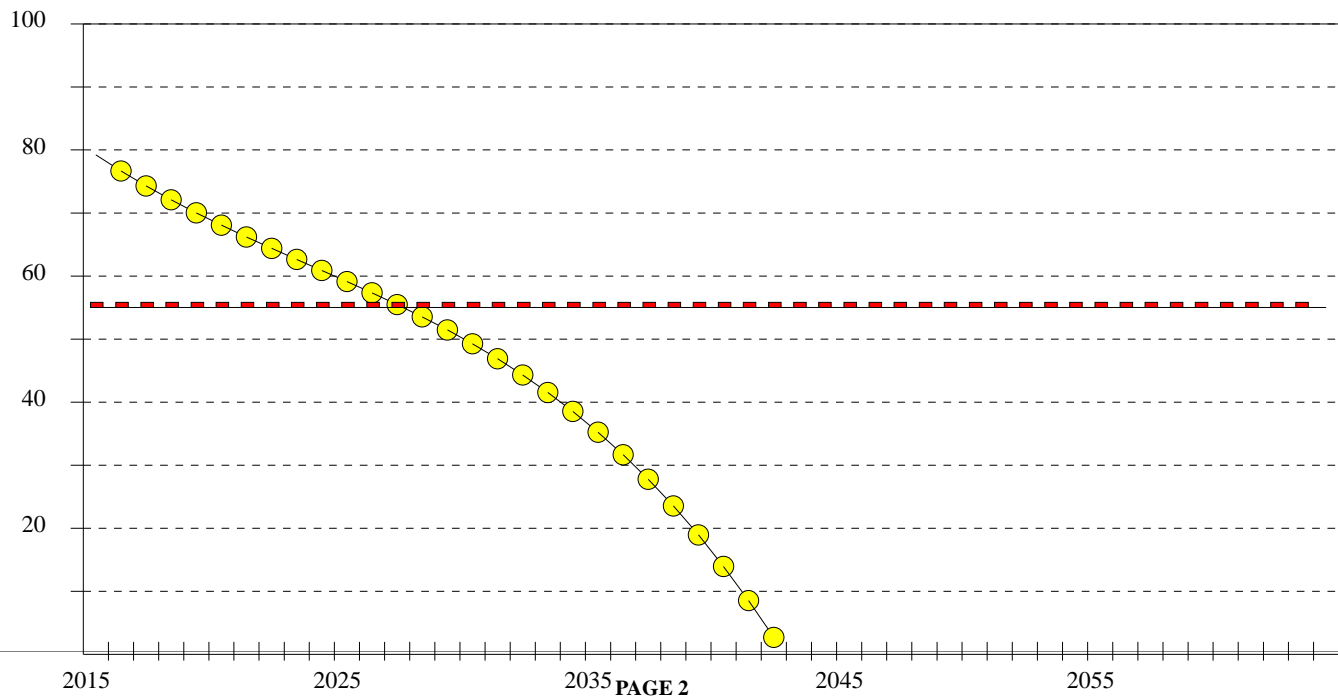
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 81

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE





## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 245

DESCRIPTION: TAXIWAY B-3

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2017

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 60

FEATURE AREA: 11,500

FEATURE'S LOW PCI: 60

INSPECTED AREA: 11,500

AVERAGE PCI: 60 FAIR

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 54 in 2017

## COMMENTS/HISTORY FOR FEATURE 245, TAXIWAY B-3

1997: P401 Pavement

\*  
\*  
\*

## DISTRESS QUANTITIES FOR FEATURE 245

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
BLOCK CRACKING	MED	525	525	S.F.	30.1
LONG.& TRANS. CRACK	MED	820	820	L.F.	51
LONG.& TRANS. CRACK	LOW	439	439	L.F.	18.7

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	47 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	53 %





## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 245

DESCRIPTION: TAXIWAY B-3

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2017

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 60 FAIR

CONSTRUCTION YEAR: 1997

ESTIMATED PCI IS: 54 in 2017

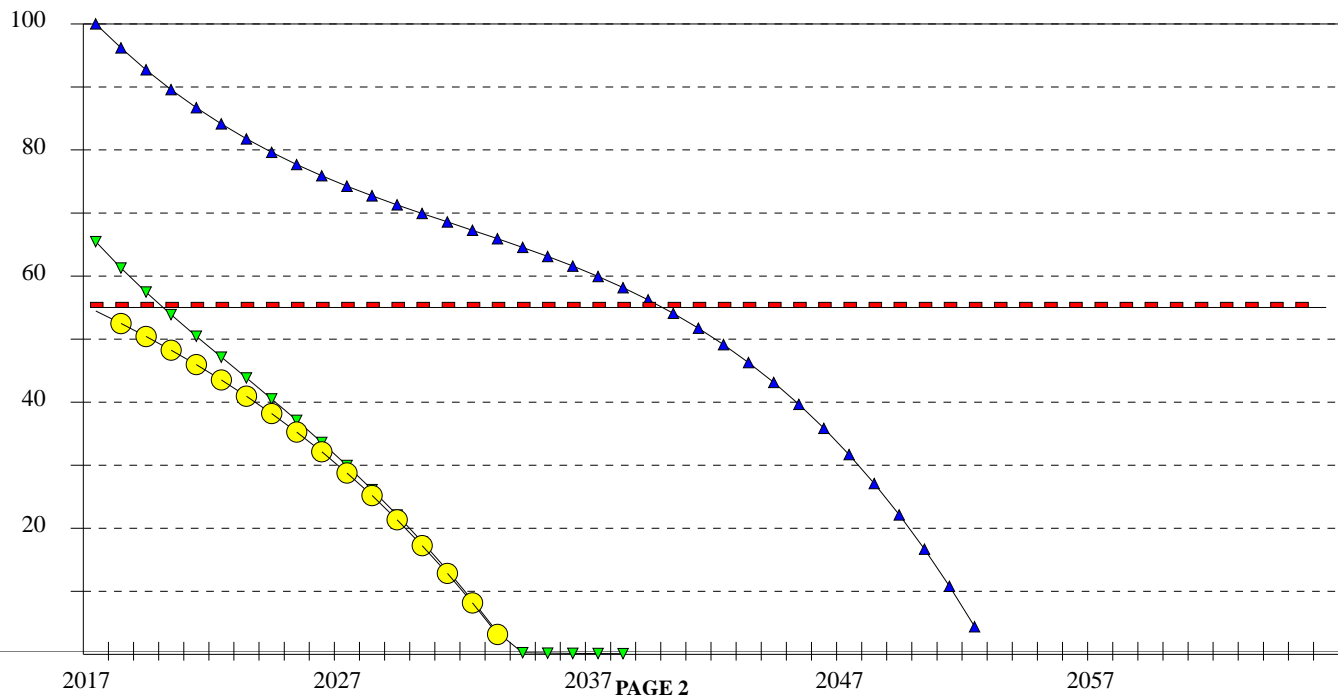
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 61

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$16,560	23 YEARS
▼	CRACK REPAIR	\$1,951	3 YEARS
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 250

DESCRIPTION: TAXIWAY B-4

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 35

FEATURE AREA: 15,850

FEATURE'S LOW PCI: 29

INSPECTED AREA: 10,600

AVERAGE PCI: 32 VERY POOR

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 29 in 2015

## COMMENTS/HISTORY FOR FEATURE 250, TAXIWAY B-4

1991 3.25" P401 ON 3.5" P401 ON 7.5" P209

\*  
\*  
\*

## DISTRESS QUANTITIES FOR FEATURE 250

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
ALLIGATOR CRACKING	MED	64	95	S.F.	22.9
ALLIGATOR CRACKING	LOW	9	13	S.F.	4.4
BLOCK CRACKING	MED	8,400	12,560	S.F.	48.8
BLOCK CRACKING	LOW	400	598	S.F.	7.5
LONG.& TRANS. CRACK	MED	110	164	L.F.	6.6
RAVELING	MED	200	299	S.F.	6.6
RAVELING	LOW	200	299	S.F.	3

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	27 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	8 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	65 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 250

DESCRIPTION: TAXIWAY B-4

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 32 VERY POOR

CONSTRUCTION YEAR: 1991

ESTIMATED PCI IS: 29 in 2015

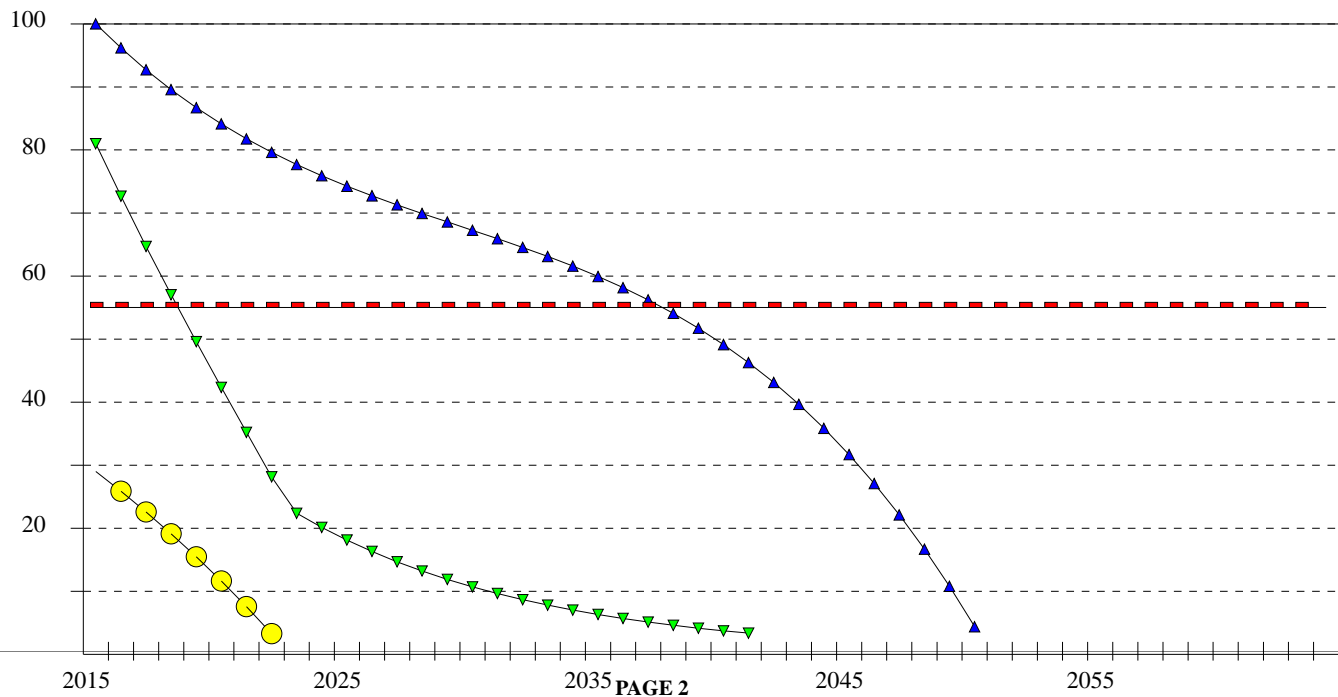
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 54

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$22,824	23 YEARS
▼	SURFACE TREATMENT	\$15,729	4 YEARS
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 253

DESCRIPTION: TAXIWAY B-4

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2023

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC OVERLAY

FEATURE'S HIGH PCI: 76

FEATURE AREA: 14,825

FEATURE'S LOW PCI: 72

INSPECTED AREA: 10,000

AVERAGE PCI: 74 SATISFACTORY

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 53 in 2023

## COMMENTS/HISTORY FOR FEATURE 253, TAXIWAY B-4

2007 AC Overlay est  
 2002: 1.5" Mill and Inlay  
 1991: 3.25" P401 (1.75" Existing) / 3.5" P401 Base / 7.5" P209  
 \*

## DISTRESS QUANTITIES FOR FEATURE 253

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
LONG.& TRANS. CRACK	MED	95	140	L.F.	28.1
LONG.& TRANS. CRACK	LOW	932	1,381	L.F.	71.8

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	67 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	33 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 253

DESCRIPTION: TAXIWAY B-4

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2023

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC OVERLAY

AVERAGE PCI AT INSPECTION: 74 SATISFACTORY

CONSTRUCTION YEAR: 2007

ESTIMATED PCI IS: 53 in 2023

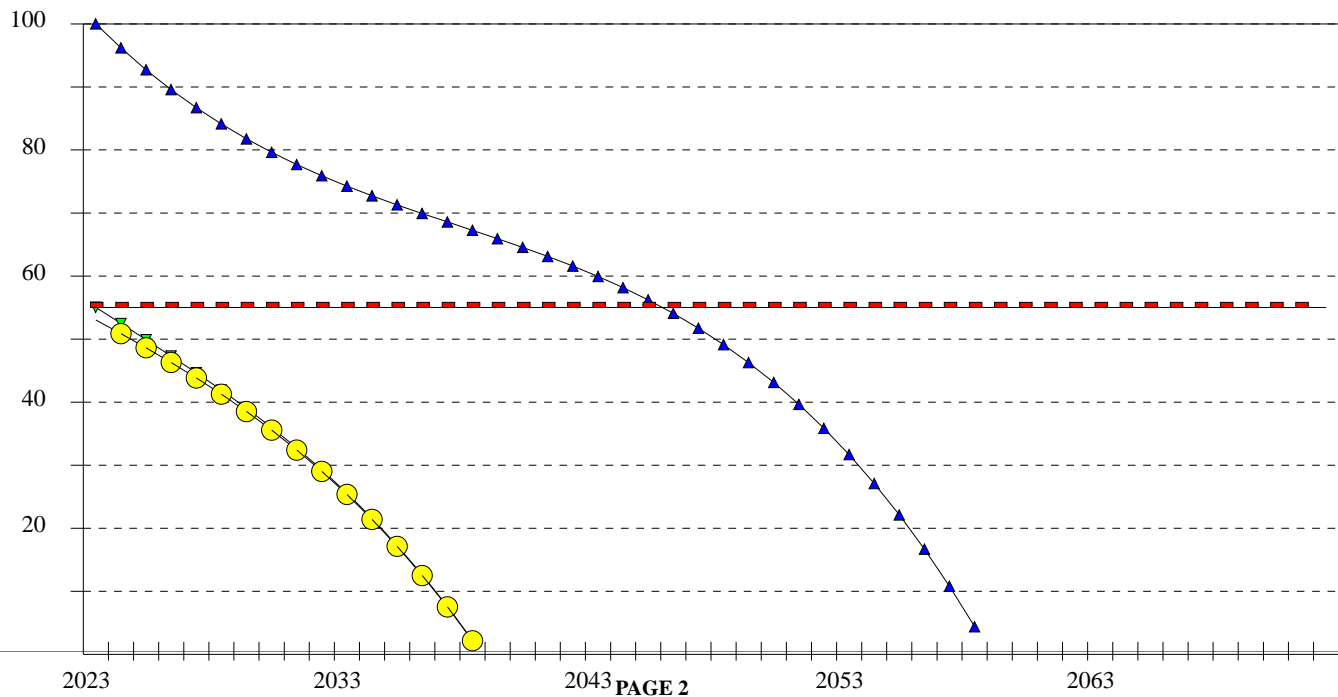
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 65

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$21,348	23 YEARS
▼	CRACK REPAIR	\$1,886	1 YEAR
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 255

DESCRIPTION: TAXIWAY B-4

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2017

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 60

FEATURE AREA: 12,528

FEATURE'S LOW PCI: 60

INSPECTED AREA: 12,528

AVERAGE PCI: 60 FAIR

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 54 in 2017

## COMMENTS/HISTORY FOR FEATURE 255, TAXIWAY B-4

1997 AC P401

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## DISTRESS QUANTITIES FOR FEATURE 255

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
ALLIGATOR CRACKING	LOW	40	40	S.F.	24.3
LONG.& TRANS. CRACK	MED	877	877	L.F.	56
LONG.& TRANS. CRACK	LOW	448	448	L.F.	19.6

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	24 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	50 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	25 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 255

DESCRIPTION: TAXIWAY B-4

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2017

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 60 FAIR

CONSTRUCTION YEAR: 1997

ESTIMATED PCI IS: 54 in 2017

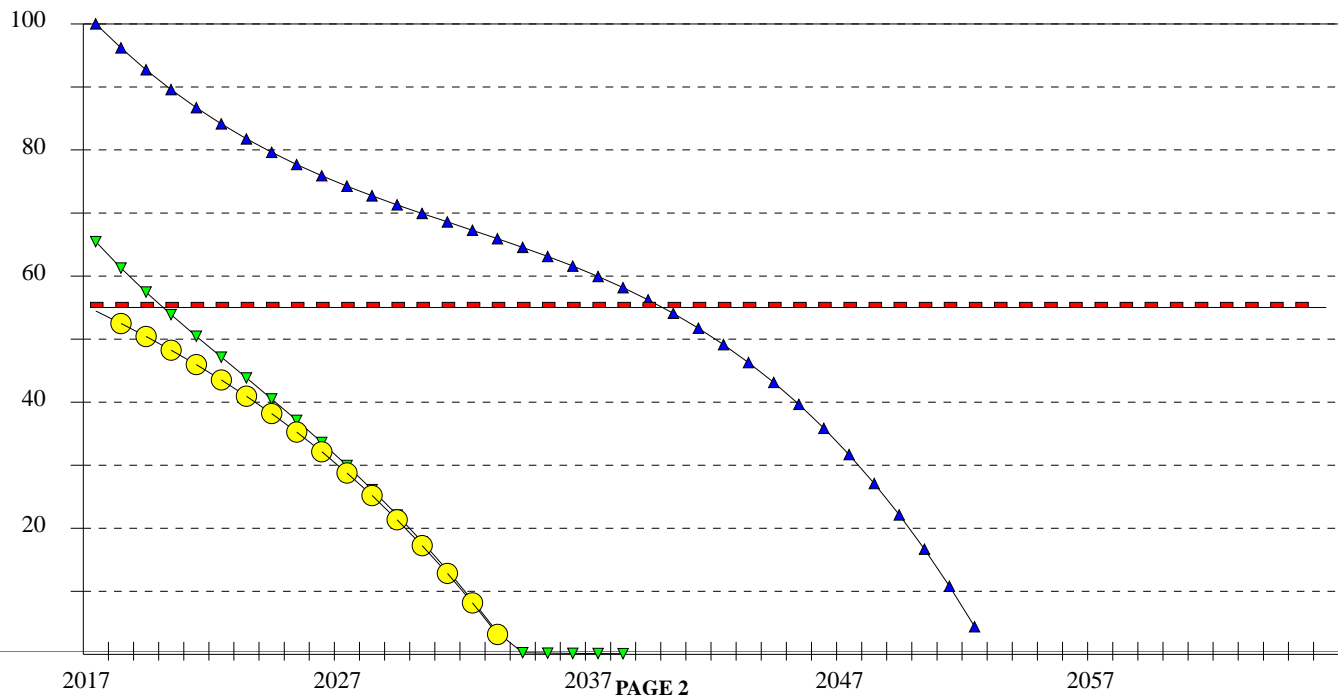
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 61

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$18,040	23 YEARS
▼	CRACK REPAIR	\$1,643	3 YEARS
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE





## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 260

DESCRIPTION: TAXIWAY B-5

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 37

FEATURE AREA: 14,081

FEATURE'S LOW PCI: 36

INSPECTED AREA: 7,800

AVERAGE PCI: 36 VERY POOR

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 33 in 2015

## COMMENTS/HISTORY FOR FEATURE 260, TAXIWAY B-5

1991: 3.25" P401 (1.75" Existing) / 3.5" P401 Base / 7.5" P209

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## DISTRESS QUANTITIES FOR FEATURE 260

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
ALLIGATOR CRACKING	MED	12	21	S.F.	12.1
ALLIGATOR CRACKING	LOW	12	21	S.F.	6.6
BLOCK CRACKING	MED	5,500	9,928	S.F.	57.4
BLOCK CRACKING	LOW	200	361	S.F.	8.7
LONG.& TRANS. CRACK	MED	105	189	L.F.	8.3
LONG.& TRANS. CRACK	LOW	25	45	L.F.	2.1
RAVELING	LOW	300	541	S.F.	4.4

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	19 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	8 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	73 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 260

DESCRIPTION: TAXIWAY B-5

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 36 VERY POOR

CONSTRUCTION YEAR: 1991

ESTIMATED PCI IS: 33 in 2015

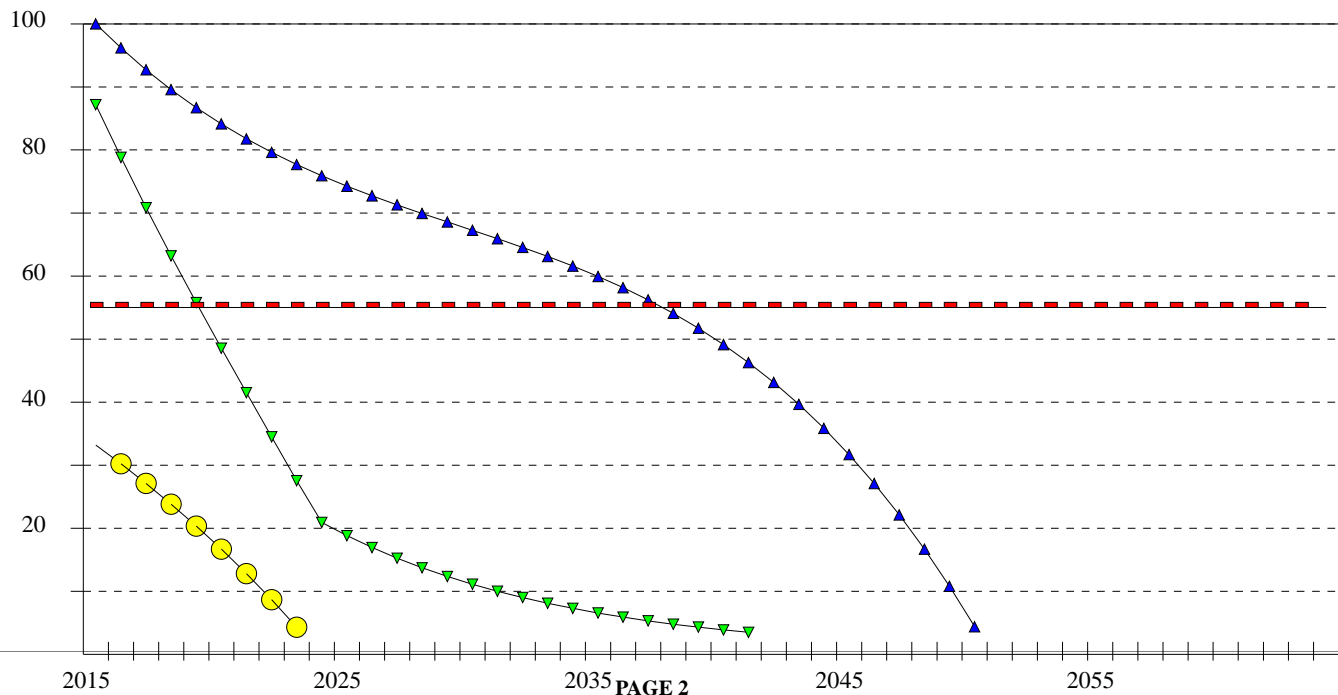
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 54

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$20,276	23 YEARS
▼	SURFACE TREATMENT	\$13,112	5 YEARS
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 263

DESCRIPTION: TAXIWAY B-5

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2023

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC OVERLAY

FEATURE'S HIGH PCI: 76

FEATURE AREA: 15,110

FEATURE'S LOW PCI: 72

INSPECTED AREA: 9,000

AVERAGE PCI: 74 SATISFACTORY

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 53 in 2023

## COMMENTS/HISTORY FOR FEATURE 263, TAXIWAY B-5

2007 AC Overlay est  
 2002: 1.5" Mill and Inlay  
 1991: 3.25" P401 (1.75" Existing) / 3.5" P401 Base / 7.5" P209  
 \*

## DISTRESS QUANTITIES FOR FEATURE 263

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
LONG.& TRANS. CRACK	MED	252	423	L.F.	50.4
LONG.& TRANS. CRACK	LOW	569	955	L.F.	49.5

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	67 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	33 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 263

DESCRIPTION: TAXIWAY B-5

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2023

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC OVERLAY

AVERAGE PCI AT INSPECTION: 74 SATISFACTORY

CONSTRUCTION YEAR: 2007

ESTIMATED PCI IS: 53 in 2023

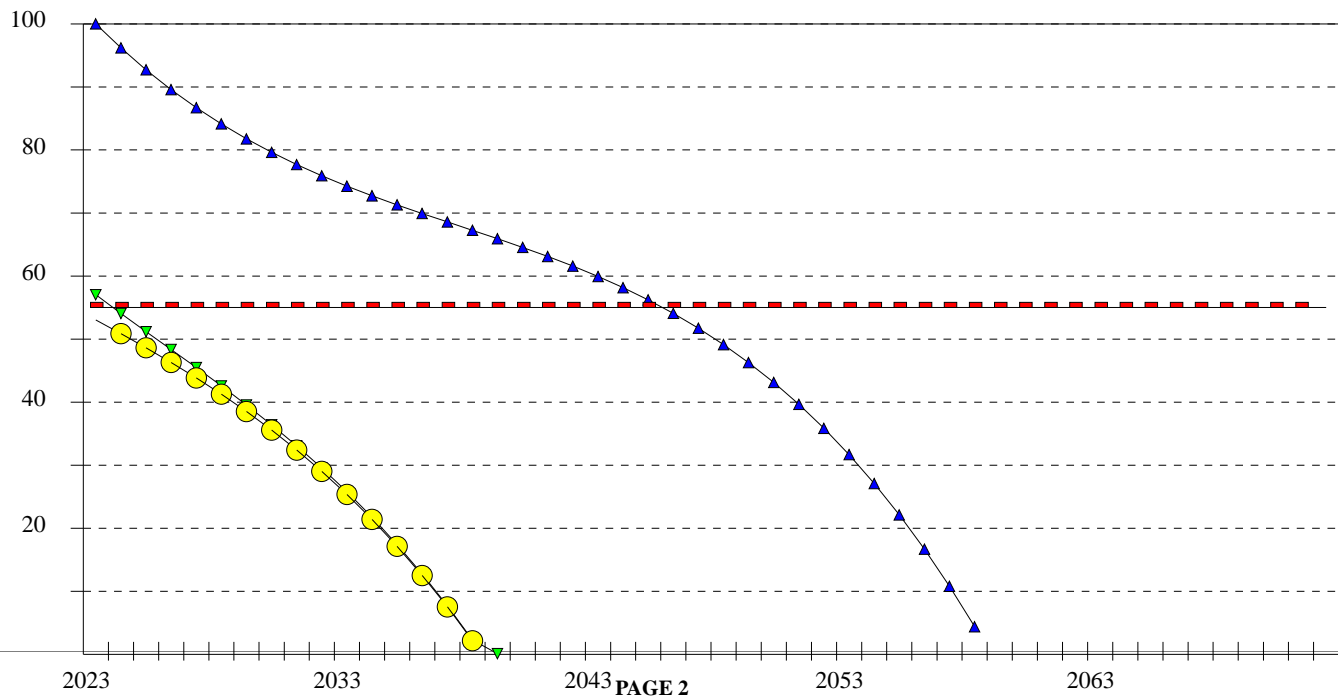
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 65

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$21,758	23 YEARS
▼	CRACK REPAIR	\$1,708	1 YEAR
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 265

DESCRIPTION: TAXIWAY B-5

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 47

FEATURE AREA: 9,905

FEATURE'S LOW PCI: 45

INSPECTED AREA: 6,750

AVERAGE PCI: 46 POOR

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 43 in 2015

## COMMENTS/HISTORY FOR FEATURE 265, TAXIWAY B-5

1997 AC P-401

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## DISTRESS QUANTITIES FOR FEATURE 265

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
ALLIGATOR CRACKING	MED	10	14	S.F.	10.1
LONG.& TRANS. CRACK	MED	974	1,429	L.F.	59
LONG.& TRANS. CRACK	LOW	578	848	L.F.	30.7

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	10 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	60 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	30 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 265

DESCRIPTION: TAXIWAY B-5

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 46 POOR

CONSTRUCTION YEAR: 1997

ESTIMATED PCI IS: 43 in 2015

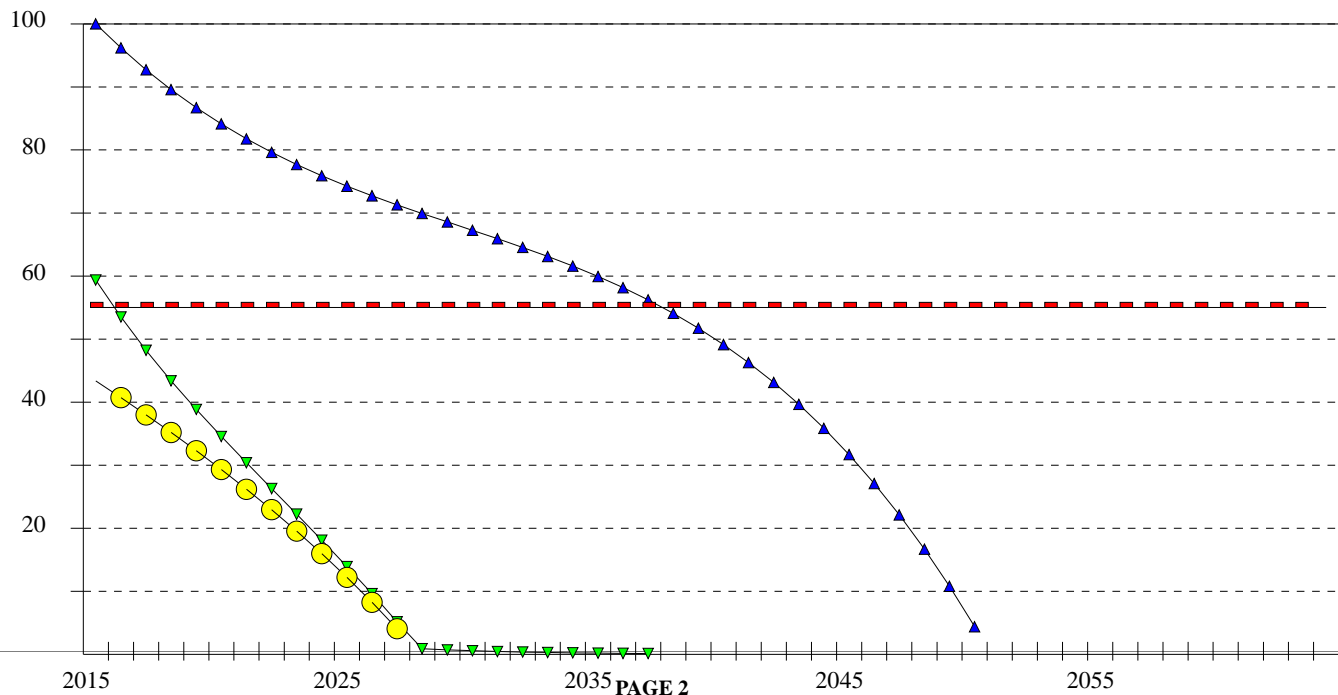
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 64

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$14,263	23 YEARS
▼	CRACK REPAIR	\$2,823	1 YEAR
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE





## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 405

DESCRIPTION: TAXIWAY D

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2023

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 78

FEATURE AREA: 110,247

FEATURE'S LOW PCI: 58

INSPECTED AREA: 32,000

AVERAGE PCI: 70 FAIR

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 55 in 2023

## COMMENTS/HISTORY FOR FEATURE 405, TAXIWAY D

1996 UNKNOWN P401 SECTION

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## DISTRESS QUANTITIES FOR FEATURE 405

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
ALLIGATOR CRACKING	MED	58	199	S.F.	18.4
ALLIGATOR CRACKING	LOW	28	96	S.F.	7.7
DEPRESSION	LOW	24	82	S.F.	1
LONG.& TRANS. CRACK	MED	284	978	L.F.	24
LONG.& TRANS. CRACK	LOW	2,626	9,047	L.F.	48.6

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	26 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	50 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	24 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 405

DESCRIPTION: TAXIWAY D

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2023

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 70 FAIR

CONSTRUCTION YEAR: 1996

ESTIMATED PCI IS: 55 in 2023

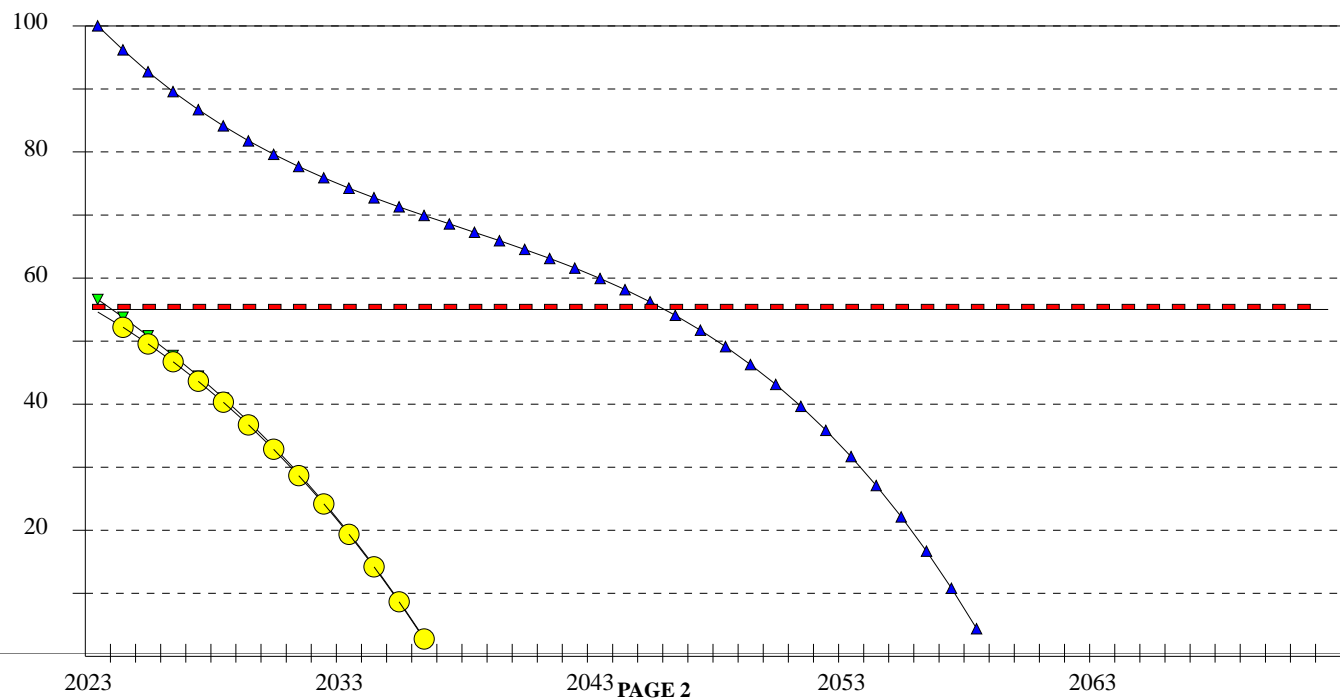
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 48

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	STRUCTURAL OVERLAY	\$203,956	23 YEARS
▼	CRACK REPAIR	\$12,431	1 YEAR
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 410

DESCRIPTION: TAXIWAY D

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 56

FEATURE AREA: 5,415

FEATURE'S LOW PCI: 56

INSPECTED AREA: 5,030

AVERAGE PCI: 56 FAIR

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 54 in 2015

## COMMENTS/HISTORY FOR FEATURE 410, TAXIWAY D

1993 1.5" P401 ON 2.5" LEVELING ON 6.5" RECYCLED

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\*  
\*

## DISTRESS QUANTITIES FOR FEATURE 410

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
LONG.& TRANS. CRACK	HIGH	54	58	L.F.	28.5
LONG.& TRANS. CRACK	MED	196	211	L.F.	29.8
LONG.& TRANS. CRACK	LOW	807	868	L.F.	41.5

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	67 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	33 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 410

DESCRIPTION: TAXIWAY D

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 56 FAIR

CONSTRUCTION YEAR: 1993

ESTIMATED PCI IS: 54 in 2015

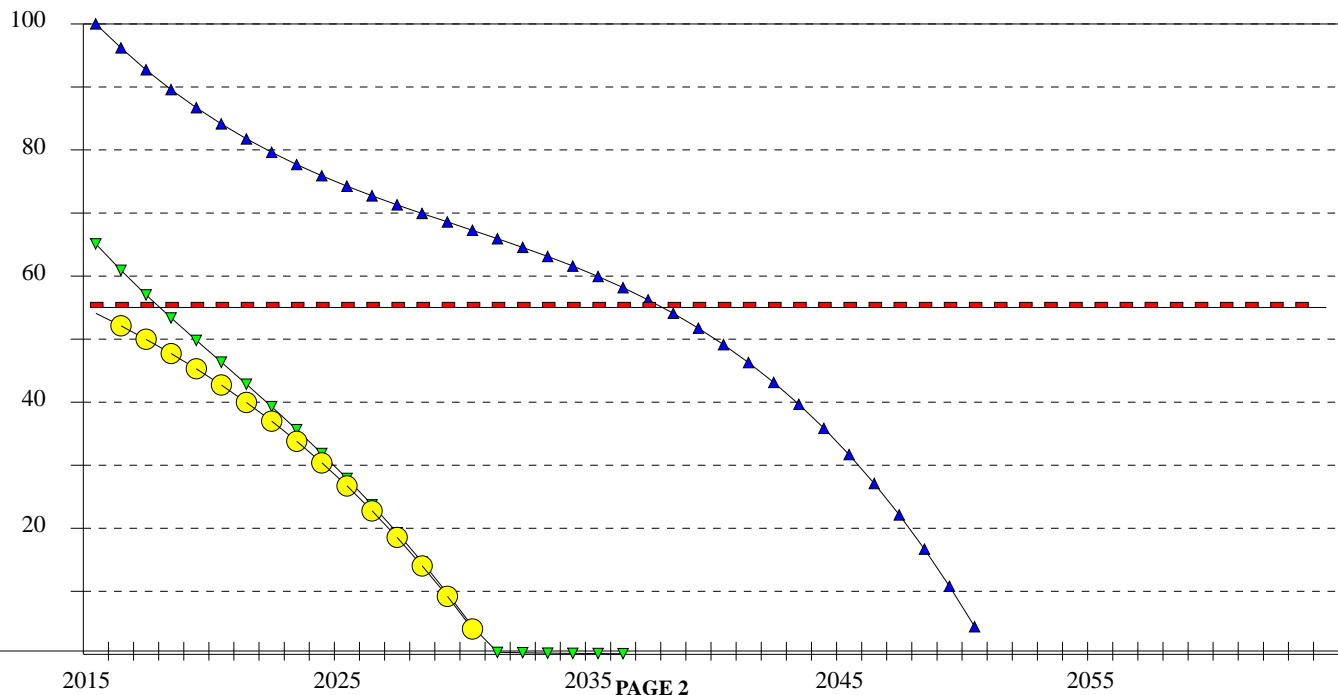
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 58

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$7,797	23 YEARS
▼	CRACK REPAIR	\$1,409	3 YEARS
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE





## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 420

DESCRIPTION: TAXIWAY D-2

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2019

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 63

FEATURE AREA: 4,313

FEATURE'S LOW PCI: 63

INSPECTED AREA: 3,900

AVERAGE PCI: 63 FAIR

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 54 in 2019

## COMMENTS/HISTORY FOR FEATURE 420, TAXIWAY D-2

1993 1.5" P401 ON 2.5" P401 LEVELING  
ON 6.5" RECYCLED

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## DISTRESS QUANTITIES FOR FEATURE 420

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
LONG.& TRANS. CRACK	HIGH	12	13	L.F.	20.8
LONG.& TRANS. CRACK	MED	15	16	L.F.	12.5
LONG.& TRANS. CRACK	LOW	293	324	L.F.	36
RUTTING	LOW	15	16	S.F.	24
WEATHERING	MED	125	138	S.F.	3.5
WEATHERING	LOW	500	552	S.F.	2.9

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	16 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	57 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	27 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 420

DESCRIPTION: TAXIWAY D-2

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2019

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 63 FAIR

CONSTRUCTION YEAR: 1993

ESTIMATED PCI IS: 54 in 2019

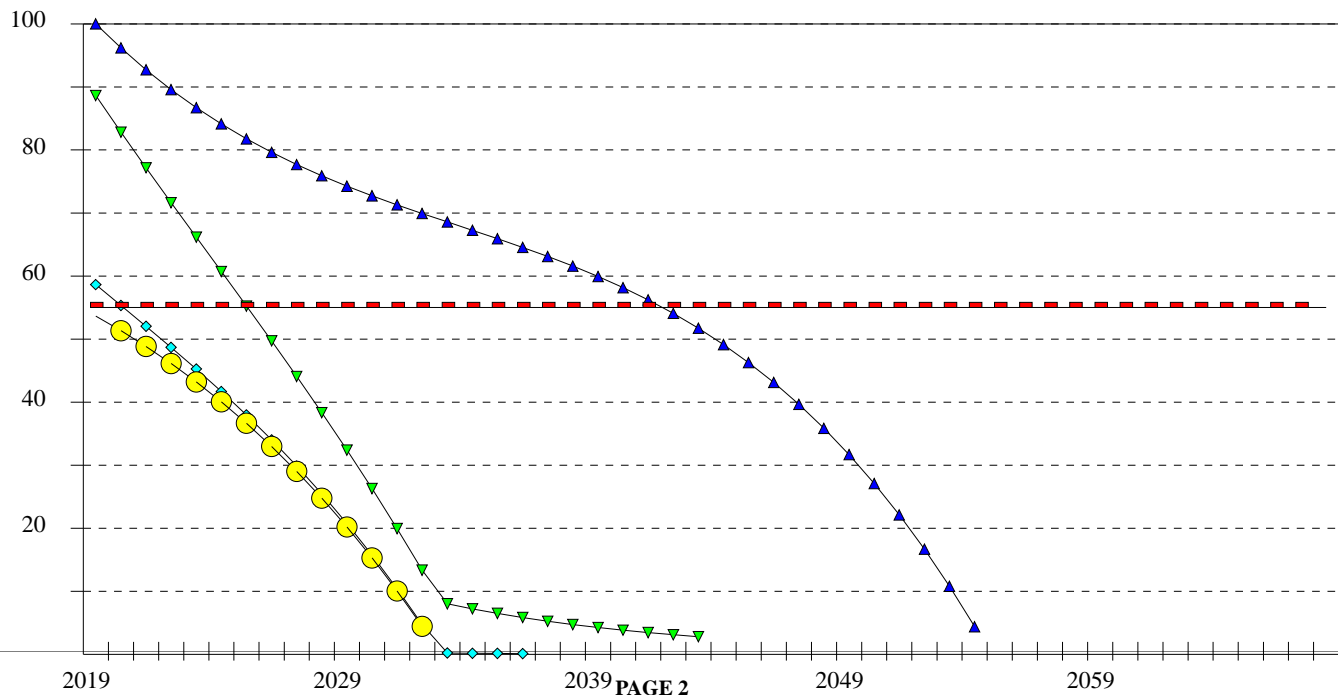
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 50

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$6,210	23 YEARS
▼	SURFACE TREATMENT	\$1,718	7 YEARS
◆	CRACK REPAIR	\$437	2 YEARS
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE





## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 425

DESCRIPTION: TAXIWAY D-2

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2018

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 61

FEATURE AREA: 5,683

FEATURE'S LOW PCI: 61

INSPECTED AREA: 5,500

AVERAGE PCI: 61 FAIR

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 54 in 2018

## COMMENTS/HISTORY FOR FEATURE 425, TAXIWAY D-2

1996 UNKNOWN P401 SECTION

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\*

## DISTRESS QUANTITIES FOR FEATURE 425

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
ALLIGATOR CRACKING	MED	21	21	S.F.	40.5
LONG.& TRANS. CRACK	MED	28	28	L.F.	15.4
LONG.& TRANS. CRACK	LOW	500	516	L.F.	43.9

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	41 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	40 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	20 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 425

DESCRIPTION: TAXIWAY D-2

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2018

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 61 FAIR

CONSTRUCTION YEAR: 1996

ESTIMATED PCI IS: 54 in 2018

MINIMUM SERVICE LEVEL: 55

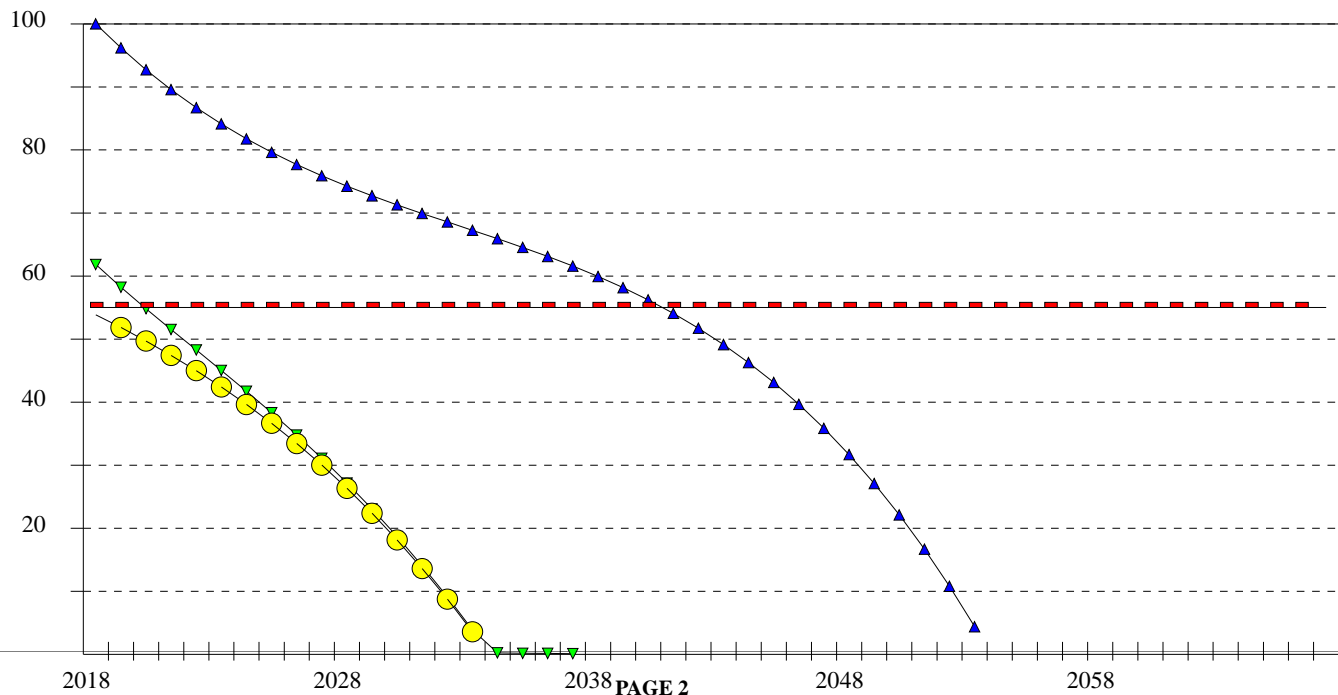
NORMAL PCI FOR THIS AGE: 58

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$8,183	23 YEARS
▼	CRACK REPAIR	\$674	2 YEARS
●	NO ACTION	N/A	N/A

- MINIMUM SERVICE LEVEL, CURRENTLY 55

## PROJECTED PERFORMANCE



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 430

DESCRIPTION: TAXIWAY D-3

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2020

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 65

FEATURE AREA: 7,365

FEATURE'S LOW PCI: 65

INSPECTED AREA: 7,160

AVERAGE PCI: 65 FAIR

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 54 in 2020

## COMMENTS/HISTORY FOR FEATURE 430, TAXIWAY D-3

1993 1.5" P401 ON 2.5" P401 LEVELING  
ON 6.5" RECYCLED

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## DISTRESS QUANTITIES FOR FEATURE 430

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
ALLIGATOR CRACKING	MED	8	8	S.F.	19.7
ALLIGATOR CRACKING	LOW	12	12	S.F.	17.5
LONG.& TRANS. CRACK	HIGH	5	5	L.F.	12.9
LONG.& TRANS. CRACK	MED	92	94	L.F.	21.1
LONG.& TRANS. CRACK	LOW	401	412	L.F.	28.5

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	37 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	42 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	21 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 430

DESCRIPTION: TAXIWAY D-3

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2020

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 65 FAIR

CONSTRUCTION YEAR: 1993

ESTIMATED PCI IS: 54 in 2020

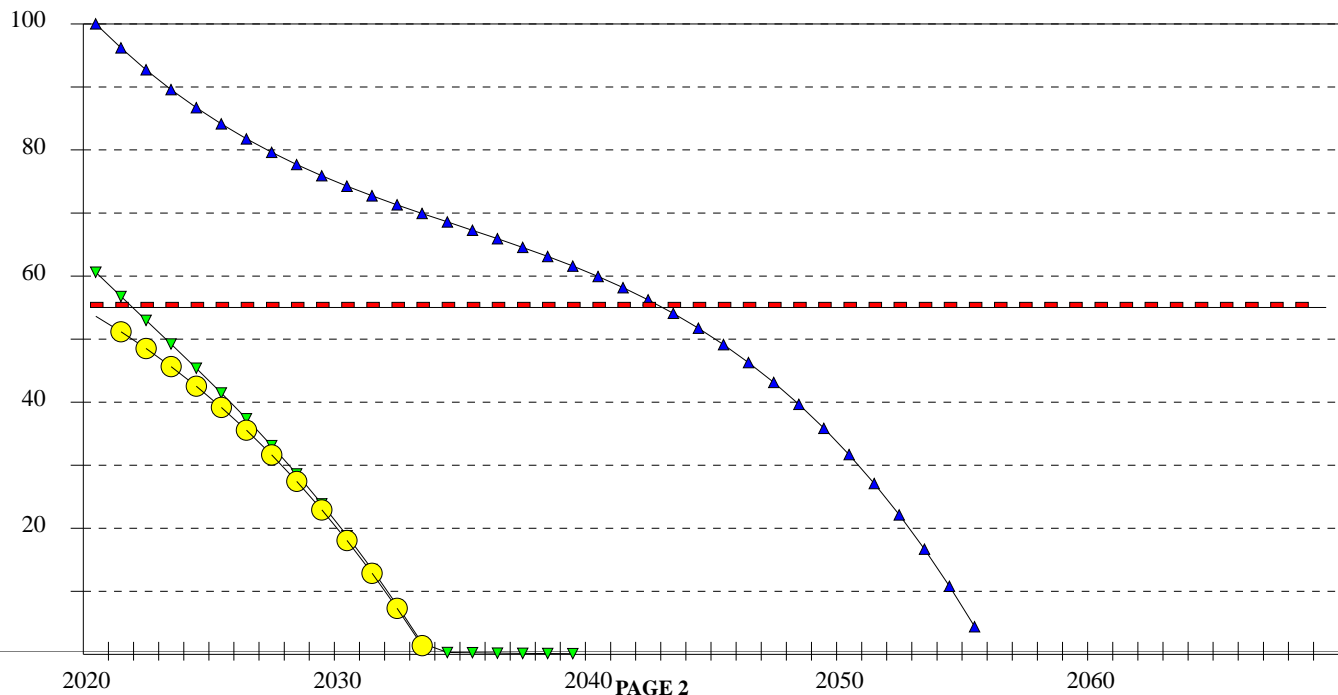
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 48

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$10,605	23 YEARS
▼	CRACK REPAIR	\$633	2 YEARS
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE





## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 435

DESCRIPTION: TAXIWAY D-3

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2022

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 76

FEATURE AREA: 22,925

FEATURE'S LOW PCI: 58

INSPECTED AREA: 12,000

AVERAGE PCI: 68 FAIR

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 54 in 2022

## COMMENTS/HISTORY FOR FEATURE 435, TAXIWAY D-3

1996 UNKNOWN P401 SECTION

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## DISTRESS QUANTITIES FOR FEATURE 435

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
ALLIGATOR CRACKING	MED	15	28	S.F.	13
ALLIGATOR CRACKING	LOW	55	105	S.F.	23.2
DEPRESSION	LOW	30	57	S.F.	2.1
LONG.& TRANS. CRACK	HIGH	30	57	L.F.	11.4
LONG.& TRANS. CRACK	MED	113	215	L.F.	18.2
LONG.& TRANS. CRACK	LOW	731	1,396	L.F.	31.8

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	36 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	43 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	21 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 435

DESCRIPTION: TAXIWAY D-3

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2022

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 68 FAIR

CONSTRUCTION YEAR: 1996

ESTIMATED PCI IS: 54 in 2022

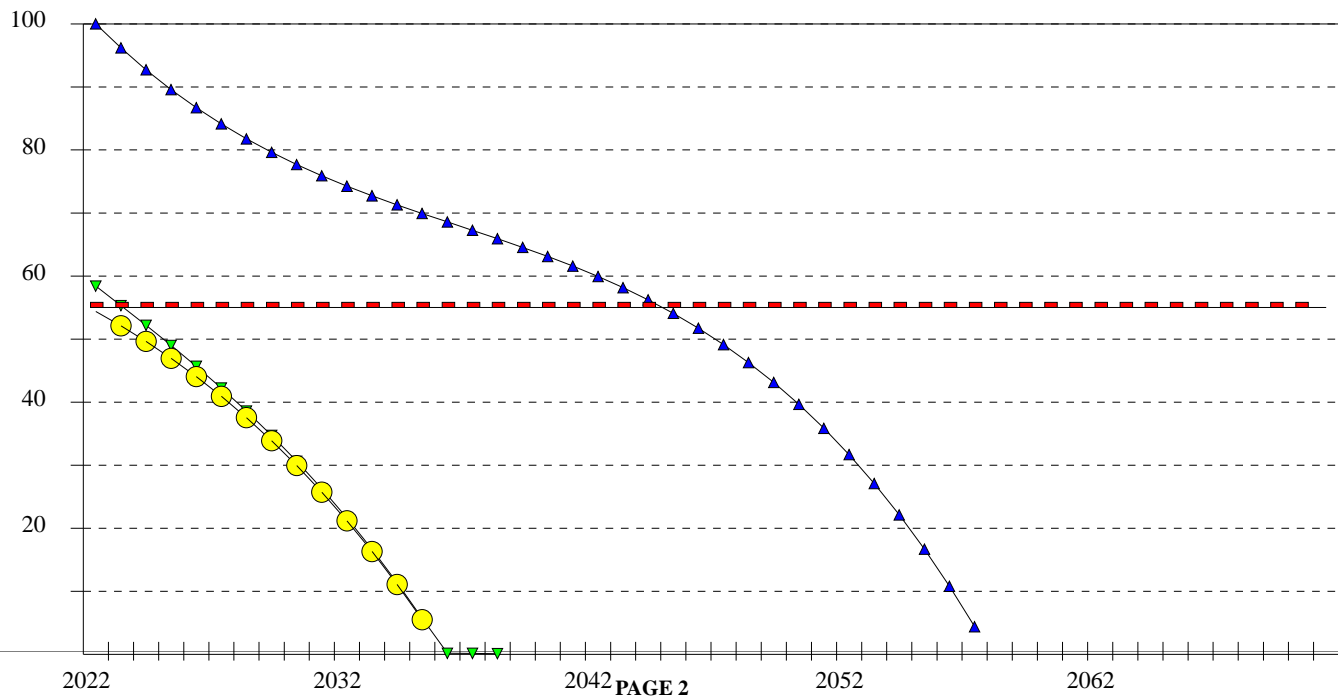
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 50

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$33,012	23 YEARS
▼	CRACK REPAIR	\$2,068	2 YEARS
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE





## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 440

DESCRIPTION: TAXIWAY D-3

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 60

FEATURE AREA: 42,500

FEATURE'S LOW PCI: 44

INSPECTED AREA: 20,000

AVERAGE PCI: 54 POOR

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 52 in 2015

## COMMENTS/HISTORY FOR FEATURE 440, TAXIWAY D-3

1993 1.5" P401 ON 2.5" BINDER  
ON 4" P401 ON 6" P208

\*

## DISTRESS QUANTITIES FOR FEATURE 440

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
ALLIGATOR CRACKING	MED	3	6	S.F.	2.5
ALLIGATOR CRACKING	LOW	26	55	S.F.	4.5
BLOCK CRACKING	MED	1,150	2,443	S.F.	13.5
BLOCK CRACKING	LOW	6,850	14,556	S.F.	31.5
LONG.& TRANS. CRACK	HIGH	3	6	L.F.	1.7
LONG.& TRANS. CRACK	MED	482	1,024	L.F.	19.6
LONG.& TRANS. CRACK	LOW	1,768	3,757	L.F.	26.3

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	7 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	32 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	61 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 440

DESCRIPTION: TAXIWAY D-3

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 54 POOR

CONSTRUCTION YEAR: 1993

ESTIMATED PCI IS: 52 in 2015

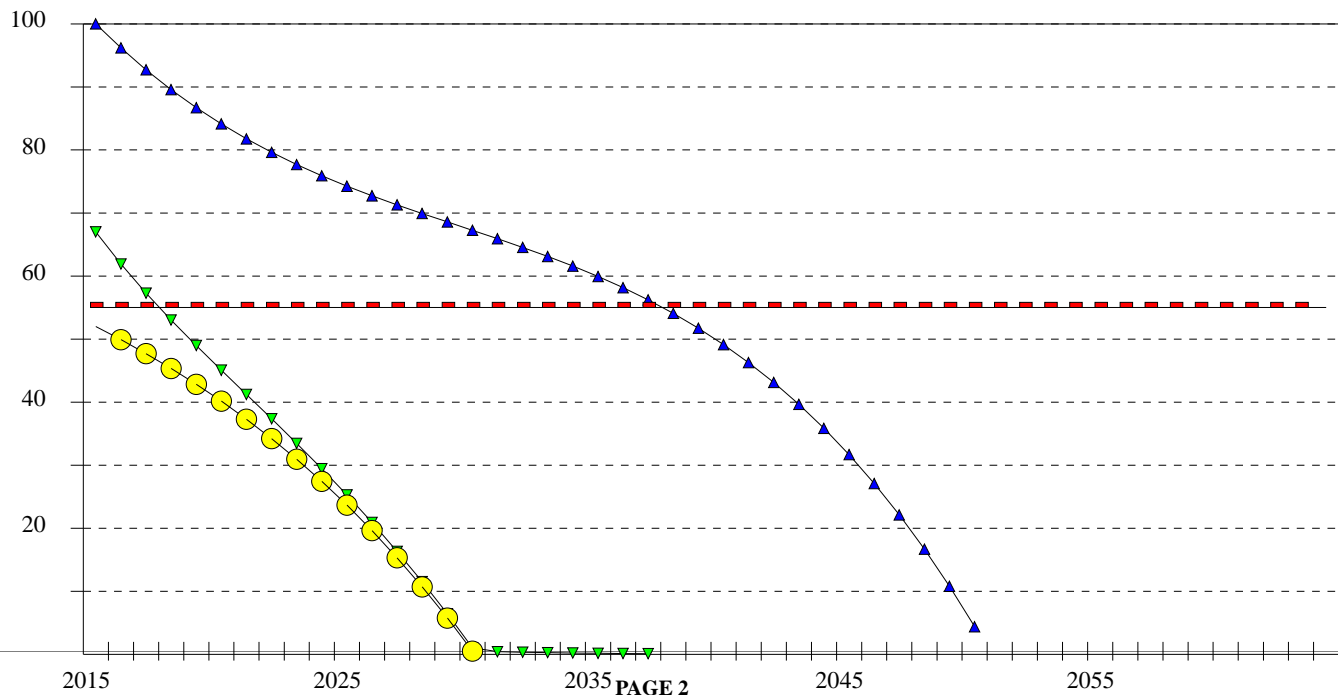
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 58

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$61,200	23 YEARS
▼	CRACK REPAIR	\$18,583	3 YEARS
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 445

DESCRIPTION: TAXIWAY D-3

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2021

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC OVERLAY

FEATURE'S HIGH PCI: 82

FEATURE AREA: 13,928

FEATURE'S LOW PCI: 61

INSPECTED AREA: 9,850

AVERAGE PCI: 72 SATISFACTORY

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 53 in 2021

## COMMENTS/HISTORY FOR FEATURE 445, TAXIWAY D-3

2007 AC Overlay est  
 2002: 1.5" Mill & Inlay /  
 1993 1.5" P401 / 2.5" BINDER / 4" P401 / 6" P208  
 \*

## DISTRESS QUANTITIES FOR FEATURE 445

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
ALLIGATOR CRACKING	MED	53	74	S.F.	36.9
LONG.& TRANS. CRACK	MED	102	144	L.F.	23.9
LONG.& TRANS. CRACK	LOW	559	790	L.F.	39.1

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	37 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	42 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	21 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 445

DESCRIPTION: TAXIWAY D-3

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2021

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC OVERLAY

AVERAGE PCI AT INSPECTION: 72 SATISFACTORY

CONSTRUCTION YEAR: 2007

ESTIMATED PCI IS: 53 in 2021

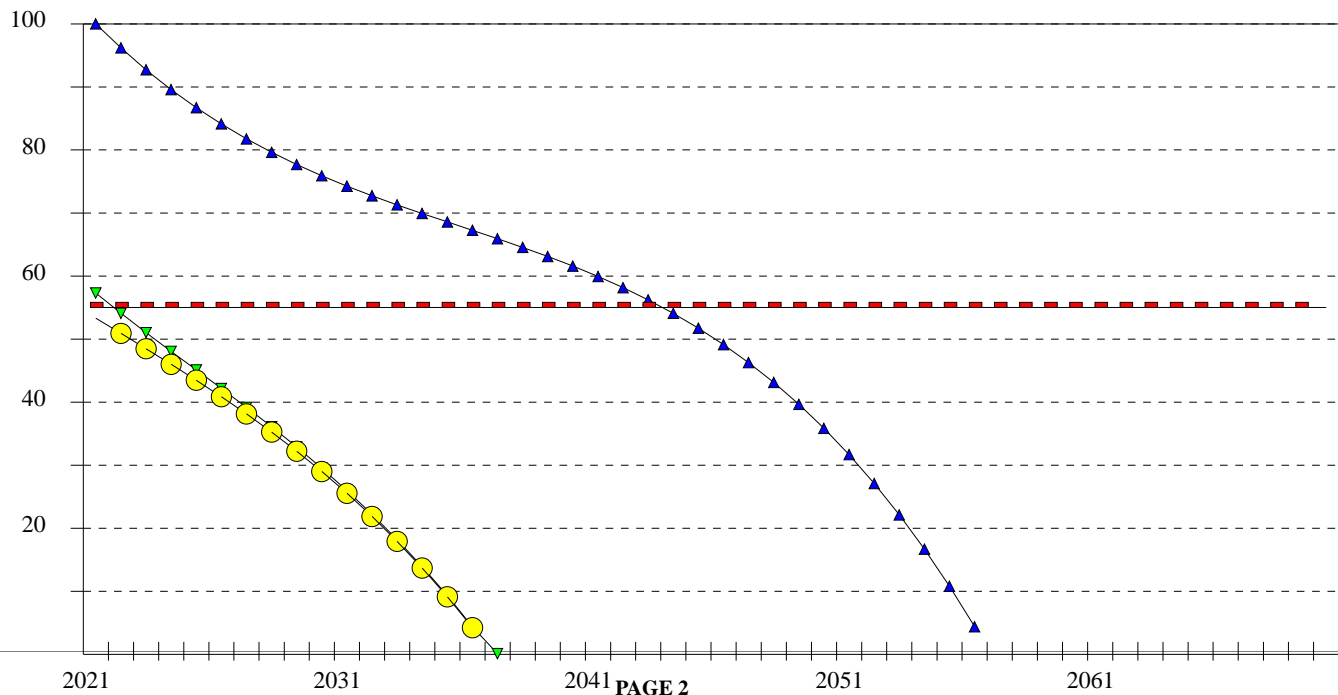
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 68

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$20,056	23 YEARS
▼	CRACK REPAIR	\$1,158	1 YEAR
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE





## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 450

DESCRIPTION: TAXIWAY D-4

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2019

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 71

FEATURE AREA: 36,557

FEATURE'S LOW PCI: 57

INSPECTED AREA: 15,000

AVERAGE PCI: 64 FAIR

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 54 in 2019

## COMMENTS/HISTORY FOR FEATURE 450, TAXIWAY D-4

1991 1.5" P401 ON 4.5" P401 ON 6" P208

\*  
\*  
\*

## DISTRESS QUANTITIES FOR FEATURE 450

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
ALLIGATOR CRACKING	MED	44	107	S.F.	15.6
ALLIGATOR CRACKING	LOW	36	87	S.F.	10.4
LONG.& TRANS. CRACK	HIGH	33	80	L.F.	15.9
LONG.& TRANS. CRACK	MED	350	853	L.F.	25.8
LONG.& TRANS. CRACK	LOW	1,119	2,727	L.F.	32.1

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	26 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	49 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	25 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 450

DESCRIPTION: TAXIWAY D-4

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2019

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 64 FAIR

CONSTRUCTION YEAR: 1991

ESTIMATED PCI IS: 54 in 2019

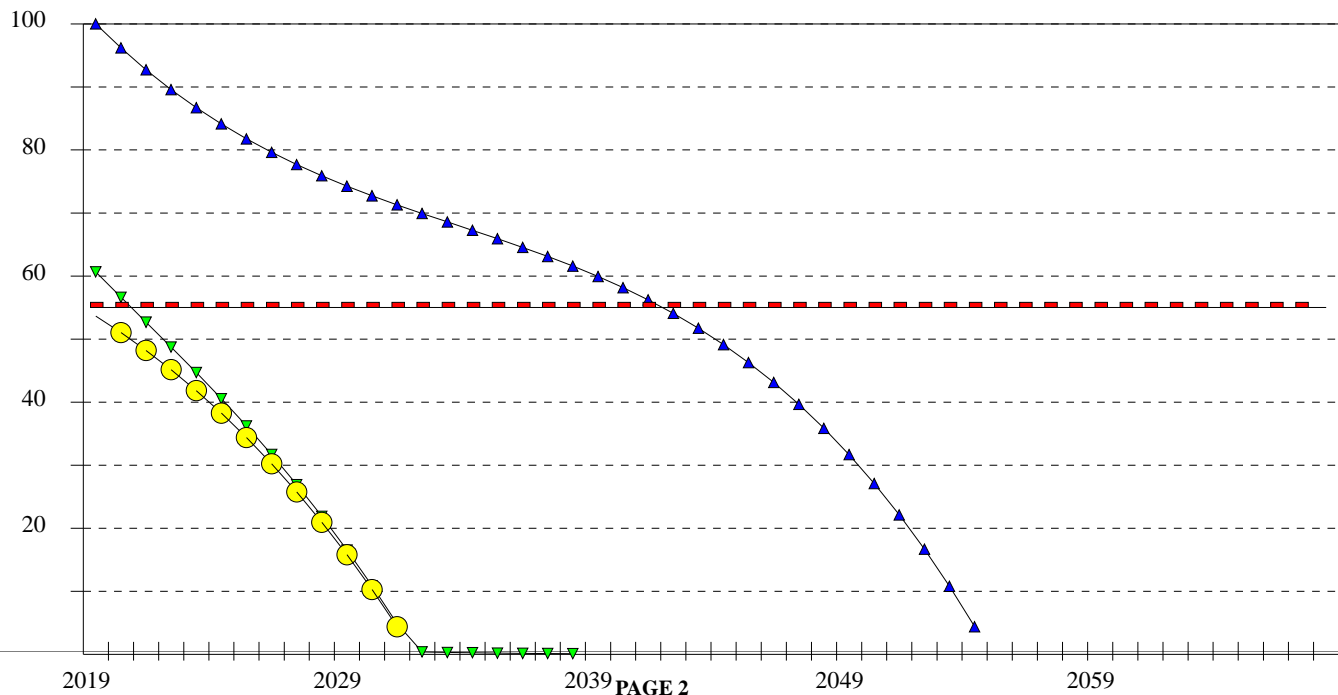
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 45

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$52,642	23 YEARS
▼	CRACK REPAIR	\$4,538	2 YEARS
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE





## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 510

DESCRIPTION: TAXIWAY

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2025

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 83

FEATURE AREA: 9,561

FEATURE'S LOW PCI: 81

INSPECTED AREA: 8,620

AVERAGE PCI: 82 SATISFACTORY

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 54 in 2025

## COMMENTS/HISTORY FOR FEATURE 510, TAXIWAY

2009 AC 12" P-401 three lifts (5"-5-"2") / 10" P-209

\*  
\*  
\*

## DISTRESS QUANTITIES FOR FEATURE 510

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
LONG.& TRANS. CRACK	MED	128	142	L.F.	53.1
LONG.& TRANS. CRACK	LOW	305	338	L.F.	46.8

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	67 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	33 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 510

DESCRIPTION: TAXIWAY

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2025

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 82 SATISFACTORY

CONSTRUCTION YEAR: 2009

ESTIMATED PCI IS: 54 in 2025

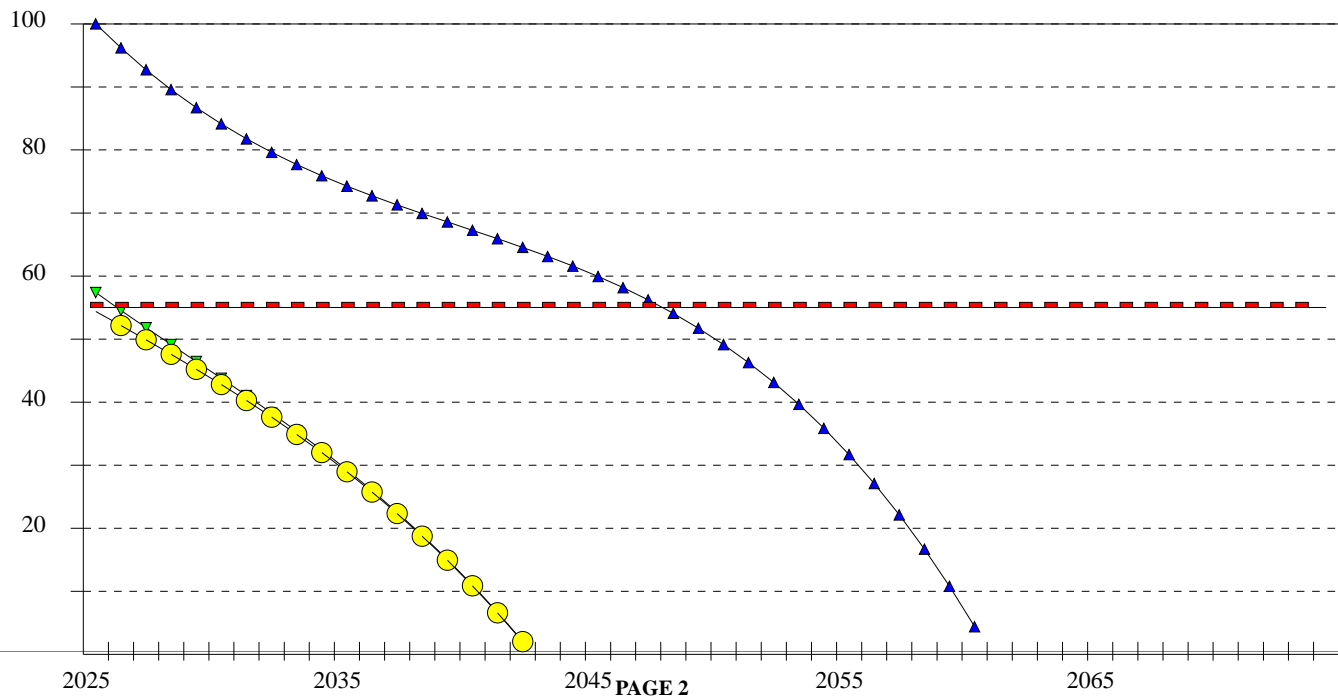
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 67

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$13,767	23 YEARS
▼	CRACK REPAIR	\$595	1 YEAR
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 515

DESCRIPTION: TAXIWAY

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2021

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 72

FEATURE AREA: 16,450

FEATURE'S LOW PCI: 60

INSPECTED AREA: 7,280

AVERAGE PCI: 66 FAIR

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 54 in 2021

## COMMENTS/HISTORY FOR FEATURE 515, TAXIWAY

1997 UNKNOWN P401 SECTION

\*  
\*  
\*

## DISTRESS QUANTITIES FOR FEATURE 515

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
ALLIGATOR CRACKING	LOW	53	119	S.F.	33
LONG.& TRANS. CRACK	MED	248	560	L.F.	34.6
LONG.& TRANS. CRACK	LOW	449	1,014	L.F.	29.3
WEATHERING	MED	175	395	S.F.	2.9

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	33 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	44 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	23 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 515

DESCRIPTION: TAXIWAY

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2021

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 66 FAIR

CONSTRUCTION YEAR: 1997

ESTIMATED PCI IS: 54 in 2021

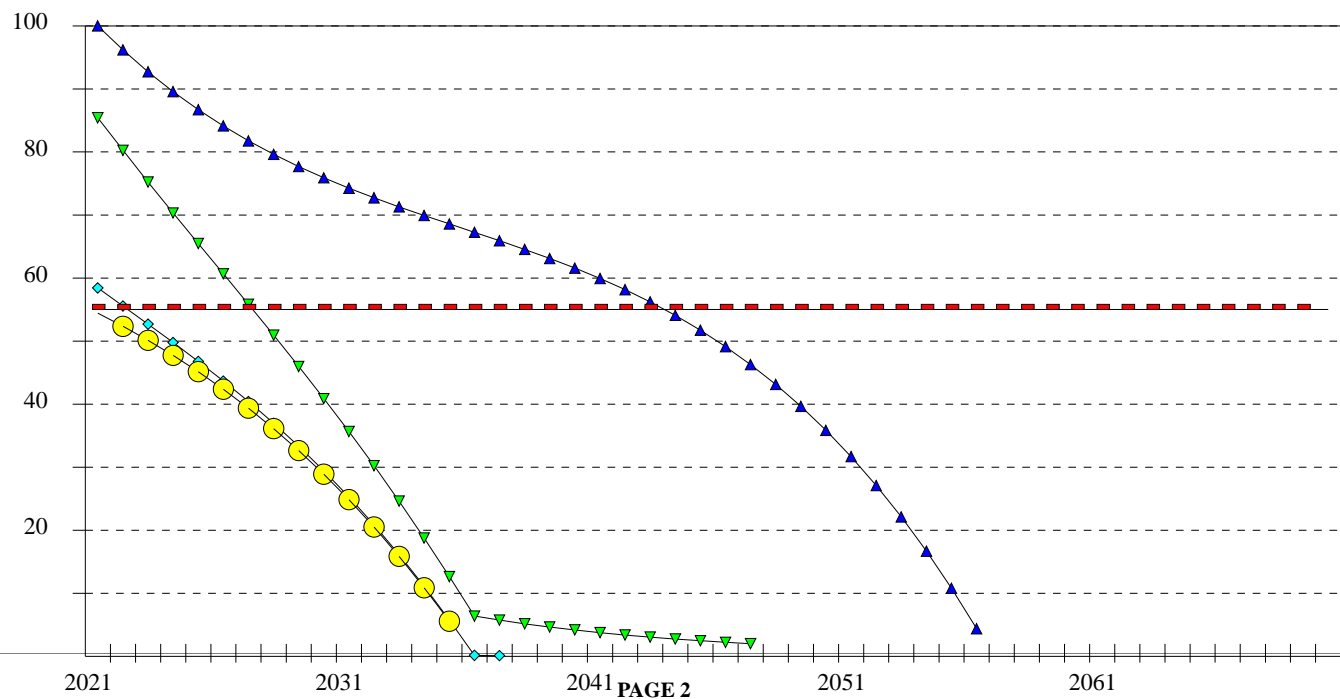
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 54

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$23,688	23 YEARS
▼	SURFACE TREATMENT	\$7,109	7 YEARS
◆	CRACK REPAIR	\$1,951	2 YEARS
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 520

DESCRIPTION: TAXIWAY

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2023

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 84

FEATURE AREA: 6,525

FEATURE'S LOW PCI: 76

INSPECTED AREA: 6,525

AVERAGE PCI: 80 SATISFACTORY

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 53 in 2023

## COMMENTS/HISTORY FOR FEATURE 520, TAXIWAY

2009 AC 12" P-401 three lifts (5"-5-"2") / 10" P-209

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\*  
\*

## DISTRESS QUANTITIES FOR FEATURE 520

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
LONG.& TRANS. CRACK	MED	117	117	L.F.	60.7
LONG.& TRANS. CRACK	LOW	206	206	L.F.	39.2

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	67 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	33 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 520

DESCRIPTION: TAXIWAY

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2023

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 80 SATISFACTORY

CONSTRUCTION YEAR: 2009

ESTIMATED PCI IS: 53 in 2023

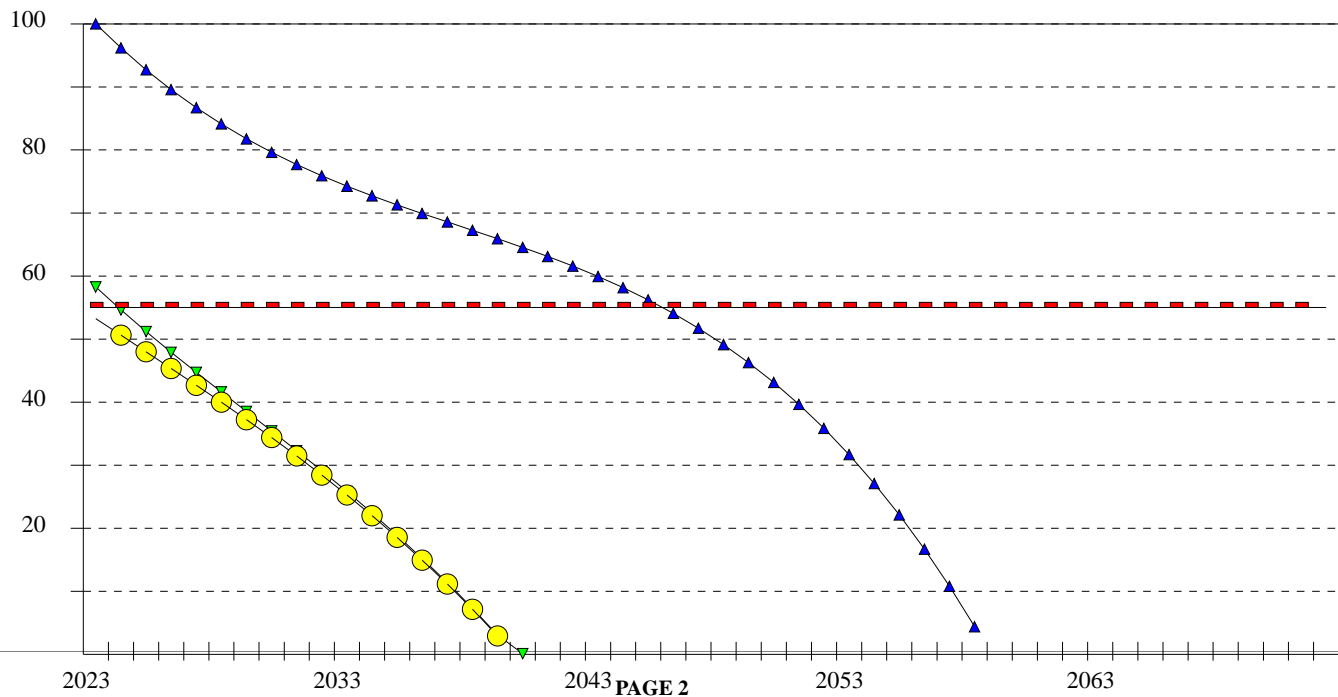
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 70

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$9,396	23 YEARS
▼	CRACK REPAIR	\$400	1 YEAR
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE





## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 3005

DESCRIPTION: TERMINAL RAMP

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 25

FEATURE AREA: 32,768

FEATURE'S LOW PCI: 21

INSPECTED AREA: 18,175

AVERAGE PCI: 23 SERIOUS

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 11 in 2015

## COMMENTS/HISTORY FOR FEATURE 3005, TERMINAL RAMP

1961 2" P401 ON 6" P208

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\*

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## DISTRESS QUANTITIES FOR FEATURE 3005

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
ALLIGATOR CRACKING	MED	246	443	S.F.	14.7
BLOCK CRACKING	MED	3,000	5,408	S.F.	12.7
BLOCK CRACKING	LOW	4,600	8,293	S.F.	13.7
DEPRESSION	LOW	84	151	S.F.	1.7
LONG.& TRANS. CRACK	MED	287	517	L.F.	6.3
LONG.& TRANS. CRACK	LOW	282	508	L.F.	3.8
RAVELING	HIGH	15	27	S.F.	1.8
RAVELING	MED	16,175	29,162	S.F.	39.5
RAVELING	LOW	1,000	1,802	S.F.	2.5
RUTTING	LOW	34	61	S.F.	2.7

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	17 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	24 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	59 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 3005

DESCRIPTION: TERMINAL RAMP

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 23 SERIOUS

CONSTRUCTION YEAR: 1961

ESTIMATED PCI IS: 11 in 2015

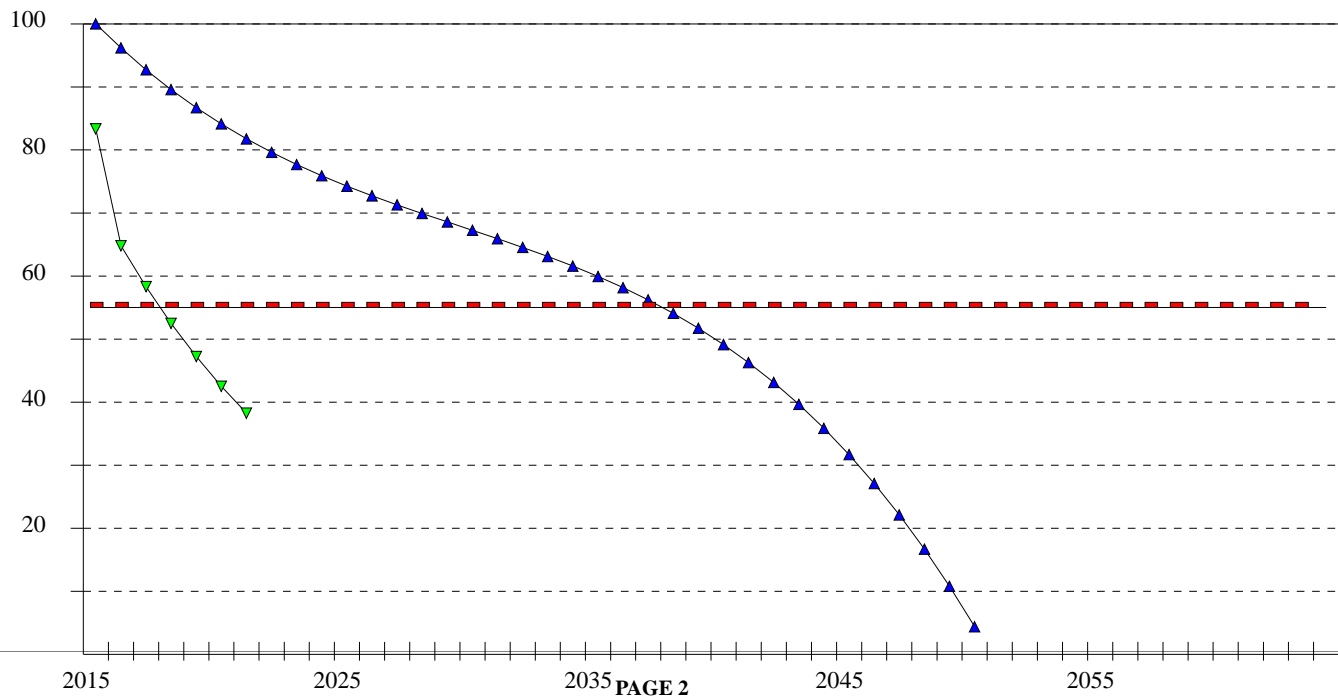
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 0

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$47,185	23 YEARS
▼	SURFACE TREATMENT	\$17,444	3 YEARS
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 3010

DESCRIPTION: TERMINAL RAMP

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-31-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 54

FEATURE AREA: 73,155

FEATURE'S LOW PCI: 39

INSPECTED AREA: 25,100

AVERAGE PCI: 49 POOR

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 43 in 2015

## COMMENTS/HISTORY FOR FEATURE 3010, TERMINAL RAMP

1972 2" P401 ON 6" P208

\*  
\*  
\*

## DISTRESS QUANTITIES FOR FEATURE 3010

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
ALLIGATOR CRACKING	LOW	48	139	S.F.	8
LONG.& TRANS. CRACK	HIGH	330	961	L.F.	26.7
LONG.& TRANS. CRACK	MED	1,985	5,785	L.F.	41.5
LONG.& TRANS. CRACK	LOW	231	673	L.F.	5.6
RAVELING	HIGH	225	655	S.F.	10.7
RAVELING	MED	50	145	S.F.	2.1
RAVELING	LOW	20	58	S.F.	.5
RUTTING	LOW	10	29	S.F.	2.7
WEATHERING	MED	550	1,603	S.F.	1.7

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	10 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	55 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	35 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 3010

DESCRIPTION: TERMINAL RAMP

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-31-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 49 POOR

CONSTRUCTION YEAR: 1972

ESTIMATED PCI IS: 43 in 2015

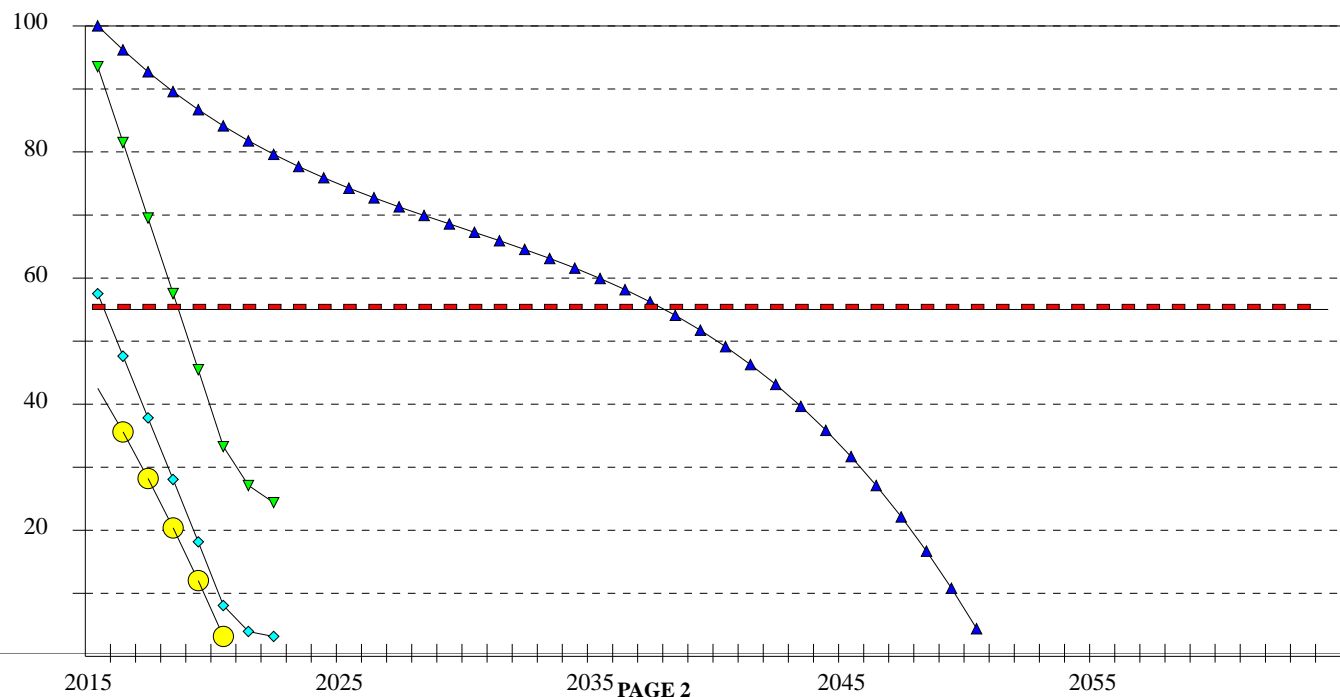
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 0

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$105,343	23 YEARS
▼	SURFACE TREATMENT	\$36,895	4 YEARS
◆	CRACK REPAIR	\$9,199	1 YEAR
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE





## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 3015

DESCRIPTION: TERMINAL RAMP

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC OVERLAY

FEATURE'S HIGH PCI: 53

FEATURE AREA: 12,554

FEATURE'S LOW PCI: 46

INSPECTED AREA: 6,070

AVERAGE PCI: 50 POOR

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 48 in 2015

## COMMENTS/HISTORY FOR FEATURE 3015, TERMINAL RAMP

1993 UNKNOWN P401 SECTION

1972 2" P401 ON 6" P208

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\*

## DISTRESS QUANTITIES FOR FEATURE 3015

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
ALLIGATOR CRACKING	LOW	44	91	S.F.	13.9
LONG.& TRANS. CRACK	HIGH	24	49	L.F.	16.3
LONG.& TRANS. CRACK	MED	572	1,183	L.F.	44.7
LONG.& TRANS. CRACK	LOW	540	1,116	L.F.	24.9

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	14 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	57 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	29 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 3015

DESCRIPTION: TERMINAL RAMP

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC OVERLAY

AVERAGE PCI AT INSPECTION: 50 POOR

CONSTRUCTION YEAR: 1993

ESTIMATED PCI IS: 48 in 2015

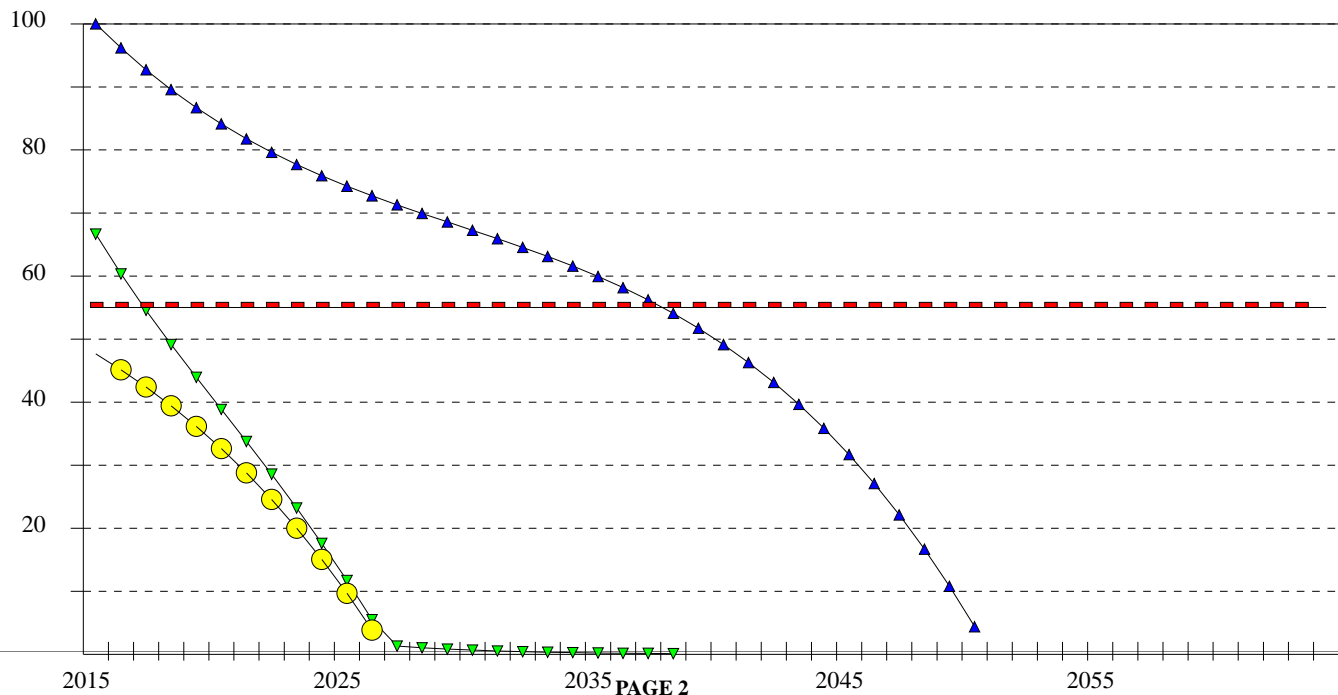
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 56

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$18,077	23 YEARS
▼	CRACK REPAIR	\$2,911	2 YEARS
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE





## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 3105

DESCRIPTION: NORTH RAMP

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: PCC

FEATURE'S HIGH PCI: 100

FEATURE AREA: 52,097

FEATURE'S LOW PCI: 100

INSPECTED AREA: 20,250

AVERAGE PCI: 100 GOOD

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 97 in 2015

## COMMENTS/HISTORY FOR FEATURE 3105, NORTH RAMP

2010 PCC 10" P-501/ 10" P-209

\*  
\*  
\*

## DISTRESS QUANTITIES FOR FEATURE 3105

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
---------------	----------	----------------------	-----------------------------	-------	-------------------------------

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	0 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 3105

DESCRIPTION: NORTH RAMP

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: PCC

AVERAGE PCI AT INSPECTION: 100 GOOD

CONSTRUCTION YEAR: 2010

ESTIMATED PCI IS: 97 in 2015

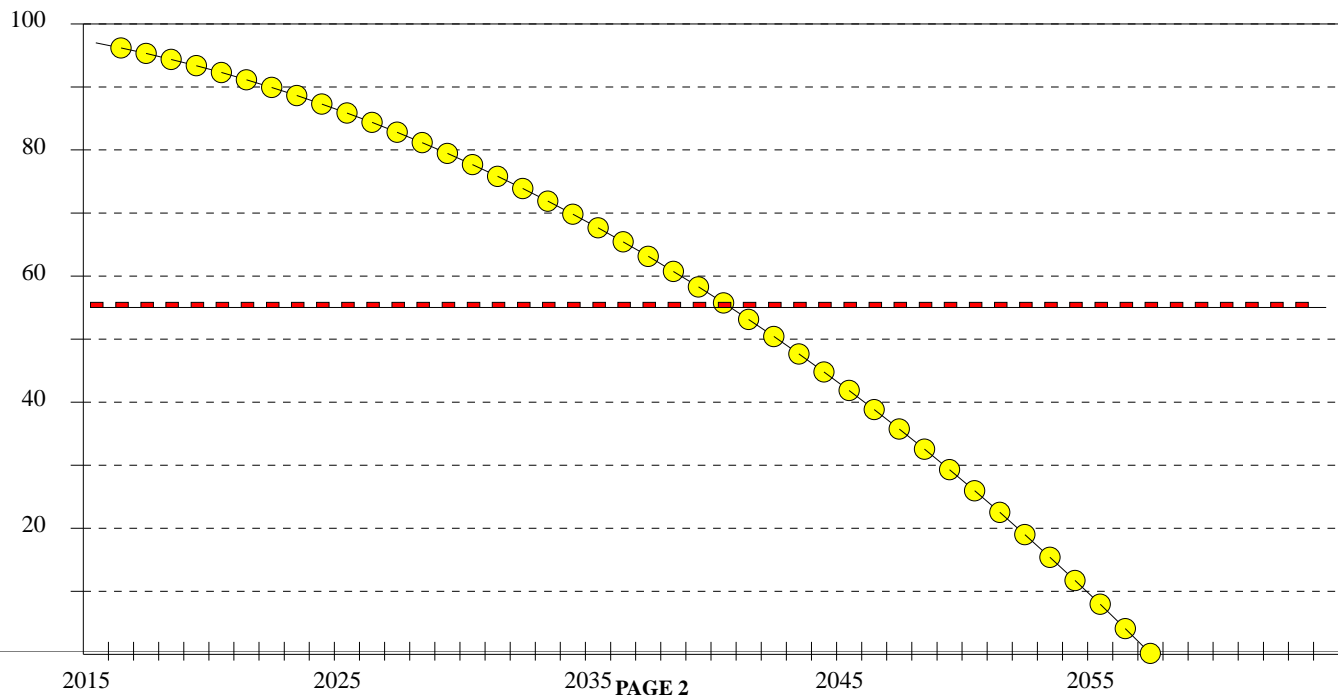
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 96

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 3110

DESCRIPTION: NORTH RAMP

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 98

FEATURE AREA: 42,009

FEATURE'S LOW PCI: 95

INSPECTED AREA: 19,900

AVERAGE PCI: 96 GOOD

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 92 in 2015

## COMMENTS/HISTORY FOR FEATURE 3110, NORTH RAMP

2013 AC 2" P-401/5: P-401 base/5" P-401 base/  
10" P-209

\*

\*

## DISTRESS QUANTITIES FOR FEATURE 3110

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
LONG.& TRANS. CRACK	LOW	148	312	L.F.	100

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	67 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	33 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 3110

DESCRIPTION: NORTH RAMP

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 96 GOOD

CONSTRUCTION YEAR: 2013

ESTIMATED PCI IS: 92 in 2015

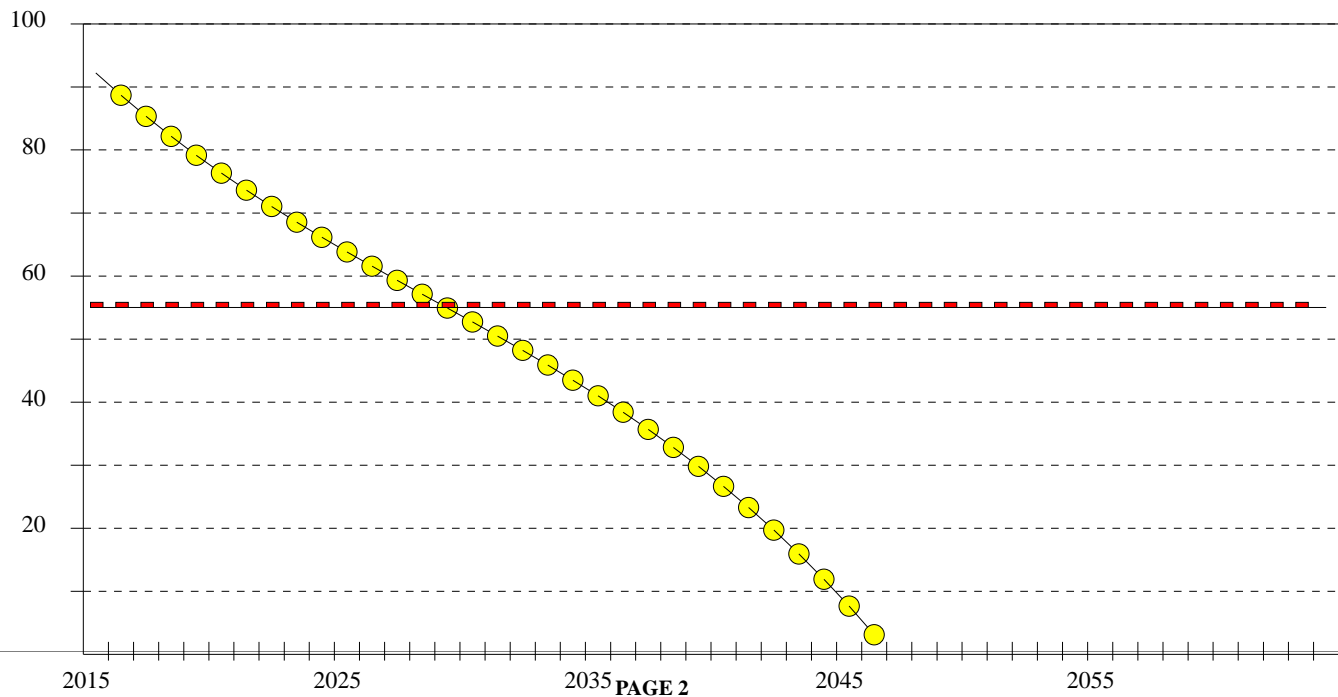
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 93

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 3115

DESCRIPTION: NORTH RAMP

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: PCC

FEATURE'S HIGH PCI: 100

FEATURE AREA: 36,426

FEATURE'S LOW PCI: 100

INSPECTED AREA: 16,200

AVERAGE PCI: 100 GOOD

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 98 in 2015

## COMMENTS/HISTORY FOR FEATURE 3115, NORTH RAMP

2012 PCC 10" P-501/10" P-209

\*  
\*  
\*

## DISTRESS QUANTITIES FOR FEATURE 3115

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
---------------	----------	----------------------	-----------------------------	-------	-------------------------------

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	0 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 3115

DESCRIPTION: NORTH RAMP

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: PCC

AVERAGE PCI AT INSPECTION: 100 GOOD

CONSTRUCTION YEAR: 2012

ESTIMATED PCI IS: 98 in 2015

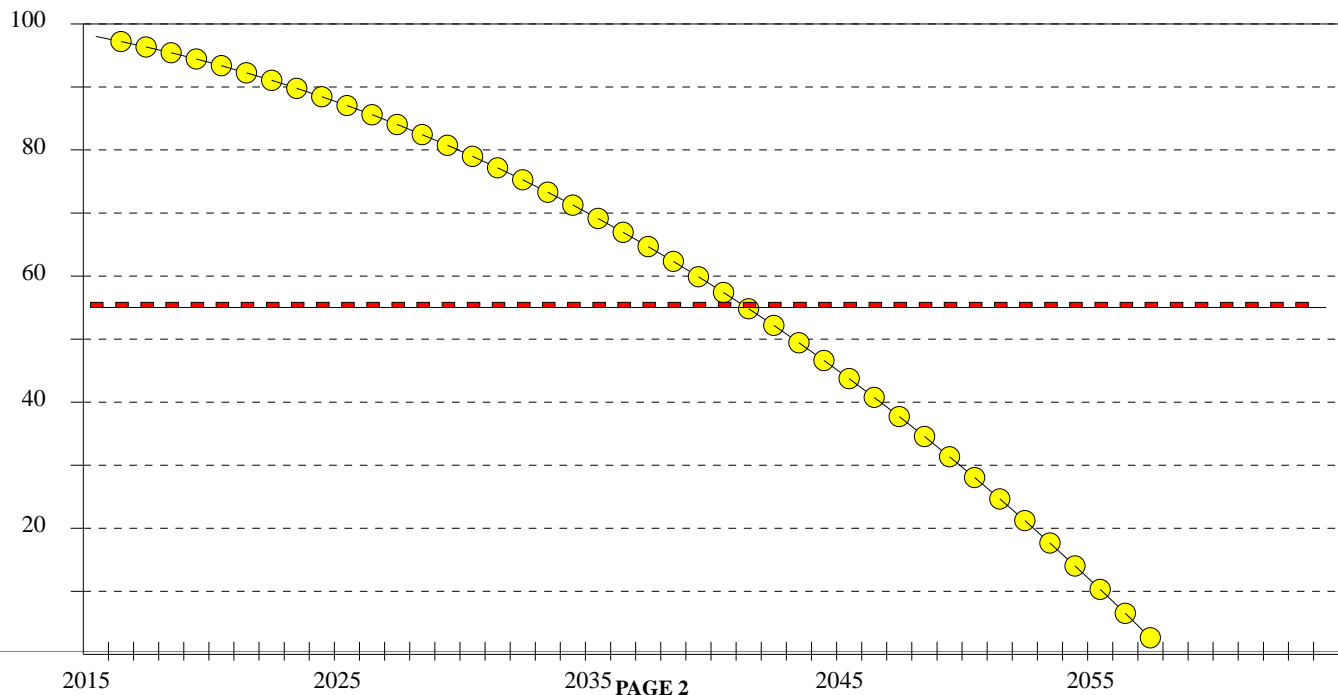
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 98

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE





## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 3120

DESCRIPTION: NORTH RAMP

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 87

FEATURE AREA: 14,328

FEATURE'S LOW PCI: 83

INSPECTED AREA: 11,200

AVERAGE PCI: 85 SATISFACTORY

MINIMUM SERVICE LEVEL: 55

ESTIMATED PCI IS: 83 in 2015

## COMMENTS/HISTORY FOR FEATURE 3120, NORTH RAMP

2009 AC

\*

\*

\*

## DISTRESS QUANTITIES FOR FEATURE 3120

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
LONG.& TRANS. CRACK	MED	88	112	L.F.	51.4
LONG.& TRANS. CRACK	LOW	355	454	L.F.	48.5

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	67 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	33 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 3120

DESCRIPTION: NORTH RAMP

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 85 SATISFACTORY

CONSTRUCTION YEAR: 2009

ESTIMATED PCI IS: 83 in 2015

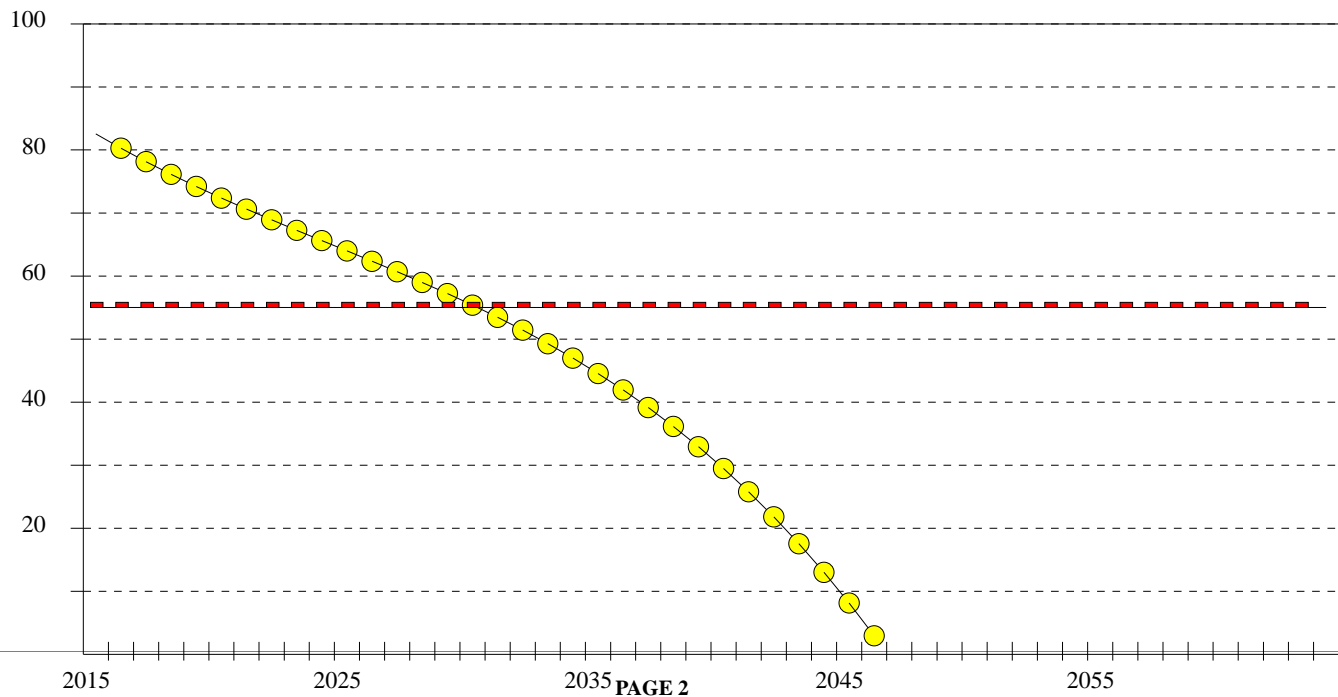
MINIMUM SERVICE LEVEL: 55

NORMAL PCI FOR THIS AGE: 83

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 55		

## PROJECTED PERFORMANCE



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 6005

DESCRIPTION: RUNWAY 17-35

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2022

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

FEATURE'S HIGH PCI: 80

FEATURE AREA: 300,000

FEATURE'S LOW PCI: 67

INSPECTED AREA: 45,000

AVERAGE PCI: 73 SATISFACTORY

MINIMUM SERVICE LEVEL: 60

ESTIMATED PCI IS: 58 in 2022

## COMMENTS/HISTORY FOR FEATURE 6005, RUNWAY 17-35

1993 1.5" P401 ON 2.5" P401 LEVELING  
ON 6.5" RECYCLED

\*

\*

## DISTRESS QUANTITIES FOR FEATURE 6005

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
ALLIGATOR CRACKING	MED	9	60	S.F.	4.6
LONG.& TRANS. CRACK	HIGH	75	500	L.F.	13.8
LONG.& TRANS. CRACK	MED	1,141	7,606	L.F.	39
LONG.& TRANS. CRACK	LOW	3,026	20,173	L.F.	42.3

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	5 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	64 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	32 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 6005

DESCRIPTION: RUNWAY 17-35

ANALYSIS YEAR: 2015 OPTIMIZED FOR: 2022

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: AC

AVERAGE PCI AT INSPECTION: 73 SATISFACTORY

CONSTRUCTION YEAR: 1993

ESTIMATED PCI IS: 58 in 2022

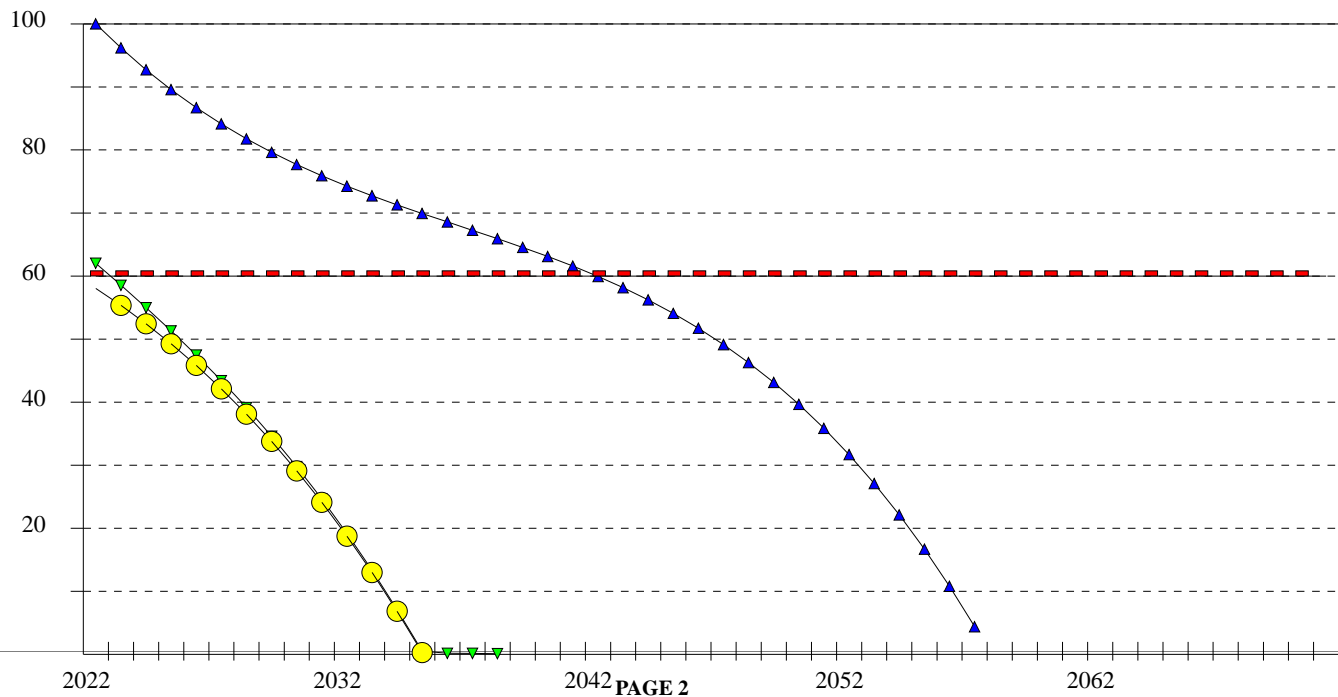
MINIMUM SERVICE LEVEL: 60

NORMAL PCI FOR THIS AGE: 42

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
▲	RESURFACING	\$432,000	20 YEARS
▼	CRACK REPAIR	\$35,065	1 YEAR
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 60		

## PROJECTED PERFORMANCE



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 6105

DESCRIPTION: RUNWAY 9-27

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: PCC

FEATURE'S HIGH PCI: 100

FEATURE AREA: 325,118

FEATURE'S LOW PCI: 99

INSPECTED AREA: 64,800

AVERAGE PCI: 100 GOOD

MINIMUM SERVICE LEVEL: 60

ESTIMATED PCI IS: 99 in 2015

## COMMENTS/HISTORY FOR FEATURE 6105, RUNWAY 9-27

2009 PCC mill 4.25" P-401 and replace with 10" P-501/existing

1991 3.5" P401 (1.75" Existing) / 7.5" P209

\*

\*

## DISTRESS QUANTITIES FOR FEATURE 6105

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
SHRINKAGE CRACKS	N/A	4	20	SLABS	100

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	50 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	50 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 6105

DESCRIPTION: RUNWAY 9-27

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: PCC

AVERAGE PCI AT INSPECTION: 100 GOOD

CONSTRUCTION YEAR: 2009

ESTIMATED PCI IS: 99 in 2015

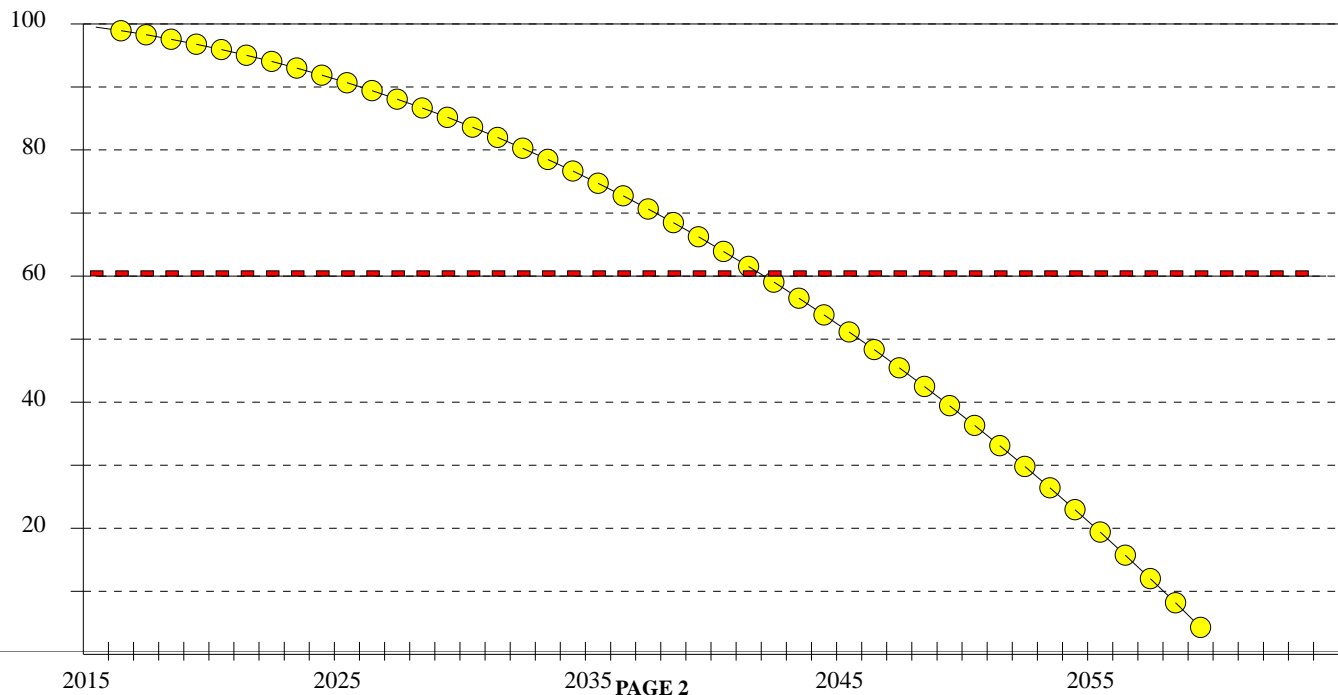
MINIMUM SERVICE LEVEL: 60

NORMAL PCI FOR THIS AGE: 96

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 60		

## PROJECTED PERFORMANCE





## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 6110

DESCRIPTION: RUNWAY 9-27

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: PCC

FEATURE'S HIGH PCI: 100

FEATURE AREA: 455,164

FEATURE'S LOW PCI: 98

INSPECTED AREA: 64,800

AVERAGE PCI: 100 GOOD

MINIMUM SERVICE LEVEL: 60

ESTIMATED PCI IS: 99 in 2015

## COMMENTS/HISTORY FOR FEATURE 6110, RUNWAY 9-27

2009 PCC mill 4.25" P-401 and replace with 10" P-501/existing

1991 3.5" P401 (1.75" Existing) / 7.5" P209

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\*

## DISTRESS QUANTITIES FOR FEATURE 6110

DISTRESS TYPE	SEVERITY	MEASURED QUANTITY	ESTIMATED TOTAL QUANTITY	UNITS	PERCENTAGE OF All DISTRESS
JOINT SEAL DAMAGE	LOW	24	168	SLABS	73
SHRINKAGE CRACKS	N/A	1	7	SLABS	26.9

## BASIC DISTRESS CAUSES

APPROXIMATE AMOUNT OF DISTRESS RELATED TO LOAD ON THE PAVEMENT IS:	0 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO MATERIALS PROBLEMS IN THE FEATURE IS:	38 %
APPROXIMATE AMOUNT OF DISTRESS RELATED TO AGE OF PAVEMENT AND TRAFFIC REPETITIONS IS:	62 %



## AIRPORT: ELKHART MUNICIPAL

## AIRPAV FEATURE ANALYSIS PROGRAM OUTPUT

FEATURE: 6110

DESCRIPTION: RUNWAY 9-27

ANALYSIS YEAR: 2015

INSPECTION DATE: 8-30-14

PAVEMENT TYPE: PCC

AVERAGE PCI AT INSPECTION: 100 GOOD

CONSTRUCTION YEAR: 2009

ESTIMATED PCI IS: 99 in 2015

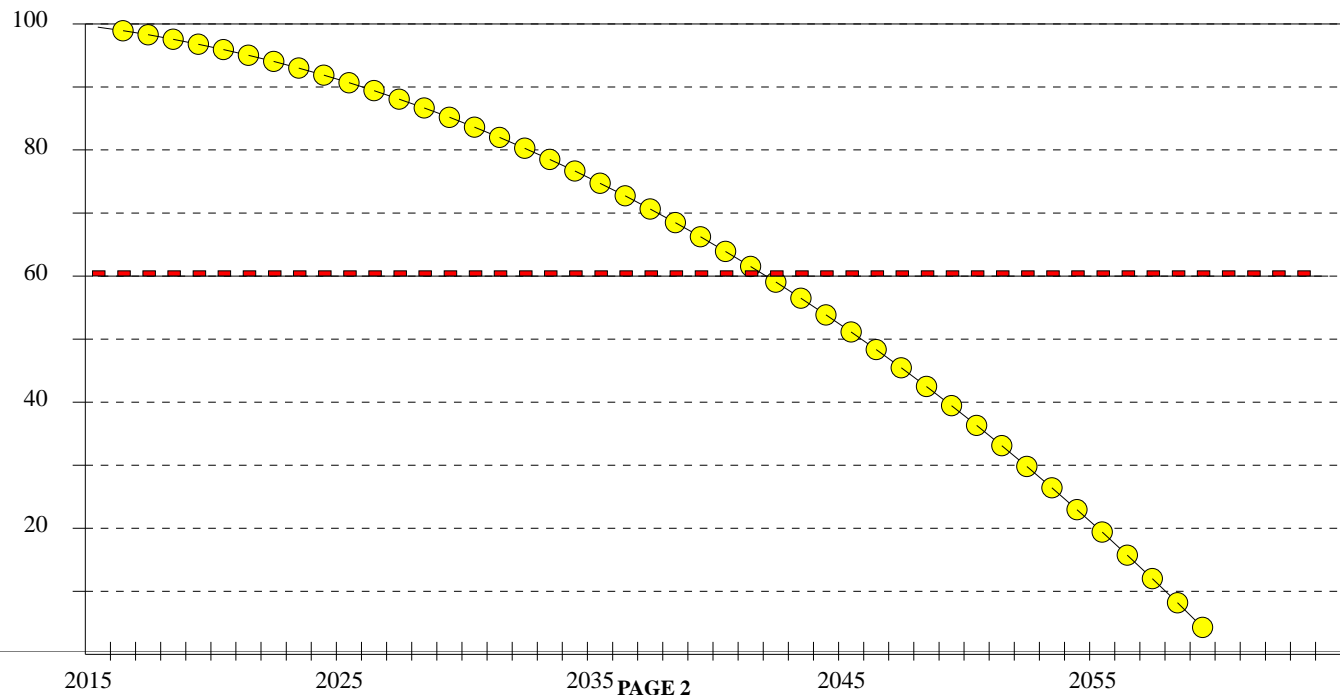
MINIMUM SERVICE LEVEL: 60

NORMAL PCI FOR THIS AGE: 96

## THE FOLLOWING PROJECTS HAVE BEEN SELECTED AS VIABLE ALTERNATIVES

LEGEND	DESCRIPTION	COST	LIFE EXTENSION
●	NO ACTION	N/A	N/A
-	MINIMUM SERVICE LEVEL, CURRENTLY 60		

## PROJECTED PERFORMANCE





## Appendix F. Airport Responsibilities

### Grant Assurances

In 1995, Congress mandated that the FAA require, as a condition of grant funding, that airport sponsors prepare documentation of a maintenance management program on pavement that has been constructed, reconstructed, or repaired with Federal assistance.

This report fulfills many of the grant assurance requirements, including documenting:

- Locating all runways, taxiways, and aprons.
- Documenting pavement dimensions.
- Documenting types of pavement.
- Documenting year of construction or most recent major rehabilitation.

The airport owners must be an active participant in maintaining compliance. Actions taken to ensure compliance include:

- Annotating areas constructed or repaired with Federal aid.
- Conducting monthly drive-by inspections to detect changes in pavement condition.
- Recording each drive-by inspection and any maintenance performed as a result.
- Keeping complete records of all maintenance activities.
- Keeping records for 5 years.
- Documenting detailed inspection information with a history of recorded pavement deterioration by PCI survey (e.g., this report).

ASSURANCES Airport Sponsors	
<b>A. General.</b>	
1.	These assurances shall be complied with in the performance of grant agreements for airport development, airport planning, and noise compatibility program grants for airport sponsors.
2.	These assurances are required to be submitted as part of the project application by sponsors requesting funds under the provisions of Title 49, U.S.C., subtitle VII, as amended. As used herein, the term "public agency sponsor" means a public agency with control of a public-use airport; the term "private sponsor" means a private owner of a public-use airport; and the term "sponsor" includes both public agency sponsors and private sponsors.
3.	Upon acceptance of the grant offer by the sponsor, these assurances are incorporated in and become part of the grant agreement.
<b>B. Duration and Applicability.</b>	
1.	<b>Airport development or Noise Compatibility Program Projects Undertaken by a Public Agency Sponsor.</b> The terms, conditions and assurances of the grant agreement shall remain in full force and effect throughout the useful life of the facilities developed or equipment acquired for an airport development or noise compatibility program project, or throughout the useful life of the project items installed within a facility under a noise compatibility program project, but in any event not to exceed twenty (20) years from the date of acceptance of a grant offer of Federal funds for the project. However, there shall be no limit on the duration of the assurances regarding Exclusive Rights and Airport Revenue so long as the airport is used as an airport. There shall be no limit on the duration of the terms, conditions, and assurances with respect to real property acquired with federal funds. Furthermore, the duration of the Civil Rights assurance shall be specified in the assurances.
2.	<b>Airport Development or Noise Compatibility Projects Undertaken by a Private Sponsor.</b> The preceding paragraph 1 also applies to a private sponsor except that the useful life of project items installed within a facility or the useful life of the facilities developed or equipment acquired under an airport development or noise compatibility program project shall be no less than ten (10) years from the date of acceptance of Federal aid for the project.
3.	<b>Airport Planning Undertaken by a Sponsor.</b> Unless otherwise specified in the grant agreement, only Assurances 1, 2, 3, 5, 6, 13, 18, 30, 32, 33, and 34 in section C apply to planning projects. The terms, conditions, and assurances of the grant agreement shall remain in full force and effect during the life of the project.
<b>C. Sponsor Certification.</b>	The sponsor hereby assures and certifies, with respect to this grant that:
1.	<b>General Federal Requirements.</b> It will comply with all applicable Federal laws, regulations, executive orders, policies, guidelines, and requirements as they relate to the application, acceptance and use of Federal funds for this project including but not limited to the following:
	<b>Federal Legislation</b>
a.	Title 49, U.S.C., subtitle VII, as amended.
b.	Davis-Bacon Act - 40 U.S.C. 276(a), <u>et seq.</u> <sup>1</sup>
c.	Federal Fair Labor Standards Act - 29 U.S.C. 201, <u>et seq.</u>
d.	Hatch Act - 5 U.S.C. 1501, <u>et seq.</u> <sup>2</sup>
Airport Assurances (3/2005)	

The table on the following pages is available for maintaining a record of drive-by inspections and maintenance repairs.

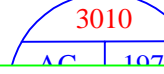
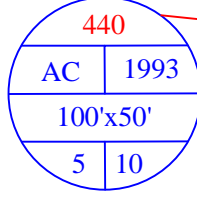
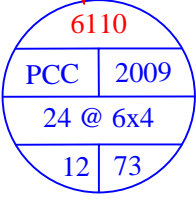
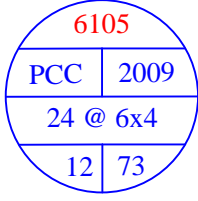
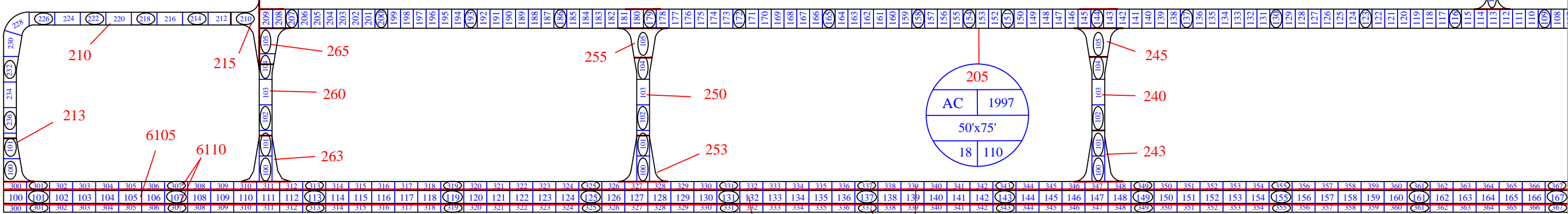
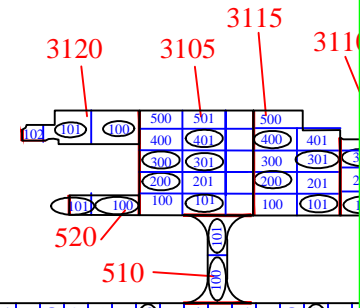
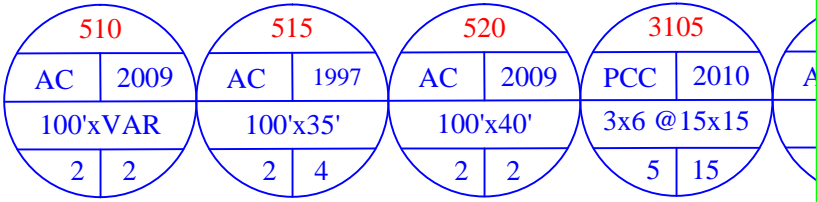
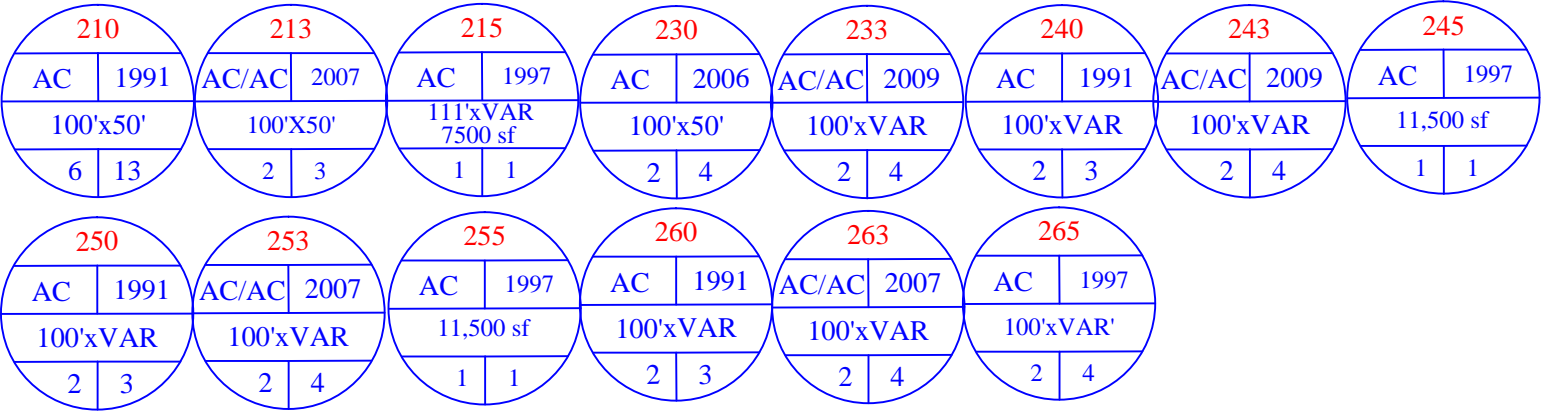
### Table F-1. Monthly Pavement Inspection Log

[illegible]

[illegible]



[illegible]



**LEGEND**

TYPE OF PAVEMENT  
CONSTRUCTION MATERIAL

FEATURE

YEAR OF CONSTRUCTION

TYPICAL SAMPLE  
UNIT SIZE  
(LENGTH X WIDTH)

IF PCC, TYPICAL  
SLAB SIZE  
(SB = SLAB)

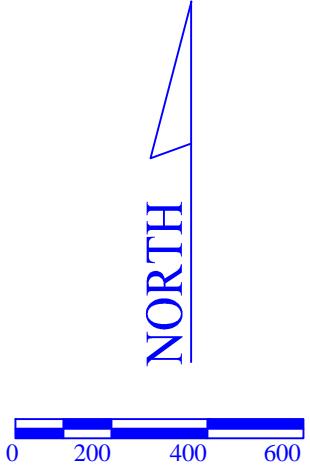
NUMBER OF SAMPLE  
UNITS IN FEATURE

NUMBER OF SAMPLE  
UNITS INSPECTED

SAMPLE UNIT  
DESIGNATED

FEATURE  
DELINEATION LINE

SAMPLE UNIT  
INSPECTED



ABN	2011 REVISIONS
Rev.	Description
PCI Inspection Map	
INDIANA DEPARTMENT OF TRANSPORTATION ELKHART MUNICIPAL AIRPORT (EKM) ELKHART, INDIANA	
CTAF 119.5 Unicom 122.95 Ground 121.80	
	Page: 1/2

