Maquoketa Municipal Airport

Pavement Management Report

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MAQUOKETA MUNICIPAL AIRPORT
PAVEMENT MANAGEMENT REPORT

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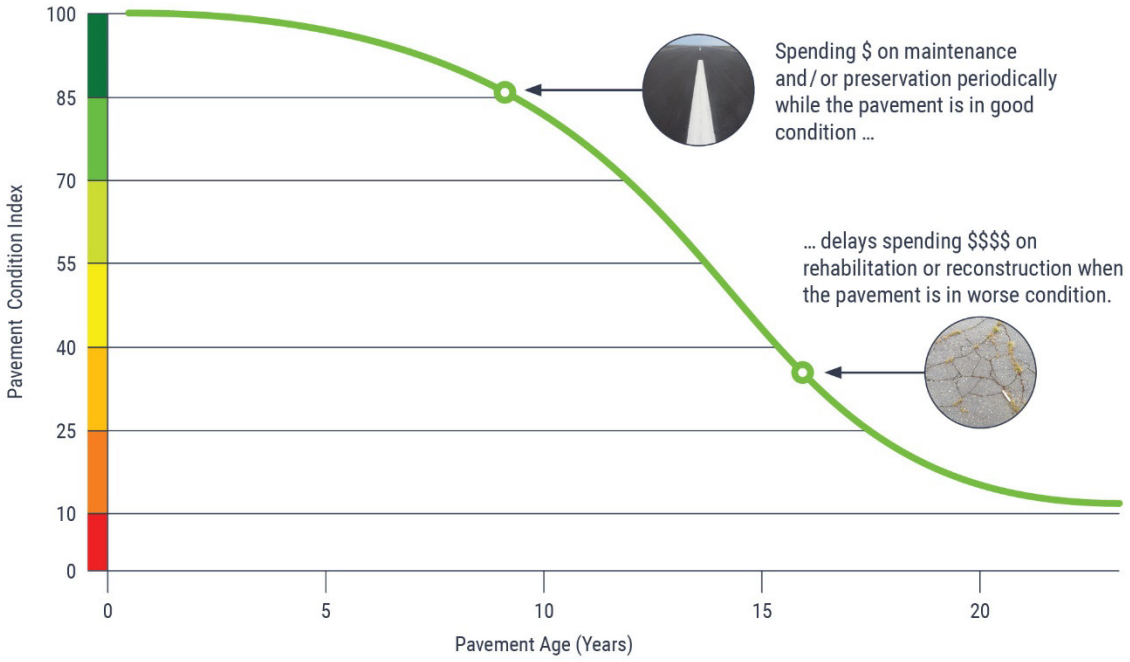
INTRODUCTION

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 – Aviation (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 Maquoketa Municipal Airport were visually assessed in November 2023 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 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). 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 Maquoketa Municipal Airport are presented within this report and can be used by Maquoketa 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 Maquoketa 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 2020.

The pavement network at Maquoketa 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 303,100 square feet of pavement were evaluated at Maquoketa 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 Maquoketa Municipal Airport.

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

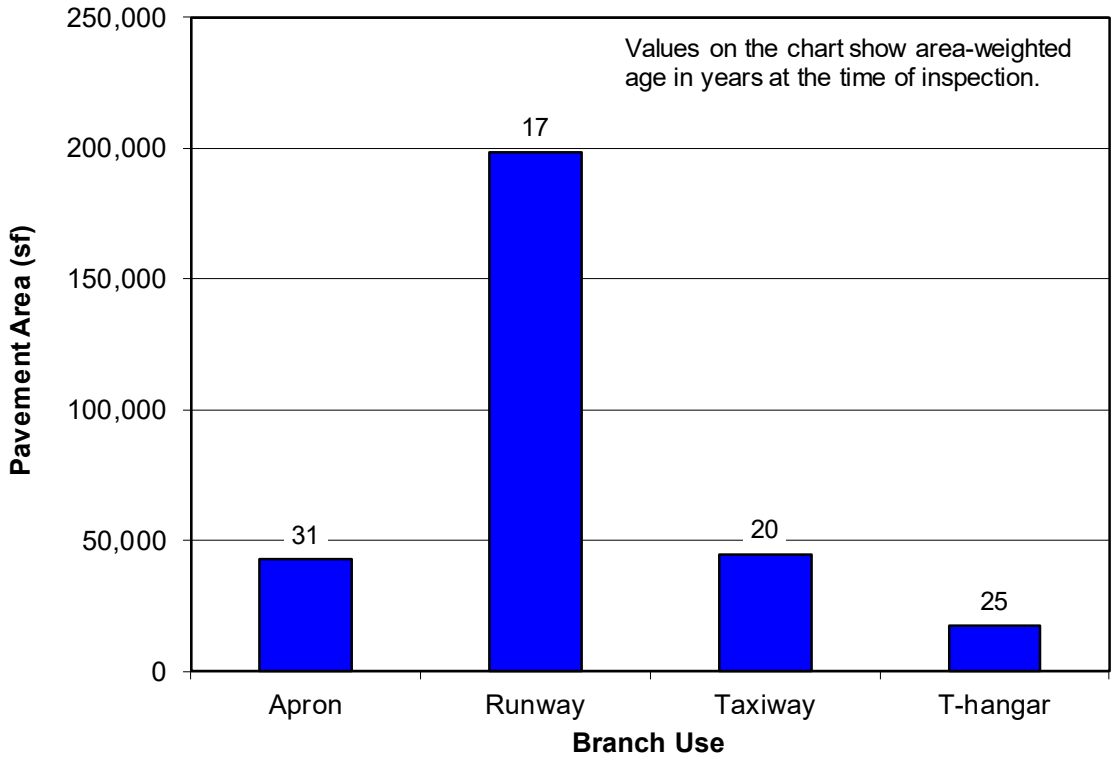
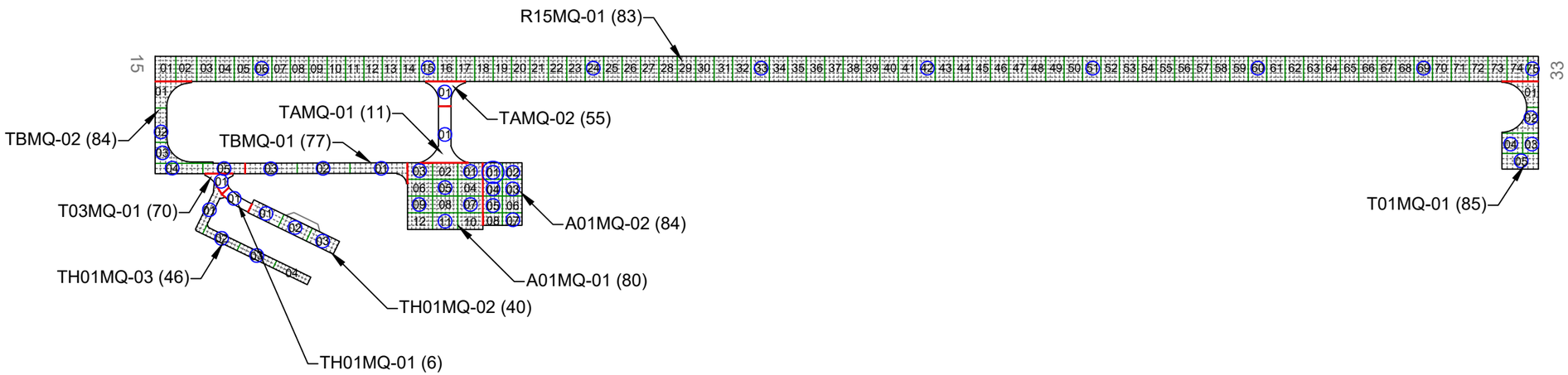


FIGURE 3. NETWORK DEFINITION MAP.



NETWORK DEFINITION LEGEND

- BRANCH IDENTIFIER
- SECTION IDENTIFIER
- PCI VALUE

R15MQ-01 (90)

- SECTION BREAK LINE
- SAMPLE UNIT BREAK LINE
- SLAB JOINT
- 03 — SAMPLE UNIT NUMBER
- (03) — SAMPLE UNIT INSPECTED
- (03) — ADDITIONAL SAMPLE UNIT

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AGENCY:	Iowa Department of Transportation Modal Transportation Bureau - Aviation
LOCATION:	Maquoketa Municipal Airport Maquoketa, Iowa
PAGE TITLE:	Network Definition Map

PROJECT DATE:	CREATION DATE:	PROJECT MANAGER:	JOB NUMBER:
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PAVEMENT EVALUATION

Pavement Evaluation Procedure

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

- FAA Advisory Circular 150/5380-6C, *Guidelines and Procedures for Maintenance of Airport Pavements*.
- FAA Advisory Circular 150/5380-7B, *Airport Pavement Management Program (PMP)*.
- ASTM D5340-20, *Standard Test Method for Airport Pavement Condition Index Surveys*.

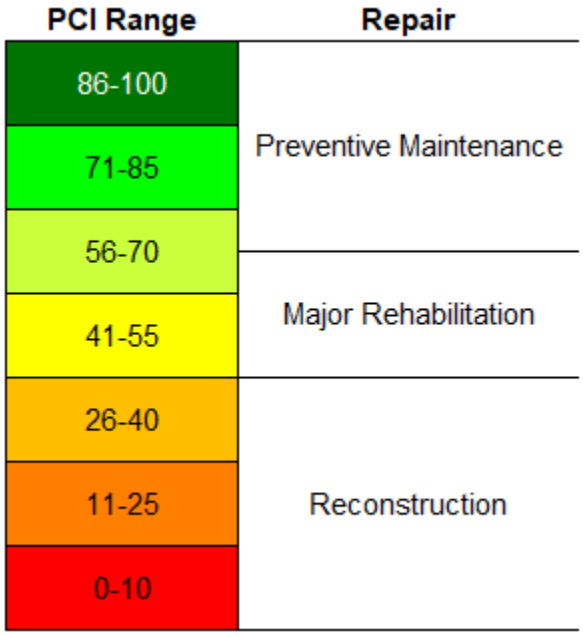
During the PCI inspection, a cursory inspection of the entirety of a pavement section was performed. Sample units identified for more detailed inspection were verified, and adjustments to the selected sample units for inspection were made as needed to ensure an accurate assessment of the pavement's condition. 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 Maquoketa 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.



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. PCI distress types are characterized as:

- Load-related—These distress types are defined as being 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 corner breaks on portland cement concrete (PCC) pavements.
- Climate/durability-related—These distress types often signify the presence of aged or environmentally susceptible (or both) material and include durability-related issues. Examples of climate/durability-related distress include weathering on asphalt-surfaced pavements, which is climate-related, and durability cracking on PCC pavements, which is durability-related.
- Other—Distress types that fall into this category 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 PCC pavements.

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 Maquoketa Municipal Airport were inspected in November 2023. The 2023 area-weighted condition of Maquoketa Municipal Airport is 79, with conditions ranging from 6 to 85 (on a scale of 0 [failed] to 100 [excellent]). During the previous pavement inspection in 2020, the area-weighted PCI of the airport was 81.

Figure 6 summarizes the overall condition of the pavements at Maquoketa 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 Maquoketa Municipal Airport.

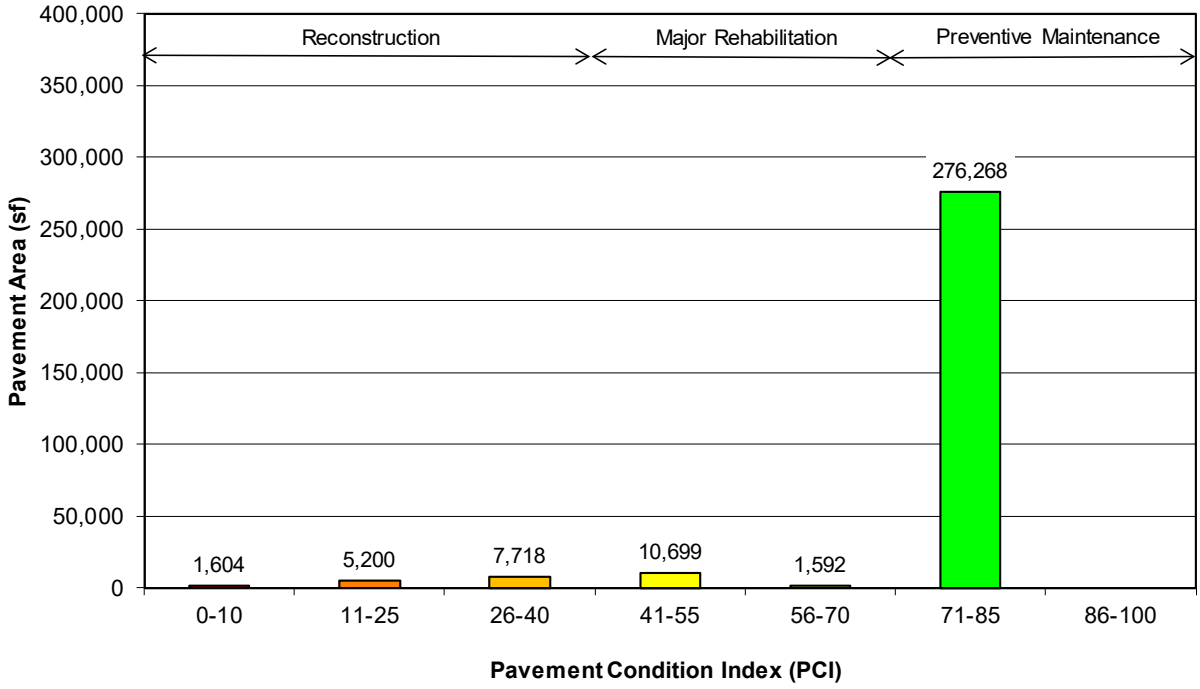


Figure 7. Area-weighted PCI by branch use at Maquoketa Municipal Airport.
(Values on chart are area-weighted)

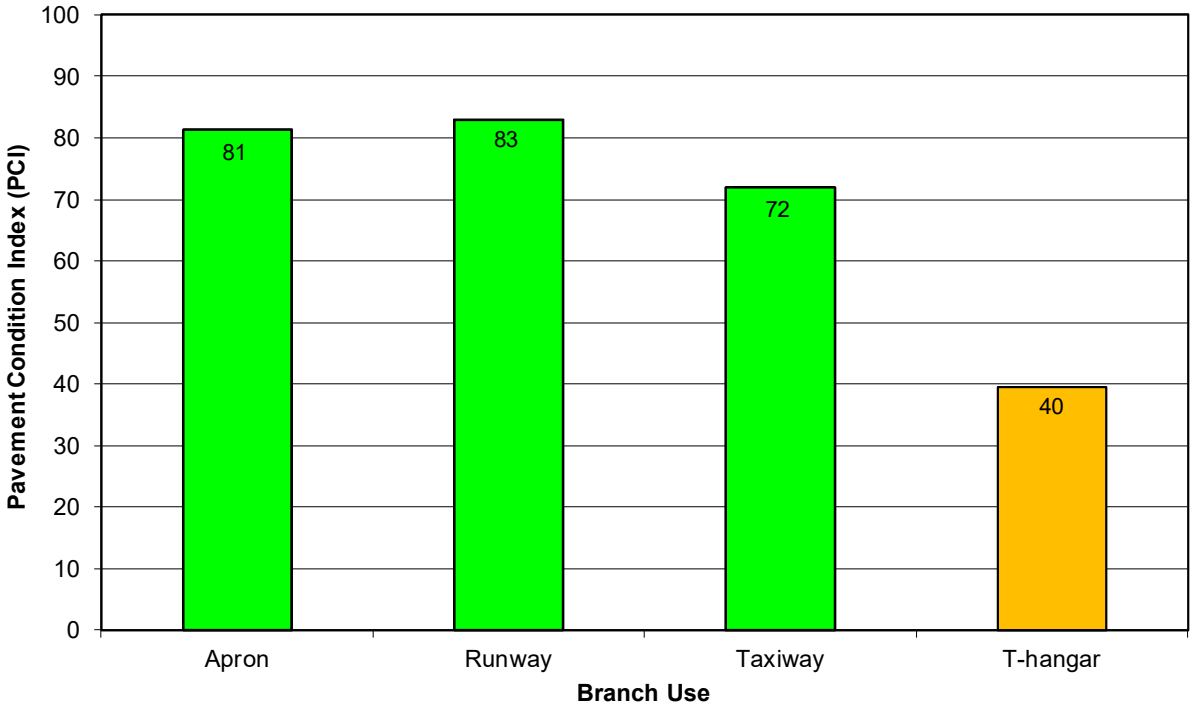
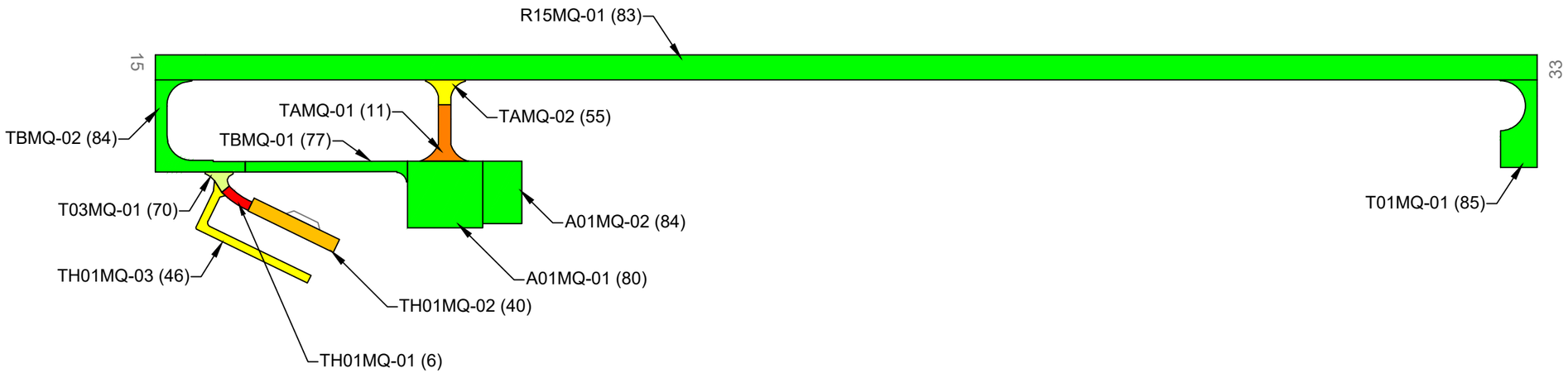


FIGURE 8. PCI MAP.



LEGEND

BRANCH IDENTIFIER
SECTION IDENTIFIER
PCI VALUE
R15MQ-01 (90)

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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LOCATION: Maquoketa Municipal Airport
Maquoketa, Iowa

PAGE TITLE: 2023 Pavement Condition Index Map

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1"=300'	MAR. 2024	DMS	ABF
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Table 1. 2023 pavement evaluation results.

Branch	Section	Surface Type	Section Area (sf)	LCD	2023 PCI	% Distress Due to Load	% Distress Due to Climate/ Durability	% Distress Due to Other	Type of Distress
A01MQ	01	PCC	28,682	6/1/1986	80	30	50	20	Corner Break, Faulting, Joint Spalling, Joint Seal Damage, LTD Cracking
A01MQ	02	PCC	14,000	6/2/2005	84	24	65	11	Corner Spalling, Joint Spalling, Joint Seal Damage, LTD Cracking, Shrinkage Cracking
R15MQ	01	PCC	198,248	10/15/2006	83	0	63	37	Faulting, Joint Spalling, Joint Seal Damage, Shrinkage Cracking, Small Patch
T01MQ	01	PCC	12,603	10/1/2006	85	10	82	8	Corner Spalling, Joint Seal Damage, LTD Cracking
T03MQ	01	AAC	1,592	10/1/2006	70	0	100	0	L&T Cracking, Weathering
TAMQ	01	AC	5,200	6/1/1982	11	83	15	2	Alligator Cracking, Raveling, Swelling
TAMQ	02	AC	2,748	10/1/2006	55	23	73	4	Alligator Cracking, L&T Cracking, Swelling, Weathering
TBMQ	01	PCC	9,948	6/2/2005	77	34	41	25	Corner Break, Corner Spalling, Faulting, Joint Spalling, Joint Seal Damage, LTD Cracking, Shattered Slab
TBMQ	02	PCC	12,787	10/2/2006	84	0	70	30	Corner Spalling, Joint Spalling, Joint Seal Damage, Shrinkage Cracking
TH01MQ	01	AC	1,604	3/1/1984	6	68	32	0	Alligator Cracking, Raveling, Weathering
TH01MQ	02	PCC	7,718	6/1/2000	40	82	14	4	Corner Break, Joint Spalling, Joint Seal Damage, LTD Cracking, Shattered Slab
TH01MQ	03	PCC	7,951	1/1/1999	46	73	14	13	Corner Break, Corner Spalling, Faulting, Joint Spalling, Joint Seal Damage, LTD Cracking, Shattered Slab

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 PCC.
3. LCD = last construction date.

Table 1. 2023 pavement evaluation results (continued).

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 PCC 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 PCC 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 D5340-20. L&T Cracking = Longitudinal and Transverse Cracking; LTD Cracking = Longitudinal, Transverse, and Diagonal Cracking; ASR = Alkali-Silica Reaction.

Inspection Comments

Maquoketa Municipal Airport was inspected on November 11, 2023. There were twelve pavement sections defined during the inspection.

Runway

Runway 15/33 consisted of one section. Low-severity faulting, low- and medium-severity joint spalling, high-severity joint seal damage, all severities of small patching, and shrinkage cracking were recorded in Section 01.

Taxiways

Taxiway A was defined by two sections that connected the apron area to Runway 15/33. Section 01 was in poor condition with low-severity swelling, medium-severity alligator cracking, and high-severity raveling observed. The high-severity raveling was recorded where the surface treatment had raveled away. Section 02 contained areas of low-severity longitudinal and transverse (L&T) cracking and swelling, medium-severity alligator cracking, and medium- and high-severity weathering. The low-severity L&T cracking was sealed.

Taxiway B contained two sections that connected the apron area to the Runway 33 approach. Low-severity corner break, corner spalling, faulting, and shattered slab; low- and medium-severity joint spalling and longitudinal, transverse, and diagonal (LTD) cracking; and high-severity joint seal damage were observed in Section 01. Areas of medium-severity corner spalling and joint spalling, high-severity joint seal damage, and shrinkage cracking were recorded in Section 02.

Taxiway 01 consisted of one section, located at the Runway 15 approach. Areas of low-severity LTD cracking, medium-severity corner spalling, and high-severity joint seal damage were identified in Section 01.

Taxiway 03 contained one section and connected Taxiway B to the T-hangar area. Low-severity L&T cracking and medium- and high-severity weathering were observed in Section 01. The low-severity L&T cracking was sealed.

Apron

The apron area was defined by two sections. Section 01 contained areas of low-severity corner break, low- and medium-severity faulting and LTD cracking, medium-severity joint spalling, and high-severity joint seal damage. Low-severity corner spalling and joint spalling, high-severity joint seal damage, and shrinkage cracking were observed in Section 02. An isolated area of low- and medium-severity LTD cracking was identified and recorded as an additional sample unit in accordance with ASTM D5340.

T-Hangar

The T-hangar area contained three sections. Section 01 was in poor condition with medium-severity alligator cracking and high-severity raveling and weathering. The high-severity raveling and weathering were due to the loss of the surface treatment. Section 02 was also in poor condition with areas of low-severity shattered slab; low- and medium-severity corner break, joint spalling, and LTD cracking; and high-severity joint seal damage. Section 03 contained areas of low-severity corner spalling; low- and medium-severity corner break, joint spalling, LTD cracking, and shattered slab; medium-severity faulting; and high-severity joint seal damage.

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 Maquoketa 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 the 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 localized preventive maintenance policies and unit costs may require adjustment to reflect specific conditions at Maquoketa 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 estimate the cost of such work more accurately.

Budget and Inflation Rate

An unlimited budget with a start date of July 1, 2024, and an inflation rate of 2.0 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 (2024) 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 2025 or 2026, then localized preventive maintenance was not recommended for 2024. While localized preventive maintenance should be an annual undertaking at Maquoketa 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 2024 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 Maquoketa Municipal Airport is presented in Table 2. Detailed information on the recommended localized preventive maintenance plan for 2024 is provided 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
2024	A01MQ	01	PCC	Preventive Maintenance	$18,604
2024	A01MQ	02	PCC	Preventive Maintenance	$8,488
2024	R15MQ	01	PCC	Preventive Maintenance	$116,156
2024	T01MQ	01	PCC	Preventive Maintenance	$6,381
2024	T03MQ	01	AAC	Preventive Maintenance	$1,554
2024	TAMQ	01	AC	Major Rehabilitation	$57,392
2024	TAMQ	02	AC	Major Rehabilitation	$14,348
2024	TBMQ	01	PCC	Preventive Maintenance	$4,182
2024	TBMQ	02	PCC	Preventive Maintenance	$5,716
2024	TH01MQ	01	AC	Major Rehabilitation	$17,703
2024	TH01MQ	02	PCC	Major Rehabilitation	$142,330
2024	TH01MQ	03	PCC	Major Rehabilitation	$107,839
2028	T03MQ	01	AAC	Major Rehabilitation	$8,997
				Total Estimated Cost:	**$510,000**

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 PCC.
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 adjustment to reflect specific conditions at Maquoketa Municipal Airport.

The recommendations made in this report are based on a broad network-level analysis and meant to provide Maquoketa 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 Maquoketa 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, Maquoketa 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. Provide a method of tracking all maintenance activities that occur because of these inspections. This documentation needs 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 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 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 (particularly farming, construction, mowing, 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 Maquoketa 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, Maquoketa 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 the 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. 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 provided in Figure 3 of this report shows the location of all runways, taxiways, aprons, and T-hangars at Maquoketa 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 provided 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 Maquoketa 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 Maquoketa 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 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
A01MQ	01					
A01MQ	02					
R15MQ	01					
T01MQ	01					
T03MQ	01					
TAMQ	01					

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
TAMQ	02					
TBMQ	01					
TBMQ	02					
TH01MQ	01					
TH01MQ	02					
TH01MQ	03					

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 Maquoketa Municipal Airport. A visual inspection of the pavements in 2023 found that the overall condition of the pavement network is a PCI of 79. A 5-year pavement repair program, shown in Table 2, was generated for Maquoketa Municipal Airport, which revealed that approximately $510,000 needs to be expended on M&R. Maquoketa 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.

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 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.

Distress Type	Probable Cause of Distress
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.
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

A01MQ-01. Overview.

A01MQ-01. Corner Break (Sample Unit No. 09).

A01MQ-01. LTD Cracking (Sample Unit No. 11).

A01MQ-02. Overview.

A01MQ-02. Joint Seal Damage (Sample Unit No. 07).

A01MQ-02. Joint Spalling (Sample Unit No. 02).

A01MQ-02. LTD Cracking (Additional Sample Unit No. 01).

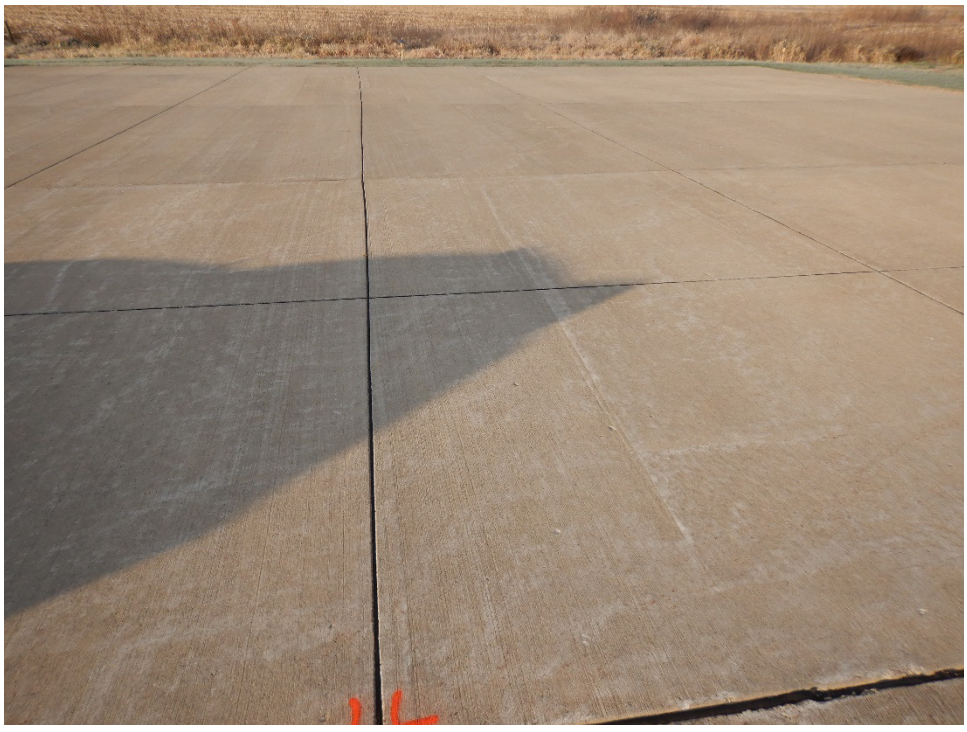
R15MQ-01. Overview.

R15MQ-01. Joint Seal Damage (Sample Unit No. 06).

R15MQ-01. Joint Spalling (Sample Unit No. 33).

R15MQ-01. Small Patching (Sample Unit No. 60).

T01MQ-01. Overview.



T01MQ-01. Corner Spalling (Sample Unit No. 05).

T01MQ-01. LTD Cracking (Sample Unit No. 02).

T03MQ-01. Overview.

T03MQ-01. L&T Cracking (Sample Unit No. 01).

T03MQ-01. Weathering (Sample Unit No. 01).

TAMQ-01. Overview.

TAMQ-01. Alligator Cracking (Sample Unit No. 01).

TAMQ-01. Swelling (Sample Unit No. 01).

TAMQ-02. Overview.

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

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

TBMQ-01. Overview.

TBMQ-01. Joint Spalling (Sample Unit No. 01).

TBMQ-01. Shattered Slab (Sample Unit No. 01).

TBMQ-02. Overview.

TBMQ-02. Corner Spalling (Sample Unit No. 03).

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

TH01MQ-01. Overview.

TH01MQ-01. Alligator Cracking (Sample Unit No. 01).

TH01MQ-02. Overview.

TH01MQ-02. Corner Break (Sample Unit No. 01).

TH01MQ-02. LTD Cracking (Sample Unit No. 02).

TH01MQ-03. Overview.

TH01MQ-03. LTD Cracking (Sample Unit No. 02).

TH01MQ-03. Shattered Slab (Sample Unit No. 03).

APPENDIX C

INSPECTION REPORT

RE-INSPECTION REPORT
MAQUOKETA MUNICIPAL AIRPORT

Pavement Database: IA 2023 | Generate Date: 4/16/2024

Network ID: OQW |

Branch - Section ID: A01MQ - 001

Branch Name: APRON | Use: APRON

LCD: 6/1/1986
Surface Type: PCC
Rank: P
Section Area (sf): 28,682.00
Length (ft): 185.00
Width (ft): 160.00
From: BUILDING
To: TAXIWAY 02

PCI Family: IowaPCCAP_NCE_BasicLocal

Slabs: 287
Slab Length (ft): 10.00
Slab Width (ft): 10.00
Joint Length (ft): 5,402.10

Section Comments:

Last Insp Date: 11/11/2023
PCI: 80
Total Samples: 12
Surveyed: 6

Inspection Comments:

Sample Number: 01

Sample Type: R
Sample PCI: 71
Sample Area (Slabs): 24.00

Sample Comments:

62 CORNER BREAK	L	1.00	Slabs
63 LINEAR CR	L	1.00	Slabs
63 LINEAR CR	M	1.00	Slabs
65 JT SEAL DMG	H	24.00	Slabs
74 JOINT SPALL	M	2.00	Slabs

Sample Number: 03

Sample Type: R
Sample PCI: 69
Sample Area (Slabs): 24.00

Sample Comments:

63 LINEAR CR	L	1.00	Slabs
63 LINEAR CR	M	1.00	Slabs
65 JT SEAL DMG	H	24.00	Slabs
71 FAULTING	L	3.00	Slabs
71 FAULTING	M	1.00	Slabs

Sample Number: 05

Sample Type: R
Sample PCI: 88
Sample Area (Slabs): 24.00

Sample Comments:

65 JT SEAL DMG	H	24.00	Slabs

Sample Number: 07

Sample Type: R
Sample PCI: 88
Sample Area (Slabs): 24.00

Sample Comments:

65 JT SEAL DMG	H	24.00	Slabs

RE-INSPECTION REPORT
MAQUOKETA MUNICIPAL AIRPORT

Sample Number: 09

Sample Type: R
Sample PCI: 83
Sample Area (Slabs): 24.00

Sample Comments:

62 CORNER BREAK	L	2.00	Slabs
65 JT SEAL DMG	H	24.00	Slabs

Sample Number: 11

Sample Type: R
Sample PCI: 84
Sample Area (Slabs): 24.00

Sample Comments:

63 LINEAR CR	L	1.00	Slabs
65 JT SEAL DMG	H	24.00	Slabs

Branch - Section ID: A01MQ - 002

Branch Name: APRON Use: APRON

LCD: 6/2/2005
Surface Type: PCC
Rank: P
Section Area (sf): 14,000.00
Length (ft): 150.00
Width (ft): 95.00
From: AUXILIARY ROAD
To: APRON 01 SECT 01

PCI Family: IowaPCCAP_NCE_BasicLocal

Slabs: 147
Slab Length (ft): 10.00
Slab Width (ft): 9.50
Joint Length (ft): 2,632.98

Section Comments:

Last Insp Date: 11/11/2023
PCI: 84
Total Samples: 8
Surveyed: 6

Inspection Comments:

Sample Number: 01

Sample Type: A
Sample PCI: 71
Sample Area (Slabs): 20.00

Sample Comments:

63 LINEAR CR	L	1.00	Slabs
63 LINEAR CR	M	2.00	Slabs
65 JT SEAL DMG	H	20.00	Slabs

Sample Number: 02

Sample Type: R
Sample PCI: 81
Sample Area (Slabs): 20.00

Sample Comments:

65 JT SEAL DMG	H	20.00	Slabs
74 JOINT SPALL	L	2.00	Slabs
75 CORNER SPALL	L	2.00	Slabs

Sample Number: 03

Sample Type: R
Sample PCI: 85
Sample Area (Slabs): 20.00

Sample Comments:

65 JT SEAL DMG	H	20.00	Slabs
73 SHRINKAGE CR	N	1.00	Slabs
75 CORNER SPALL	L	1.00	Slabs

Sample Number: 04

Sample Type: R
Sample PCI: 88
Sample Area (Slabs): 20.00

Sample Comments:

65 JT SEAL DMG	H	20.00	Slabs

Sample Number: 05

Sample Type: R
Sample PCI: 88
Sample Area (Slabs): 20.00

Sample Comments:

65 JT SEAL DMG	H	20.00	Slabs

RE-INSPECTION REPORT
MAQUOKETA MUNICIPAL AIRPORT

Sample Number: 07

Sample Type: R
Sample PCI: 88
Sample Area (Slabs): 15.00

Sample Comments:

65	JT SEAL DMG	H	15.00 Slabs

RE-INSPECTION REPORT
MAQUOKETA MUNICIPAL AIRPORT

Branch - Section ID: R15MQ - 001

Branch Name: RUNWAY 15/33 Use: RUNWAY

LCD: 10/15/2006
Surface Type: PCC
Rank: P
Section Area (sf): 198,248.00
Length (ft): 3,278.00
Width (ft): 60.00
From: RUNWAY 15 END
To: RUNWAY 33 END

PCI Family: IowaPCCRW_NCE_BasicLocal

Slabs: 1,802
Slab Length (ft): 11.00
Slab Width (ft): 10.00
Joint Length (ft): 34,482.73

Section Comments:

Last Insp Date: 11/11/2023
PCI: 83
Total Samples: 75
Surveyed: 9

Inspection Comments:

Sample Number: 06

Sample Type: R
Sample PCI: 83
Sample Area (Slabs): 24.00

Sample Comments:

65 JT SEAL DMG	H	24.00	Slabs
66 SMALL PATCH	L	1.00	Slabs
71 FAULTING	L	1.00	Slabs

Sample Number: 15

Sample Type: R
Sample PCI: 87
Sample Area (Slabs): 24.00

Sample Comments:

65 JT SEAL DMG	H	24.00	Slabs
73 SHRINKAGE CR	N	1.00	Slabs

Sample Number: 24

Sample Type: R
Sample PCI: 79
Sample Area (Slabs): 24.00

Sample Comments:

65 JT SEAL DMG	H	24.00	Slabs
66 SMALL PATCH	L	2.00	Slabs
71 FAULTING	L	1.00	Slabs
74 JOINT SPALL	M	1.00	Slabs

Sample Number: 33

Sample Type: R
Sample PCI: 81
Sample Area (Slabs): 24.00

Sample Comments:

65 JT SEAL DMG	H	24.00	Slabs
71 FAULTING	L	1.00	Slabs
74 JOINT SPALL	M	1.00	Slabs

Sample Number: 42

Sample Type: R
Sample PCI: 83
Sample Area (Slabs): 24.00

Sample Comments:

65 JT SEAL DMG	H	24.00	Slabs
71 FAULTING	L	2.00	Slabs

Sample Number: 51

Sample Type: R
Sample PCI: 84
Sample Area (Slabs): 24.00

Sample Comments:

65 JT SEAL DMG	H	24.00	Slabs
71 FAULTING	L	1.00	Slabs

Sample Number: 60

Sample Type: R
Sample PCI: 78
Sample Area (Slabs): 24.00

Sample Comments:

65 JT SEAL DMG	H	24.00	Slabs
66 SMALL PATCH	H	1.00	Slabs
66 SMALL PATCH	L	1.00	Slabs
66 SMALL PATCH	M	1.00	Slabs
74 JOINT SPALL	L	1.00	Slabs

Sample Number: 69

Sample Type: R
Sample PCI: 84
Sample Area (Slabs): 24.00

Sample Comments:

65 JT SEAL DMG	H	24.00	Slabs
66 SMALL PATCH	L	2.00	Slabs
66 SMALL PATCH	M	1.00	Slabs

Sample Number: 75

Sample Type: R
Sample PCI: 88
Sample Area (Slabs): 12.00

Sample Comments:

65 JT SEAL DMG	H	12.00	Slabs

RE-INSPECTION REPORT
MAQUOKETA MUNICIPAL AIRPORT

Branch - Section ID: T01MQ - 001

Branch Name: TAXIWAY 01 Use: TAXIWAY

LCD: 10/1/2006
Surface Type: PCC
Rank: P
Section Area (sf): 12,603.00
Length (ft): 264.00
Width (ft): 30.00
From: SEE MAP
To: SEE MAP

PCI Family: IowaPCCTW_NCE_GenBasicLocal

Slabs: 115
Slab Length (ft): 11.00
Slab Width (ft): 10.00
Joint Length (ft): 1,938.19

Section Comments:

Last Insp Date: 11/11/2023
PCI: 85
Total Samples: 5
Surveyed: 4

Inspection Comments:

Sample Number: 02

Sample Type: R
Sample PCI: 83
Sample Area (Slabs): 20.00

Sample Comments:

63 LINEAR CR	L	1.00	Slabs
65 JT SEAL DMG	H	20.00	Slabs

Sample Number: 03

Sample Type: R
Sample PCI: 88
Sample Area (Slabs): 12.00

Sample Comments:

65 JT SEAL DMG	H	12.00	Slabs

Sample Number: 04

Sample Type: R
Sample PCI: 88
Sample Area (Slabs): 16.00

Sample Comments:

65 JT SEAL DMG	H	16.00	Slabs

Sample Number: 05

Sample Type: R
Sample PCI: 84
Sample Area (Slabs): 21.00

Sample Comments:

65 JT SEAL DMG	H	21.00	Slabs
75 CORNER SPALL	M	1.00	Slabs

RE-INSPECTION REPORT
MAQUOKETA MUNICIPAL AIRPORT

Branch - Section ID: T03MQ - 001

Branch Name: TAXIWAY 03 Use: TAXIWAY

LCD: 10/1/2006
Surface Type: AAC
Rank: P
Section Area (sf): 1,592.00
Length (ft): 82.00
Width (ft): 25.00
From: SEE MAP
To: SEE MAP

PCI Family: IowaAACTW_NCE

Slabs:
Slab Length (ft):
Slab Width (ft):
Joint Length (ft):

Section Comments: Majority of this section has been removed

Last Insp Date: 11/11/2023
PCI: 70
Total Samples: 1
Surveyed: 1

Inspection Comments:

Sample Number: 01

Sample Type: R
Sample PCI: 70
Sample Area (SF): 1,592.00

Sample Comments:

48 L & T CR	L	60.00	Ft	LS
57 WEATHERING	H	100.00	SF	
57 WEATHERING	M	1,492.00	SF	

RE-INSPECTION REPORT
MAQUOKETA MUNICIPAL AIRPORT

Branch - Section ID: TAMQ - 001

Branch Name: TAXIWAY A Use: TAXIWAY

LCD: 6/1/1982
Surface Type: AC
Rank: P
Section Area (sf): 5,200.00
Length (ft): 140.00
Width (ft): 30.00
From: APRON
To: SECTION 02

PCI Family: IowaACTW_NCE

Slabs:
Slab Length (ft):
Slab Width (ft):
Joint Length (ft):

Section Comments:

Last Insp Date: 11/11/2023
PCI: 11
Total Samples: 1
Surveyed: 1

Inspection Comments:

Sample Number: 01

Sample Type: R
Sample PCI: 11
Sample Area (SF): 5,200.00

Sample Comments:

41 ALLIGATOR CR	M	5,200.00	SF	PARTIAL SEALING OF ALLIGA
52 RAVELING	H	45.00	SF	ST
56 SWELLING	L	40.00	SF	

RE-INSPECTION REPORT
MAQUOKETA MUNICIPAL AIRPORT

Branch - Section ID: TAMQ - 002

Branch Name: TAXIWAY A Use: TAXIWAY

LCD: 10/1/2006
Surface Type: AC
Rank: P
Section Area (sf): 2,748.00
Length (ft): 60.00
Width (ft): 30.00
From: SECTION 01
To: RUNWAY

PCI Family: IowaACTW_NCE

Slabs:
Slab Length (ft):
Slab Width (ft):
Joint Length (ft):

Section Comments:

Last Insp Date: 11/11/2023
PCI: 55
Total Samples: 1
Surveyed: 1

Inspection Comments:

Sample Number: 01

Sample Type: R
Sample PCI: 55
Sample Area (SF): 2,748.00

Sample Comments:

41 ALLIGATOR CR	M	10.00	SF	
48 L & T CR	L	96.00	Ft	LS AT BRK
48 L & T CR	L	212.00	Ft	LS
56 SWELLING	L	30.00	SF	AT BREAK
57 WEATHERING	H	200.00	SF	
57 WEATHERING	M	2,548.00	SF	

RE-INSPECTION REPORT
MAQUOKETA MUNICIPAL AIRPORT

Branch - Section ID: TBMQ - 001

Branch Name: TAXIWAY B Use: TAXIWAY

LCD: 6/2/2005
Surface Type: PCC
Rank: P
Section Area (sf): 9,948.00
Length (ft): 387.00
Width (ft): 25.00
From: T03MQ-01
To: APRON 01 SECT 01

PCI Family: IowaPCCTW_NCE_GenBasicLocal

Slabs: 65
Slab Length (ft): 12.30
Slab Width (ft): 12.50
Joint Length (ft): 1,181.00

Section Comments: Old pavement was removed. Pvmt is now PCC.

Last Insp Date: 11/11/2023
PCI: 77
Total Samples: 3
Surveyed: 3

Inspection Comments:

Sample Number: 01

Sample Type: R
Sample PCI: 58
Sample Area (Slabs): 25.00

Sample Comments:

62 CORNER BREAK	L	1.00	Slabs
63 LINEAR CR	L	1.00	Slabs
63 LINEAR CR	M	1.00	Slabs
65 JT SEAL DMG	H	25.00	Slabs
71 FAULTING	L	3.00	Slabs
72 SHAT. SLAB	L	1.00	Slabs
74 JOINT SPALL	L	2.00	Slabs
74 JOINT SPALL	M	1.00	Slabs
75 CORNER SPALL	L	1.00	Slabs

Sample Number: 02

Sample Type: R
Sample PCI: 88
Sample Area (Slabs): 20.00

Sample Comments:

65 JT SEAL DMG	H	20.00	Slabs

Sample Number: 03

Sample Type: R
Sample PCI: 88
Sample Area (Slabs): 20.00

Sample Comments:

65 JT SEAL DMG	H	20.00	Slabs

Branch - Section ID: TBMQ - 002

Branch Name: TAXIWAY B Use: TAXIWAY

LCD: 10/2/2006
Surface Type: PCC
Rank: P
Section Area (sf): 12,787.00
Length (ft): 287.00
Width (ft): 25.00
From: SEE MAP
To: SEE MAP

PCI Family: IowaPCCTW_NCE_GenBasicLocal

Slabs: 82
Slab Length (ft): 12.50
Slab Width (ft): 12.50
Joint Length (ft): 1,489.89

Section Comments:

Last Insp Date: 11/11/2023
PCI: 84
Total Samples: 5
Surveyed: 4

Inspection Comments:

Sample Number: 02

Sample Type: R
Sample PCI: 87
Sample Area (Slabs): 21.00

Sample Comments:

65 JT SEAL DMG	H	21.00	Slabs
73 SHRINKAGE CR	N	1.00	Slabs

Sample Number: 03

Sample Type: R
Sample PCI: 83
Sample Area (Slabs): 21.00

Sample Comments:

65 JT SEAL DMG	H	21.00	Slabs
73 SHRINKAGE CR	N	1.00	Slabs
75 CORNER SPALL	M	1.00	Slabs

Sample Number: 04

Sample Type: R
Sample PCI: 83
Sample Area (Slabs): 18.00

Sample Comments:

65 JT SEAL DMG	H	18.00	Slabs
73 SHRINKAGE CR	N	1.00	Slabs
74 JOINT SPALL	M	1.00	Slabs

Sample Number: 05

Sample Type: R
Sample PCI: 83
Sample Area (Slabs): 16.00

Sample Comments:

65 JT SEAL DMG	H	16.00	Slabs
74 JOINT SPALL	M	2.00	Slabs

RE-INSPECTION REPORT
MAQUOKETA MUNICIPAL AIRPORT

Branch - Section ID: TH01MQ - 001

Branch Name: T-HANGAR 01 Use: T-HANGAR

LCD: 3/1/1984
Surface Type: AC
Rank: P
Section Area (sf): 1,604.00
Length (ft): 60.00
Width (ft): 25.00
From: TAXIWAY 03
To: SECTION 02

PCI Family: IowaAsphaltTH_Northern

Slabs:
Slab Length (ft):
Slab Width (ft):
Joint Length (ft):

Section Comments:

Last Insp Date: 11/11/2023
PCI: 6
Total Samples: 1
Surveyed: 1

Inspection Comments:

Sample Number: 01

Sample Type: R
Sample PCI: 6
Sample Area (SF): 1,604.00

Sample Comments:

41 ALLIGATOR CR	M	1,604.00	SF	
52 RAVELING	H	20.00	SF	ST
57 WEATHERING	H	120.00	SF	ST

Branch - Section ID: TH01MQ - 002

Branch Name: T-HANGAR 01 Use: T-HANGAR

LCD: 6/1/2000
Surface Type: PCC
Rank: P
Section Area (sf): 7,718.00
Length (ft): 225.00
Width (ft): 35.00
From: SEE MAP
To: SEE MAP

PCI Family: IowaPCCTH_NE&NCE

Slabs: 45
Slab Length (ft): 14.70
Slab Width (ft): 11.60
Joint Length (ft): 935.56

Section Comments:

Last Insp Date: 11/11/2023
PCI: 40
Total Samples: 3
Surveyed: 3

Inspection Comments:

Sample Number: 01

Sample Type: R
Sample PCI: 43
Sample Area (Slabs): 15.00

Sample Comments:

62 CORNER BREAK	M	2.00	Slabs
63 LINEAR CR	L	2.00	Slabs
63 LINEAR CR	M	5.00	Slabs
65 JT SEAL DMG	H	15.00	Slabs
74 JOINT SPALL	L	1.00	Slabs

Sample Number: 02

Sample Type: R
Sample PCI: 37
Sample Area (Slabs): 15.00

Sample Comments:

62 CORNER BREAK	M	2.00	Slabs
63 LINEAR CR	L	3.00	Slabs
63 LINEAR CR	M	6.00	Slabs
65 JT SEAL DMG	H	15.00	Slabs
74 JOINT SPALL	M	1.00	Slabs

Sample Number: 03

Sample Type: R
Sample PCI: 42
Sample Area (Slabs): 15.00

Sample Comments:

62 CORNER BREAK	L	2.00	Slabs
63 LINEAR CR	L	4.00	Slabs
63 LINEAR CR	M	4.00	Slabs
65 JT SEAL DMG	H	15.00	Slabs
72 SHAT. SLAB	L	1.00	Slabs
74 JOINT SPALL	L	1.00	Slabs

RE-INSPECTION REPORT
MAQUOKETA MUNICIPAL AIRPORT

Branch - Section ID: TH01MQ - 003

Branch Name: T-HANGAR 01 Use: T-HANGAR

LCD: 1/1/1999
Surface Type: PCC
Rank: P
Section Area (sf): 7,951.00
Length (ft): 415.00
Width (ft): 20.00
From: SEE MAP
To: SEE MAP

PCI Family: IowaPCCTH_NE&NCE

Slabs: 80
Slab Length (ft): 10.00
Slab Width (ft): 10.00
Joint Length (ft): 1,173.49

Section Comments:

Last Insp Date: 11/11/2023
PCI: 46
Total Samples: 4
Surveyed: 3

Inspection Comments:

Sample Number: 01

Sample Type: R
Sample PCI: 40
Sample Area (Slabs): 23.00

Sample Comments:

62	CORNER BREAK	L	1.00 Slabs
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	23.00 Slabs
71	FAULTING	M	1.00 Slabs
72	SHAT. SLAB	L	1.00 Slabs
72	SHAT. SLAB	M	2.00 Slabs
74	JOINT SPALL	L	1.00 Slabs
74	JOINT SPALL	M	2.00 Slabs

Sample Number: 02

Sample Type: R
Sample PCI: 67
Sample Area (Slabs): 21.00

Sample Comments:

62	CORNER BREAK	M	1.00 Slabs
63	LINEAR CR	L	1.00 Slabs
63	LINEAR CR	M	1.00 Slabs
65	JT SEAL DMG	H	21.00 Slabs
74	JOINT SPALL	L	1.00 Slabs
74	JOINT SPALL	L	1.00 Slabs
74	JOINT SPALL	M	1.00 Slabs

Sample Number: 03

Sample Type: R

Sample PCI: 32

Sample Area (Slabs): 20.00

Sample Comments:

62 CORNER BREAK	M	2.00	Slabs
63 LINEAR CR	L	2.00	Slabs
63 LINEAR CR	M	6.00	Slabs
65 JT SEAL DMG	H	20.00	Slabs
72 SHAT. SLAB	L	1.00	Slabs
72 SHAT. SLAB	M	1.00	Slabs
74 JOINT SPALL	M	2.00	Slabs
75 CORNER SPALL	L	2.00	Slabs

APPENDIX D

WORK HISTORY REPORT

WORK HISTORY

Pavement Database: IA 2023
Network ID: OQW

Generate Date: 4/30/2024

Network: MAQUOKETA MUNICIPAL AIRPORT

Branch - Section ID: A01MQ - 001

LCD: 6/1/1986
Use: APRON
Rank: P
Surface: PCC

Length (ft): 185.00
Width (ft): 160.00
True Area (sf): 28,682.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
06-01-1986	NC-PC	New Construction - PCC	$0.00	0.00	True	-

Branch - Section ID: A01MQ - 002

LCD: 6/2/2005
Use: APRON
Rank: P
Surface: PCC

Length (ft): 150.00
Width (ft): 95.00
True Area (sf): 14,000.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
06-02-2005	CR-PC	Complete Reconstruction - PCC	$0.00	5.00	True	5" P-505
06-01-2005	SB-AG	Subbase - Aggregate	$0.00	12.00	False	12" P-154/RAP
10-01-1998	SS-FS	Surface Seal - Fog Seal	$0.00	0.00	False	-
06-01-1972	NC-AC	New Construction - AC	$0.00	0.00	True	-

Branch - Section ID: R15MQ - 001

LCD: 10/15/2006
Use: RUNWAY
Rank: P
Surface: PCC

Length (ft): 3,278.00
Width (ft): 60.00
True Area (sf): 198,248.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
01-01-2016	PA-PP	Patching - PCC Partial Depth	$0.00	0.00	False	FIELD ESTIMATE
10-15-2006	CR-PC	Complete Reconstruction - PCC	$0.00	0.00	True	-
10-01-1998	SS-FS	Surface Seal - Fog Seal	$0.00	0.00	False	-
06-01-1982	NC-AC	New Construction - AC	$0.00	0.00	True	-

Branch - Section ID: T01MQ - 001

LCD: 10/1/2006
Use: TAXIWAY
Rank: P
Surface: PCC

Length (ft): 264.00
Width (ft): 30.00
True Area (sf): 12,603.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
10-01-2006	CR-PC	Complete Reconstruction - PCC	$0.00	0.00	True	-
10-01-1998	SS-FS	Surface Seal - Fog Seal	$0.00	0.00	False	-
06-01-1982	OL-AS	Overlay - AC Structural	$0.00	0.00	True	-

WORK HISTORY

Pavement Database: IA 2023
Network ID: OQW

Generate Date: 4/30/2024

Branch - Section ID: T03MQ - 001

LCD: 10/1/2006
Use: TAXIWAY
Rank: P
Surface: AAC

Length (ft): 82.00
Width (ft): 25.00
True Area (sf): 1,592.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
06-01-2023	CS-AC	Crack Sealing - AC	$0.00	0.00	False	Estimated Date
10-01-2006	OL-AS	Overlay - AC Structural	$0.00	0.00	True	-
10-01-1998	ST-SS	Surface Treatment - Slurry Seal	$0.00	0.00	False	-
06-01-1982	NC-AC	New Construction - AC	$0.00	0.00	True	-

Branch - Section ID: TAMQ - 001

LCD: 6/1/1982
Use: TAXIWAY
Rank: P
Surface: AC

Length (ft): 140.00
Width (ft): 30.00
True Area (sf): 5,200.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
06-01-2023	CS-AC	Crack Sealing - AC	$0.00	0.00	False	Estimated Date
10-01-1998	ST-SS	Surface Treatment - Slurry Seal	$0.00	0.00	False	-
06-01-1982	NC-AC	New Construction - AC	$0.00	0.00	True	-

Branch - Section ID: TAMQ - 002

LCD: 10/1/2006
Use: TAXIWAY
Rank: P
Surface: AC

Length (ft): 60.00
Width (ft): 30.00
True Area (sf): 2,748.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
06-01-2023	CS-AC	Crack Sealing - AC	$0.00	0.00	False	Estimated Date
10-01-2006	NC-AC	New Construction - AC	$0.00	0.00	True	-

Branch - Section ID: TBMQ - 001

LCD: 6/2/2005
Use: TAXIWAY
Rank: P
Surface: PCC

Length (ft): 387.00
Width (ft): 25.00
True Area (sf): 9,948.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
06-02-2005	CR-PC	Complete Reconstruction - PCC	$0.00	5.00	True	5" P-505
06-01-2005	SB-AG	Subbase - Aggregate	$0.00	12.00	False	12" P-154/RAP
10-01-1998	SS-FS	Surface Seal - Fog Seal	$0.00	0.00	False	-
06-01-1982	NC-AC	New Construction - AC	$0.00	0.00	True	-

WORK HISTORY

Branch - Section ID: TBMQ - 002

LCD: 10/2/2006
Use: TAXIWAY
Rank: P
Surface: PCC

Length (ft): 287.00
Width (ft): 25.00
True Area (sf): 12,787.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
10-02-2006	CR-PC	Complete Reconstruction - PCC	$0.00	5.00	True	5" P-505
10-01-2006	SB-AG	Subbase - Aggregate	$0.00	12.00	False	12" P-154/RAP

Branch - Section ID: TH01MQ - 001

LCD: 3/1/1984
Use: T-HANGAR
Rank: P
Surface: AC

Length (ft): 60.00
Width (ft): 25.00
True Area (sf): 1,604.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
06-01-2023	CS-AC	Crack Sealing - AC	$0.00	0.00	False	Estimated Date
06-01-1998	ST-SS	Surface Treatment - Slurry Seal	$0.00	0.00	False	-
03-01-1984	BCALC	Back-calculated Construction	$0.00	0.00	True	UNKNOWN; CONSTRUCTED PRIOR TO 1994 PER GOOGLE EARTH

Branch - Section ID: TH01MQ - 002

LCD: 6/1/2000
Use: T-HANGAR
Rank: P
Surface: PCC

Length (ft): 225.00
Width (ft): 35.00
True Area (sf): 7,718.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
06-01-2000	NC-PC	New Construction - PCC	$0.00	0.00	True	ESTIMATED VIA AERIAL, BETWEEN 1994-2000

Branch - Section ID: TH01MQ - 003

LCD: 1/1/1999
Use: T-HANGAR
Rank: P
Surface: PCC

Length (ft): 415.00
Width (ft): 20.00
True Area (sf): 7,951.00

Work Date	Work Code	Work Description	Cost	Thickness (in)	Major MR	Comments
01-01-1999	NC-PC	New Construction - PCC	$0.00	0.00	True	EST. VIA GOOGLE EARTH; CONSTRUCTED BETWEEN 1994-2004

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, PCC 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—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
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—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
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. 2024 unit costs for localized preventive maintenance actions.

Maintenance Action	Unit Cost
Asphalt Patch—Asphalt-Surfaced Pavement	$15.54/sf
Crack Sealing—Asphalt-Surfaced Pavement	$2.66/lf
Partial Depth PCC Patch—PCC Pavement	$39.82/sf
Full Depth PCC Patch—PCC Pavement	$17.78/sf
Crack Sealing—PCC Pavement	$3.20/lf
Joint Sealing—PCC Pavement	$3.20/lf
Grinding—PCC Pavement	$0.38/sf
Slab Replacement—PCC Pavement	$17.78/sf

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

Table E-4. 2024 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	$11.04	$5.22	$5.22	$5.22	$0.00	$0.00	$0.00
PCC	$18.44	$8.72	$8.72	$8.72	$0.00	$0.00	$0.00

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

APPENDIX F

YEAR 2024 LOCALIZED PREVENTIVE MAINTENANCE DETAILS

Table F-1. Year 2024 localized preventive maintenance details.

Branch	Section	Distress Type	Severity	Distress Quantity	Distress Unit	Maintenance Action	Unit Cost	2024 Estimated Cost
A01MQ	01	LTD Cracking	Medium	4	Slabs	Crack Sealing - PCC	$3.20	$128
A01MQ	01	Joint Seal Damage	High	287	Slabs	Joint Seal (Localized)	$3.20	$17,287
A01MQ	01	Faulting	Medium	2	Slabs	Grinding (Localized)	$0.38	$8
A01MQ	01	Joint Spalling	Medium	4	Slabs	Patching - PCC Partial Depth	$39.82	$1,025
A01MQ	01	Corner Break	Low	6	Slabs	Crack Sealing - PCC	$3.20	$157
A01MQ	02	LTD Cracking	Medium	2	Slabs	Crack Sealing - PCC	$3.20	$62
A01MQ	02	Joint Seal Damage	High	147	Slabs	Joint Seal (Localized)	$3.20	$8,426
R15MQ	01	Small Patch	High	9	Slabs	Patching - PCC Full Depth	$17.78	$423
R15MQ	01	Joint Spalling	Medium	18	Slabs	Patching - PCC Partial Depth	$39.82	$4,543
R15MQ	01	Joint Seal Damage	High	1,802	Slabs	Joint Seal (Localized)	$3.20	$110,345
R15MQ	01	Small Patch	Medium	18	Slabs	Patching - PCC Full Depth	$17.78	$845
T01MQ	01	Corner Spalling	Medium	2	Slabs	Patching - PCC Partial Depth	$39.82	$179
T01MQ	01	Joint Seal Damage	High	115	Slabs	Joint Seal (Localized)	$3.20	$6,202
T03MQ	01	Weathering	High	100	SqFt	Patching - AC Deep	$15.54	$1,554
TBMQ	01	Corner Break	Low	1	Slabs	Crack Sealing - PCC	$3.20	$26
TBMQ	01	Joint Seal Damage	High	65	Slabs	Joint Seal (Localized)	$3.20	$3,779
TBMQ	01	LTD Cracking	Medium	1	Slabs	Crack Sealing - PCC	$3.20	$40
TBMQ	01	Shattered Slab	Low	1	Slabs	Crack Sealing - PCC	$3.20	$79
TBMQ	01	Joint Spalling	Medium	1	Slabs	Patching - PCC Partial Depth	$39.82	$257
TBMQ	02	Corner Spalling	Medium	1	Slabs	Patching - PCC Partial Depth	$39.82	$116
TBMQ	02	Joint Seal Damage	High	82	Slabs	Joint Seal (Localized)	$3.20	$4,768
TBMQ	02	Joint Spalling	Medium	3	Slabs	Patching - PCC Partial Depth	$39.82	$832

Table F-1. Year 2024 localized preventive maintenance details (continued).

Table Notes:

1. See Figure 3 for the location of the branch and section.
2. Distress types are defined by ASTM D5340-20. 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 adjustment to reflect specific conditions at Maquoketa Municipal Airport.

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