

Estherville Municipal Airport



Pavement Management Report

PREPARED BY

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ESTHERVILLE MUNICIPAL AIRPORT PAVEMENT MANAGEMENT REPORT



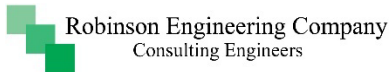
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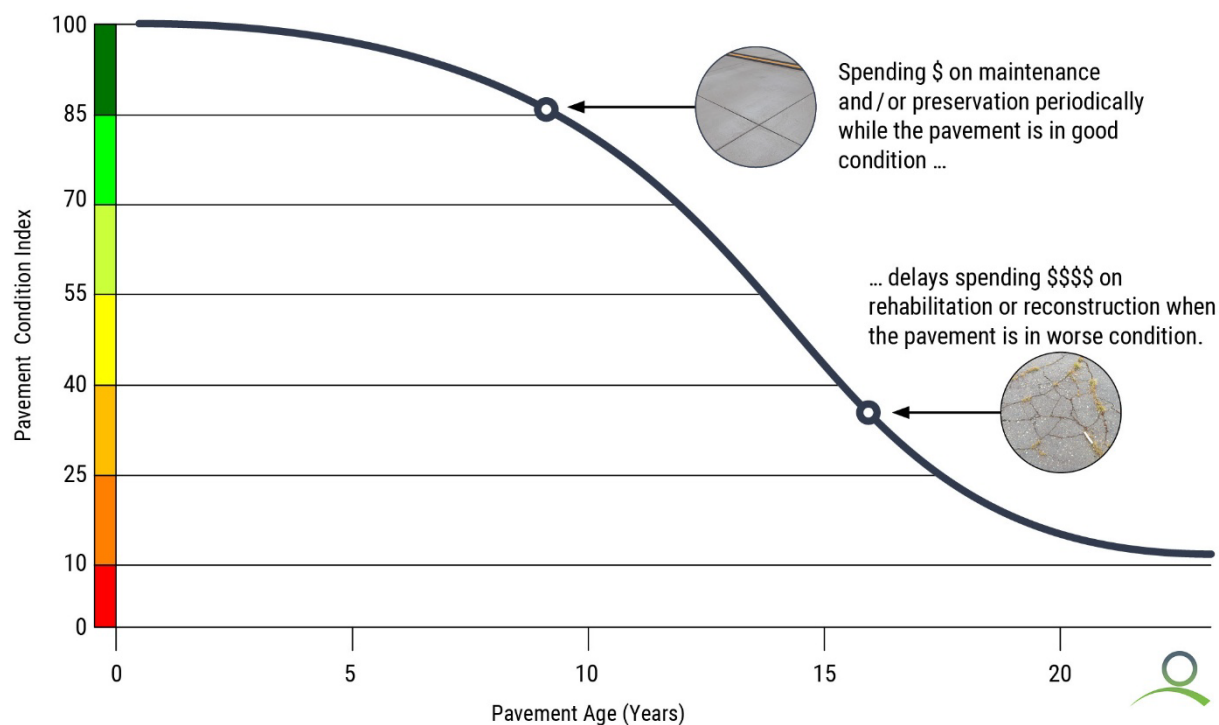
INTRODUCTION

Applied Pavement Technology, Inc. (APTech), with assistance from Robinson Engineering Company Consulting Engineers (Robinson), updated the airport pavement management system (APMS) for the Iowa Department of Transportation, Modal Transportation Bureau (Iowa DOT). The APMS provides a means to monitor the condition of the pavements in the State of Iowa and to proactively plan for their preservation.

As part of this project, pavement conditions at Estherville Municipal Airport were visually assessed in February 2026 using the Pavement Condition Index (PCI) procedure. During a PCI inspection, the types, severities, and amounts of distress present on the pavement surface 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 data and results are 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). Delaying maintenance and rehabilitation (M&R) until a pavement structure has seriously degraded can cost many times more than if M&R was applied earlier in a pavement's life cycle, as shown in Figure 1. From a safety perspective, pavement distresses, such as cracks and loose debris, may pose risks in terms of the potential for aircraft tire damage and the ability of a pilot to safely control aircraft.

Figure 1. Pavement condition versus cost of repair.



The pavement evaluation results for Estherville Municipal Airport are presented in this report and can be used by Estherville Municipal Airport, the Iowa DOT, and the Federal Aviation Administration (FAA) to identify, prioritize, and schedule pavement M&R actions at the airport. In addition to this report, the web-based interactive pavement data visualization tool IDEA, containing the information collected during this project, was updated and may be accessed from the [Iowa DOT's website](#) or directly ([Iowa APMS IDEA](#)).

PAVEMENT INVENTORY

The project began with a review of the existing inventory information pertaining to the pavements at Estherville Municipal Airport. The date of original construction, along with the date of any subsequent rehabilitation; the location of completed work; and the type of work undertaken were gathered. The information was used to update the pavement management database and associated maps, as necessary, to account for pavement-related work that had been undertaken since the last time the airport was evaluated in 2022.

The pavement network at Estherville Municipal Airport was then divided into branches, sections, and sample units. 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, date of last construction, 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 overall section condition and quantities of distress.

Approximately 552,000 square feet of pavement were evaluated at Estherville 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 is 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 Estherville Municipal Airport.

Figure 2. Pavement area by branch use at Estherville Municipal Airport.

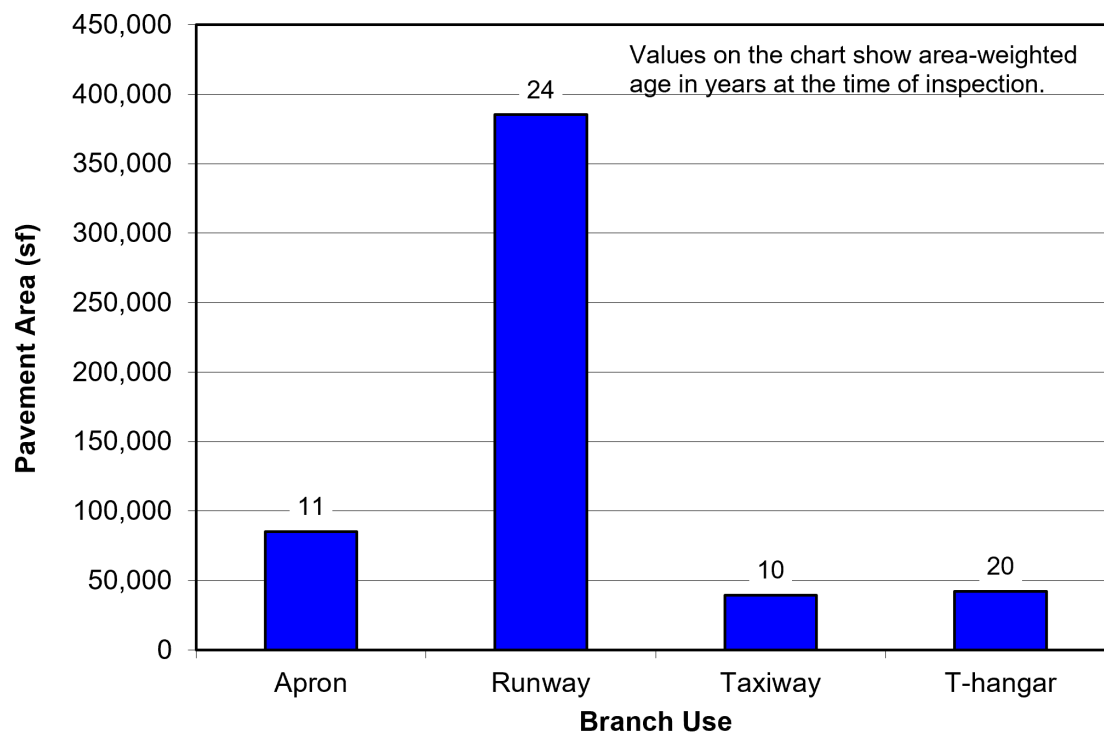
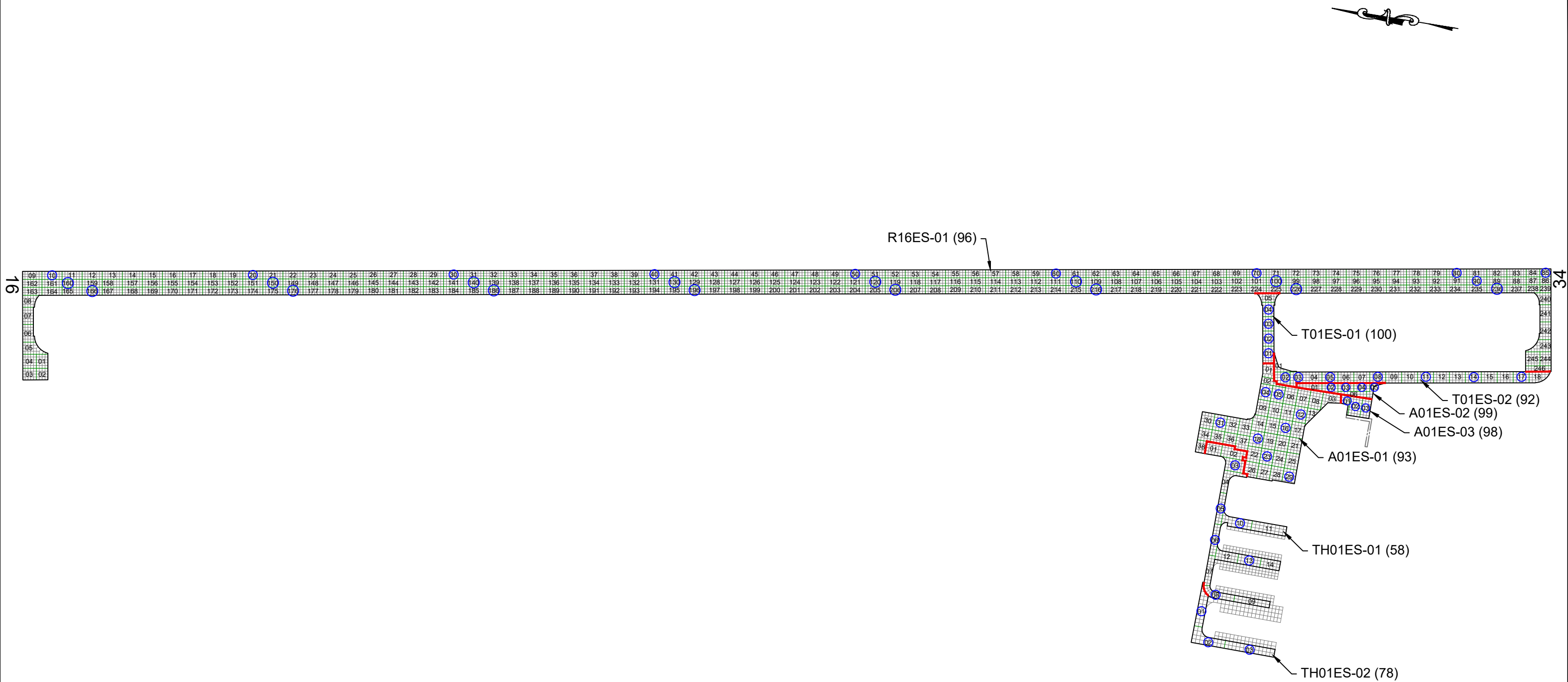


FIGURE 3. NETWORK DEFINITION MAP.



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		

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AGENCY: Iowa Department of Transportation			
Modal Transportation Bureau			
LOCATION: Estherville Municipal Airport			
Estherville, Iowa			
PAGE TITLE: Network Definition Map			
PROJECT DATE: NOV. 2025	CREATION DATE: NOV. 2025	PROJECT MANAGER: LJR	JOB NUMBER: 2021-125-AM04
DRAWING SCALE: 1"=300'	LAST MODIFIED DATE: JUN. 2026	REVISED BY: KEW	DRAWN BY: KEW
FILENAME: Estherville.dwg	LAYOUT NAME/NUMBER: NET. DEF.	PAGE NUMBER: 5	

PAVEMENT EVALUATION

Pavement Evaluation Procedure

APTech visually inspected the pavements at Estherville Municipal Airport using the PCI procedure described in the following publications:

- FAA Advisory Circular 150/5380-6C, *Guidelines and Procedures for Maintenance of Airport Pavements* (FAA 2014a).
- FAA Advisory Circular 150/5380-7B, *Airport Pavement Management Program (PMP)*; (FAA 2014b).
- ASTM D5340, *Standard Test Method for Airport Pavement Condition Index Surveys* (ASTM 2024).
- USACE *PAVER Distress Identification Manuals* (USACE 2009a, 2009b).

During the PCI inspection, a cursory inspection of the entirety of a pavement section was performed. Sample units identified for more detailed inspection were verified, and adjustments to the selected sample units for inspection were made as needed to ensure an accurate assessment of the pavement's condition. Data pertaining to the types, severities, and quantities of observed pavement distresses were then collected within each sample unit. These data were then used to calculate the composite PCI of each pavement section. The PCI provides a numerical indication of overall pavement condition, as illustrated in Figure 4. The PCI ranges from a value of 0, which represents a pavement in a *Failed* condition, to a value of 100, which represents a pavement in *Excellent* condition with no visible signs of deterioration. It is important to note that factors other than overall PCI need to be considered when identifying the appropriate type of repair, including types of distress present and rate of deterioration. Also, since the PCI does not assess the structural integrity or capacity of the pavement structure, further testing may be needed to validate and refine the treatment strategy.

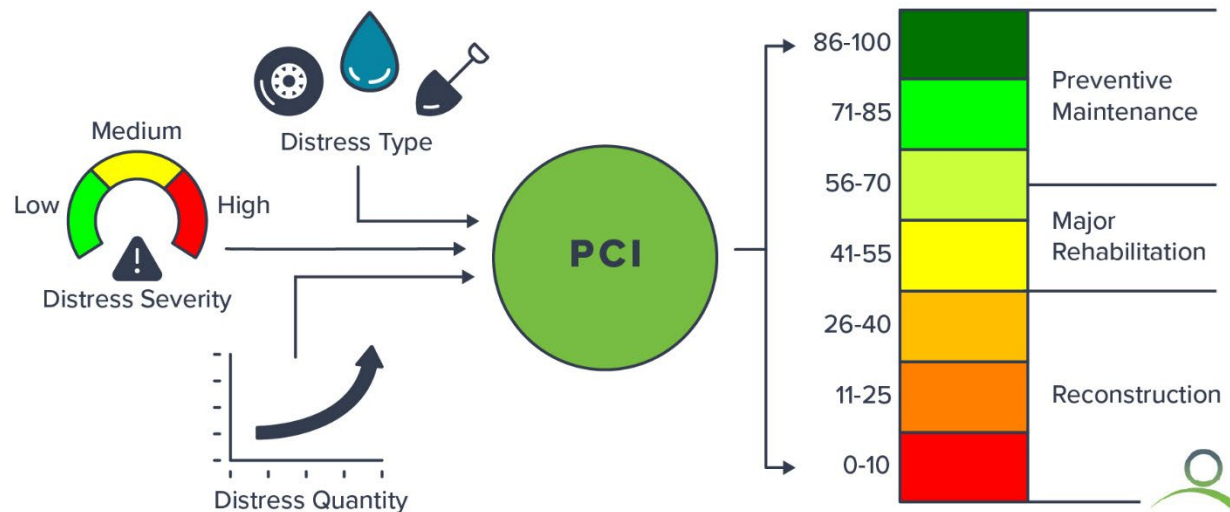
Figure 4. Visual representation of PCI scale on typical pavement surfaces.



Note: Photographs shown are not specific to Estherville 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 on the maps and charts in this report for each PCI range.

Figure 5. PCI versus repair type.



The types of distress identified during the PCI inspection provide insight into the cause of pavement deterioration, which is useful when selecting M&R strategies. Understanding the cause of distress helps in selecting a rehabilitation alternative that corrects the cause and thus eliminates or delays its recurrence. Appendix A identifies the distress types considered during a PCI inspection and describes the likely cause of each distress type. The PCI procedure is based on visual signs of pavement deterioration and does not provide a measure of structural capacity. PCI distress types are characterized as follows:

- Load-related distress types are caused by aircraft or vehicular traffic and may indicate a structural deficiency. Examples of load-related distress include alligator cracking on asphalt-surfaced pavements and shattered slabs or corner breaks on concrete pavements.
- Climate- and durability-related distress types often signify the presence of aged or environmentally susceptible (or both) material and include durability-related issues. Examples of climate- and durability-related distress include weathering on asphalt-surfaced pavements, which is climate related, and durability cracking on concrete pavements, which is durability related.
- Other distress types cannot be attributed solely to load or climate/durability. Examples of this type of distress include depressions on asphalt-surfaced pavements and shrinkage cracking on concrete pavements.

Pavement Evaluation Results

The pavements at Estherville Municipal Airport were inspected in February 2026. The 2026 area-weighted condition of Estherville Municipal Airport is 93, with conditions ranging from 58 to 100 (on a scale of 0 [*Failed*] to 100 [*Excellent*]). During the previous pavement inspection in 2022, the area-weighted PCI of the airport was 83.

Figure 6 summarizes the overall condition of the pavements at Estherville 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 distress types 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 Estherville Municipal Airport.

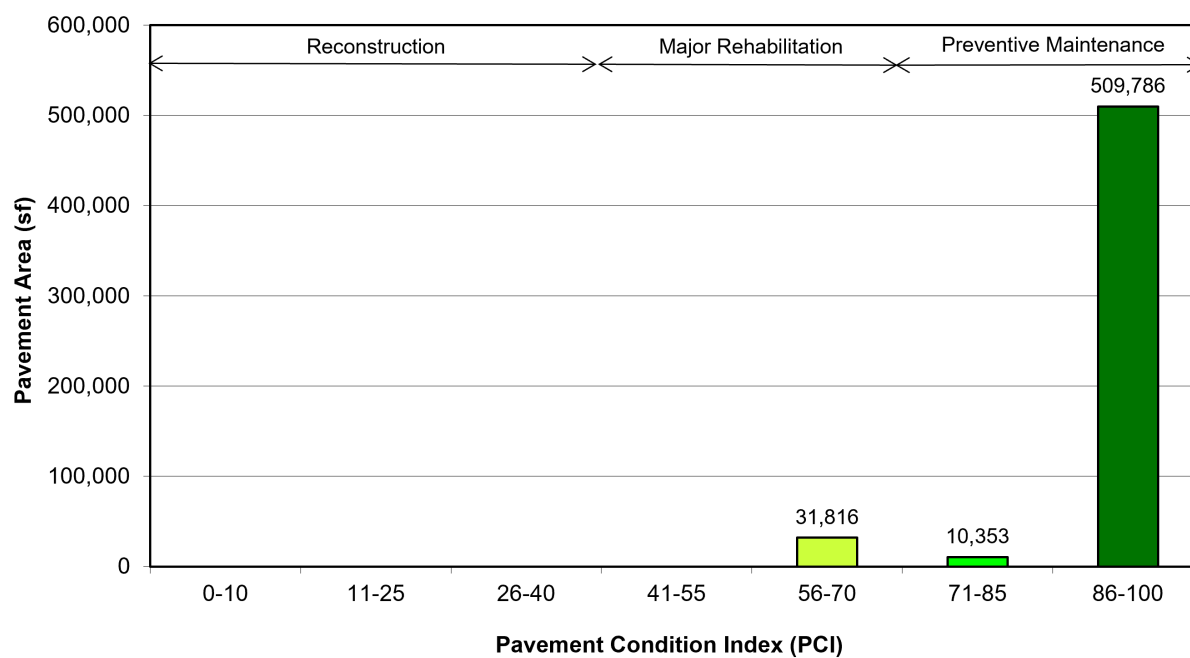


Figure 7. Area-weighted PCI by branch use at Estherville Municipal Airport.

(Values on chart are area weighted.)

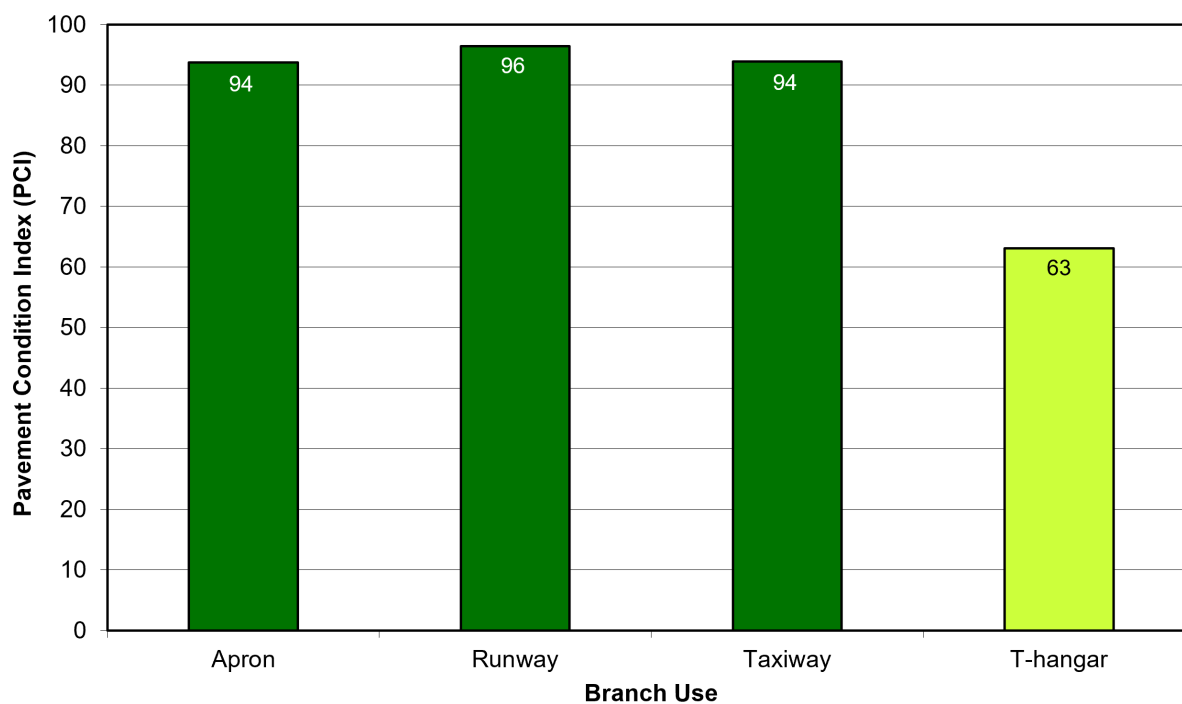
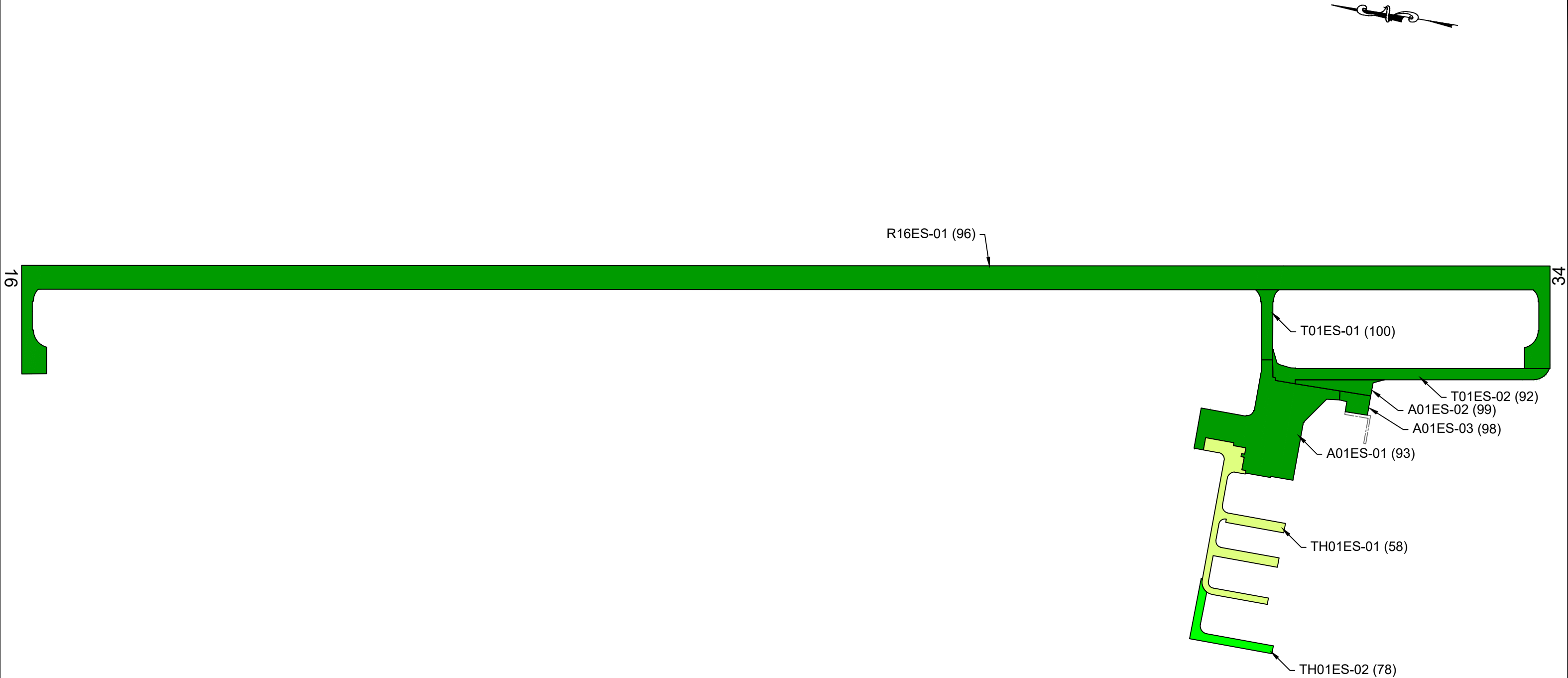


FIGURE 8. PCI MAP.



LEGEND

BRANCH IDENTIFIER
SECTION IDENTIFIER
PCI VALUE
SECTION BREAK LINE

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



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AGENCY: Iowa Department of Transportation Modal Transportation Bureau			
LOCATION: Estherville Municipal Airport Estherville, Iowa			
PAGE TITLE: 2026 Pavement Condition Index Map			
PROJECT DATE: NOV. 2025	CREATION DATE: NOV. 2025	PROJECT MANAGER: LJR	JOB NUMBER: 2021-125-AM04
DRAWING SCALE: 1"=300'	LAST MODIFIED DATE: JUL. 2026	REVISED BY: KEW	DRAWN BY: KEW
FILENAME: Estherville.dwg		LAYOUT NAME/NUMBER: PCI	PAGE NUMBER: 10

Table 1. 2026 pavement evaluation results.

Branch	Section	Surface Type	Section Area (sf)	LCD	2026 PCI	% Distress Due to Load	% Distress Due to Climate/ Durability	% Distress Due to Other	Type of Distress
A01ES	01	PCC	72,145	6/3/2013	93	56	24	20	Corner Break, Corner Spalling, Joint Spalling, Joint Seal Damage, LTD Cracking
A01ES	02	PCC	7,948	10/1/2024	99	0	0	100	Joint Spalling
A01ES	03	PCC	5,057	10/1/2024	98	0	0	100	Joint Spalling
R16ES	01	PCC	385,138	12/9/2002	96	82	0	18	LTD Cracking, Small Patch
T01ES	01	PCC	8,262	12/9/2002	100	0	0	100	Small Patch
T01ES	02	PCC	31,236	3/3/2020	92	59	19	22	Corner Break, Corner Spalling, Joint Spalling, Joint Seal Damage, LTD Cracking
TH01ES	01	PCC	31,816	1/25/2005	58	44	23	33	ASR, Corner Break, Corner Spalling, Faulting, Joint Spalling, Joint Seal Damage, LTD Cracking, Popouts, Shattered Slab, Shrinkage Cracking
TH01ES	02	PCC	10,353	6/1/2010	78	32	49	19	Corner Break, Joint Spalling, Joint Seal Damage, Large Patch, LTD Cracking, Shrinkage Cracking

Table notes:

1. See Figure 3 for the location of the branch and section.
2. Surface type: AC = asphalt cement concrete; AAC = asphalt overlay on AC; PCC = portland cement concrete; APC = asphalt overlay on concrete.
3. LCD = last construction date.
4. Distress due to load includes distress types that are attributed to a structural deficiency in the pavement, such as alligator cracking or rutting on asphalt-surfaced pavements or shattered slabs on concrete pavements.
5. Distress due to climate or durability includes distress types that are attributed to either the aging of the pavement and the effects of the environment (such as weathering, raveling, or block cracking on asphalt-surfaced pavements) or to a materials-related problem (such as durability cracking or alkali-silica reaction [ASR] on concrete pavements). If materials-related distresses were recorded during the inspection, further laboratory testing is required to definitively determine the type present.
6. Distress due to other refers to distress types that are not attributed to one factor but rather may be caused by a combination of factors.
7. Distress types are defined by ASTM D5340. L&T cracking = longitudinal and transverse cracking; LTD cracking = longitudinal, transverse, and diagonal cracking; ASR = alkali-silica reaction.

Inspection Comments

Estherville Municipal Airport was inspected on February 27, 2026. Eight pavement sections were defined during the inspection. Alkali-silica reaction (ASR) was recorded at this airport according to the PCI procedure where evidence of a precipitate was observed within some of the cracking in the concrete surface. It should be noted that laboratory testing in the form of petrographic analysis is the only definitive way to validate the presence of ASR; however, the formation of a precipitate is evidence of a reaction consistent with this type of materials-related distress.

Runway

Runway 16/34 consisted of one section in *Excellent* condition. Low-severity longitudinal, transverse, and diagonal (LTD) cracking and low- and medium-severity small patching were recorded in Section 01.

Taxiway

Taxiway 01 was defined by two sections. Section 01 was in *Excellent* condition and had only low-severity small patching noted during the inspection. Low-severity corner break and joint seal damage, low- and high-severity corner spalling, medium-severity joint spalling, and low- and medium-severity LTD cracking were identified in Section 02.

Apron

The apron area contained three sections. Section 01 had medium-severity corner spalling and joint spalling and low-severity corner break, joint seal damage, and LTD cracking recorded at the time of inspection. Sections 02 and 03 were in *Excellent* condition and contained only medium-severity joint spalling.

T-Hangar

The T-hangar area consisted of two sections. Section 01 contained low-severity ASR; medium-severity corner break, corner spalling, joint spalling, and shattered slab; all severities of faulting; medium- and high-severity joint seal damage; low- and medium-severity LTD cracking; popouts; and shrinkage cracking. Section 02 had low-severity corner break and large patching, medium- and high-severity joint seal damage, low- and medium-severity joint spalling and LTD cracking, and shrinkage cracking 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 Estherville Municipal Airport (USACE 2021). 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 concrete pavements. These policies, shown in Appendix E, identify the localized preventive maintenance actions that the Iowa DOT considered appropriate to correct the various distress types and severities. The Iowa DOT provided unit costs for each of the localized preventive maintenance actions included in these policies. These costs are detailed in Appendix E. This information is of a general nature for the entire State. The localized preventive maintenance policies and unit costs may require adjustments to reflect specific conditions at Estherville 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. These costs are detailed 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 estimate the cost of such work more accurately.

Budget and Inflation Rate

An unlimited budget with a start date of August 1, 2026, and an inflation rate of 2.3 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 (2026) 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 2027 or 2028, then localized preventive maintenance was not recommended for 2026. While localized preventive maintenance should be an annual undertaking at Estherville 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 2026 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 Estherville Municipal Airport is presented in Table 2. Detailed information on the recommended localized preventive maintenance plan for 2026 is in Appendix F.

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

Year	Branch	Section	Surface Type	Type of Repair	Estimated Cost
2026	A01ES	01	PCC	Preventive Maintenance	\$2,145
2026	A01ES	02	PCC	Preventive Maintenance	\$359
2026	A01ES	03	PCC	Preventive Maintenance	\$538
2026	R16ES	01	PCC	Preventive Maintenance	\$500
2026	T01ES	02	PCC	Preventive Maintenance	\$1,226
2026	TH01ES	01	PCC	Preventive Maintenance	\$56,242
2026	TH01ES	02	PCC	Preventive Maintenance	\$4,849
2030	TH01ES	01	PCC	Major Rehabilitation	\$318,140

Total Estimated Cost: \$384,000

Table notes:

1. See Figure 3 for the location of the branch and section.
2. Surface type: AC = asphalt cement concrete; AAC = asphalt overlay on AC; PCC = portland cement concrete; APC = asphalt overlay on concrete.
3. Type of repair: major rehabilitation, such as pavement reconstruction or an overlay; localized preventive maintenance, such as crack sealing or patching.
4. The estimated costs provided are of a general nature for the entire State and may require adjustments to reflect specific conditions at Estherville Municipal Airport.

The recommendations made in this report are based on a broad network-level analysis and meant to provide Estherville 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 Estherville 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 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, Estherville 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 be 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. Track all maintenance activities that occur and have the documentation available if requested by the FAA and the Iowa DOT. This is important because 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 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 for extending the life of the pavement system.
5. Ensure all edges of pavement maintain the required 1.5-inch lip. This enables the water to drain away from the pavement system.
6. Closely monitor the movement of heavy equipment, such as farming, construction, mowing, emergency, and fueling equipment, to ensure such equipment is only operating on pavement designed to accommodate heavy loads. Failure to restrict heavy equipment to appropriate areas may result in the premature failure of airport pavements.
7. Other maintenance necessities include keeping all pavement markings well painted, safety signage clear of debris and weeds, the lighting systems continuously operational, and the operating areas free of debris found.

These recommendations are only a portion of the responsibility each sponsor has in maintaining an airport. Each airport sponsor must provide regular airport maintenance to all its aviation facilities both in the aircraft movement areas and all adjacent areas supporting aviation. It is particularly important to be vigilant in repairing pavements where conditions can pose a hazard to safe operations.

FAA Requirements (Public Law 103-305)

Because Estherville 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 (GPO 1994). 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 Federal law, the PMMS must include the following components at minimum: pavement inventory, pavement inspections, record keeping, information retrieval, and program funding.

By undertaking this project, the Iowa DOT has provided Estherville Municipal Airport with an excellent basis for meeting the requirements of this law. This report serves as a complete pavement inventory and detailed inspection. To remain in compliance with the law, Estherville 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](#) (FAA 2014b) provides detailed guidance pertaining to the requirements for an acceptable pavement management program (PMP). Appendix A of the FAA Advisory Circular outlines what needs to be included in a PMP to remain in compliance with this law and Grant Assurance 11. The following is a copy of this appendix, along with instructions for supplementing this report so that all requirements are met. **Note that the italicized text is a direct quotation 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 in Figure 3 of this report shows the location of all runways, taxiways, aprons, and T-hangars at Estherville Municipal Airport. If any new pavements are constructed or any pavement areas are permanently closed, this map must be updated. Project plans should be submitted 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 in 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 Estherville Municipal Airport is listed in Table 1 of this report and is also stored in the PAVER database. Any changes to the 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 Estherville Municipal Airport is 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 monthly drive-by inspections. 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: _____

Branch	Section	Distress Description/Dimensions/Severity/ Recommended Action	Description of Repair	Date Performed	Cost	Funding Source
A01ES	01					
A01ES	02					
A01ES	03					
R16ES	01					
T01ES	01					
T01ES	02					

Table 3. Pavement inspection report (continued).

Inspected By: _____

Date Inspected: _____

Branch	Section	Distress Description/Dimensions/Severity/ Recommended Action	Description of Repair	Date Performed	Cost	Funding Source
TH01ES	01					
TH01ES	02					

Table note: See Figure 3 for the location of the branch and section.

SUMMARY

This report documents the results of the pavement evaluation conducted at Estherville Municipal Airport. A visual inspection of the pavements in 2026 found that the overall condition of the pavement network is a PCI of 93. A 5-year pavement repair program, shown in Table 2, was generated for Estherville Municipal Airport, which revealed that approximately \$384,000 needs to be expended on M&R. Estherville Municipal Airport should utilize these study results to assist in planning for future maintenance needs as part of the airport CIP planning process.

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APPENDIX A

CAUSE OF DISTRESS TABLES

Table A-1. Cause of pavement distress, asphalt-surfaced pavements (USACE 2009a).

Distress Type	Probable Cause of Distress
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 concrete 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 concrete pavements adjoin flexible pavements, concrete “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, concrete pavements (USACE 2009b).

Distress Type	Probable Cause of Distress
ASR	Chemical reaction of alkalis in the 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.
Faulting	Upheaval or consolidation.
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.
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

A01ES-01. Overview.



A01ES-01. Joint Seal Damage (Sample Unit No. 12).



A01ES-01. LTD Cracking (Sample Unit No. 12).



A01ES-02. Overview.



A01ES-02. Joint Spalling (Sample Unit No. 05).



A01ES-03. Overview.



A01ES-03. Joint Spalling (Sample Unit No. 03).



R16ES-01. Overview.



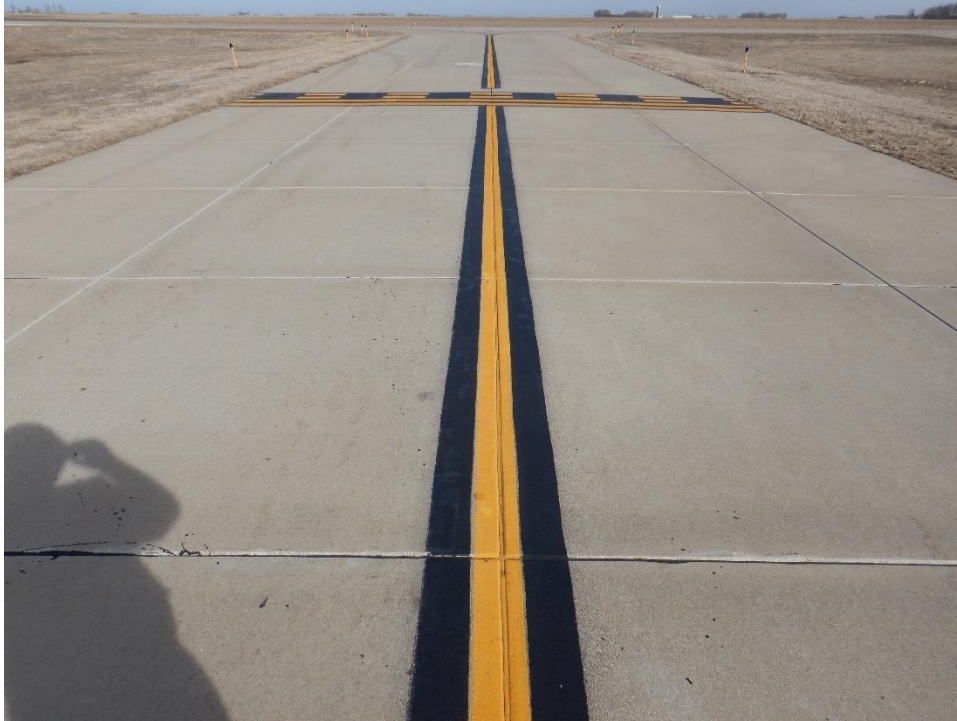
R16ES-01. LTD Cracking (Sample Unit No. 160).



R16ES-01. Small Patching (Sample Unit No. 150).



T01ES-01. Overview.



T01ES-01. Small Patching (Sample Unit No. 02).



T01ES-02. Overview.



T01ES-02. LTD Cracking (Sample Unit No. 05).



T01ES-02. LTD Cracking (Sample Unit No. 17).



TH01ES-01. Overview.



TH01ES-01. ASR (Sample Unit No. 05).



TH01ES-01. LTD Cracking (Sample Unit No. 05).



TH01ES-02. Overview.



TH01ES-02. Corner Break (Sample Unit No. 02).



TH01ES-02. Large Patching (Sample Unit No. 02).



APPENDIX C

INSPECTION REPORT

RE-INSPECTION REPORT

ESTHERVILLE MUNICIPAL AIRPORT

Pavement Database: IA 2025

Generate Date: 7/15/2026

Network ID: EST

Page 1

Branch - Section ID: A01ES - 001

Branch Name: APRON 01

Use: APRON

LCD: 6/3/2013

PCI Family: IowaPCCAP_NC_General

Surface Type: PCC

Rank: P

Section Area (sf): 72,145.00

Length (ft): 300.00

Width (ft): 180.00

From: HANGARS

To: TAXIWAY 01

Slabs: 740

Section Comments: avg slab width is entered

Slab Length (ft): 9.75

Slab Width (ft): 10.00

Joint Length (ft): 13,972.70

Last Insp Date: 2/27/2026

Inspection Comments:

PCI: 93

Total Samples: 38

Surveyed: 8

Sample Number: 04

Sample Type: R

Sample Comments:

Sample PCI: 98

Sample Area (Slabs): 20.00

65 JT SEAL DMG

L

20.00 Slabs

Sample Number: 05

Sample Type: R

Sample Comments:

Sample PCI: 83

Sample Area (Slabs): 20.00

62 CORNER BREAK

L

1.00 Slabs

63 LINEAR CR

L

3.00 Slabs

65 JT SEAL DMG

L

20.00 Slabs

Sample Number: 12

Sample Type: R

Sample Comments:

Sample PCI: 85

Sample Area (Slabs): 20.00

62 CORNER BREAK

L

1.00 Slabs

63 LINEAR CR

L

1.00 Slabs

65 JT SEAL DMG

L

20.00 Slabs

75 CORNER SPALL

M

1.00 Slabs

Sample Number: 16

Sample Type: R

Sample Comments:

Sample PCI: 98

Sample Area (Slabs): 20.00

65 JT SEAL DMG

L

20.00 Slabs

Sample Number: 18

Sample Type: R

Sample Comments:

Sample PCI: 94

Sample Area (Slabs): 20.00

65 JT SEAL DMG

L

20.00 Slabs

74 JOINT SPALL

M

1.00 Slabs

RE-INSPECTION REPORT

ESTHERVILLE MUNICIPAL AIRPORT

Pavement Database: IA 2025

Generate Date: 7/15/2026

Network ID: EST

Page 2

Sample Number: 23

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 20.00
65 JT SEAL DMG

Sample Comments:

L 20.00 Slabs

Sample Number: 29

Sample Type: R
Sample PCI: 89
Sample Area (Slabs): 20.00
62 CORNER BREAK
63 LINEAR CR
65 JT SEAL DMG

Sample Comments:

L 1.00 Slabs
L 1.00 Slabs
L 20.00 Slabs

Sample Number: 31

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 20.00
65 JT SEAL DMG

Sample Comments:

L 20.00 Slabs

RE-INSPECTION REPORT

ESTHERVILLE MUNICIPAL AIRPORT

Pavement Database: IA 2025

Generate Date: 7/15/2026

Network ID: EST

Page 3

Branch - Section ID: A01ES - 002

Branch Name: APRON 01

Use: APRON

LCD: 10/1/2024

PCI Family: IowaPCCAP_NC_General

Surface Type: PCC

Rank: P

Section Area (sf): 7,948.00

Length (ft): 270.00

Width (ft): 40.00

From: SEE MAP

To: SEE MAP

Slabs: 88

Section Comments:

Slab Length (ft): 9.00

Slab Width (ft): 10.00

Joint Length (ft): 1,672.00

Last Insp Date: 2/27/2026

Inspection Comments:

PCI: 99

Total Samples: 6

Surveyed: 4

Sample Number: 02

Sample Type: R

Sample Comments:

Sample PCI: 100

Sample Area (Slabs): 20.00

NO DISTRESS

Sample Number: 03

Sample Type: R

Sample Comments:

Sample PCI: 100

Sample Area (Slabs): 15.00

NO DISTRESS

Sample Number: 04

Sample Type: R

Sample Comments:

Sample PCI: 100

Sample Area (Slabs): 15.00

NO DISTRESS

Sample Number: 05

Sample Type: R

Sample Comments:

Sample PCI: 95

Sample Area (Slabs): 16.00

74 JOINT SPALL

M

1.00 Slabs

RE-INSPECTION REPORT

ESTHERVILLE MUNICIPAL AIRPORT

Pavement Database: IA 2025

Generate Date: 7/15/2026

Network ID: EST

Page 4

Branch - Section ID: A01ES - 003

Branch Name: APRON 01

Use: APRON

LCD: 10/1/2024

PCI Family: IowaPCCAP_NC_General

Surface Type: PCC

Rank: P

Section Area (sf): 5,057.00

Length (ft): 75.00

Width (ft): 60.00

From: SEE MAP

To: SEE MAP

Slabs: 66

Section Comments:

Slab Length (ft): 8.50

Slab Width (ft): 9.00

Joint Length (ft): 1,005.12

Last Insp Date: 2/27/2026

Inspection Comments:

PCI: 98

Total Samples: 3

Surveyed: 3

Sample Number: 01

Sample Type: R

Sample Comments:

Sample PCI: 100

Sample Area (Slabs): 17.00

NO DISTRESS

Sample Number: 02

Sample Type: R

Sample Comments:

Sample PCI: 100

Sample Area (Slabs): 28.00

NO DISTRESS

Sample Number: 03

Sample Type: R

Sample Comments:

Sample PCI: 93

Sample Area (Slabs): 21.00

74 JOINT SPALL

M

2.00 Slabs

RE-INSPECTION REPORT

ESTHERVILLE MUNICIPAL AIRPORT

Pavement Database: IA 2025

Generate Date: 7/15/2026

Network ID: EST

Page 5

Branch - Section ID: R16ES - 001

Branch Name: RUNWAY 16/34

Use: RUNWAY

LCD: 12/9/2002

PCI Family: IowaPCCRW_NC_General

Surface Type: PCC

Rank: P

Section Area (sf): 385,138.00

Length (ft): 4,797.00

Width (ft): 75.00

From: RUNWAY END 16

To: RUNWAY END 34

Slabs: 5,156

Section Comments:

Slab Length (ft): 9.00

Slab Width (ft): 8.30

Joint Length (ft): 83,979.82

Last Insp Date: 2/27/2026

Inspection Comments:

PCI: 96

Total Samples: 246

Surveyed: 25

Sample Number: 010

Sample Type: R

Sample Comments:

Sample PCI: 100

Sample Area (Slabs): 21.00

NO DISTRESS

Sample Number: 020

Sample Type: R

Sample Comments:

Sample PCI: 82

Sample Area (Slabs): 21.00

63 LINEAR CR

L

7.00 Slabs

Sample Number: 030

Sample Type: R

Sample Comments:

Sample PCI: 100

Sample Area (Slabs): 21.00

NO DISTRESS

Sample Number: 040

Sample Type: R

Sample Comments:

Sample PCI: 100

Sample Area (Slabs): 21.00

NO DISTRESS

Sample Number: 050

Sample Type: R

Sample Comments:

Sample PCI: 100

Sample Area (Slabs): 21.00

NO DISTRESS

Sample Number: 060

Sample Type: R

Sample Comments:

Sample PCI: 87

Sample Area (Slabs): 21.00

63 LINEAR CR

L

3.00 Slabs

66 SMALL PATCH

L

3.00 Slabs

RE-INSPECTION REPORT

ESTHERVILLE MUNICIPAL AIRPORT

Pavement Database: IA 2025

Generate Date: 7/15/2026

Network ID: EST

Page 6

Sample Number: 070

Sample Type: R
Sample PCI: 100
Sample Area (Slabs): 21.00
NO DISTRESS

Sample Comments:

Sample Number: 080

Sample Type: R
Sample PCI: 100
Sample Area (Slabs): 21.00
NO DISTRESS

Sample Comments:

Sample Number: 085

Sample Type: R
Sample PCI: 100
Sample Area (Slabs): 12.00
NO DISTRESS

Sample Comments:

Sample Number: 090

Sample Type: R
Sample PCI: 100
Sample Area (Slabs): 21.00
NO DISTRESS

Sample Comments:

Sample Number: 100

Sample Type: R
Sample PCI: 100
Sample Area (Slabs): 21.00
NO DISTRESS

Sample Comments:

Sample Number: 110

Sample Type: R
Sample PCI: 89
Sample Area (Slabs): 21.00
63 LINEAR CR
66 SMALL PATCH

Sample Comments:

L	2.00 Slabs
M	1.00 Slabs

Sample Number: 120

Sample Type: R
Sample PCI: 100
Sample Area (Slabs): 21.00
NO DISTRESS

Sample Comments:

Sample Number: 130

Sample Type: R
Sample PCI: 89
Sample Area (Slabs): 21.00
63 LINEAR CR

Sample Comments:

L	3.00 Slabs
---	------------

Sample Number: 140

Sample Type: R
Sample PCI: 89
Sample Area (Slabs): 21.00
63 LINEAR CR

Sample Comments:

L	3.00 Slabs
---	------------

RE-INSPECTION REPORT

ESTHERVILLE MUNICIPAL AIRPORT

Pavement Database: IA 2025

Generate Date: 7/15/2026

Network ID: EST

Page 7

Sample Number: 150

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 21.00
66 SMALL PATCH

L

Sample Comments:

2.00 Slabs

Sample Number: 160

Sample Type: R
Sample PCI: 84
Sample Area (Slabs): 21.00
63 LINEAR CR

L

Sample Comments:

6.00 Slabs

Sample Number: 166

Sample Type: R
Sample PCI: 100
Sample Area (Slabs): 21.00
NO DISTRESS

Sample Comments:

Sample Number: 176

Sample Type: R
Sample PCI: 100
Sample Area (Slabs): 21.00
NO DISTRESS

Sample Comments:

Sample Number: 186

Sample Type: R
Sample PCI: 100
Sample Area (Slabs): 21.00
NO DISTRESS

Sample Comments:

Sample Number: 196

Sample Type: R
Sample PCI: 98
Sample Area (Slabs): 21.00
66 SMALL PATCH

L

Sample Comments:

2.00 Slabs

Sample Number: 206

Sample Type: R
Sample PCI: 99
Sample Area (Slabs): 21.00
66 SMALL PATCH

L

Sample Comments:

1.00 Slabs

Sample Number: 216

Sample Type: R
Sample PCI: 100
Sample Area (Slabs): 21.00
NO DISTRESS

Sample Comments:

Sample Number: 226

Sample Type: R
Sample PCI: 100
Sample Area (Slabs): 21.00
NO DISTRESS

Sample Comments:

RE-INSPECTION REPORT

ESTHERVILLE MUNICIPAL AIRPORT

Pavement Database: IA 2025

Generate Date: 7/15/2026

Network ID: EST

Page 8

Sample Number: 236

Sample Type: R

Sample Comments:

Sample PCI: 95

Sample Area (Slabs): 21.00

63 LINEAR CR

L

1.00 Slabs

RE-INSPECTION REPORT

ESTHERVILLE MUNICIPAL AIRPORT

Pavement Database: IA 2025

Generate Date: 7/15/2026

Network ID: EST

Page 9

Branch - Section ID: T01ES - 001

Branch Name: TAXIWAY 01

Use: TAXIWAY

LCD: 12/9/2002

PCI Family: IowaPCCTW_NC_General

Surface Type: PCC

Rank: P

Section Area (sf): 8,262.00

Length (ft): 220.00

Width (ft): 35.00

From: APRON 01

To: RUNWAY 16/34

Slabs: 106

Section Comments:

Slab Length (ft): 9.00

Slab Width (ft): 8.70

Joint Length (ft): 1,594.04

Last Insp Date: 2/27/2026

Inspection Comments:

PCI: 100

Total Samples: 5

Surveyed: 4

Sample Number: 01

Sample Type: R

Sample Comments:

Sample PCI: 100

Sample Area (Slabs): 24.00

NO DISTRESS

Sample Number: 02

Sample Type: R

Sample Comments:

Sample PCI: 98

Sample Area (Slabs): 20.00

66 SMALL PATCH

L

2.00 Slabs

Sample Number: 03

Sample Type: R

Sample Comments:

Sample PCI: 100

Sample Area (Slabs): 20.00

NO DISTRESS

Sample Number: 04

Sample Type: R

Sample Comments:

Sample PCI: 100

Sample Area (Slabs): 22.00

NO DISTRESS

RE-INSPECTION REPORT

ESTHERVILLE MUNICIPAL AIRPORT

Pavement Database: IA 2025

Generate Date: 7/15/2026

Network ID: EST

Page 10

Branch - Section ID: T01ES - 002

Branch Name: TAXIWAY 01

Use: TAXIWAY

LCD: 3/3/2020

PCI Family: IowaPCCTW_NC_General

Surface Type: PCC

Rank: P

Section Area (sf): 31,236.00

Length (ft): 855.00

Width (ft): 35.00

From: .

To: .

Slabs: 359

Section Comments:

Slab Length (ft): 10.00

Slab Width (ft): 8.70

Joint Length (ft): 5,784.95

Last Insp Date: 2/27/2026

Inspection Comments:

PCI: 92

Total Samples: 18

Surveyed: 7

Sample Number: 02

Sample Type: R

Sample Comments:

Sample PCI: 94

Sample Area (Slabs): 23.00

65 JT SEAL DMG

L

23.00 Slabs

75 CORNER SPALL

H

1.00 Slabs

Sample Number: 03

Sample Type: R

Sample Comments:

Sample PCI: 94

Sample Area (Slabs): 22.00

65 JT SEAL DMG

L

22.00 Slabs

74 JOINT SPALL

M

1.00 Slabs

Sample Number: 05

Sample Type: R

Sample Comments:

Sample PCI: 80

Sample Area (Slabs): 20.00

62 CORNER BREAK

L

3.00 Slabs

63 LINEAR CR

L

3.00 Slabs

65 JT SEAL DMG

L

20.00 Slabs

Sample Number: 08

Sample Type: R

Sample Comments:

Sample PCI: 98

Sample Area (Slabs): 20.00

65 JT SEAL DMG

L

20.00 Slabs

Sample Number: 11

Sample Type: R

Sample Comments:

Sample PCI: 98

Sample Area (Slabs): 20.00

65 JT SEAL DMG

L

20.00 Slabs

RE-INSPECTION REPORT

ESTHERVILLE MUNICIPAL AIRPORT

Pavement Database: IA 2025

Generate Date: 7/15/2026

Network ID: EST

Page 11

Sample Number: 14

Sample Type: R

Sample Comments:

Sample PCI: 98

Sample Area (Slabs): 20.00

65 JT SEAL DMG

L

20.00 Slabs

Sample Number: 17

Sample Type: R

Sample Comments:

Sample PCI: 85

Sample Area (Slabs): 20.00

63 LINEAR CR

M

1.00 Slabs

65 JT SEAL DMG

L

20.00 Slabs

75 CORNER SPALL

L

1.00 Slabs

RE-INSPECTION REPORT

ESTHERVILLE MUNICIPAL AIRPORT

Pavement Database: IA 2025

Generate Date: 7/15/2026

Network ID: EST

Page 12

Branch - Section ID: TH01ES - 001

Branch Name: T-HANGAR 01

Use: T-HANGAR

LCD: 1/25/2005

PCI Family: IowaPCCTH_NC&NCW

Surface Type: PCC

Rank: P

Section Area (sf): 31,816.00

Length (ft): 1,215.00

Width (ft): 22.00

From: .

To: .

Slabs: 318

Section Comments:

Slab Length (ft): 10.00

Slab Width (ft): 10.00

Joint Length (ft): 4,890.83

Last Insp Date: 2/27/2026

Inspection Comments:

PCI: 58

Total Samples: 14

Surveyed: 6

Sample Number: 03

Sample Type: R

Sample Comments:

Sample PCI: 65

Sample Area (Slabs): 27.00

62 CORNER BREAK	M	1.00 Slabs
63 LINEAR CR	M	1.00 Slabs
65 JT SEAL DMG	H	27.00 Slabs
68 POPOUTS	N	2.00 Slabs
71 FAULTING	L	1.00 Slabs
71 FAULTING	L	1.00 Slabs
75 CORNER SPALL	M	1.00 Slabs

Sample Number: 05

Sample Type: R

Sample Comments:

Sample PCI: 22

Sample Area (Slabs): 20.00

62 CORNER BREAK	M	1.00 Slabs
63 LINEAR CR	L	1.00 Slabs
63 LINEAR CR	M	3.00 Slabs
65 JT SEAL DMG	H	20.00 Slabs
71 FAULTING	H	2.00 Slabs
71 FAULTING	L	2.00 Slabs
72 SHAT. SLAB	M	2.00 Slabs
74 JOINT SPALL	M	3.00 Slabs
75 CORNER SPALL	M	7.00 Slabs
76 ASR	L	2.00 Slabs

Sample Number: 06

Sample Type: R

Sample Comments:

Sample PCI: 60

Sample Area (Slabs): 20.00

63 LINEAR CR	M	4.00 Slabs
65 JT SEAL DMG	H	20.00 Slabs
73 SHRINKAGE CR	N	2.00 Slabs
76 ASR	L	2.00 Slabs

RE-INSPECTION REPORT

ESTHERVILLE MUNICIPAL AIRPORT

Pavement Database: IA 2025

Generate Date: 7/15/2026

Network ID: EST

Page 13

Sample Number: 08

Sample Type: R

Sample Comments:

Sample PCI: 74

Sample Area (Slabs): 20.00

62 CORNER BREAK	M	1.00 Slabs
65 JT SEAL DMG	H	20.00 Slabs
74 JOINT SPALL	M	1.00 Slabs
75 CORNER SPALL	M	1.00 Slabs
75 CORNER SPALL	M	1.00 Slabs
75 CORNER SPALL	M	1.00 Slabs

Sample Number: 10

Sample Type: R

Sample Comments:

Sample PCI: 48

Sample Area (Slabs): 26.00

62 CORNER BREAK	M	1.00 Slabs
63 LINEAR CR	L	2.00 Slabs
63 LINEAR CR	M	1.00 Slabs
65 JT SEAL DMG	H	26.00 Slabs
71 FAULTING	M	2.00 Slabs
72 SHAT. SLAB	M	2.00 Slabs
73 SHRINKAGE CR	N	1.00 Slabs
74 JOINT SPALL	M	1.00 Slabs

Sample Number: 13

Sample Type: R

Sample Comments:

Sample PCI: 81

Sample Area (Slabs): 21.00

65 JT SEAL DMG	M	21.00 Slabs
71 FAULTING	L	1.00 Slabs
75 CORNER SPALL	M	3.00 Slabs

RE-INSPECTION REPORT

ESTHERVILLE MUNICIPAL AIRPORT

Pavement Database: IA 2025

Generate Date: 7/15/2026

Network ID: EST

Page 14

Branch - Section ID: TH01ES - 002

Branch Name: T-HANGAR 01

Use: T-HANGAR

LCD: 6/1/2010

PCI Family: IowaPCCTH_NC&NCW

Surface Type: PCC

Rank: P

Section Area (sf): 10,353.00

Length (ft): 410.00

Width (ft): 25.00

From: .

To: .

Slabs: 69

Section Comments: avg

Slab Length (ft): 12.00

Slab Width (ft): 12.40

Joint Length (ft): 1,258.30

Last Insp Date: 2/27/2026

Inspection Comments:

PCI: 78

Total Samples: 3

Surveyed: 3

Sample Number: 01

Sample Type: R

Sample Comments:

Sample PCI: 64

Sample Area (Slabs): 20.00

62 CORNER BREAK	L	1.00 Slabs
63 LINEAR CR	L	5.00 Slabs
63 LINEAR CR	M	1.00 Slabs
65 JT SEAL DMG	H	20.00 Slabs
73 SHRINKAGE CR	N	1.00 Slabs
74 JOINT SPALL	L	1.00 Slabs
74 JOINT SPALL	M	1.00 Slabs

Sample Number: 02

Sample Type: R

Sample Comments:

Sample PCI: 72

Sample Area (Slabs): 23.00

62 CORNER BREAK	L	1.00 Slabs
65 JT SEAL DMG	H	23.00 Slabs
67 LARGE PATCH	L	2.00 Slabs
73 SHRINKAGE CR	N	2.00 Slabs
74 JOINT SPALL	L	3.00 Slabs
74 JOINT SPALL	M	1.00 Slabs

Sample Number: 03

Sample Type: R

Sample Comments:

Sample PCI: 93

Sample Area (Slabs): 26.00

65 JT SEAL DMG	M	26.00 Slabs
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APPENDIX D

WORK HISTORY REPORT

WORK HISTORY

Pavement Database: IA 2025

Generate Date: 6/29/2026

Network ID: EST

Page 1

Network: ESTHERVILLE MUNICIPAL AIRPORT

Branch - Section ID: A01ES - 001

LCD: 6/3/2013

Use: APRON

Rank: P

Surface: PCC

Length (ft): 300.00

Width (ft): 180.00

True Area (sf): 72,145.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
06-03-2013	CR-PC	Complete Reconstruction - PCC	-	6.00	True	6" P-501
06-02-2013	BA-AG	Base Course - Aggregate	-	6.00	False	6" P-209
06-01-2013	SG-CO	Subgrade - Compacted	-	12.00	False	12" P-152
06-01-1987	NC-AC	New Construction - AC	-	-	True	-

Branch - Section ID: A01ES - 002

LCD: 10/1/2024

Use: APRON

Rank: P

Surface: PCC

Length (ft): 270.00

Width (ft): 40.00

True Area (sf): 7,948.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
10-01-2024	NC-IN	New Construction - Initial	-	6.00	True	6" PCC

Branch - Section ID: A01ES - 003

LCD: 10/1/2024

Use: APRON

Rank: P

Surface: PCC

Length (ft): 75.00

Width (ft): 60.00

True Area (sf): 5,057.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
10-01-2024	NC-IN	New Construction - Initial	-	6.00	True	6" PCC

Branch - Section ID: R16ES - 001

LCD: 12/9/2002

Use: RUNWAY

Rank: P

Surface: PCC

Length (ft): 4,797.00

Width (ft): 75.00

True Area (sf): 385,138.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
10-01-2023	PA-PF	Patching - PCC Full Depth	-	-	False	-
10-01-2023	JS-LC	Joint Seal (Localized)	-	-	False	-
10-01-2023	CS-PC	Crack Sealing - PCC	-	-	False	-
10-01-2023	PA-PP	Patching - PCC Partial Depth	-	-	False	-
06-01-2012	JS-LC	Joint Seal (Localized)	-	-	False	-
12-09-2002	CR-PC	Complete Reconstruction - PCC	-	5.00	True	5" P-501
12-08-2002	SG-ST	Subgrade - Stabilized	-	12.00	False	12" P-155 Fly Ash Treated SG
06-01-1977	OL-AC	Overlay - AC	-	1.50	True	1.5" AC Overlay
06-01-1968	OL-AC	Overlay - AC	-	1.50	True	1.5" AC Overlay
06-03-1961	NC-AC	New Construction - AC	-	2.00	True	2" AC
06-02-1961	BA-AG	Base Course - Aggregate	-	8.00	False	8" P-208
06-01-1961	SG-CO	Subgrade - Compacted	-	6.00	False	6" P-152 Compacted SG

WORK HISTORY

Pavement Database: IA 2025

Generate Date: 6/29/2026

Network ID: EST

Page 2

Branch - Section ID: T01ES - 001

LCD: 12/9/2002
Use: TAXIWAY
Rank: P
Surface: PCC

Length (ft): 220.00
Width (ft): 35.00
True Area (sf): 8,262.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
10-01-2023	JS-SI	Joint Seal - Silicon	-	-	False	same work as runway
12-09-2002	CR-PC	Complete Reconstruction - PCC	-	5.00	True	5" P-501
12-08-2002	SG-ST	Subgrade - Stabilized	-	12.00	False	12" P-155 Fly Ash Treated SG
06-01-1987	NC-AC	New Construction - AC	-	-	True	-

Branch - Section ID: T01ES - 002

LCD: 3/3/2020
Use: TAXIWAY
Rank: P
Surface: PCC

Length (ft): 855.00
Width (ft): 35.00
True Area (sf): 31,236.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
03-03-2020	NC-PC	New Construction - PCC	-	6.00	True	6" P-501 PCC PAVEMENT
03-02-2020	BA-AG	Base Course - Aggregate	-	6.00	False	6" P-209 CRUSHED AGG BASE
03-01-2020	SG-CO	Subgrade - Compacted	-	-	False	P-152 IMPORTED FILL AS NEEDED, WITH ADDITIONAL SUBGRADE EXCAVATION AS DIRECTED BY THE ENGINEER

Branch - Section ID: TH01ES - 001

LCD: 1/25/2005
Use: T-HANGAR
Rank: P
Surface: PCC

Length (ft): 1,215.00
Width (ft): 22.00
True Area (sf): 31,816.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
01-25-2005	CR-PC	Complete Reconstruction - PCC	-	5.00	True	5" P-501 PCC
01-24-2005	SB-AG	Subbase - Aggregate	-	4.00	False	P-154/RAP

Branch - Section ID: TH01ES - 002

LCD: 6/1/2010
Use: T-HANGAR
Rank: P
Surface: PCC

Length (ft): 410.00
Width (ft): 25.00
True Area (sf): 10,353.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
06-01-2010	NC-IN	New Construction - Initial	-	-	True	-

APPENDIX E

LOCALIZED PREVENTIVE MAINTENANCE POLICIES AND UNIT COST TABLES

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

Distress Type	Severity Level	Maintenance Action
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, concrete pavements.

Distress Type	Severity Level	Maintenance Action
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—Concrete
Corner Break	Medium	Full-Depth Concrete Patch
Corner Break	High	Full-Depth Concrete Patch
Durability Cracking	Low	Monitor
Durability Cracking	Medium	Full-Depth Concrete Patch
Durability Cracking	High	Slab Replacement
Faulting	Low	Monitor
Faulting	Medium	Grinding
Faulting	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—Concrete
LTD Cracking	High	Slab Replacement
Patching (Small and Large)	Low	Monitor
Patching (Small and Large)	Medium	Full-Depth Concrete Patch
Patching (Small and Large)	High	Full-Depth Concrete Patch
Popouts	N/A	Monitor
Pumping	N/A	Monitor
Scaling	Low	Monitor
Scaling	Medium	Partial-Depth Concrete Patch
Scaling	High	Slab Replacement
Shattered Slab	Low	Crack Seal—Concrete
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 Concrete Patch
Spalling (Joint and Corner)	High	Partial-Depth Concrete Patch

Table E-3. 2026 unit costs for localized preventive maintenance actions.

Maintenance Action	Unit Cost
Asphalt Patch—Asphalt-Surfaced Pavement	\$16.27/sf
Crack Sealing—Asphalt-Surfaced Pavement	\$2.78/lf
Partial-Depth Concrete Patch—Concrete Pavement	\$41.68/sf
Full-Depth Concrete Patch—Concrete Pavement	\$18.61/sf
Crack Sealing—Concrete Pavement	\$3.35/lf
Joint Sealing—Concrete Pavement	\$3.35/lf
Grinding—Concrete Pavement	\$0.40/sf
Slab Replacement—Concrete Pavement	\$18.61/sf

Table note: The unit cost estimates are based on broad statewide numbers and should be adjusted to reflect local costs.

Table E-4. 2026 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
Asphalt-Surfaced	\$11.55	\$5.46	\$5.46	\$5.46	\$0.00	\$0.00	\$0.00
Concrete	\$19.30	\$9.13	\$9.13	\$9.13	\$0.00	\$0.00	\$0.00

Table notes:

1. The unit cost estimates are based on broad statewide numbers and should be adjusted to reflect local costs.
2. Pavement type: asphalt-surfaced = AC (asphalt cement concrete), AAC (asphalt overlay on AC), or APC (asphalt overlay on concrete).

APPENDIX F

YEAR 2026 LOCALIZED PREVENTIVE MAINTENANCE DETAILS

Table F-1. Year 2026 localized preventive maintenance details.

Branch	Section	Distress Type	Severity	Distress Quantity	Distress Unit	Maintenance Action	Unit Cost	2026 Estimated Cost
A01ES	01	Corner Break	Low	14	Slabs	Crack Sealing - PCC	\$3.35	\$381
A01ES	01	Corner Spalling	Medium	5	Slabs	Patching - PCC Partial Depth	\$41.68	\$519
A01ES	01	Joint Spalling	Medium	5	Slabs	Patching - PCC Partial Depth	\$41.68	\$1,245
A01ES	02	Joint Spalling	Medium	1	Slabs	Patching - PCC Partial Depth	\$41.68	\$359
A01ES	03	Joint Spalling	Medium	2	Slabs	Patching - PCC Partial Depth	\$41.68	\$538
R16ES	01	Small Patch	Medium	10	Slabs	Patching - PCC Full Depth	\$18.61	\$500
T01ES	02	Corner Break	Low	7	Slabs	Crack Sealing - PCC	\$3.35	\$204
T01ES	02	Corner Spalling	High	2	Slabs	Patching - PCC Partial Depth	\$41.68	\$278
T01ES	02	Joint Spalling	Medium	2	Slabs	Patching - PCC Partial Depth	\$41.68	\$666
T01ES	02	LTD Cracking	Medium	2	Slabs	Crack Sealing - PCC	\$3.35	\$78
TH01ES	01	Corner Break	Medium	9	Slabs	Patching - PCC Full Depth	\$18.61	\$5,705
TH01ES	01	Corner Spalling	Medium	33	Slabs	Patching - PCC Partial Depth	\$41.68	\$3,726
TH01ES	01	Faulting	Medium	5	Slabs	Grinding (Localized)	\$0.40	\$19
TH01ES	01	Faulting	High	5	Slabs	Slab Replacement - PCC	\$18.61	\$8,833
TH01ES	01	Joint Seal Damage	Medium	50	Slabs	Joint Seal (Localized)	\$3.35	\$2,568
TH01ES	01	Joint Seal Damage	High	268	Slabs	Joint Seal (Localized)	\$3.35	\$13,817
TH01ES	01	Joint Spalling	Medium	12	Slabs	Patching - PCC Partial Depth	\$41.68	\$3,194
TH01ES	01	LTD Cracking	Medium	21	Slabs	Crack Sealing - PCC	\$3.35	\$716
TH01ES	01	Shattered Slab	Medium	9	Slabs	Slab Replacement - PCC	\$18.61	\$17,666
TH01ES	02	Corner Break	Low	2	Slabs	Crack Sealing - PCC	\$3.35	\$55
TH01ES	02	Joint Seal Damage	Medium	26	Slabs	Joint Seal (Localized)	\$3.35	\$1,588
TH01ES	02	Joint Seal Damage	High	43	Slabs	Joint Seal (Localized)	\$3.35	\$2,627

Table F-1. Year 2026 localized preventive maintenance details (continued).

Branch	Section	Distress Type	Severity	Distress Quantity	Distress Unit	Maintenance Action	Unit Cost	2026 Estimated Cost
TH01ES	02	Joint Spalling	Medium	2	Slabs	Patching - PCC Partial Depth	\$41.68	\$538
TH01ES	02	LTD Cracking	Medium	1	Slabs	Crack Sealing - PCC	\$3.35	\$41

Table notes:

1. See Figure 3 for the location of the branch and section.
2. Distress types are defined by ASTM D5340. L&T cracking = longitudinal and transverse cracking; LTD cracking = longitudinal, transverse, and diagonal cracking; ASR = alkali-silica reaction.
3. The costs provided are of a general nature for the entire State and may require adjustments to reflect specific conditions at Estherville Municipal Airport.



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