

# Knoxville Municipal Airport

**PAVEMENT MANAGEMENT REPORT**



**PREPARED BY**

Applied Pavement Technology, Inc.  
115 West Main Street, Suite 400  
Urbana, Illinois 61801  
(217) 398-3977  
[www.appliedpavement.com](http://www.appliedpavement.com)

**AUGUST 2019**



# **KNOXVILLE MUNICIPAL AIRPORT PAVEMENT MANAGEMENT REPORT**

*PREPARED FOR:*

**IOWA DEPARTMENT OF TRANSPORTATION  
AVIATION BUREAU**

*PREPARED BY:*

**APPLIED PAVEMENT TECHNOLOGY, INC.**

*IN ASSOCIATION WITH:*

**ROBINSON ENGINEERING COMPANY**

August 2019

The preparation of this document was financed in part through an Airport Improvement Program grant from the Federal Aviation Administration (Project Number 3-19-0000-024-2018) as provided under Section 505 of the Airport and Airway Improvement Act of 1982, as amended. The contents do not necessarily reflect the DOT's official views or the policy of the FAA. Acceptance of this report by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted therein nor does it indicate the proposed development is environmentally acceptable in accordance with appropriate public laws.

## TABLE OF CONTENTS

INTRODUCTION .....	1
PAVEMENT INVENTORY .....	2
PAVEMENT EVALUATION.....	4
Pavement Evaluation Procedure .....	4
Pavement Evaluation Results.....	5
Inspection Comments.....	10
Runway .....	10
Taxiways.....	10
Aprons.....	10
T-hangar.....	10
PAVEMENT MAINTENANCE AND REHABILITATION PROGRAM .....	12
Analysis Parameters.....	12
Critical PCIs.....	12
Localized Preventive Maintenance Policies and Unit Costs.....	12
Major Rehabilitation Unit Costs.....	12
Budget and Inflation Rate .....	12
Analysis Approach.....	12
Analysis Results.....	13
General Maintenance Recommendations .....	13
FAA Requirements (Public Law 103-305).....	14
SUMMARY .....	20

## LIST OF FIGURES

Figure 1. Pavement condition versus cost of repair.....	1
Figure 2. Pavement area by branch use. ....	2
Figure 3. Knoxville Municipal Airport network definition map. ....	3
Figure 4. Visual representation of PCI scale on typical pavement surfaces.....	4
Figure 5. PCI versus repair type. ....	5
Figure 6. Pavement area by PCI range at Knoxville Municipal Airport. ....	6
Figure 7. PCI by branch use at Knoxville Municipal Airport.....	6
Figure 8. Knoxville Municipal Airport PCI map.....	7

## LIST OF TABLES

Table 1. 2018 pavement evaluation results.....	8
Table 2. 5-year M&R program under an unlimited funding analysis scenario. ....	13
Table 3. Pavement inspection report.....	17

## APPENDIXES

Appendix A. Cause of Distress Tables .....	A-1
Appendix B. Inspection Photographs .....	B-1
Appendix C. Inspection Report.....	C-1
Appendix D. Work History Report.....	D-1
Appendix E. Localized Preventive Maintenance Policies and Unit Cost Tables .....	E-1
Appendix F. Year 2019 Localized Preventive Maintenance Details .....	F-1

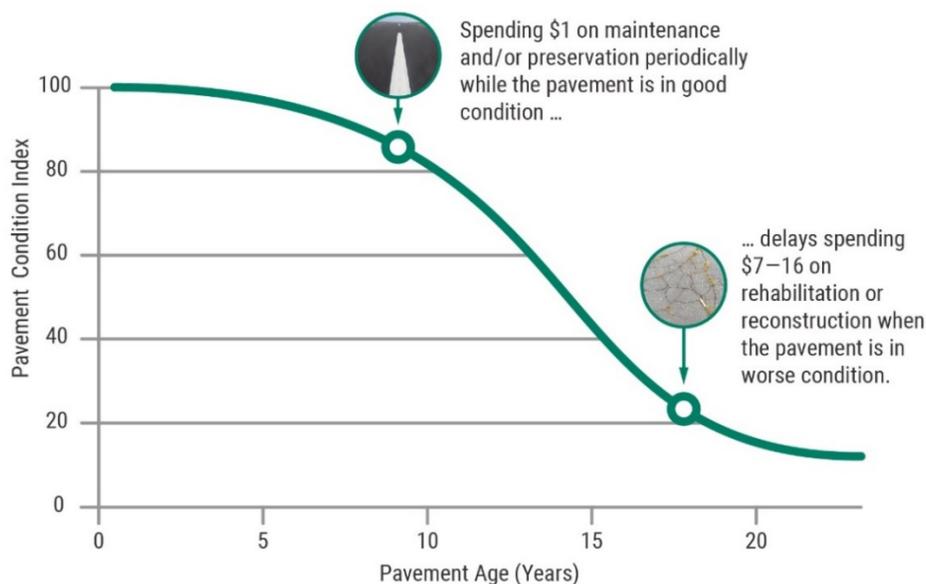
## INTRODUCTION

Applied Pavement Technology, Inc. (APTech), with assistance from Robinson Engineering Company, updated the Airport Pavement Management System (APMS) for the Iowa Department of Transportation, Aviation Bureau (Iowa DOT). The APMS provides a means to monitor the condition of the pavements within the state of Iowa and to proactively plan for their preservation.

As part of this project, pavement conditions at Knoxville Municipal Airport were assessed in November 2018 using the Pavement Condition Index (PCI) procedure. During a PCI inspection, the types, severities, and amounts of distress present in a pavement are quantified. This information is then used to develop a composite index that represents the overall condition of the pavement in numerical terms, ranging from 0 (failed) to 100 (excellent). The PCI provides an overall measure of condition and an indication of the level of work that will be required to maintain or repair a pavement. The distress information also provides insight into what is causing the pavement to deteriorate, which is the first step in selecting the appropriate repair action to correct the problem.

Programmed into an APMS, PCI information is used to determine when preventive maintenance actions (such as crack or joint sealing) are advisable and to identify the most cost-effective time to perform major rehabilitation (such as an overlay or whitetopping). The importance of identifying not only the type of repair but also the optimal time of repair is illustrated in Figure 1. This figure shows that there is a point in a pavement's life cycle where the rate of deterioration increases. The financial impact of delaying repairs beyond this point can be severe.

Figure 1. Pavement condition versus cost of repair.



The pavement evaluation results for Knoxville Municipal Airport are presented within this report and can be used by the Iowa DOT, the Federal Aviation Administration (FAA), and Knoxville Municipal Airport to identify, prioritize, and schedule pavement maintenance and rehabilitation (M&R) actions at the airport. In addition to this report, the web-based Interactive Data Exchange Application (IDEA) containing the pavement management information collected during this project was updated and may be accessed from the Iowa DOT's website.

## PAVEMENT INVENTORY

The pavement network at Knoxville Municipal Airport was divided into branches, sections, and sample units for pavement management purposes. A branch is a single entity that serves a distinct function. For example, a runway is considered a branch because it serves a single function (allowing aircraft to take off and land). Taxiways, aprons, and T-hangars are also separate branches.

Each branch was further divided into sections. Traditionally, sections are defined as parts of the branch that share common attributes, such as cross-section, last construction date, traffic level, and performance. Using this approach, if a runway was built in 1968 and then extended in 1984, it would contain two separate sections.

To estimate the overall condition of a pavement section, each section was subdivided into sample units. Portions of these sample units were evaluated during the pavement inspection, and the collected information was extrapolated to predict the condition of the section as a whole.

Approximately 609,246 square feet of pavement were evaluated at Knoxville Municipal Airport, as illustrated in Figure 2. This figure also shows the area-weighted age in years of the pavements at the time of the inspection. Figure 3 provides a map that details how the pavement network was divided into management units and identifies the sample units that were evaluated during the pavement inspection at Knoxville Municipal Airport.

Figure 2. Pavement area by branch use.

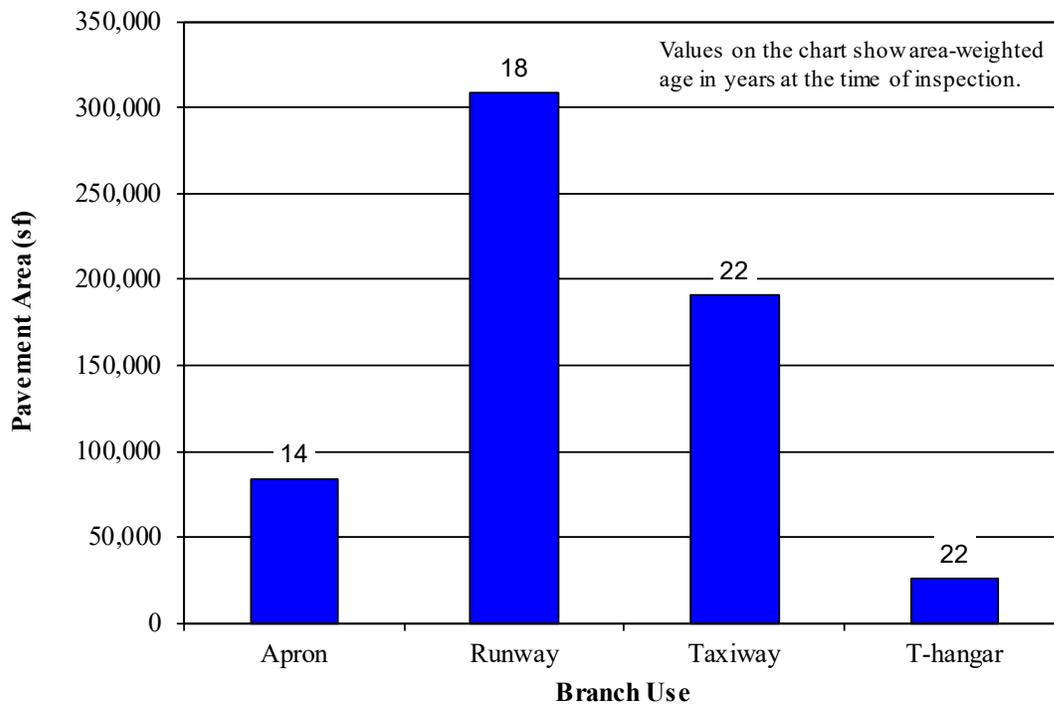
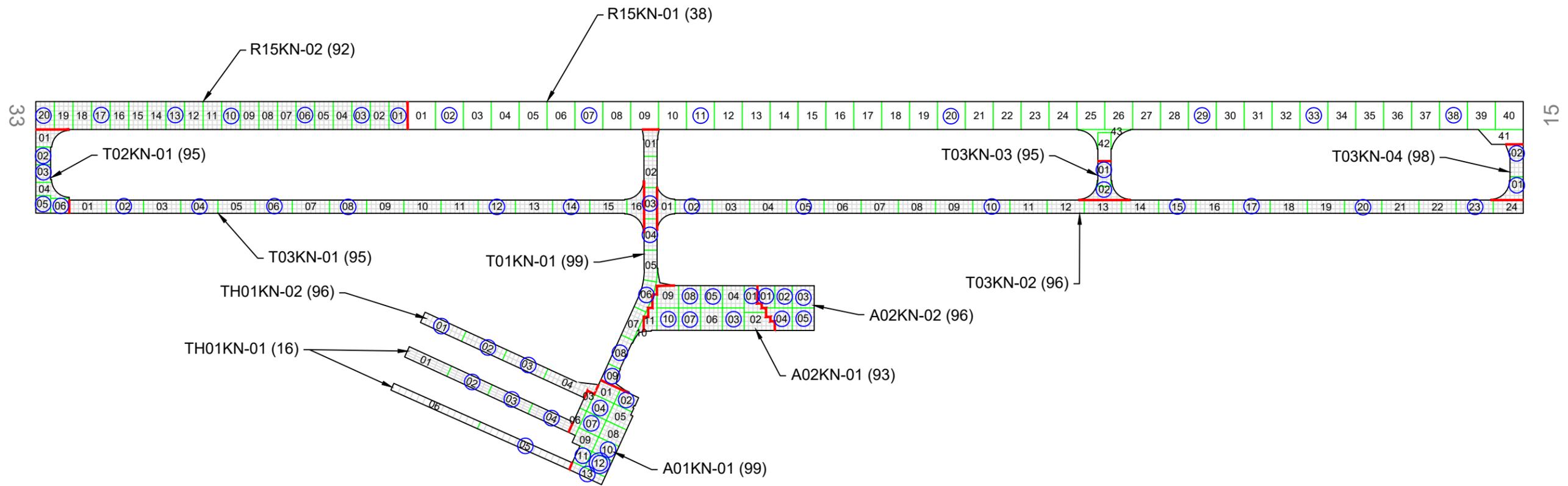


FIGURE 3. NETWORK DEFINITION MAP.



**NETWORK DEFINITION LEGEND**

	BRANCH IDENTIFIER
	SECTION IDENTIFIER
	PCI VALUE
	SECTION BREAK LINE
	SAMPLE UNIT BREAK LINE
	SLAB JOINT
	SAMPLE UNIT NUMBER
	SAMPLE UNIT INSPECTED
	ADDITIONAL SAMPLE UNIT

AGENCY: Iowa Department of Transportation Office of Aviation			
LOCATION: Knoxville Municipal Airport Knoxville, Iowa			
PAGE TITLE: Network Definition Map			
PROJECT DATE: OCT. 2018	CREATION DATE: OCT. 2018	PROJECT MANAGER: LJR	JOB NUMBER: 17-020-AM02
DRAWING SCALE: 1"=300'	LAST MODIFIED DATE: JAN. 2019	REVISED BY: DSP	DRAWN BY: DSP
FILENAME: Knoxville.dwg		LAYOUT NAME/NUMBER: NET. DEF.	PAGE NUMBER: 3

115 W. Main Street, Suite 400  
 Urbana, IL 61801  
 Tel: (217) 398-3977  
 Fax: (217) 398-4027

## PAVEMENT EVALUATION

### Pavement Evaluation Procedure

APTech inspected the pavements at Knoxville Municipal Airport using the PCI procedure described in:

- FAA Advisory Circular 150/5380-6C, *Guidelines and Procedures for Maintenance of Airport Pavements* ([https://www.faa.gov/documentLibrary/media/Advisory\\_Circular/150-5380-6C.pdf](https://www.faa.gov/documentLibrary/media/Advisory_Circular/150-5380-6C.pdf)).
- FAA Advisory Circular 150/5380-7B, *Airport Pavement Management Program (PMP)* ([https://www.faa.gov/documentLibrary/media/Advisory\\_Circular/150-5380-7B.pdf](https://www.faa.gov/documentLibrary/media/Advisory_Circular/150-5380-7B.pdf)).
- ASTM D5340-12, *Standard Test Method for Airport Pavement Condition Index Surveys*.

The PCI provides a numerical indication of overall pavement condition, as illustrated in Figure 4. The types and amounts of deterioration are used to calculate the PCI of the section. The PCI ranges from a value of 0 (representing a pavement in a failed condition) to a value of 100 (representing a pavement in excellent condition).

Figure 4. Visual representation of PCI scale on typical pavement surfaces<sup>1</sup>.



<sup>1</sup>Photographs shown are not specific to Knoxville Municipal Airport.

Generally, pavements with relatively high PCIs that are not exhibiting significant load-related distress will benefit from preventive maintenance actions, such as crack sealing or joint resealing. As the PCI drops, the pavements may require major rehabilitation, such as an overlay or whitetopping. In some situations where the PCI has dropped low enough, reconstruction may be the only viable alternative due to the substantial damage to the pavement structure. Figure 5 illustrates how the appropriate repair type varies with the PCI of a pavement section and provides the corresponding colors used for the maps and charts in this report for each range of PCIs.

Figure 5. PCI versus repair type.

PCI Range	Repair
86-100	Preventive Maintenance
71-85	
56-70	
41-55	Major Rehabilitation
26-40	Reconstruction
11-25	
0-10	

The types of distress identified during the PCI inspection provide insight into the cause of pavement deterioration. PCI distress types are characterized as load-related (such as alligator cracking on asphalt-surfaced pavements or shattered slabs on portland cement concrete [PCC] pavements), climate/durability-related (such as weathering [a climate-related distress type on asphalt-surfaced pavements] and durability cracking [a durability-related distress type on PCC pavements]), and other (distress types that cannot be attributed solely to load or climate/durability). Understanding the cause of distress helps in selecting a rehabilitation alternative that corrects the cause and thus eliminates its recurrence.

Appendix A identifies the distress types considered during a PCI inspection and describes the likely cause of each distress type. It should be noted that a PCI is based on visual signs of pavement deterioration and does not provide a measure of structural capacity.

**Pavement Evaluation Results**

The pavements at Knoxville Municipal Airport were inspected on November 13, 2018. The 2018 area-weighted condition of Knoxville Municipal Airport is 72, with conditions ranging from 16 to 99 (on a scale of 0 [failed] to 100 [excellent]). During the previous pavement inspection in 2014, the area-weighted PCI of the airport was 81.

Figure 6 summarizes the overall condition of the pavements at Knoxville Municipal Airport, and Figure 7 presents area-weighted condition (average PCI adjusted to account for the relative size of the pavement sections) by branch use. Figure 8 is a map that displays the condition of the evaluated pavements. Table 1 summarizes the results of the pavement evaluation. Appendix B presents photographs taken during the PCI inspection, and Appendix C contains detailed information on the distresses observed during the visual survey. Appendix D includes detailed work history information that was collected during the record review process.

Figure 6. Pavement area by PCI range at Knoxville Municipal Airport.

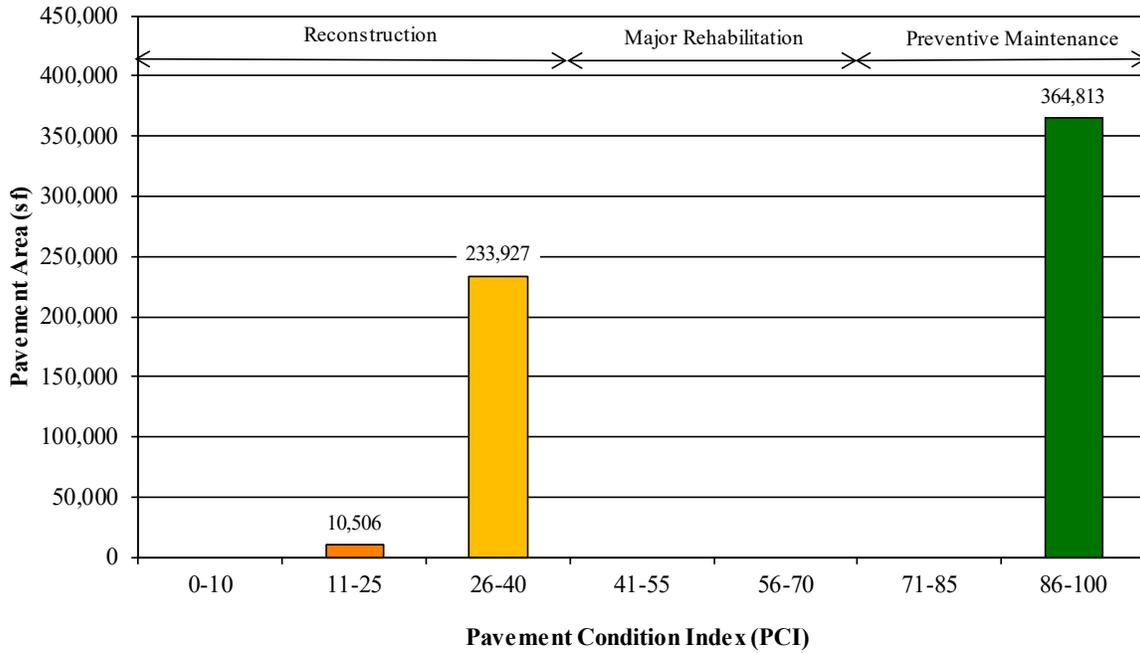


Figure 7. PCI by branch use at Knoxville Municipal Airport.

(Values on chart are area-weighted)

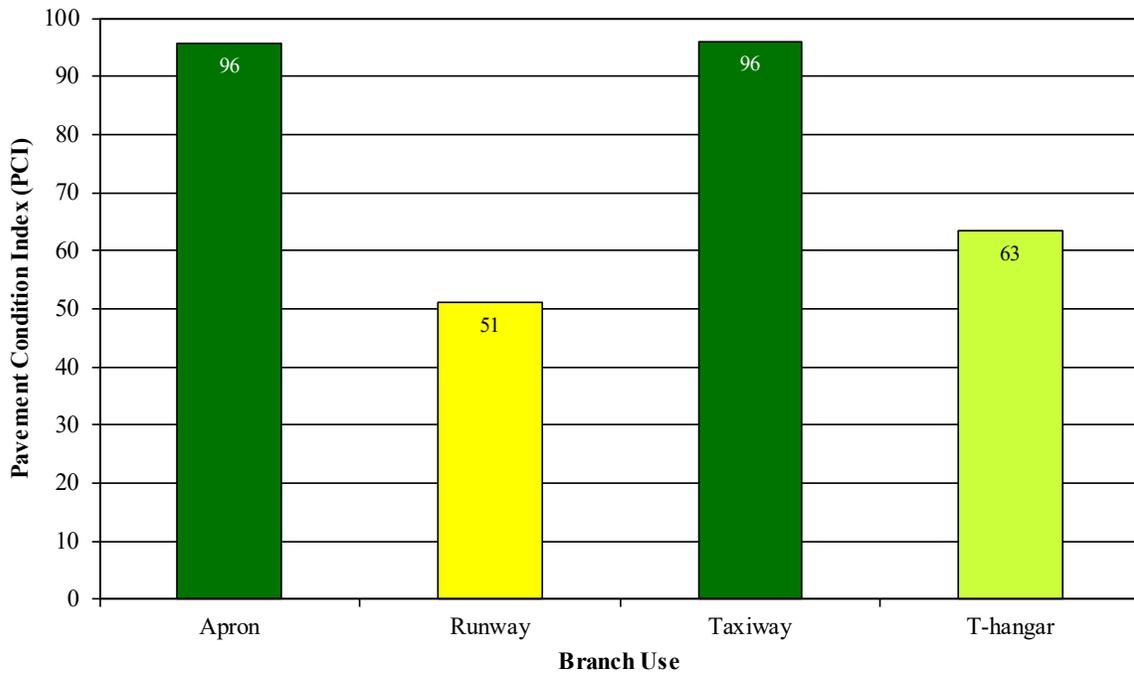
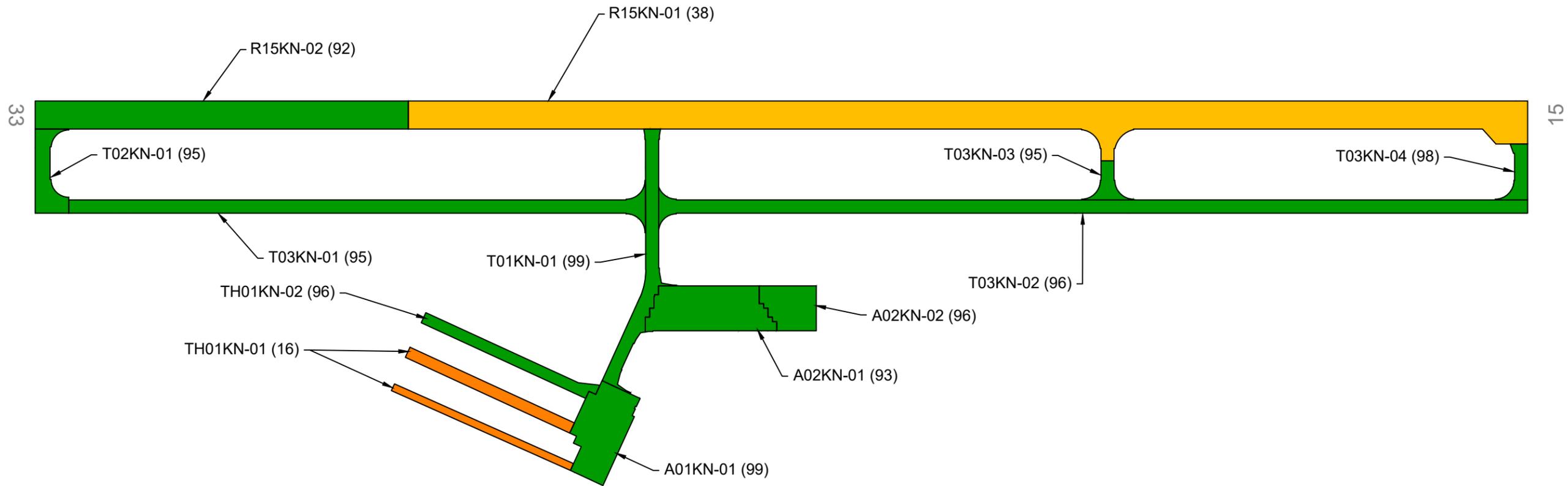


FIGURE 8. PCI MAP.



**LEGEND**

- BRANCH IDENTIFIER
- SECTION IDENTIFIER
- PCI VALUE
- SECTION BREAK LINE

R18AL-01 (71)

**PAVEMENT CONDITION INDEX**

PCI
86-100
71-85
56-70
41-55
26-40
11-25
0-10

		115 W. Main Street, Suite 400 Urbana, IL 61801 Tel: (217) 396-3977 Fax: (217) 396-4027	
		322 1st Street East Independence, IA 50644 Tel: (319) 334-7211	
AGENCY: Iowa Department of Transportation Office of Aviation			
LOCATION: Knoxville Municipal Airport Knoxville, Iowa			
PAGE TITLE: 2018 Pavement Condition Index Map			
PROJECT DATE: OCT. 2018	CREATION DATE: OCT. 2018	PROJECT MANAGER: LJR	JOB NUMBER: 17-020-AM02
DRAWING SCALE: 1"=300'	LAST MODIFIED DATE: APR. 2019	REVISED BY: DSP	DRAWN BY: DSP
FILENAME: Knoxville.dwg		LAYOUT NAME/NUMBER: PCI	PAGE NUMBER: 7

Table 1. 2018 pavement evaluation results.

Branch <sup>1</sup>	Section <sup>1</sup>	Surface Type <sup>2</sup>	Section Area (sf)	LCD <sup>3</sup>	2018 PCI	% Distress due to Load <sup>4</sup>	% Distress due to Climate/Durability <sup>5</sup>	% Distress due to Other <sup>6</sup>	Type of Distresses <sup>7</sup>
A01KN	01	PCC	30,703	3/3/2015	99	81	0	19	LTD Cracking, Shrinkage Cracking
A02KN	01	PCC	37,012	6/1/1991	93	20	27	53	Corner Spalling, Faulting, Joint Seal Damage, Joint Spalling, LTD Cracking
A02KN	02	PCC	16,055	1/1/2012	96	57	43	0	Joint Seal Damage, LTD Cracking
R15KN	01	APC	233,927	6/1/2003	38	0	90	10	Joint Reflection Cracking, L&T Cracking, Patching, Raveling, Swelling, Weathering
R15KN	02	PCC	75,000	6/30/1990	92	0	60	40	Corner Spalling, Faulting, Joint Seal Damage, Joint Spalling
T01KN	01	PCC	26,618	3/3/2015	99	0	0	100	Shrinkage Cracking, Small Patch
T02KN	01	PCC	12,433	6/30/1990	95	0	29	71	Corner Spalling, Joint Seal Damage, Joint Spalling
T03KN	01	PCC	56,546	6/4/1991	95	62	28	10	Corner Break, Joint Seal Damage, Joint Spalling, LTD Cracking
T03KN	02	PCC	83,867	6/3/1994	96	0	39	61	Corner Spalling, Faulting, Joint Seal Damage, Joint Spalling, Small Patch
T03KN	03	PCC	5,159	6/30/1991	95	0	37	63	Joint Seal Damage, Large Patch, Shrinkage Cracking
T03KN	04	PCC	6,193	6/1/1991	98	0	100	0	Joint Seal Damage
TH01KN	01	PCC	10,506	1/1/1967	16	36	11	53	ASR, Corner Break, Joint Seal Damage, Joint Spalling, Large Patch, LTD Cracking, Shattered Slab
TH01KN	02	PCC	15,227	1/1/2016	96	100	0	0	LTD Cracking

Table 1. 2018 pavement evaluation results (continued).

<sup>1</sup>See Figure 3 for the location of the branch and section.

<sup>2</sup>AC = asphalt cement concrete; AAC = asphalt overlay on AC; PCC = portland cement concrete; APC = asphalt overlay on PCC.

<sup>3</sup>LCD = last construction date.

<sup>4</sup>Distress due to load includes those distresses attributed to a structural deficiency in the pavement, such as alligator cracking or rutting on asphalt-surfaced pavements or shattered slabs on a PCC pavement.

<sup>5</sup>Distress due to climate or durability includes those distresses attributed to either the aging of the pavement and the effects of the environment (such as weathering, raveling, or block cracking in asphalt-surfaced pavements) or to a materials-related problem (such as durability cracking or alkali-silica reaction [ASR] in a PCC pavement). If materials-related distresses were recorded during the inspection, further laboratory testing is required to definitively determine the type present.

<sup>6</sup>Other refers to distresses not attributed to one factor but rather may be caused by a combination of factors.

<sup>7</sup>Distress types are defined by ASTM D5340-12. L&T Cracking = Longitudinal and Transverse Cracking; LTD Cracking = Longitudinal, Transverse, and Diagonal Cracking; ASR = Alkali-Silica Reaction.

## Inspection Comments

Knoxville Municipal Airport was inspected on November 13, 2018. There were thirteen pavement sections defined during the inspection.

### *Runway*

Runway 15/33 consisted of two sections. Section 01, which comprised the majority of the runway, was in poor condition with low- and medium-severity joint reflection cracking, longitudinal and transverse (L&T) cracking, swelling, and weathering; low-severity patching; and all severities of raveling recorded. The low-severity cracking was in either the sealed and unsealed condition, while the medium-severity cracking was due to either unsatisfactory crack sealant or unsealed crack widths greater than 1/4 in. Section 02, the extension located at the Runway 33 approach, had low- and medium-severity joint seal damage observed throughout along with smaller amounts of low-severity corner spalling and faulting and low- and medium-severity joint spalling.

### *Taxiways*

Taxiway 01 was defined by one section that was recently rehabilitated. Section 01 connected the apron areas to Runway 15/33 and was in excellent condition with only small amounts of shrinkage cracking and low-severity small patching identified.

Taxiway 02 contained one section and was located at the Runway 33 approach. Section 01 was in excellent condition with medium-severity corner spalling and joint spalling and low-severity joint seal damage recorded.

Taxiway 03, the parallel taxiway to Runway 15/33, consisted of four sections in excellent condition. Section 01 had low-severity joint seal damage observed throughout along with small amounts of low-severity joint spalling and medium-severity corner break and longitudinal, transverse, and diagonal (LTD) cracking. Low- and medium-severity corner spalling and low-severity faulting, joint seal damage, joint spalling, and small patching were identified in Section 02. Section 03 had low-severity joint seal damage recorded throughout along with low-severity large patching and shrinkage cracking. Low-severity joint seal damage was observed in Section 04.

### *Aprons*

Apron 01 contained one recently rehabilitated section. Section 01 was in excellent condition with isolated amounts of low-severity LTD cracking and shrinkage cracking that were recorded as an additional sample unit according to ASTM D5340-12.

Apron 02 was defined by two sections. Low-severity corner spalling, faulting, joint seal damage, joint spalling, and LTD cracking were identified in Section 01. Section 02 was in excellent condition with low-severity joint seal damage recorded throughout along with areas of low-severity LTD cracking.

### *T-hangar*

T-hangar 01 consisted of two sections located adjacent to Apron 01. Section 01 was in poor condition with all severities of alkali-silica reaction (ASR) and corner break, medium- and high-severity joint seal damage, medium-severity joint spalling, low-severity large patching, and low- and medium-severity LTD cracking and shattered slab observed. The suspected ASR was

recorded in accordance with ASTM D5340-12. Laboratory testing and analysis is the only definitive way to validate the presence of ASR. Section 02 was recently rehabilitated and was in excellent condition. Low-severity LTD cracking was identified during the inspection.

## PAVEMENT MAINTENANCE AND REHABILITATION PROGRAM

Using the information collected during the pavement inspection, the PAVER pavement management software was used to develop a 5-year M&R program for Knoxville Municipal Airport. In addition, a 1-year plan for localized preventive maintenance (such as crack sealing and patching) was prepared.

### Analysis Parameters

#### *Critical PCIs*

PAVER uses critical PCIs to determine whether localized preventive maintenance or major rehabilitation is the appropriate repair action. Above the critical PCI, localized preventive maintenance activities are recommended. Below the critical PCI, major rehabilitation actions, such as an overlay or reconstruction, are recommended. The Iowa DOT set the critical PCIs at 65 for runways, 60 for taxiways, and 55 for aprons and T-hangars.

#### *Localized Preventive Maintenance Policies and Unit Costs*

Localized preventive maintenance policies were developed for asphalt-surfaced and PCC pavements. These policies, shown in Appendix E, identify the localized preventive maintenance actions that the Iowa DOT considered appropriate to correct different distress types and severities. The Iowa DOT provided unit costs for each of the localized preventive maintenance actions included in these policies, and these costs are detailed in Appendix E. Please note that this information is of a general nature for the entire state. The maintenance policies and unit costs may require adjustment to reflect specific conditions at Knoxville Municipal Airport.

#### *Major Rehabilitation Unit Costs*

PAVER estimates the cost of major rehabilitation based on the predicted PCI of the pavement section. The Iowa DOT provided the costs for major rehabilitation, and they are presented in Appendix E. If major rehabilitation is recommended in the 5-year program, further engineering investigation will be needed to identify the most appropriate rehabilitation action and to more accurately estimate the cost of such work.

#### *Budget and Inflation Rate*

An unlimited budget with a start date of July 1, 2019, and an inflation rate of 1.5 percent was used during the analysis.

### Analysis Approach

The 5-year M&R program was prepared with the goal of maintaining the pavements above established critical PCIs. During this analysis, major rehabilitation was recommended for pavements in the year they dropped below their critical PCI. For the first year (2019) of the analysis only, a localized preventive maintenance plan was developed for those pavement sections that were above their critical PCI. If major rehabilitation was triggered for a section in 2020 or 2021, then localized maintenance was not recommended for 2019. While localized preventive maintenance should be an annual undertaking at Knoxville Municipal Airport, it is not possible to accurately predict the propagation of cracking and other distress types. Therefore, the airport should budget for maintenance every year and can use the 2019 localized preventive maintenance plan as a baseline for that work. As the pavements age, it can be assumed that the amount of localized preventive maintenance required will increase.

## Analysis Results

A summary of the M&R program for Knoxville Municipal Airport is presented in Table 2. Detailed information on the recommended localized preventive maintenance plan for 2019 is contained in Appendix F.

Table 2. 5-year M&R program under an unlimited funding analysis scenario.

Year	Branch <sup>1</sup>	Section <sup>1</sup>	Surface Type <sup>2</sup>	Type of Repair <sup>3</sup>	Estimated Cost <sup>4</sup>
2019	R15KN	01	APC	Major Rehabilitation	\$2,269,091
2019	R15KN	02	PCC	Localized Maintenance	\$5,462
2019	T02KN	01	PCC	Localized Maintenance	\$1,034
2019	T03KN	01	PCC	Localized Maintenance	\$1,440
2019	T03KN	02	PCC	Localized Maintenance	\$320
2019	TH01KN	01	PCC	Major Rehabilitation	\$170,092

**Total Estimated Cost: \$2,448,000**

<sup>1</sup>See Figure 3 for the location of the branch and section.

<sup>2</sup>AC = asphalt cement concrete; AAC = asphalt overlay on AC; PCC = portland cement concrete; APC = asphalt overlay on PCC.

<sup>3</sup>Major Rehabilitation: such as pavement reconstruction or an overlay. Localized Preventive Maintenance: such as crack sealing or patching.

<sup>4</sup>The costs provided are of a general nature for the entire state and may require adjustment to reflect specific conditions at the airport.

The recommendations made in this report are based on a broad network-level analysis and meant to provide Knoxville Municipal Airport with an indication of the type of pavement-related work required during the next 5 years. Further engineering investigation may be necessary to identify which repair action is most appropriate. In addition, the cost estimates provided are based on overall unit costs for the entire state, and Knoxville Municipal Airport should adjust the plan to reflect local costs.

Because an unlimited budget was used in the analysis, it is possible that the pavement repair program may need to be adjusted to consider economic and/or operational constraints. The identification of a project need does not necessarily mean that state or federal funding will be available in the year it is indicated. It is important to remember that regardless of the recommendations presented within this report, Knoxville Municipal Airport is responsible for repairing pavements where existing conditions pose a hazard to safe operations.

## General Maintenance Recommendations

In addition to the specific maintenance actions presented in Appendix F, it is recommended that the following strategies are considered for prolonging pavement life:

1. Regularly inspect all safety areas of the airport and document all inspection activity. A sample form that can be used to perform these inspections is provided in Table 3 of this report.
2. Provide a method of tracking all maintenance activities that occur as a result of inspections. These need to be reported to the FAA and the Iowa DOT. This information

is used to update the APMS records and is required to remain in compliance with Public Law 103-305 (see the next section of this report for further information on this law).

3. Conduct an aggressive campaign against weed growth through timely herbicide applications and mowing programs of the safety areas. Vegetation growth in pavement cracks is very destructive and significantly increases the rate of pavement deterioration.
4. Implement a periodic crack and joint sealing program. Keeping water and debris out of the pavement system by sealing cracks and joints is a proven and cost-effective method of extending the life of the pavement system.
5. Ensure that dirt does not build up along the edges of the pavements. This can create a “bathtub” effect, reducing the ability of water to drain away from the pavement system.
6. Closely monitor the movement of heavy equipment (particularly farming, construction, and fueling equipment) to make sure it is only operating on pavements that are designed to accommodate heavy loads. Failure to restrict heavy equipment to appropriate areas may result in the premature failure of airport pavements.

### **FAA Requirements (Public Law 103-305)**

Because Knoxville Municipal Airport is in the National Plan of Integrated Airport Systems (NPIAS), the airport sponsor is required to keep the airport in a viable operating condition. This includes maintaining airport pavements in accordance with Public Law 103-305. Public Law 103-305 states that after January 1, 1995, NPIAS airport sponsors must provide assurances or certifications that an airport has implemented an effective airport pavement maintenance management system (PMMS) before the airport will be considered for federal funding of pavement replacement or reconstruction projects. To be in full compliance with the federal law, the PMMS must include the following components at minimum: pavement inventory, pavement inspections, record keeping, information retrieval, and program funding.

This report serves as a complete pavement inventory and detailed inspection. To remain in compliance with the law, Knoxville Municipal Airport will also need to undertake monthly drive-by inspections of pavement conditions and track pavement-related maintenance activities.

FAA Advisory Circular 150/5380-7B provides detailed guidance pertaining to the requirements for an acceptable pavement management program (PMP). Appendix A of FAA Advisory Circular 150/5380-7B outlines what needs to be included in a PMP to remain in compliance with this law and Grant Assurance #11. Following is a copy of this Appendix, along with instructions for supplementing this report so that all requirements are met. **Note that the italicized words are direct quotations from the FAA Advisory Circular.**

#### *FAA Advisory Circular 150/5830-7B, Appendix A. Pavement Management Program (PMP)*

*A-1.0. An effective PMP specifies the procedures to follow to assure that proper preventative and remedial pavement maintenance is performed. The program should identify funding or anticipated funding and other resources available to provide remedial and preventive maintenance activities. An airport sponsor may use any format deemed appropriate, but the program needs to, as a minimum, include the following:*

**A-1.1. Pavement Inventory.** *The following must be depicted:*

- a. *Identification of all runways, taxiways, and aprons with pavement broken down into sections each having similar properties.*

The network definition map provided in Figure 3 of this report shows the location of all runways, taxiways, aprons, and T-hangars at Knoxville Municipal Airport. If any new pavements are constructed or any pavement areas are permanently closed, this map must be updated. Maps can be updated by submitting the project plans to the Iowa DOT after project completion.

- b. *Dimensions of pavement sections.*

The dimensions of all runways, taxiways, aprons, and T-hangars are stored in the PAVER database. Appendix C provides information on length, width, and area. In addition, the network definition map (Figure 3) is drawn to scale. Any changes to pavement dimensions must be recorded.

- c. *Type of pavement surface.*

The type of pavement for each section at the airport is listed in Table 1 of this report and is also stored in the PAVER database. Any changes to pavement type (through an overlay or reconstruction) must be recorded.

- d. *Year of construction and/or most recent major rehabilitation.*

Dates for pavement construction, rehabilitation, or reconstruction must be recorded. The current pavement history for Knoxville Municipal Airport is provided in Appendix D of this report.

- e. *Whether AIP [Airport Improvement Program] or PFC [Passenger Facility Charge] funds were used to construct, reconstruct, or repair the pavement.*

Funding sources for all pavement projects should be recorded.

**A-1.2. PMP Pavement Inspection Schedule.** *Airports must perform a detailed inspection of airfield pavements at least once a year for the PMP. If a pavement condition index (PCI) survey is performed, as set forth in ASTM D5340, Standard Test Method for Airport Pavement Condition Index Surveys, the frequency of the detailed inspection by PCI surveys may be extended to three years. Less comprehensive routine daily, weekly, and monthly maintenance inspections required for operations should be addressed.*

This report consists of a detailed inspection that will extend the inspection period to 3 years. It is the airport sponsor's responsibility to perform a monthly drive-by inspection. A sample pavement inspection report form is provided in Table 3 of this report.

**A-1.3. Record Keeping.** *The airport must record and keep on file complete information about all detailed inspections and maintenance performed until the pavement system is replaced. The types of distress, their locations, and remedial action, scheduled or performed, must be documented. The minimum information recorded includes:*

- a. *Inspection date*
- b. *Location*
- c. *Distress types*
- d. *Maintenance scheduled or performed*

Items a through c are satisfied by this inspection report. Item d is the responsibility of the airport, as is record keeping of the monthly drive-by inspections.

***A-1.4. Information Retrieval.*** *An airport sponsor may use any form of record keeping it deems appropriate so long as the information and records from the pavement survey can generate required reports, as necessary.*

Keep this report, monthly drive-by inspection reports, construction updates, and all records of maintenance activities in a readily accessible location so that they can be easily retrieved as requested by the FAA.

Table 3. Pavement inspection report.

Inspected By: \_\_\_\_\_

Date Inspected: \_\_\_\_\_

<b>Branch<sup>1</sup></b>	<b>Section<sup>1</sup></b>	<b>Distress Description/Dimensions/Severity/ Recommended Action</b>	<b>Description of Repair</b>	<b>Date Performed</b>	<b>Cost</b>	<b>Funding Source</b>
A01KN	01					
A02KN	01					
A02KN	02					
R15KN	01					
R15KN	02					
T01KN	01					

Table 3. Pavement inspection report (continued).

Inspected By: \_\_\_\_\_

Date Inspected: \_\_\_\_\_

<b>Branch<sup>1</sup></b>	<b>Section<sup>1</sup></b>	<b>Distress Description/Dimensions/Severity/ Recommended Action</b>	<b>Description of Repair</b>	<b>Date Performed</b>	<b>Cost</b>	<b>Funding Source</b>
T02KN	01					
T03KN	01					
T03KN	02					
T03KN	03					
T03KN	04					
TH01KN	01					

Table 3. Pavement inspection report (continued).

Inspected By: \_\_\_\_\_

Date Inspected: \_\_\_\_\_

<b>Branch<sup>1</sup></b>	<b>Section<sup>1</sup></b>	<b>Distress Description/Dimensions/Severity/ Recommended Action</b>	<b>Description of Repair</b>	<b>Date Performed</b>	<b>Cost</b>	<b>Funding Source</b>
TH01KN	02					

<sup>1</sup>See Figure 3 for the location of the branch and section.

---

## SUMMARY

This report documents the results of the pavement evaluation conducted at Knoxville Municipal Airport. A visual inspection of the pavements in 2018 found that the overall condition of the pavement network is a PCI of 72. A 5-year pavement repair program, shown in Table 2, was generated for Knoxville Municipal Airport, which revealed that approximately \$2,448,000 needs to be expended on M&R. Knoxville Municipal Airport should utilize these study results to assist in planning for future maintenance needs as part of the airport CIP planning process.

## **APPENDIX A**

### **CAUSE OF DISTRESS TABLES**

Table A-1. Cause of pavement distress, asphalt-surfaced pavements.

<b>Distress Type</b>	<b>Probable Cause of Distress</b>
Alligator Cracking	Fatigue failure of the asphalt surface under repeated traffic loading.
Bleeding	Excessive amounts of asphalt cement or tars in the mix or low air void content, or both.
Block Cracking	Shrinkage of the asphalt and daily temperature cycling; it is not load associated.
Corrugation	Traffic action combined with an unstable pavement layer.
Depression	Settlement of the foundation soil or can be “built up” during construction.
Jet-Blast Erosion	Bituminous binder has been burned or carbonized.
Joint Reflection Cracking	Movement of the concrete slab beneath the asphalt surface due to thermal and moisture changes.
L&T Cracking	Cracks may be caused by (1) a poorly constructed paving lane joint, (2) shrinkage of the asphalt surface due to low temperatures or hardening of the asphalt, or (3) reflective cracking caused by cracks in an underlying PCC slab.
Oil Spillage	Deterioration or softening of the pavement surface caused by the spilling of oil, fuel, or other solvents.
Patching	N/A
Polished Aggregate	Repeated traffic applications.
Raveling	Asphalt binder may have hardened significantly, causing coarse aggregate pieces to dislodge.
Rutting	Usually caused by consolidation or lateral movement of the materials due to traffic loads.
Shoving	Where PCC pavements adjoin flexible pavements, PCC “growth” may shove the asphalt pavement.
Slippage Cracking	Low strength surface mix or poor bond between the surface and the next layer of the pavement structure.
Swelling	Usually caused by frost action or by swelling soil.
Weathering	Asphalt binder and/or fine aggregate may wear away as the pavement ages and hardens.

Table A-2. Cause of pavement distress, PCC pavements.

<b>Distress Type</b>	<b>Probable Cause of Distress</b>
ASR	Chemical reaction of alkalis in the portland cement with certain reactive silica minerals. ASR may be accelerated by the use of chemical pavement deicers.
Blowup	Incompressible materials in the joints.
Corner Break	Load repetition combined with loss of support and curling stresses.
Durability Cracking	Concrete's inability to withstand environmental factors such as freeze-thaw cycles.
Joint Seal Damage	Stripping of joint sealant, extrusion of joint sealant, weed growth, hardening of the filler (oxidation), loss of bond to the slab edges, or absence of sealant in the joint.
LTD Cracking	Combination of load repetition, curling stresses, and shrinkage stresses.
Patching (Small and Large)	N/A
Popouts	Freeze-thaw action in combination with expansive aggregates.
Pumping	Poor drainage, poor joint sealant.
Scaling	Over finishing of concrete, deicing salts, improper construction, freeze-thaw cycles, and poor aggregate.
Settlement	Upheaval or consolidation.
Shattered Slab	Load repetition.
Shrinkage Cracking	Setting and curing of the concrete.
Spalling (Joint and Corner)	Excessive stresses at the joint caused by infiltration of incompressible materials or traffic loads; weak concrete at the joint combined with traffic loads.

## **APPENDIX B**

### **INSPECTION PHOTOGRAPHS**

A01KN-01. Overview.



A01KN-01. LTD Cracking (Additional Sample Unit No. 12).



A02KN-01. Overview.



A02KN-01. LTD Cracking (Sample Unit No. 08).



A02KN-02. Overview.



A02KN-02. LTD Cracking (Sample Unit No. 04).



R15KN-01. Overview.



R15KN-01. L&T Cracking (Sample Unit No. 02).



R15KN-01. Swelling (Sample Unit No. 29).



R15KN-01. Weathering (Sample Unit No. 02).



R15KN-02. Overview.



T01KN-01. Overview.



T02KN-01. Overview.



T02KN-01. Corner Spalling (Sample Unit No. 06).



T02KN-01. Joint Spalling (Sample Unit No. 06).



T03KN-01. Overview.



T03KN-01. LTD Cracking (Sample Unit No. 08).



T03KN-02. Overview.



T03KN-02. Small Patching (Sample Unit No. 02).



T03KN-03. Overview.



T03KN-03. Large Patching (Sample Unit No. 02).



T03KN-04. Overview.



TH01KN-01. Overview.



TH01KN-01. ASR (Sample Unit No. 03) (1).



TH01KN-01. ASR (Sample Unit No. 03) (2).



TH01KN-02. Overview.



TH01KN-02. LTD Cracking (Sample Unit No. 02).



## **APPENDIX C**

### **INSPECTION REPORT**

# Re-inspection Report

IA2018ALL

Report Generated Date: June 25, 2019

Network: OXV Name: KNOXVILLE MUNICIPAL AIRPORT

Branch: A01KN Name: APRON 01 AT KNOXVILLE Use: APRON Area: 30,703.00SqFt

Section: 01 of 1 From: HANGARS To: TAXIWAY 01 Last Const.: 03/03/2015  
Surface: PCC Family: IowaPCCAPSE Zone: Category: Rank: P  
Area: 30,703.00SqFt Length: 250.00Ft Width: 120.00Ft  
Slabs: 199 Slab Width: 12.50Ft Slab Length: 12.50Ft Joint Length: 4,430.00Ft  
Shoulder: Street Type: Grade: 0.00 Lanes: 0

Section Comments:

Last Insp. Date: 11/13/2018 Total Samples: 13 Surveyed: 7

Conditions: PCI: 99

Inspection Comments:

Sample Number: 02 Type: R Area: 20.00Slabs PCI = 100  
Sample Comments:  
<NO DISTRESSES>

Sample Number: 04 Type: R Area: 20.00Slabs PCI = 100  
Sample Comments:  
<NO DISTRESSES>

Sample Number: 07 Type: R Area: 20.00Slabs PCI = 100  
Sample Comments:  
<NO DISTRESSES>

Sample Number: 10 Type: R Area: 20.00Slabs PCI = 100  
Sample Comments:  
<NO DISTRESSES>

Sample Number: 11 Type: R Area: 12.00Slabs PCI = 100  
Sample Comments:  
<NO DISTRESSES>

Sample Number: 12 Type: A Area: 20.00Slabs PCI = 94  
Sample Comments:  
63 LINEAR CRACKING L 1.00 Slabs Comments:  
73 SHRINKAGE CRACKING N 1.00 Slabs Comments:

Sample Number: 13 Type: R Area: 16.00Slabs PCI = 100  
Sample Comments:  
<NO DISTRESSES>

# Re-inspection Report

IA2018ALL

Report Generated Date: June 25, 2019

Network: OXV Name: KNOXVILLE MUNICIPAL AIRPORT

Branch: A02KN Name: APRON 02 AT KNOXVILLE Use: APRON Area: 53,067.00SqFt

Section: 01 of 2 From: T01KN-01 To: A02KN-01 Last Const.: 06/01/1991  
Surface: PCC Family: IowaPCCAPSE Zone: Category: Rank: P  
Area: 37,012.00SqFt Length: 120.00Ft Width: 300.00Ft  
Slabs: 279 Slab Width: 12.00Ft Slab Length: 11.75Ft Joint Length: 5,643.83Ft  
Shoulder: Street Type: Grade: 0.00 Lanes: 0

Section Comments:

Last Insp. Date: 11/13/2018 Total Samples: 11 Surveyed: 6

Conditions: PCI: 93

Inspection Comments:

Sample Number: 01 Type: R Area: 21.00Slabs PCI = 96  
Sample Comments:  
74 JOINT SPALLING L 1.00 Slabs Comments:  
65 JOINT SEAL DAMAGE L 21.00 Slabs Comments:

Sample Number: 03 Type: R Area: 25.00Slabs PCI = 91  
Sample Comments:  
65 JOINT SEAL DAMAGE L 25.00 Slabs Comments:  
63 LINEAR CRACKING L 1.00 Slabs Comments:  
74 JOINT SPALLING L 1.00 Slabs Comments:  
75 CORNER SPALLING L 1.00 Slabs Comments:

Sample Number: 05 Type: R Area: 25.00Slabs PCI = 98  
Sample Comments:  
65 JOINT SEAL DAMAGE L 25.00 Slabs Comments:

Sample Number: 07 Type: R Area: 25.00Slabs PCI = 95  
Sample Comments:  
74 JOINT SPALLING L 2.00 Slabs Comments:  
65 JOINT SEAL DAMAGE L 25.00 Slabs Comments:

Sample Number: 08 Type: R Area: 25.00Slabs PCI = 83  
Sample Comments:  
65 JOINT SEAL DAMAGE L 25.00 Slabs Comments:  
71 FAULTING L 3.00 Slabs Comments:  
74 JOINT SPALLING L 1.00 Slabs Comments:  
63 LINEAR CRACKING L 1.00 Slabs Comments:

Sample Number: 10 Type: R Area: 25.00Slabs PCI = 95  
Sample Comments:  
65 JOINT SEAL DAMAGE L 25.00 Slabs Comments:  
75 CORNER SPALLING L 1.00 Slabs Comments:  
74 JOINT SPALLING L 1.00 Slabs Comments:

# Re-inspection Report

IA2018ALL

Report Generated Date: June 25, 2019

Network: OXV Name: KNOXVILLE MUNICIPAL AIRPORT

Branch: A02KN Name: APRON 02 AT KNOXVILLE Use: APRON Area: 53,067.00SqFt

Section: 02 of 2 From: SEE MAP To: SEE MAP Last Const.: 01/01/2012  
Surface: PCC Family: IowaPCCAPSE Zone: Category: Rank: P  
Area: 16,055.00SqFt Length: 130.00Ft Width: 120.00Ft  
Slabs: 114 Slab Width: 12.00Ft Slab Length: 11.75Ft Joint Length: 2,377.66Ft  
Shoulder: Street Type: Grade: 0.00 Lanes: 0

Section Comments:

Last Insp. Date: 11/13/2018 Total Samples: 5 Surveyed: 5

Conditions: PCI: 96

Inspection Comments:

Sample Number: 01 Type: R Area: 19.00Slabs PCI = 98  
Sample Comments:  
65 JOINT SEAL DAMAGE L 19.00 Slabs Comments:

Sample Number: 02 Type: R Area: 20.00Slabs PCI = 98  
Sample Comments:  
65 JOINT SEAL DAMAGE L 20.00 Slabs Comments:

Sample Number: 03 Type: R Area: 25.00Slabs PCI = 98  
Sample Comments:  
65 JOINT SEAL DAMAGE L 25.00 Slabs Comments:

Sample Number: 04 Type: R Area: 25.00Slabs PCI = 88  
Sample Comments:  
65 JOINT SEAL DAMAGE L 25.00 Slabs Comments:  
63 LINEAR CRACKING L 3.00 Slabs Comments:

Sample Number: 05 Type: R Area: 25.00Slabs PCI = 98  
Sample Comments:  
65 JOINT SEAL DAMAGE L 25.00 Slabs Comments:

# Re-inspection Report

IA2018ALL

Report Generated Date: June 25, 2019

Network: OXV Name: KNOXVILLE MUNICIPAL AIRPORT

Branch: R15KN Name: RUNWAY 15/33 AT KNOXVILLE Use: RUNWAY Area: 308,927.00SqFt

Section: 01 of 2 From: RUNWAY END 33 To: RUNWAY END 15 Last Const.: 06/01/2003

Surface: APC Family: IowaAPCRWSouthern Zone: Category: Rank: P

Area: 233,927.00SqFt Length: 3,000.00Ft Width: 75.00Ft

Shoulder: Street Type: Grade: 0.00 Lanes: 0

Section Comments:

Last Insp. Date: 11/13/2018 Total Samples: 43 Surveyed: 7

Conditions: PCI: 38

Inspection Comments:

Sample Number: 02 Type: R Area: 5,625.00SqFt PCI = 43

Sample Comments:

47 JOINT REFLECTION CRACKING	M	275.00 Ft	Comments:fs
47 JOINT REFLECTION CRACKING	L	250.00 Ft	Comments:ls
48 LONGITUDINAL/TRANSVERSE CRACKING	L	111.00 Ft	Comments:lu
48 LONGITUDINAL/TRANSVERSE CRACKING	M	109.00 Ft	Comments:w
57 WEATHERING	M	3,000.00 SqFt	Comments:
57 WEATHERING	L	2,625.00 SqFt	Comments:
52 RAVELING	L	500.00 SqFt	Comments:

Sample Number: 07 Type: R Area: 5,625.00SqFt PCI = 39

Sample Comments:

48 LONGITUDINAL/TRANSVERSE CRACKING	M	41.00 Ft	Comments:w, fs
48 LONGITUDINAL/TRANSVERSE CRACKING	L	40.00 Ft	Comments:lu
47 JOINT REFLECTION CRACKING	L	405.00 Ft	Comments:ls
47 JOINT REFLECTION CRACKING	M	375.00 Ft	Comments:fs
57 WEATHERING	M	3,000.00 SqFt	Comments:
57 WEATHERING	L	2,625.00 SqFt	Comments:
52 RAVELING	L	500.00 SqFt	Comments:

Sample Number: 11 Type: R Area: 5,625.00SqFt PCI = 37

Sample Comments:

48 LONGITUDINAL/TRANSVERSE CRACKING	L	60.00 Ft	Comments:lu
48 LONGITUDINAL/TRANSVERSE CRACKING	M	141.00 Ft	Comments:w, fs
47 JOINT REFLECTION CRACKING	L	225.00 Ft	Comments:ls, lu
47 JOINT REFLECTION CRACKING	M	375.00 Ft	Comments:fs, w
57 WEATHERING	M	3,000.00 SqFt	Comments:
57 WEATHERING	L	2,550.00 SqFt	Comments:
52 RAVELING	L	500.00 SqFt	Comments:
50 PATCHING	L	75.00 SqFt	Comments:
56 SWELLING	L	10.00 SqFt	Comments:

Sample Number: 20 Type: R Area: 5,625.00SqFt PCI = 38

Sample Comments:

47 JOINT REFLECTION CRACKING	M	327.00 Ft	Comments:fs
47 JOINT REFLECTION CRACKING	L	314.00 Ft	Comments:ls, lu
57 WEATHERING	M	3,000.00 SqFt	Comments:
57 WEATHERING	L	2,255.00 SqFt	Comments:
52 RAVELING	L	500.00 SqFt	Comments:
48 LONGITUDINAL/TRANSVERSE CRACKING	M	20.00 Ft	Comments:w
48 LONGITUDINAL/TRANSVERSE CRACKING	L	19.00 Ft	Comments:lu
50 PATCHING	L	370.00 SqFt	Comments:

# Re-inspection Report

IA2018ALL

Report Generated Date: June 25, 2019

---

Sample Number:	29	Type:	R	Area:	5,625.00SqFt	PCI =	36
Sample Comments:							
47	JOINT REFLECTION CRACKING		L	315.00	Ft	Comments:	ls
47	JOINT REFLECTION CRACKING		M	375.00	Ft	Comments:	fs
48	LONGITUDINAL/TRANSVERSE CRACKING		L	64.00	Ft	Comments:	lu, ls
48	LONGITUDINAL/TRANSVERSE CRACKING		M	69.00	Ft	Comments:	fs
56	SWELLING		L	10.00	SqFt	Comments:	
56	SWELLING		M	10.00	SqFt	Comments:	
52	RAVELING		H	10.00	SqFt	Comments:	
52	RAVELING		M	10.00	SqFt	Comments:	
57	WEATHERING		M	3,000.00	SqFt	Comments:	
57	WEATHERING		L	2,605.00	SqFt	Comments:	
52	RAVELING		L	500.00	SqFt	Comments:	

---

Sample Number:	33	Type:	R	Area:	5,625.00SqFt	PCI =	39
Sample Comments:							
47	JOINT REFLECTION CRACKING		L	288.00	Ft	Comments:	ls
47	JOINT REFLECTION CRACKING		M	318.00	Ft	Comments:	fs
48	LONGITUDINAL/TRANSVERSE CRACKING		L	39.00	Ft	Comments:	lu, ls
57	WEATHERING		M	3,000.00	SqFt	Comments:	
57	WEATHERING		L	2,550.00	SqFt	Comments:	
52	RAVELING		L	500.00	SqFt	Comments:	
48	LONGITUDINAL/TRANSVERSE CRACKING		M	10.00	Ft	Comments:	w
50	PATCHING		L	75.00	SqFt	Comments:	

---

Sample Number:	38	Type:	R	Area:	5,625.00SqFt	PCI =	36
Sample Comments:							
47	JOINT REFLECTION CRACKING		L	175.00	Ft	Comments:	ls
47	JOINT REFLECTION CRACKING		M	475.00	Ft	Comments:	fs
48	LONGITUDINAL/TRANSVERSE CRACKING		L	48.00	Ft	Comments:	lu, ls
57	WEATHERING		M	3,000.00	SqFt	Comments:	
57	WEATHERING		L	2,615.00	SqFt	Comments:	
56	SWELLING		L	23.00	SqFt	Comments:	
52	RAVELING		M	10.00	SqFt	Comments:	
52	RAVELING		L	500.00	SqFt	Comments:	

# Re-inspection Report

IA2018ALL

Report Generated Date: June 25, 2019

Network: OXV Name: KNOXVILLE MUNICIPAL AIRPORT

Branch: R15KN Name: RUNWAY 15/33 AT KNOXVILLE Use: RUNWAY Area: 308,927.00SqFt

Section: 02 of 2 From: 33 END OF RWY 15/33 To: 1000 FEET SE Last Const.: 06/30/1990  
Surface: PCC Family: IowaPCCRWSE Zone: Category: Rank: P  
Area: 75,000.00SqFt Length: 1,000.00Ft Width: 75.00Ft  
Slabs: 480 Slab Width: 12.50Ft Slab Length: 12.50Ft Joint Length: 12,000.00Ft  
Shoulder: Street Type: Grade: 0.00 Lanes: 0

Section Comments:

Last Insp. Date: 11/13/2018 Total Samples: 20 Surveyed: 7

Conditions: PCI: 92

Inspection Comments:

Sample Number: 01 Type: R Area: 24.00Slabs PCI = 88  
Sample Comments:  
71 FAULTING L 2.00 Slabs Comments:  
65 JOINT SEAL DAMAGE M 24.00 Slabs Comments:

Sample Number: 03 Type: R Area: 24.00Slabs PCI = 83  
Sample Comments:  
74 JOINT SPALLING L 1.00 Slabs Comments:  
74 JOINT SPALLING M 1.00 Slabs Comments:  
65 JOINT SEAL DAMAGE L 24.00 Slabs Comments:  
71 FAULTING L 3.00 Slabs Comments:

Sample Number: 06 Type: R Area: 24.00Slabs PCI = 97  
Sample Comments:  
65 JOINT SEAL DAMAGE L 24.00 Slabs Comments:  
74 JOINT SPALLING L 1.00 Slabs Comments:

Sample Number: 10 Type: R Area: 24.00Slabs PCI = 96  
Sample Comments:  
65 JOINT SEAL DAMAGE L 24.00 Slabs Comments:  
75 CORNER SPALLING L 1.00 Slabs Comments:

Sample Number: 13 Type: R Area: 24.00Slabs PCI = 94  
Sample Comments:  
65 JOINT SEAL DAMAGE L 24.00 Slabs Comments:  
71 FAULTING L 1.00 Slabs Comments:

Sample Number: 17 Type: R Area: 24.00Slabs PCI = 91  
Sample Comments:  
65 JOINT SEAL DAMAGE L 24.00 Slabs Comments:  
71 FAULTING L 2.00 Slabs Comments:

Sample Number: 20 Type: R Area: 24.00Slabs PCI = 98  
Sample Comments:  
65 JOINT SEAL DAMAGE L 24.00 Slabs Comments:

# Re-inspection Report

IA2018ALL

Report Generated Date: June 25, 2019

Network: OXV Name: KNOXVILLE MUNICIPAL AIRPORT

Branch: T01KN Name: TAXIWAY 01 AT KNOXVILLE Use: TAXIWAY Area: 26,618.00SqFt

Section: 01 of 1 From: APRON 01 To: RUNWAY 15/33 Last Const.: 03/03/2015  
Surface: PCC Family: IowaPCCTWSE Zone: Category: Rank: P  
Area: 26,618.00SqFt Length: 705.00Ft Width: 35.00Ft  
Slabs: 202 Slab Width: 11.00Ft Slab Length: 12.00Ft Joint Length: 3,559.43Ft  
Shoulder: Street Type: Grade: 0.00 Lanes: 0

Section Comments:

Last Insp. Date: 11/13/2018 Total Samples: 10 Surveyed: 5

Conditions: PCI: 99

Inspection Comments:

Sample Number: 03 Type: R Area: 21.00Slabs PCI = 100

Sample Comments:  
<NO DISTRESSES>

Sample Number: 04 Type: R Area: 21.00Slabs PCI = 98

Sample Comments:  
66 SMALL PATCH L 2.00 Slabs Comments:

Sample Number: 06 Type: R Area: 21.00Slabs PCI = 100

Sample Comments:  
<NO DISTRESSES>

Sample Number: 08 Type: R Area: 21.00Slabs PCI = 100

Sample Comments:  
<NO DISTRESSES>

Sample Number: 09 Type: R Area: 19.00Slabs PCI = 99

Sample Comments:  
73 SHRINKAGE CRACKING N 1.00 Slabs Comments:

# Re-inspection Report

IA2018ALL

Report Generated Date: June 25, 2019

Network: OXV Name: KNOXVILLE MUNICIPAL AIRPORT

Branch: T02KN Name: TAXIWAY 02 AT KNOXVILLE Use: TAXIWAY Area: 11,756.01SqFt

Section: 01 of 1 From: RWY END 33 To: END OF T02KN-01 Last Const.: 06/30/1990  
Surface: PCC Family: IowaPCCTWSE Zone: Category: Rank: P  
Area: 12,433.00SqFt Length: 350.00Ft Width: 45.83Ft  
Slabs: 105 Slab Width: 10.00Ft Slab Length: 11.83Ft Joint Length: 2,564.71Ft  
Shoulder: Street Type: Grade: 0.00 Lanes: 0

Section Comments:

Last Insp. Date: 11/13/2018 Total Samples: 6 Surveyed: 4

Conditions: PCI: 95

Inspection Comments:

Sample Number: 02 Type: R Area: 16.00Slabs PCI = 98  
Sample Comments:  
65 JOINT SEAL DAMAGE L 16.00 Slabs Comments:

Sample Number: 03 Type: R Area: 17.00Slabs PCI = 98  
Sample Comments:  
65 JOINT SEAL DAMAGE L 17.00 Slabs Comments:

Sample Number: 05 Type: R Area: 16.00Slabs PCI = 98  
Sample Comments:  
65 JOINT SEAL DAMAGE L 16.00 Slabs Comments:

Sample Number: 06 Type: R Area: 16.00Slabs PCI = 84  
Sample Comments:  
65 JOINT SEAL DAMAGE L 16.00 Slabs Comments:  
74 JOINT SPALLING M 2.00 Slabs Comments:  
75 CORNER SPALLING M 2.00 Slabs Comments:

# Re-inspection Report

IA2018ALL

Report Generated Date: June 25, 2019

Network: OXV Name: KNOXVILLE MUNICIPAL AIRPORT

Branch: T03KN Name: TAXIWAY 03 AT KNOXVILLE Use: TAXIWAY Area: 1,544,274.01SqFt

Section: 01 of 4 From: SW END OF T02KN-01 To: T01KN Last Const.: 06/04/1991  
Surface: PCC Family: IowaPCCTWSE Zone: Category: Rank: P  
Area: 56,546.00SqFt Length: 1,600.00Ft Width: 35.00Ft  
Slabs: 385 Slab Width: 11.75Ft Slab Length: 12.50Ft Joint Length: 7,610.96Ft  
Shoulder: Street Type: Grade: 0.00 Lanes: 0

Section Comments:

Last Insp. Date: 11/13/2018 Total Samples: 16 Surveyed: 6

Conditions: PCI: 95

Inspection Comments:

Sample Number: 02 Type: R Area: 24.00Slabs PCI = 97  
Sample Comments:  
65 JOINT SEAL DAMAGE L 24.00 Slabs Comments:  
74 JOINT SPALLING L 1.00 Slabs Comments:

Sample Number: 04 Type: R Area: 24.00Slabs PCI = 97  
Sample Comments:  
65 JOINT SEAL DAMAGE L 24.00 Slabs Comments:  
74 JOINT SPALLING L 1.00 Slabs Comments:

Sample Number: 06 Type: R Area: 24.00Slabs PCI = 98  
Sample Comments:  
65 JOINT SEAL DAMAGE L 24.00 Slabs Comments:

Sample Number: 08 Type: R Area: 24.00Slabs PCI = 84  
Sample Comments:  
65 JOINT SEAL DAMAGE L 24.00 Slabs Comments:  
63 LINEAR CRACKING M 1.00 Slabs Comments:  
62 CORNER BREAK M 1.00 Slabs Comments:

Sample Number: 12 Type: R Area: 24.00Slabs PCI = 98  
Sample Comments:  
65 JOINT SEAL DAMAGE L 24.00 Slabs Comments:

Sample Number: 14 Type: R Area: 24.00Slabs PCI = 97  
Sample Comments:  
65 JOINT SEAL DAMAGE L 24.00 Slabs Comments:  
74 JOINT SPALLING L 1.00 Slabs Comments:

# Re-inspection Report

IA2018ALL

Report Generated Date: June 25, 2019

Network: OXV Name: KNOXVILLE MUNICIPAL AIRPORT

Branch: T03KN Name: TAXIWAY 03 AT KNOXVILLE Use: TAXIWAY Area: 1,544,274.01SqFt

Section: 02 of 4 From: T01KN To: T03KN Last Const.: 06/03/1994  
Surface: PCC Family: IowaPCCTWSE Zone: Category: Rank: P  
Area: 83,867.00SqFt Length: 2,400.00Ft Width: 35.00Ft  
Slabs: 571 Slab Width: 11.75Ft Slab Length: 12.50Ft Joint Length: 11,433.94Ft  
Shoulder: Street Type: Grade: 0.00 Lanes: 0

Section Comments:

Last Insp. Date: 11/13/2018 Total Samples: 24 Surveyed: 7

Conditions: PCI: 96

Inspection Comments:

Sample Number: 02 Type: R Area: 24.00Slabs PCI = 93

Sample Comments:

65 JOINT SEAL DAMAGE L 24.00 Slabs Comments:  
66 SMALL PATCH L 3.00 Slabs Comments:  
75 CORNER SPALLING M 1.00 Slabs Comments:

Sample Number: 05 Type: R Area: 24.00Slabs PCI = 97

Sample Comments:

74 JOINT SPALLING L 1.00 Slabs Comments:  
65 JOINT SEAL DAMAGE L 24.00 Slabs Comments:

Sample Number: 10 Type: R Area: 24.00Slabs PCI = 98

Sample Comments:

65 JOINT SEAL DAMAGE L 24.00 Slabs Comments:

Sample Number: 15 Type: R Area: 24.00Slabs PCI = 95

Sample Comments:

66 SMALL PATCH L 1.00 Slabs Comments:  
75 CORNER SPALLING L 1.00 Slabs Comments:  
65 JOINT SEAL DAMAGE L 24.00 Slabs Comments:

Sample Number: 17 Type: R Area: 24.00Slabs PCI = 98

Sample Comments:

65 JOINT SEAL DAMAGE L 24.00 Slabs Comments:

Sample Number: 20 Type: R Area: 24.00Slabs PCI = 94

Sample Comments:

71 FAULTING L 1.00 Slabs Comments:  
65 JOINT SEAL DAMAGE L 24.00 Slabs Comments:

Sample Number: 23 Type: R Area: 24.00Slabs PCI = 98

Sample Comments:

65 JOINT SEAL DAMAGE L 24.00 Slabs Comments:

# Re-inspection Report

IA2018ALL

Report Generated Date: June 25, 2019

Network: OXV Name: KNOXVILLE MUNICIPAL AIRPORT

Branch: T03KN Name: TAXIWAY 03 AT KNOXVILLE Use: TAXIWAY Area: 1,544,274.01SqFt

Section: 03 of 4 From: R15KN-01 To: T03KN-03 Last Const.: 06/30/1991  
Surface: PCC Family: IowaPCCTWSE Zone: Category: Rank: P  
Area: 5,159.00SqFt Length: 105.00Ft Width: 35.00Ft  
Slabs: 48 Slab Width: 11.75Ft Slab Length: 9.60Ft Joint Length: 555.58Ft  
Shoulder: Street Type: Grade: 0.00 Lanes: 0

Section Comments:

Last Insp. Date: 11/13/2018 Total Samples: 2 Surveyed: 2

Conditions: PCI: 95

Inspection Comments:

Sample Number: 01 Type: R Area: 21.00Slabs PCI = 98

Sample Comments:

65 JOINT SEAL DAMAGE L 21.00 Slabs Comments:

Sample Number: 02 Type: R Area: 27.00Slabs PCI = 92

Sample Comments:

73 SHRINKAGE CRACKING N 1.00 Slabs Comments:

67 LARGE PATCH/UTILITY L 2.00 Slabs Comments:

65 JOINT SEAL DAMAGE L 27.00 Slabs Comments:

# Re-inspection Report

IA2018ALL

Report Generated Date: June 25, 2019

Network: OXV Name: KNOXVILLE MUNICIPAL AIRPORT

Branch: T03KN Name: TAXIWAY 03 AT KNOXVILLE Use: TAXIWAY Area: 1,544,274.01SqFt

Section: 04 of 4 From: NORTH END OF R15KN-01 To: NORTH END OF T03KN-02 Last Const.: 06/01/1991  
Surface: PCC Family: IowaPCCTWSE Zone: Category: Rank: P  
Area: 6,193.00SqFt Length: 150.00Ft Width: 35.00Ft  
Slabs: 45 Slab Width: 11.75Ft Slab Length: 12.50Ft Joint Length: 681.81Ft  
Shoulder: Street Type: Grade: 0.00 Lanes: 0

Section Comments:

Last Insp. Date: 11/13/2018 Total Samples: 2 Surveyed: 2

Conditions: PCI: 98

Inspection Comments:

Sample Number: 01 Type: R Area: 23.00Slabs PCI = 98

Sample Comments:

65 JOINT SEAL DAMAGE L 23.00 Slabs Comments:

Sample Number: 02 Type: R Area: 22.00Slabs PCI = 98

Sample Comments:

65 JOINT SEAL DAMAGE L 22.00 Slabs Comments:

# Re-inspection Report

IA2018ALL

Report Generated Date: June 25, 2019

Network: OXV Name: KNOXVILLE MUNICIPAL AIRPORT

Branch: TH01KN Name: T-HANGAR 01 AT KNOXVILLE Use: T-HANGAR Area: 25,733.00SqFt

Section: 01 of 2 From: SEE MAP To: SEE MAP Last Const.: 01/01/1967  
Surface: PCC Family: IowaPCCTH Zone: Category: Rank: P  
Area: 10,506.00SqFt Length: 1,010.00Ft Width: 25.00Ft  
Slabs: 125 Slab Width: 10.00Ft Slab Length: 10.00Ft Joint Length: 4,015.00Ft  
Shoulder: Street Type: Grade: 0.00 Lanes: 0

Section Comments:

Last Insp. Date: 11/13/2018 Total Samples: 6 Surveyed: 4

Conditions: PCI: 16

Inspection Comments:

Sample Number: 02 Type: R Area: 24.00Slabs PCI = 21

Sample Comments:

63 LINEAR CRACKING	L	3.00 Slabs	Comments:
62 CORNER BREAK	M	2.00 Slabs	Comments:
62 CORNER BREAK	L	1.00 Slabs	Comments:
63 LINEAR CRACKING	L	1.00 Slabs	Comments:
74 JOINT SPALLING	M	1.00 Slabs	Comments:
76 ASR	H	7.00 Slabs	Comments:
76 ASR	M	1.00 Slabs	Comments:
76 ASR	L	3.00 Slabs	Comments:
65 JOINT SEAL DAMAGE	H	24.00 Slabs	Comments:

Sample Number: 03 Type: R Area: 24.00Slabs PCI = 4

Sample Comments:

76 ASR	H	6.00 Slabs	Comments:
76 ASR	M	8.00 Slabs	Comments:
76 ASR	L	10.00 Slabs	Comments:
63 LINEAR CRACKING	M	5.00 Slabs	Comments:
63 LINEAR CRACKING	L	5.00 Slabs	Comments:
65 JOINT SEAL DAMAGE	H	24.00 Slabs	Comments:
62 CORNER BREAK	M	2.00 Slabs	Comments:
62 CORNER BREAK	H	1.00 Slabs	Comments:

Sample Number: 04 Type: R Area: 24.00Slabs PCI = 32

Sample Comments:

65 JOINT SEAL DAMAGE	M	24.00 Slabs	Comments:
63 LINEAR CRACKING	L	4.00 Slabs	Comments:
63 LINEAR CRACKING	M	1.00 Slabs	Comments:
67 LARGE PATCH/UTILITY	L	3.00 Slabs	Comments:
74 JOINT SPALLING	M	1.00 Slabs	Comments:
76 ASR	L	2.00 Slabs	Comments:
76 ASR	M	2.00 Slabs	Comments:
76 ASR	H	2.00 Slabs	Comments:

Sample Number: 05 Type: R Area: 15.00Slabs PCI = 0

Sample Comments:

65 JOINT SEAL DAMAGE	H	15.00 Slabs	Comments:
63 LINEAR CRACKING	M	7.00 Slabs	Comments:
76 ASR	H	3.00 Slabs	Comments:
72 SHATTERED SLAB	M	3.00 Slabs	Comments:
76 ASR	L	3.00 Slabs	Comments:
72 SHATTERED SLAB	L	1.00 Slabs	Comments:

# Re-inspection Report

IA2018ALL

Report Generated Date: June 25, 2019

Network: OXV Name: KNOXVILLE MUNICIPAL AIRPORT

Branch: TH01KN Name: T-HANGAR 01 AT KNOXVILLE Use: T-HANGAR Area: 25,733.00SqFt

Section: 02 of 2 From: SEE MAP To: SEE MAP Last Const.: 01/01/2016  
Surface: PCC Family: IowaPCCTH Zone: Category: Rank: P  
Area: 15,227.00SqFt Length: 515.00Ft Width: 30.00Ft  
Slabs: 85 Slab Width: 12.50Ft Slab Length: 12.90Ft Joint Length: 1,888.67Ft  
Shoulder: Street Type: Grade: 0.00 Lanes: 0

Section Comments:

Last Insp. Date: 11/13/2018 Total Samples: 4 Surveyed: 3

Conditions: PCI: 96

Inspection Comments:

Sample Number: 01 Type: R Area: 20.00Slabs PCI = 100

Sample Comments:  
<NO DISTRESSES>

Sample Number: 02 Type: R Area: 20.00Slabs PCI = 89  
Sample Comments:  
63 LINEAR CRACKING L 3.00 Slabs Comments:

Sample Number: 03 Type: R Area: 20.00Slabs PCI = 100

Sample Comments:  
<NO DISTRESSES>

## **APPENDIX D**

### **WORK HISTORY REPORT**

Date:07/01/2019

**Work History Report**

1 of 3

Pavement Database:IA2018All

**Network:** OXV      **Branch:** A01KN      (APRON 01 AT KNOXVILLE)      **Section:** 01      **Surface:** PCC  
**L.C.D.:** 03/03/2015   **Use:** APRON      **Rank:** P   **Length:** 250.00 Ft   **Width:** 120.00 Ft   **True Area:** 30,703.00 SqF

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major M&R	Comments
03/03/2015	CR-PC	Complete Reconstruction - PC	\$0	6.00	True	6" P505 PCC
03/02/2015	SB-AG	Subbase - Aggregate	\$0	6.00	False	6" GRANULAR SUBBASE (IDOT 2111)
03/01/2015	SG-ST	Subgrade - Stabilized	\$0	12.00	False	12" P158 FLY ASH TREATED SUBGRADE
06/01/2009	SL-PC	Slab Replacement - PCC	\$0	0.00	False	EST
06/01/2009	PA-PP	Patching - PCC Partial Depth	\$0	0.00	False	EST
06/01/1967	NC-PC	New Construction - PCC	\$0	0.00	True	-

**Network:** OXV      **Branch:** A02KN      (APRON 02 AT KNOXVILLE)      **Section:** 01      **Surface:** PCC  
**L.C.D.:** 06/01/1991   **Use:** APRON      **Rank:** P   **Length:** 120.00 Ft   **Width:** 300.00 Ft   **True Area:** 37,012.00 SqF

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major M&R	Comments
10/01/2012	JS-LC	Joint Seal (Localized)	\$0	0.00	False	-
06/01/1991	NC-PC	New Construction - PCC	\$0	0.00	True	-

**Network:** OXV      **Branch:** A02KN      (APRON 02 AT KNOXVILLE)      **Section:** 02      **Surface:** PCC  
**L.C.D.:** 01/01/2012   **Use:** APRON      **Rank:** P   **Length:** 130.00 Ft   **Width:** 120.00 Ft   **True Area:** 16,055.00 SqF

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major M&R	Comments
01/01/2012	NC-PC	New Construction - PCC	\$0	0.00	True	ESTIMATED DATE

**Network:** OXV      **Branch:** R15KN      (RUNWAY 15/33 AT KNOXVILLE)      **Section:** 01      **Surface:** APC  
**L.C.D.:** 06/01/2003   **Use:** RUNWAY      **Rank:** P   **Length:** 3,000.00 Ft   **Width:** 75.00 Ft   **True Area:**233,927.00 SqF

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major M&R	Comments
10/01/2012	PA-AD	Patching - AC Deep	\$0	0.00	False	-
10/01/2012	CS-AC	Crack Sealing - AC	\$0	0.00	False	-
06/01/2003	OL-AS	Overlay - AC Structural (Major)	\$406,036	-	True	-
06/03/1967	NC-PC	New Construction - PCC	\$0	6.00	True	6" P501 PCC (ASSUMED MAT. CODE)
06/02/1967	SB-AG	Subbase - Aggregate	\$0	6.00	False	6" P154 SUBBASE
06/01/1967	SG-CO	Subgrade - Compacted	\$0	6.00	False	6" P152 COMPACTED SUBGRADE

**Network:** OXV      **Branch:** R15KN      (RUNWAY 15/33 AT KNOXVILLE)      **Section:** 02      **Surface:** PCC  
**L.C.D.:** 06/30/1990   **Use:** RUNWAY      **Rank:** P   **Length:** 1,000.00 Ft   **Width:** 75.00 Ft   **True Area:** 75,000.00 SqF

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major M&R	Comments
10/01/2012	JS-LC	Joint Seal (Localized)	\$0	0.00	False	-
10/01/2012	GR-PP	Grinding (Localized)	\$0	0.00	False	-
06/01/2003	SL-PC	Slab Replacement - PCC	\$0	7.00	False	7" P501 SURFACE/ 4" EXIS. P209/ EXIS. P152
06/30/1990	NC-PC	New Construction - PCC	\$0	0.00	True	-

**Network:** OXV      **Branch:** T01KN      (TAXIWAY 01 AT KNOXVILLE)      **Section:** 01      **Surface:** PCC  
**L.C.D.:** 03/03/2015   **Use:** TAXIWAY      **Rank:** P   **Length:** 705.00 Ft   **Width:** 35.00 Ft   **True Area:** 26,618.00 SqF

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major M&R	Comments
03/03/2015	CR-PC	Complete Reconstruction - PC	\$0	6.00	True	6" P505 PCC
03/02/2015	SB-AG	Subbase - Aggregate	\$0	6.00	False	6" GRANULAR SUBBASE (IDOT 2111)
03/01/2015	SG-ST	Subgrade - Stabilized	\$0	12.00	False	12" P158 FLY ASH TREATED SUBGRADE
06/01/2009	PA-PP	Patching - PCC Partial Depth	\$0	0.00	False	EST
06/01/2009	SL-PC	Slab Replacement - PCC	\$0	0.00	False	EST
06/01/1967	NC-PC	New Construction - PCC	\$0	0.00	True	-

Date:07/01/2019

**Work History Report**

2 of 3

Pavement Database:IA2018All

**Network:** OXV      **Branch:** T02KN      (TAXIWAY 02 AT KNOXVILLE)      **Section:** 01      **Surface:** PCC  
**L.C.D.:** 06/30/1990    **Use:** TAXIWAY      **Rank:** P    **Length:** 350.00 Ft      **Width:** 45.83 Ft      **True Area:** 12,433.00 SqF

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major M&R	Comments
10/01/2012	JS-LC	Joint Seal (Localized)	\$0	0.00	False	-
06/30/1990	NC-PC	New Construction - PCC	\$0	0.00	True	-

**Network:** OXV      **Branch:** T03KN      (TAXIWAY 03 AT KNOXVILLE)      **Section:** 01      **Surface:** PCC  
**L.C.D.:** 06/04/1991    **Use:** TAXIWAY      **Rank:** P    **Length:** 1,600.00 Ft      **Width:** 35.00 Ft      **True Area:** 56,546.00 SqF

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major M&R	Comments
10/01/2012	JS-LC	Joint Seal (Localized)	\$0	0.00	False	-
06/04/1991	NC-PC	New Construction - PCC	\$0	6.00	True	6" P501 PCC
06/03/1991	SB-AG	Subbase - Aggregate	\$0	6.00	False	6" P154 SUBBASE
06/02/1991	SG-ST	Subgrade - Stabilized	\$0	6.00	False	6" P155 FLY ASH TREATED SUBGRADE
06/01/1991	SG-CO	Subgrade - Compacted	\$0	6.00	False	6" P152 COMPACTED SUBGRADE

**Network:** OXV      **Branch:** T03KN      (TAXIWAY 03 AT KNOXVILLE)      **Section:** 02      **Surface:** PCC  
**L.C.D.:** 06/03/1994    **Use:** TAXIWAY      **Rank:** P    **Length:** 2,400.00 Ft      **Width:** 35.00 Ft      **True Area:** 83,867.00 SqF

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major M&R	Comments
10/01/2012	JS-LC	Joint Seal (Localized)	\$0	0.00	False	-
06/03/1994	NC-PC	New Construction - PCC	\$0	6.00	True	6" P501 PCC SURFACE
06/02/1994	SB-AG	Subbase - Aggregate	\$0	6.00	False	6" P154 SUBBASE
06/01/1994	SG-CO	Subgrade - Compacted	\$0	6.00	False	6" P152 COMPACTED SUBGRADE

**Network:** OXV      **Branch:** T03KN      (TAXIWAY 03 AT KNOXVILLE)      **Section:** 03      **Surface:** PCC  
**L.C.D.:** 06/30/1991    **Use:** TAXIWAY      **Rank:** P    **Length:** 105.00 Ft      **Width:** 35.00 Ft      **True Area:** 5,159.00 SqF

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major M&R	Comments
10/01/2012	JS-LC	Joint Seal (Localized)	\$0	0.00	False	-
06/30/1991	NC-PC	New Construction - PCC	\$0	0.00	True	-

**Network:** OXV      **Branch:** T03KN      (TAXIWAY 03 AT KNOXVILLE)      **Section:** 04      **Surface:** PCC  
**L.C.D.:** 06/01/1991    **Use:** TAXIWAY      **Rank:** P    **Length:** 150.00 Ft      **Width:** 35.00 Ft      **True Area:** 6,193.00 SqF

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major M&R	Comments
10/01/2012	JS-LC	Joint Seal (Localized)	\$0	0.00	False	-
06/01/1991	NC-PC	New Construction - PCC	\$0	0.00	True	-

**Network:** OXV      **Branch:** TH01KN      (T-HANGAR 01 AT KNOXVILLE)      **Section:** 01      **Surface:** PCC  
**L.C.D.:** 01/01/1967    **Use:** T-HANGAR      **Rank:** P    **Length:** 1,010.00 Ft      **Width:** 25.00 Ft      **True Area:** 10,506.00 SqF

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major M&R	Comments
01/01/1967	NC-PC	New Construction - PCC	\$0	0.00	True	UNKNOWN

**Network:** OXV      **Branch:** TH01KN      (T-HANGAR 01 AT KNOXVILLE)      **Section:** 02      **Surface:** PCC  
**L.C.D.:** 01/01/2016    **Use:** T-HANGAR      **Rank:** P    **Length:** 515.00 Ft      **Width:** 30.00 Ft      **True Area:** 15,227.00 SqF

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major M&R	Comments
01/01/2016	CR-PC	Complete Reconstruction - PC	\$0	0.00	True	PER GOOGLE EARTH
06/01/2009	SL-PC	Slab Replacement - PCC	\$0	0.00	False	EST
06/01/2009	PA-PP	Patching - PCC Partial Depth	\$0	0.00	False	EST
06/01/1967	NC-PC	New Construction - PCC	\$0	0.00	True	-

**Summary:**

<b>Work Description</b>	<b>Section Count</b>	<b>Area Total (SqFt)</b>	<b>Thickness Avg (in)</b>	<b>Thickness STD (in)</b>
Complete Reconstruction - PCC	3	72,548.00	4.00	3.46
Crack Sealing - AC	1	233,927.00	.00	-
Grinding (Localized)	1	75,000.00	.00	-
Joint Seal (Localized)	7	276,210.00	.00	.00
New Construction - PCC	13	609,246.00	1.38	2.63
Overlay - AC Structural (Major MR)	1	233,927.00	-	-
Patching - AC Deep	1	233,927.00	.00	-
Patching - PCC Partial Depth	3	72,548.00	.00	.00
Slab Replacement - PCC	4	147,548.00	1.75	3.50
Subbase - Aggregate	5	431,661.00	6.00	.00
Subgrade - Compacted	3	374,340.00	6.00	.00
Subgrade - Stabilized	3	113,867.00	10.00	3.46

## **APPENDIX E**

### **LOCALIZED PREVENTIVE MAINTENANCE POLICIES AND UNIT COST TABLES**

Table E-1. Localized preventive maintenance policy, asphalt-surfaced pavements.

<b>Distress Type</b>	<b>Severity Level</b>	<b>Maintenance Action</b>
Alligator Cracking	Low	Monitor
Alligator Cracking	Medium	Asphalt Patch
Alligator Cracking	High	Asphalt Patch
Bleeding	N/A	Monitor
Block Cracking	Low	Monitor
Block Cracking	Medium	Crack Seal—Asphalt
Block Cracking	High	Crack Seal—Asphalt
Corrugation	Low	Monitor
Corrugation	Medium	Asphalt Patch
Corrugation	High	Asphalt Patch
Depression	Low	Monitor
Depression	Medium	Monitor
Depression	High	Asphalt Patch
Jet-Blast Erosion	N/A	Asphalt Patch
Joint Reflection Cracking	Low	Monitor
Joint Reflection Cracking	Medium	Crack Seal—Asphalt
Joint Reflection Cracking	High	Crack Seal—Asphalt
L&T Cracking	Low	Monitor
L&T Cracking	Medium	Crack Seal—Asphalt
L&T Cracking	High	Crack Seal—Asphalt
Oil Spillage	N/A	Asphalt Patch
Patching	Low	Monitor
Patching	Medium	Asphalt Patch
Patching	High	Asphalt Patch
Polished Aggregate	N/A	Monitor
Raveling	Low	Monitor
Raveling	Medium	Asphalt Patch
Raveling	High	Asphalt Patch
Rutting	Low	Monitor
Rutting	Medium	Monitor
Rutting	High	Asphalt Patch
Shoving	Low	Monitor
Shoving	Medium	Asphalt Patch
Shoving	High	Asphalt Patch
Slippage Cracking	N/A	Asphalt Patch
Swelling	Low	Monitor
Swelling	Medium	Monitor
Swelling	High	Asphalt Patch
Weathering	Low	Monitor
Weathering	Medium	Monitor
Weathering	High	Asphalt Patch

Table E-2. Localized preventive maintenance policy, PCC pavements.

<b>Distress Type</b>	<b>Severity Level</b>	<b>Maintenance Action</b>
ASR	Low	Monitor
ASR	Medium	Slab Replacement
ASR	High	Slab Replacement
Blowup	Low	Slab Replacement
Blowup	Medium	Slab Replacement
Blowup	High	Slab Replacement
Corner Break	Low	Crack Seal—PCC
Corner Break	Medium	Full Depth PCC Patch
Corner Break	High	Full Depth PCC Patch
Durability Cracking	Low	Monitor
Durability Cracking	Medium	Full Depth Patch
Durability Cracking	High	Slab Replacement
Joint Seal Damage	Low	Monitor
Joint Seal Damage	Medium	Joint Seal
Joint Seal Damage	High	Joint Seal
LTD Cracking	Low	Monitor
LTD Cracking	Medium	Crack Seal—PCC
LTD Cracking	High	Slab Replacement
Patching (Small and Large)	Low	Monitor
Patching (Small and Large)	Medium	Full Depth PCC Patch
Patching (Small and Large)	High	Full Depth PCC Patch
Popouts	N/A	Monitor
Pumping	N/A	Monitor
Scaling	Low	Monitor
Scaling	Medium	Partial Depth PCC Patch
Scaling	High	Slab Replacement
Settlement	Low	Monitor
Settlement	Medium	Grinding
Settlement	High	Slab Replacement
Shattered Slab	Low	Crack Seal—PCC
Shattered Slab	Medium	Slab Replacement
Shattered Slab	High	Slab Replacement
Shrinkage Cracking	N/A	Monitor
Spalling (Joint and Corner)	Low	Monitor
Spalling (Joint and Corner)	Medium	Partial Depth PCC Patch
Spalling (Joint and Corner)	High	Partial Depth PCC Patch

Table E-3. 2019 unit costs for preventive maintenance actions.

Maintenance Action	Unit Cost
Asphalt Patch—Asphalt-Surfaced Pavement	\$13.66/sf
Crack Sealing—Asphalt-Surfaced Pavement	\$2.34/lf
Partial Depth PCC Patch—PCC Pavement	\$34.97/sf
Full Depth PCC Patch—PCC Pavement	\$15.62/sf
Crack Sealing—PCC Pavement	\$2.81/lf
Joint Sealing—PCC Pavement	\$2.81/lf
Grinding—PCC Pavement	\$0.34/sf
Slab Replacement—PCC Pavement	\$15.62/sf

Table E-4. 2019 unit costs (per square foot) based on pavement type and PCI ranges.

Pavement Type	PCI Range 0-40	PCI Range 40-50	PCI Range 50-60	PCI Range 60-70	PCI Range 70-80	PCI Range 80-90	PCI Range 90-100
AC	\$9.70	\$4.59	\$4.59	\$4.59	\$0.00	\$0.00	\$0.00
PCC	\$16.19	\$7.65	\$7.65	\$7.65	\$0.00	\$0.00	\$0.00

## **APPENDIX F**

# **YEAR 2019 LOCALIZED PREVENTIVE MAINTENANCE DETAILS**

Table F-1. Year 2019 localized preventive maintenance details.

Branch <sup>1</sup>	Section <sup>1</sup>	Distress Type <sup>2</sup>	Severity	Distress Quantity	Distress Unit	Maintenance Action	Unit Cost <sup>3</sup>	2019 Estimated Cost <sup>3</sup>
R15KN	02	Joint Seal Damage	Medium	69	Slabs	Joint Seal (Localized)	\$2.81	\$4,817
R15KN	02	Joint Spalling	Medium	3	Slabs	Patching - PCC Partial Depth	\$34.97	\$645
T02KN	01	Corner Spalling	Medium	3	Slabs	Patching - PCC Partial Depth	\$34.97	\$304
T02KN	01	Joint Spalling	Medium	3	Slabs	Patching - PCC Partial Depth	\$34.97	\$730
T03KN	01	Corner Break	Medium	3	Slabs	Patching - PCC Full Depth	\$15.62	\$1,349
T03KN	01	LTD Cracking	Medium	3	Slabs	Crack Sealing - PCC	\$2.81	\$91
T03KN	02	Corner Spalling	Medium	3	Slabs	Patching - PCC Partial Depth	\$34.97	\$320

<sup>1</sup>See Figure 3 for the location of the branch and section.

<sup>2</sup>Distress types are defined by ASTM D5340-12. L&T Cracking = Longitudinal and Transverse Cracking; LTD Cracking = Longitudinal, Transverse, and Diagonal Cracking; ASR = Alkali-Silica Reaction.

<sup>3</sup>The costs provided are of a general nature for the entire state and may require adjustment to reflect specific conditions at the airport.



**PREPARED FOR**

Iowa Department of Transportation  
Aviation Bureau  
800 Lincoln Way  
Ames, Iowa 50010  
515-239-1691  
<https://iowadot.gov/aviation>

**AUGUST 2019**