Appendix 6

Airport Pavement Assessments

Pavement Evaluation/Maintenance Management Program 2018

Aurora State Airport

Oregon

DEPARTMENT OF AVIATION

Pavement Evaluation/ Maintenance Management Program 2018

Pavement Consultants Inc.

Aurora State Airport

Oregon Department of Aviation

2018 Pavement Evaluation / Maintenance Management Program

Final Report – Individual Airports
Functional Category 2, Central Climatic Zone

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Introduction

The Oregon Department of Aviation has been collecting pavement condition information at eligible airports since the mid-1980s. In January 1995 the Federal Aviation Administration (FAA) mandated that any airport sponsor receiving and/or requesting federal funds for pavement improvement projects must have implemented a pavement maintenance management program. Through the Department's system planning efforts, the airports included in the Department's Pavement Evaluation / Maintenance Management Program have been complying with the intent of the law since the mid-1980s, well ahead of the FAA mandate. The information collected during this study ensures that your airport continues to comply with the Federal mandate. The developed pavement maintenance management program, as it relates to an individual airport, is described in this report.

The Oregon Department of Aviation routinely provides information to airport owners and operators throughout the State that assists them in maintaining and operating their airports. The State addresses many issues as part of their planning process, one of which is to provide to each individual airport, on a three-year cycle, a report on pavement condition. Through the statewide study, pavement maintenance management programs for all eligible airports in the state are efficiently and economically completed through the Department of Aviation's Pavement Evaluation / Maintenance Management Program.

Each airport owner or operator makes frequent decisions about the timing and type of maintenance and repair activities that should be completed on their pavements to maintain acceptable surface condition and adequate load-carrying capacity. The pavement maintenance management program described in this document, and supplemented by the information contained in the attached report prepared specifically for your airport, will assist you in making necessary decisions about pavement maintenance and rehabilitation projects at your airport, and will ensure compliance with the Federal mandate.

To develop a pavement maintenance management program for each eligible airport, the Department of Aviation elected to conduct pavement evaluations (visual inspections), and to implement the PAVER pavement maintenance management software. These activities were completed as part of the Department's Continuous Aviation System Plan efforts. PAVER uses the evaluation results to efficiently identify pavements requiring maintenance and rehabilitation, and to establish project priorities. The software can also be used to assess overall pavement network condition, prepare and forecast the budgets required to maintain the network at an acceptable condition level, and identify required maintenance and rehabilitation activities.

The federally mandated pavement maintenance management program identifies five major requirements:

- **Pavement inventory**
- **Inspection schedule (detailed and monthly)**
- **Record keeping**
- **Information retrieval**
- **Program funding**

The approach taken to meet these program requirements for your airport is described in this report.

Pavement Inventory

The FAA-mandated Pavement Inventory requirement specifies that information about each piece of pavement at an airport be compiled. This information is to include, at a minimum: pavement location, pavement dimensions, pavement surface type, and last construction date. The process used to develop this information is discussed under "Records Review".

Additionally, information is collected about the pavements at an airport so its pavement network can be defined. After the pavement network is defined, pavement inspections can be completed and a pavement maintenance management program can be developed. The methodology for defining the pavement network follows the Records Review discussion.

Records Review

The first step in meeting FAA's pavement maintenance management program requirement is to develop a maintenance and construction history for all pavements at an airport. For more than 30 years the Oregon Department of Aviation has, for its eligible airports, been conducting pavement evaluations to determine existing condition. In 1991 Pavement Consultants Inc. began assisting the Department in their efforts to compile and update that information. The information collected was used to develop a pavement maintenance management program for each eligible airport as described in this report, and your attached individual airport report.

Previous State-sponsored projects identified pavement layout, pavement construction history and pavement condition at each eligible airport. During this inspection cycle these documents were reviewed, and follow-up inquiries on pavement construction history were directed to the Oregon Department of Aviation, the FAA, consultants and airport sponsors. Based on this review, pavement boundaries were identified at your airport and were placed on an AutoCAD-generated base map (see Figure 1 in your attached airport report). ***The established base map fulfills the FAA "Pavement Inventory" requirement for locating pavements, identifying their dimensions, and identifying pavement type and age.***

Network Definition

Once the pavement history at an airport has been compiled, individual pavement features can be identified, a process called network definition. These pavement features are defined on the basis of: primary use, construction history, and traffic pattern. Each airport is divided into features according to the guidelines contained in the current edition of ASTM International-Standard D5340, *Standard Test Method for Airport Condition Index Surveys*. The pavement features used in this project are defined as follows.

Network: Each eligible airport constitutes a separate pavement network.

Branch: A branch is any identifiable part of a pavement network that has a distinct function. Airfield pavements such as individual runways, taxiways and aprons are each considered to be a separate branch.

Section: A section is a subdivision of a branch and has consistent characteristics throughout its length or area. These characteristics include: pavement layer material type and thickness, construction history, traffic, and pavement condition. A section is the basic management unit of a pavement network, and is that portion of a branch over which a maintenance and rehabilitation project is likely to be completed.

Sample Unit: A sample unit is an arbitrarily defined portion of a pavement section that is used when performing detailed pavement inspections. It is the smallest subdivision in a pavement network. For flexible airport pavements such as asphalt concrete or surface treatment, sample units are about 5,000 square feet in area. For rigid (portland cement concrete) airport pavements, sample units typically include approximately 20 contiguous pavement slabs.

Beginning approximately 30 years ago, branches, sections and sample units were established for each eligible airport in the Oregon system. During this project, these divisions were reviewed and modified as required, based on changed conditions (new pavements, demolished pavements), or completion of any pavement-related maintenance and rehabilitation projects.

Branch and Section Names

Each pavement feature is assigned a name that allows it to be uniquely identified in the statewide airport system. Each branch name consists of a series of characters. The first character indicates the branch type: “R” for Runway, “T” for Taxiway, “A” for Apron or Helipad. The last two characters in the branch name identify the airport to which the branch belongs and were taken from the airport name. All branches for your airport carry this airport-specific two-letter identifier. The individual runway, taxiway, apron or helipad referenced is identified by characters located between the branch type (“R”, “T” or “A”) and your two-letter airport identifier. To the extent possible, these identifying characters were chosen to reflect the facility names you use. If the facility does not have a name it was assigned a number. In the case of runways, numbers are used that are the lower of the two runway numbers corresponding to compass bearing.

Located after a hyphen following the branch name are two- or three alpha-numeric characters. These characters identify the section within the branch. An example illustrating the naming convention is:

R17AU-01

which is the name for Runway 17/35, Aurora State Airport, Section 01.

The branches, sections and sample units identified for your airport are shown on Figure 2 in your attached individual airport report.

Network Identifiers

Several designators are used to describe information about a particular airport included in the State System Plan. These designators include: network identification, zone, functional category, funding group, ownership and climatic region.

Network Identification

Each airport in the statewide system is assigned a unique network identifier (name). This name is typically the name of the city in which the airport is located. The network identification name for your airport can be found in the appendices attached to your airport report. This network identification name is assigned so that an individual airport or a group of airports contained in the statewide database can be selected for evaluation. The statewide database contains information for all eligible airports in the State.

Zone

Zones are used to allow individual airports within the statewide database to be separately selected for analysis. The FAA airport designator is used as the zone designator.

Functional Category

Each airport is assigned a functional category based on its classification within the State System Plan. Each airport is assigned a functional category of either 1, 2, 3, 4 or 5 in accordance with the criteria set forth in the System Plan. These categories correspond to the following airport types: commercial service, business or high activity general aviation, regional general aviation, community general aviation, and low activity general aviation, respectively. The category assigned to your airport is listed in the appendices attached to your airport report. This category assignment allows groups of airports in different functional categories to be separately evaluated.

Funding Group

Airports in the State are categorized as either NPIAS or non-NPIAS. NPIAS designated airports are eligible for project funding under the FAA's Airport Improvement Program (AIP). Being designated as NPIAS or non-NPIAS in the database allows the Department to evaluate funding alternatives for the State airport system.

Ownership

Airport ownership is designated as Public, State or Private. This designation allows the Department to evaluate funding allocations based on eligibility for State and/or Federal funding.

Climatic Region

Each airport in the statewide system is assigned to one of three climatic regions - eastern, central or coastal. Because climatic conditions can impact pavement performance, assigning airports to a climatic region allows pavement performance to be more accurately modeled, resulting in more accurate pavement condition forecasts.

Branch or Section Identifiers

Several designators are used to describe a branch or section's function, importance or construction. These characteristics are: branch use, pavement rank, and surface type.

Branch Use

Branch use identifies the primary use of each distinct pavement area. For each airport pavement included in this study, a branch use of "Runway", "Taxiway", "Apron" or "Helipad" is assigned, as appropriate.

Pavement Rank

Pavement rank refers to the relative importance assigned to multiple facilities having the same branch use. Each pavement section is assigned a rank of primary ("P"), secondary ("S") or tertiary ("T") as appropriate. As an example, an airport with two runways might rank the more heavily used runway as primary and the lesser-used runway as secondary. The pavement rank assigned to each pavement section at your airport can be found in the appendices attached to your individual airport report.

Surface Type

Each pavement section is assigned a surface type designator based on the type of surface material present. Throughout the State six (6) surface types were encountered: asphalt overlay over asphalt concrete (AAC), asphalt concrete (AC), asphalt overlay over portland cement concrete (APC), portland cement concrete (PCC), surface treatment (ST), and chip seal (X). The surface type assigned to each pavement section at your airport is provided in the report appended to this document. ***Surface type identification fulfills one of FAA's "Pavement Inventory" requirements.***

Structural and Construction History Data

Available construction records for each airport were obtained from the Oregon Department of Aviation, Federal Aviation Administration, consultants, or airport sponsors. These records were reviewed to establish a last construction date for each pavement section. Additional information was requested from individual airport sponsors to update or clarify this information, as necessary. The last construction date and known construction history for each pavement section can be found on Figure 1 in your individual airport report. The last construction date is also identified in the reports found in the attached appendixes. For those pavement sections where information

was not available, a last construction date was assigned based on pavement condition. ***Last construction date identification fulfills the final FAA "Pavement Inventory" requirement.***

Field Verification

Information obtained through the records review and discussions with airport sponsors, Department of Aviation staff, FAA personnel and consultant staff was field-verified to ensure that each facility is accurately mapped and properly subdivided into branches and sections. Modifications to the maps, and/or branch and section divisions, were made as necessary wherever discrepancies in airport geometry, paving materials, or construction history were found during the visual inspections.

Inspection Schedule

The FAA's Pavement Maintenance Management Program guidelines require all airports seeking or receiving federal funds for pavement-related projects to complete both detailed and drive-by inspections. The guidelines require that detailed inspections be performed yearly, unless the inspections are conducted in accordance with the Pavement Condition Index methodology set forth in ASTM D5340, at which point detailed inspections are required once every three years. ***The Pavement Condition Index methodology is used to inspect Oregon's airports. Each airport is inspected on a three-year cycle thus complying with the FAA detailed inspection requirement.***

The drive-by inspections required by the FAA are to be completed monthly. These inspections are cursory inspections that are performed to detect any unexpected changes in pavement condition.

A description of the detailed inspection methodology, as well as an approach to completing the monthly drive-by inspections, is provided below.

Detailed Inspection

Methodology

Pavement Condition Index (PCI) surveys were performed in May and July 2018 for all airports included in this year's project. The surveys were performed using the Pavement Condition Index (PCI) methodology developed by the U.S. Army Corps of Engineers, and outlined in the current edition of ASTM D-5340, *Standard Test Method for Airport Condition Index Surveys*. This document defines distress types, severity levels, and methods for measuring and recording distresses.

The PCI procedure was developed to collect data that would provide engineers and managers with a numerical value indicating overall pavement condition, and that would reflect both pavement structural integrity and surface operational condition. The procedure was designed to be highly repeatable and was found to be well-correlated with the judgment of experienced pavement engineers.

A PCI survey is performed by measuring the amount and severity of certain defined distresses (defects) observed in a sample unit. Table 1 lists both the asphalt concrete and portland cement concrete pavement distress types considered in the PCI method, and also identifies their most common cause (load, climate/durability, other) as assigned by the PAVER software. Load-related distresses are apparent where the pavement has been over-stressed by traffic loads applied to its surface. Climate/durability-related distresses arise due to exposure to the environment. Other-related distresses are caused by actions not related to load or climate such as fuel spills or construction deficiencies.

Table 1. Pavement Condition Index Distress Types and Related Causes.

Asphalt Concrete		Portland Cement Concrete	
Pavement Distress	**Related Cause**	**Pavement Distress**	**Related Cause**
Alligator Cracking	Load	Blow-Up	Climate/Durability
Bleeding	Other	Corner Break	Load
Block Cracking	Climate/Durability	Cracks: Longitudinal, Transverse, and Diagonal	Load
Corrugation	Other	Durability ("D") Crack	Climate/Durability
Depression	Other	Joint Seal Damage	Climate/Durability
Jet Blast Erosion	Other	Patching, Small	Other
Joint Reflection Cracking	Climate/Durability	Patching, Large and Utility Cuts	Other
Longitudinal and Transverse Cracking	Climate/Durability	Popouts	Other
Oil Spillage	Other	Pumping	Other
Patching and Utility Cut Patching	Climate/Durability	Scaling, Map Cracking, Crazing	Other
Polished Aggregate	Other	Settlement or Faulting	Other
Raveling	Climate/Durability	Shattered Slab / Intersecting Cracks	Load
Rutting	Load	Shrinkage Cracks	Other
Shoving	Other	Spalling (Longitudinal and Transverse Joint)	Other
Slippage Cracking	Other	Spalling (Corner)	Other
Swell	Other	Alkali Silica Reaction (ASR)	Other
Weathering	Climate/Durability		

To obtain a statistically reliable PCI for a given pavement section it is not necessary to inspect all sample units in that section. A pre-determined number of randomly chosen sample units are selected for inspection based on the total number of sample units in the section. The sampling rates used during this study are shown in Table 2. The sampling rates contained in Table 2 result in data that are reliable at a 92 percent confidence level.

Table 2. Selection of Number of Sample Units to Inspect.

Flexible Pavement		Rigid Pavement	
N	n	N	n
1	1	1	1
2 - 3	2	2	2
4 - 6	3	3 - 4	3
7 - 13	4	5 - 6	4
14 - 38	5	7 - 8	5
39 +	6	9 - 11	6
		12 - 14	7
		15 - 19	8
		20 - 27	9
		28 - 38	10
		39 - 58	11
		59 - 104	12
		105 - 313	13
		314 +	14

Where: N = Total number of sample units in a pavement section
n = Number of sample units to be surveyed

Pavement Condition Index Calculation

To calculate a PCI for a given sample unit, each distress type observed is assigned a deduct value based on its density (frequency of occurrence) in that sample area, and its severity. All deducts are summed and subsequently adjusted (corrected) for the number of different distresses found. This corrected deduct value is subtracted from 100, the PCI for a "perfect" pavement, to arrive at a PCI for that particular sample unit. The PCI for a pavement section is the area-weighted average PCI value of all sample units evaluated in that section. Pavement Condition Ratings (PCRs) are associated with ranges of PCI values.

The color-coded Figure 3 in your attached individual airport report shows the PCRs and their associated PCI ranges, as well as the pavement condition at your airport in May or July 2018.

Monthly Drive-By Inspection

As part of the FAA-mandated pavement maintenance management program, a monthly drive-by inspection is required. This inspection is intended to identify abrupt changes in condition occurring since the last monthly inspection, and to record any maintenance activities completed during the previous month. This inspection can easily be accomplished by driving your airport and noting any changes or maintenance performed on the form provided in Figure 1. Each drive-by inspection must note the date the inspection was completed, and record any maintenance performed since the last inspection. These records must be kept on-file for five years.

Figure 1. Monthly Drive-By Inspection Form.

Airport: _____

Date: _____

Inspector: _____

Branch*	Section*	Distresses Observed	Maintenance Performed Since Last Inspection

* Refer to the "Airport Layout, Dimensions and Pavement Cross-Sections" or "Pavement Branch, Section and Sample Unit Layout" figures in your airport report.

Record Keeping and Data Retrieval

The FAA pavement maintenance management program requires that compiled records be kept for five years. To facilitate record keeping and data retrieval at the State level, the PAVER pavement maintenance management software was implemented. PAVER provides the Oregon Department of Aviation with a method for storing data and generating reports.

PAVER was developed by the U.S. Army Construction Engineering Research Laboratory (USA-CERL). The program uses the guidelines contained in the current edition of ASTM D5340 as its basis. The current version, Version 7.0.6, is a Windows-based program that can store pavement condition information, as well as construction and maintenance history information. Using the data stored in the PAVER database the user has many capabilities, including: evaluating current condition, predicting future condition, determining maintenance and rehabilitation needs, scheduling future inspections, and preparing budget estimates.

The statewide database containing the information for all evaluated airports was updated during this project. Information for each individual airport can easily be extracted from the statewide database. The database allows required records to be stored indefinitely, thus meeting the FAA requirement that records be maintained for a five-year period. Additionally, the software allows data to be retrieved quickly and efficiently.

After data were entered into the State's PAVER database for each inspected airport, the software was used to analyze the stored data and to generate useful reports. The reports described in Table 3 were generated for your airport and are provided as appendices to your individual airport report.

Table 3. PAVER Reports.

Report Name	Report Description
Branch Condition	Lists information about each branch, including: network identification, branch identification, name, use, number of sections, total branch area and the average and area-weighted average PCI for the entire branch.
Section Condition	Provides information about each section, including: branch identification and section number, last construction date, surface type, use, rank, section area, last inspection date, age of pavement at last inspection and the PCI at the last inspection.
Network Maintenance	Applies the stored distress maintenance policy to the pavement network and identifies the type and cost of routine maintenance required across the entire network. Information in this report is listed by section.
Re-Inspection	Summarizes the distress data collected during the most recent inspection and provides the PCI for each sample unit inspected, as well as summary information about the section.

Pavement Condition Prediction

To allow future pavement condition to be predicted, data collected throughout the State were used to generate "performance curves". The curves were developed based on surface type, use, airport functional category and climatic region. These curves (models) are used to predict future pavement condition by assuming the behavior of an individual pavement section is similar to the behavior of the pavement sections used to generate the "performance curve". Figures 2 through 10 show the “performance curves” used to model pavements in your airport’s functional category and climatic region.

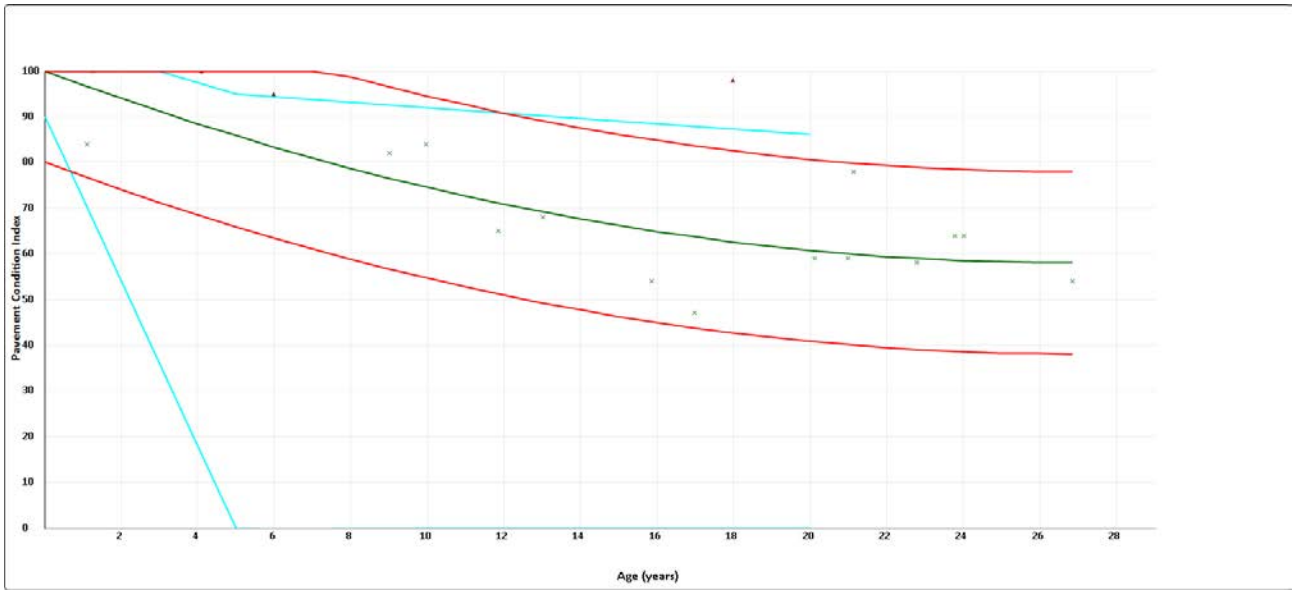


Figure 2. Performance Curve for Category 2 AAC Aprons – Central Oregon.

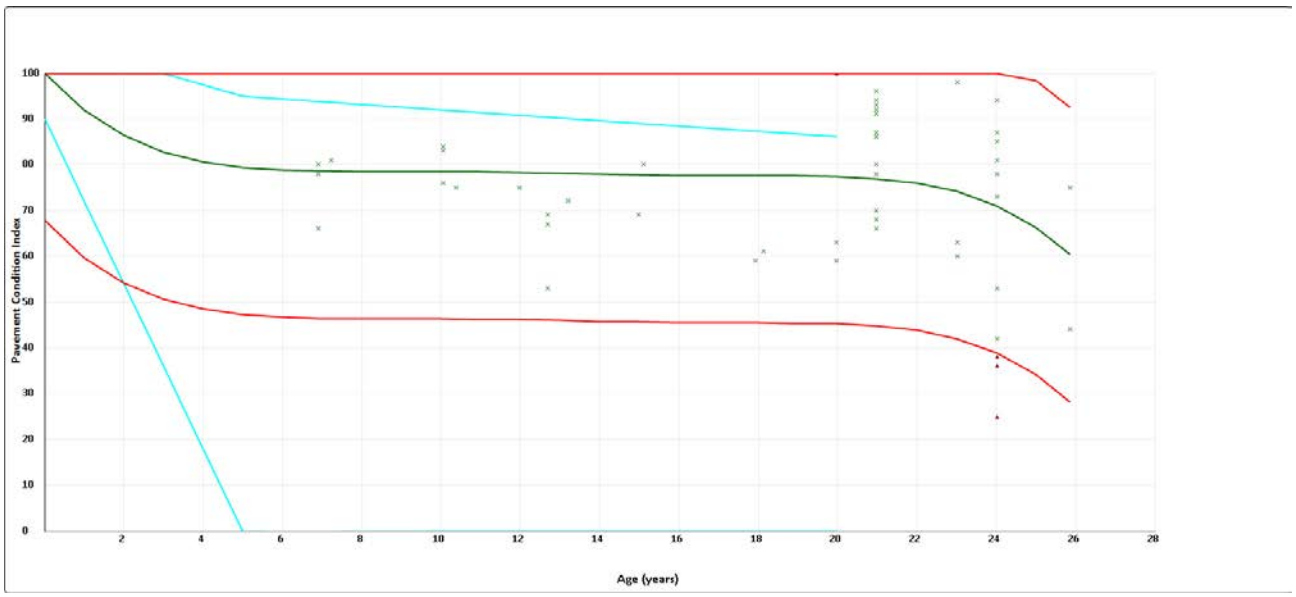


Figure 3. Performance Curve for Category 2 AAC Runways – Central Oregon.

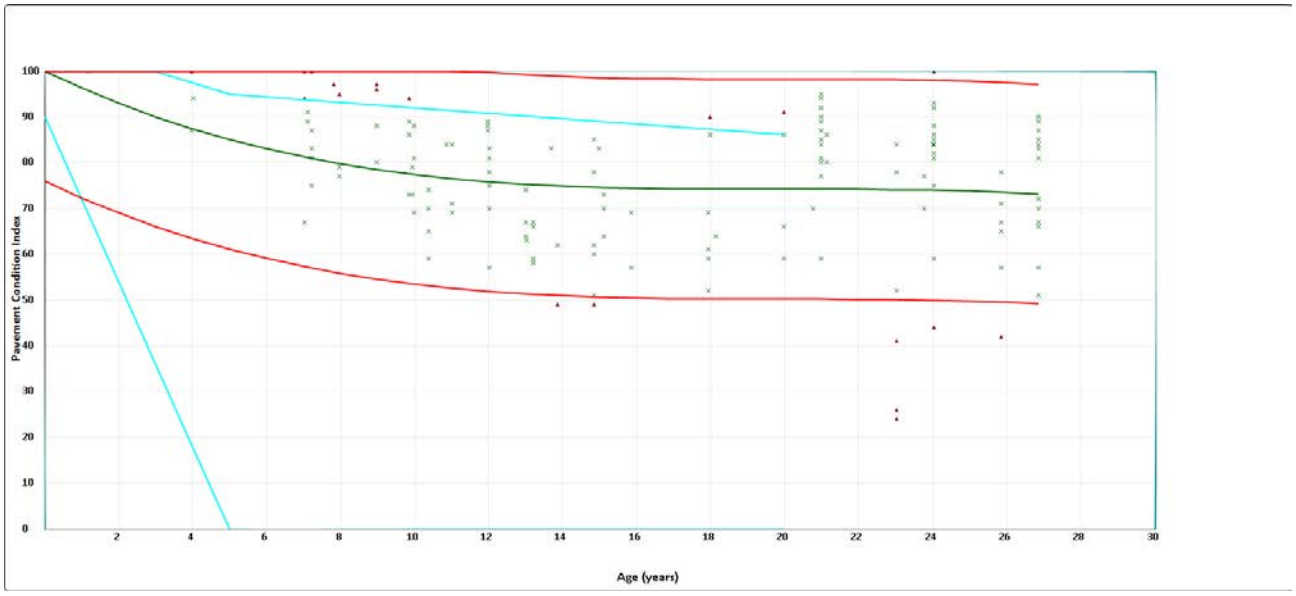


Figure 4. Performance Curve for Category 2 AAC Taxiways – Central Oregon.

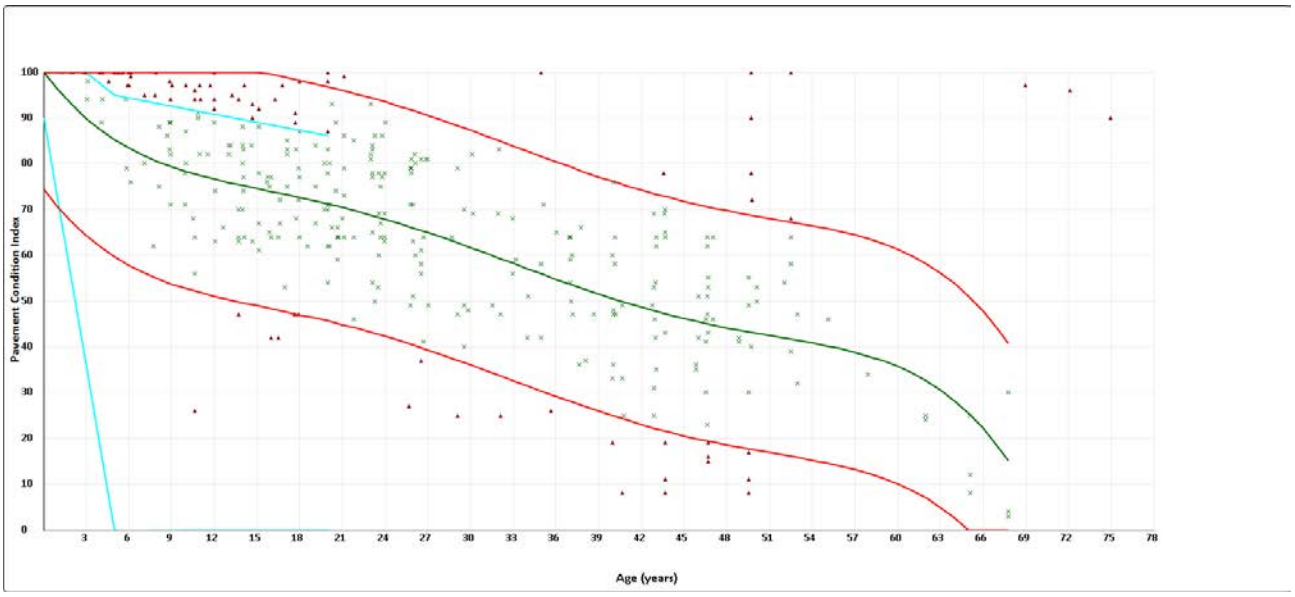


Figure 5. Performance Curve for Category 2 AC Aprons – Central Oregon.

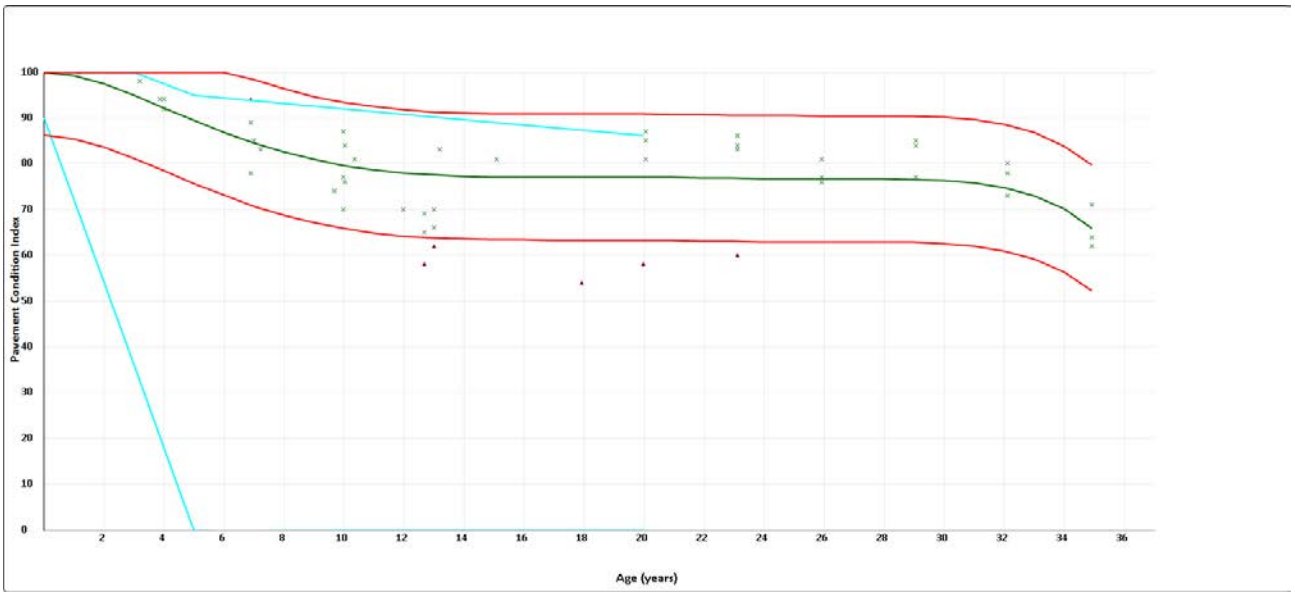


Figure 6. Performance Curve for Category 2 AC Runways – Central Oregon.

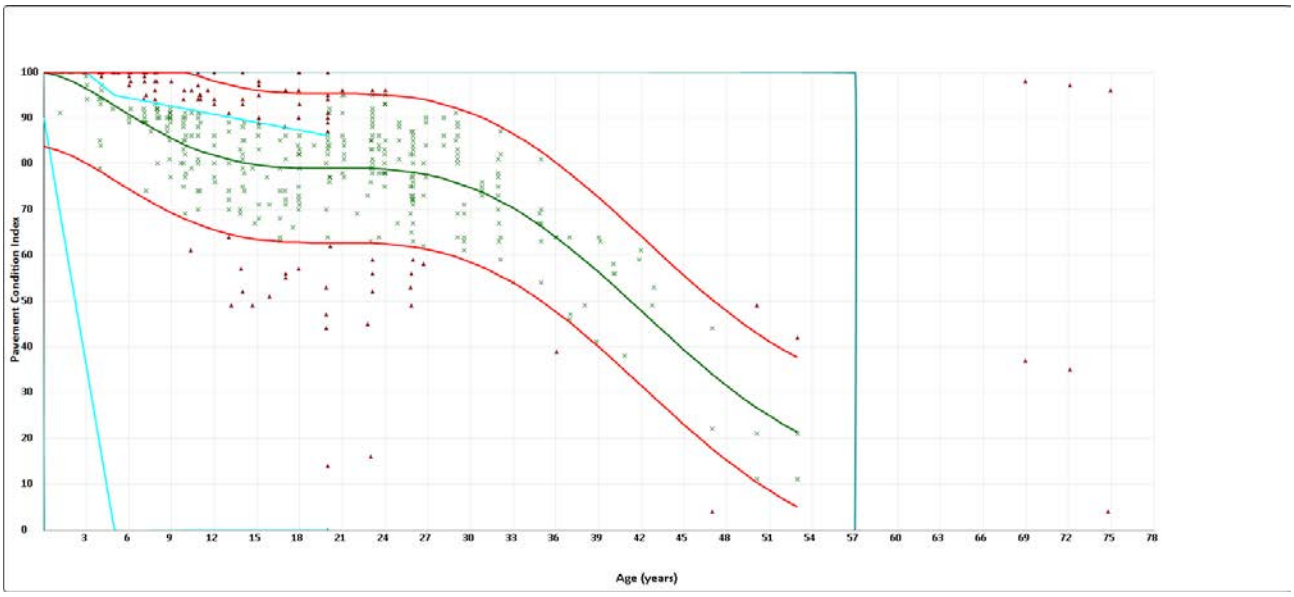


Figure 7. Performance Curve for Category 2 AC Taxiways – Central Oregon.

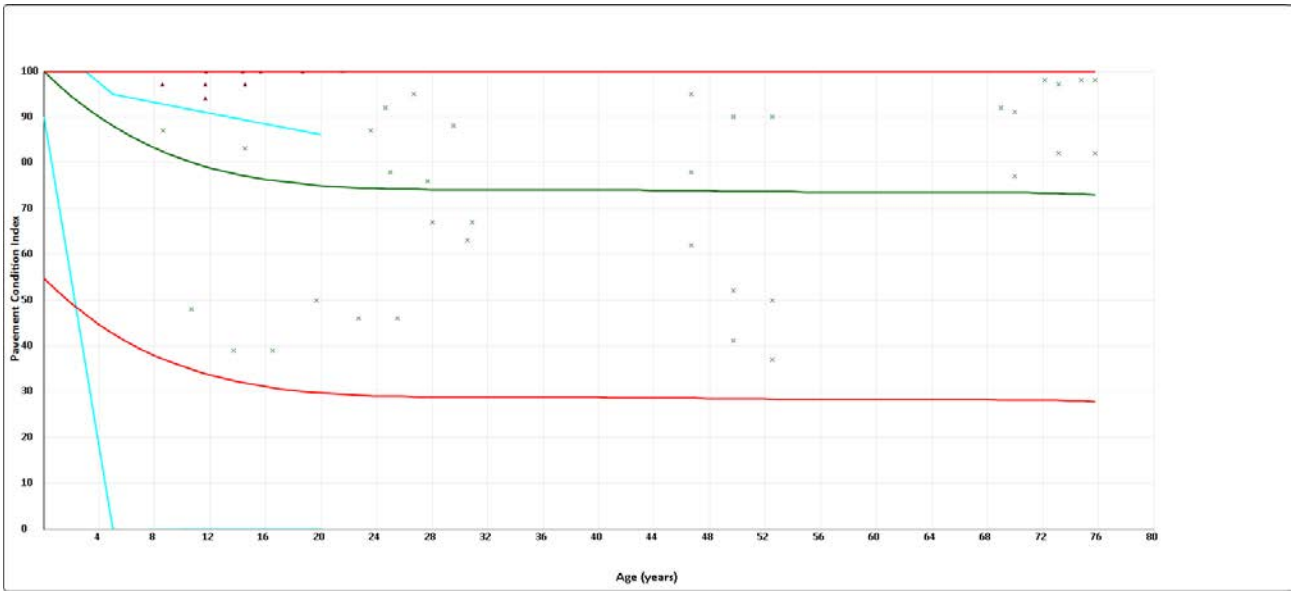


Figure 8. Performance Curve for Category 2 PCC Aprons – Central Oregon.

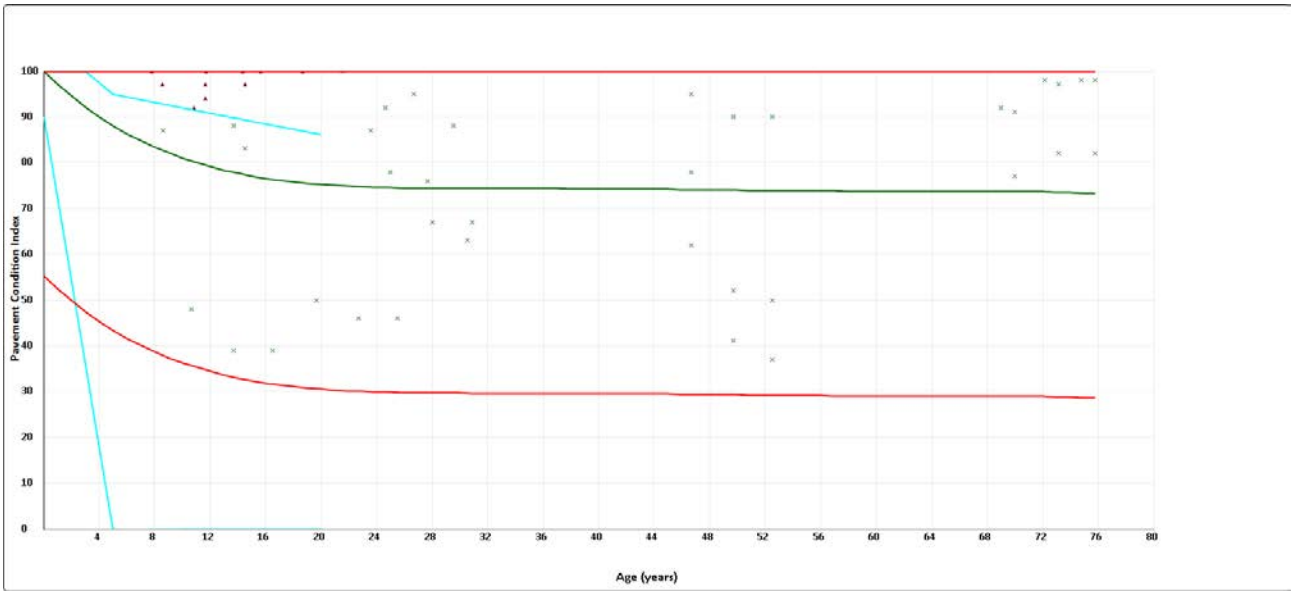


Figure 9. Performance Curve for Category 2 PCC Taxiways – Central Oregon.

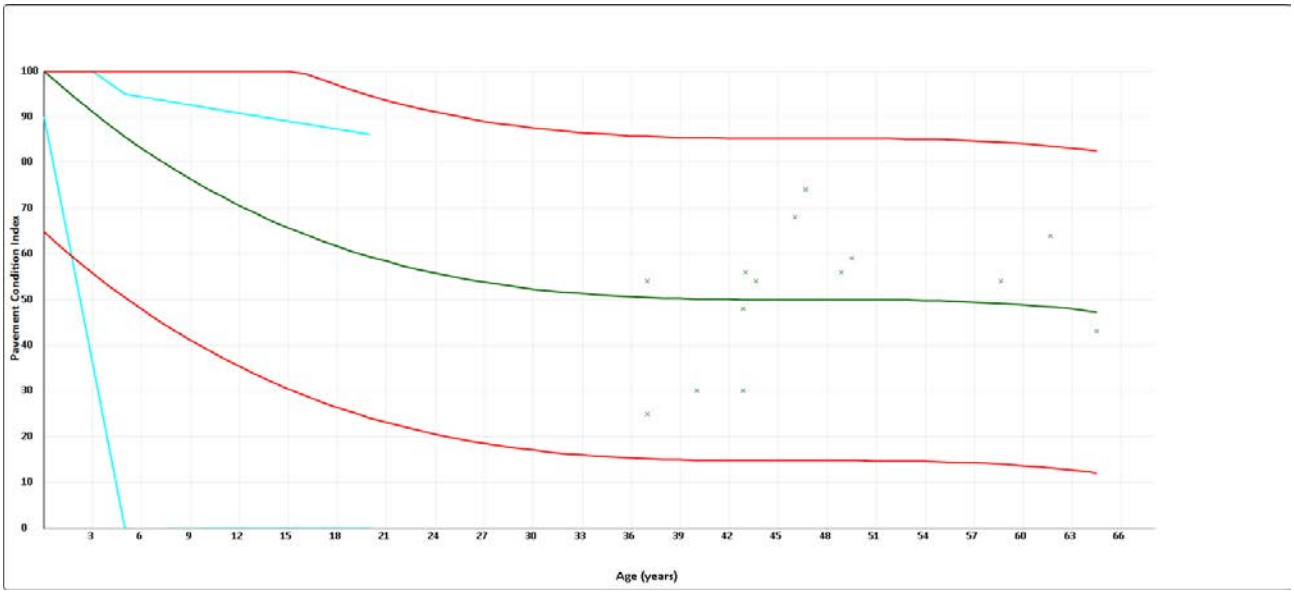


Figure 10. Performance Curve for Category 2 ST Aprons – Central Oregon.

Typical Maintenance Requirements

The PAVER-generated M&R Plan Report was used to identify when pavement maintenance and rehabilitation projects are required for a given pavement section, and what repair type is most appropriate. The repair strategies evaluated were:

- Reconstruction (pavements with Pavement Condition Indices less than 40).
- Overlay flexible pavements (runways with Pavement Condition Indices between 40 and 65, taxiways between 40 and 60, aprons between 40 and 55, and pavements exhibiting significant load-related distress with PCIs above the critical PCI).
- Global maintenance (fog seal, slurry seal or thin (2 inch) overlay) applied on a user-specified interval of 6 years for a fog seal, 6 years for a slurry seal, and 10 years for an overlay, unless the Pavement Condition Index (PCI) is above 90, at which point the global maintenance will be scheduled when the PCI falls to 90 or below. The global maintenance type recommended is based on the distress types observed in the section during the visual inspections.
- Routine maintenance, such as crack sealing and patching.

The M&R Plan Report was generated for a 5-year period beginning in June 2019. Included in the work plan are estimated costs for each recommended project. The costs are estimated by applying a unit cost for the recommended activity to the square foot area of the pavement section. The unit costs include adjustments for engineering and administration, mobilization, restriping and contingency. The unit costs used to develop the work plan activity cost are shown in Table 4. The recommended work plan for your airport is provided in your attached individual airport report.

Table 4. Unit Costs for the Various Work Plan Activities.

Activity	Unit	Unit Cost
Fog Seal	SF	$0.19
Slurry Seal	SF	$0.31
2” Asphalt Concrete Overlay	SF	$2.50
2” – 3” AC Mill and Replace	SF	$3.00 - $4.50
Reconstruction	SF	$7.95 – 13.6

Your Airport Report

AURORA STATE AIRPORT

This report describes how your Pavement Maintenance Management Program (PMMP) was developed. Your Program was developed as part of the Oregon Continuous Aviation System Plan sponsored in part by the Oregon Department of Aviation and the Federal Aviation Administration (FAA). The information and data contained in this report ensures you comply with the requirements of FAA Grant Assurance Number 11 which states that any airport requesting federal funds for pavement improvement projects must have implemented a pavement maintenance management program.

DATA COLLECTION

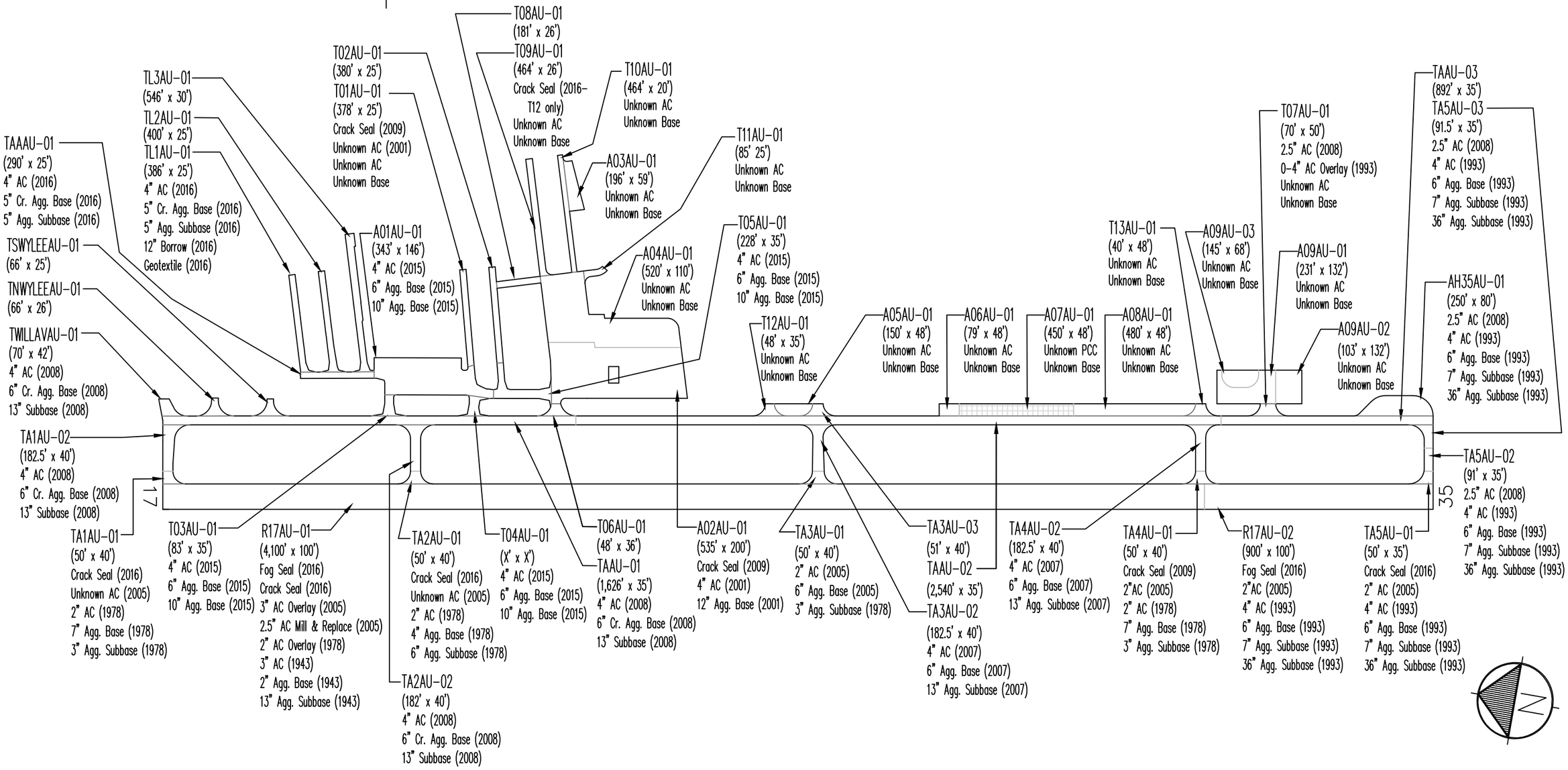
To determine how your pavements were constructed and their age, a records review was conducted. Figure AU-1 shows the records review results. This figure identifies pavement boundaries, dimensions, pavement layer types, thicknesses and dates of construction. The most recent construction date for each pavement can also be found in the Section Condition Report in Appendix 2. Figure AU-1 and the information contained in Appendices 1, 2 and 4 ensure that your airport complies with the "pavement inventory" requirement of FAA's PMMP guidelines.

The pavements at your airport were divided into branches, sections and sample units in accordance with the methodology outlined in the current edition of ASTM D5430, *Standard Test Method for Airport Condition Index Surveys*. The branches, sections and sample units established at your airport are shown in Figure AU-2. A Branch Condition Report showing all branches, their associated areas, and their area-weighted average condition is provided in Appendix 1. Additionally, the Appendix 2 Section Condition Report provides information used to define each branch and section in the PAVER database.

Using the branch, section and sample unit divisions established, a visual condition survey was conducted at Aurora State Airport in July 2018. During the inspection, pavement defects were identified and measured in accordance with the methodology outlined in ASTM D5430. This inspection ensures your airport complies with the "detailed inspection" requirement of FAA's PMMP guidelines. After collection, the data were entered into the PAVER software for analysis. These data are reproduced in the Re-Inspection Report attached as Appendix 4.

The PAVER database updated during this project ensures your airport complies with the "record keeping and information retrieval" requirements of FAA's PMMP guidelines.

Figure AU-1. Airport Layout, Dimensions and Pavement Cross-Sections.
Aurora State Airport



Drawing Date: September 2018

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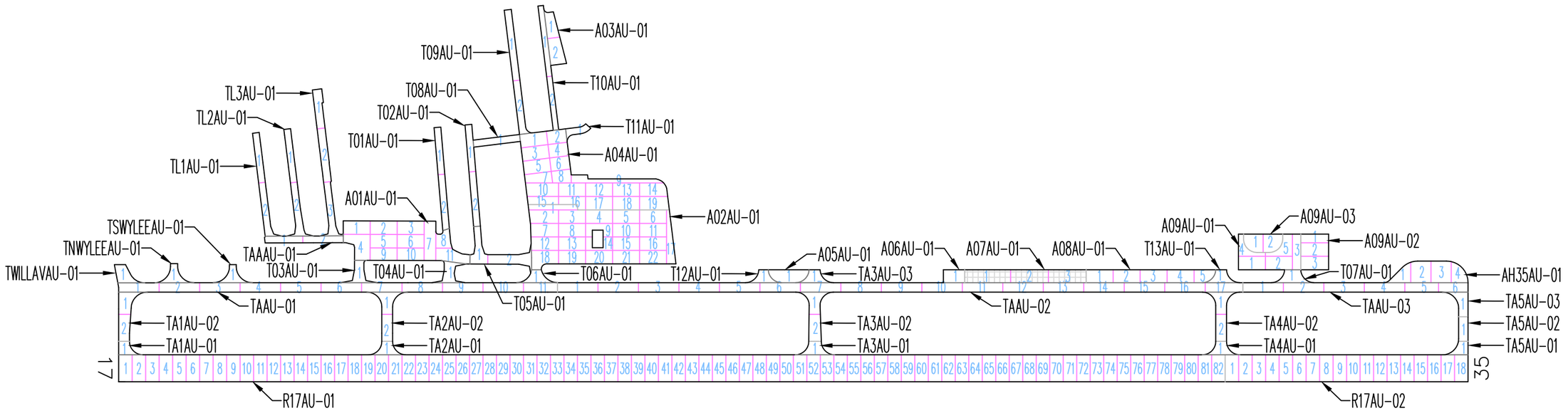
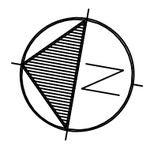
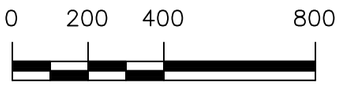
Figure AU-2. Pavement Branch, Section and Sample Unit Layout.
Aurora State Airport







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RESULTS

Using the data collected during the visual inspection, the PAVER software was used to calculate an area-weighted average Pavement Condition Index (PCI) for each pavement section inspected using the sample units evaluated. Using each section's PCI, a Pavement Condition Rating (PCR) was assigned. The PCIs measured during this inspection are shown in Table 1. The table also contains PCIs from past inspections as well as projected PCIs for 2023 and 2028. The projections were based on pavement deterioration models developed by PAVER using the inspection data from other pavements in the same airport category as your airport, located in the same climatic region, and with the same surface type and use.

The Branch Condition Report in Appendix 1 summarizes current pavement condition by branch while the Section Condition Report in Appendix 2 lists pavement condition by section. The current Pavement Condition Rating (PCR) is shown graphically in Figure AU-3.

Table 1. Past, Present and Future Pavement Condition Indices.

Branch	Section	Inspections			Forecast	
		2012	2015	2018	2023	2028
A01AU	01	---	100	100	85	78
A02AU	01	82	64	53	48	44
A03AU	01	78	53	49	45	42
A04AU	01	98	62	68	63	57
A05AU	01	69	41	40	35	25
A06AU	01	100	86	82	77	73
A07AU	01	87	95	88	81	77
A08AU	01	78	64	70	66	60
A09AU	01	60	64	49	45	42
A09AU	02	---	100	75	72	68
A09AU	03	---	100	88	80	75
AH35AU	01	100	80	71	67	62
R17AU	01	83	81	83	78	77
R17AU	02	81	75	72	47	24
T01AU	01	95	89	88	81	79
T02AU	01	91	85	74	65	52
T03AU	01	---	100	100	93	84
T04AU	01	---	100	100	93	84
T05AU	01	---	100	100	93	84
T06AU	01	100	89	80	79	79
T07AU	01	100	91	79	75	74
T08AU	01	83	80	64	51	37
T09AU	01	86	73	71	60	46
T10AU	01	78	58	61	48	34

Table 1. Past, Present and Future Pavement Condition Indices.

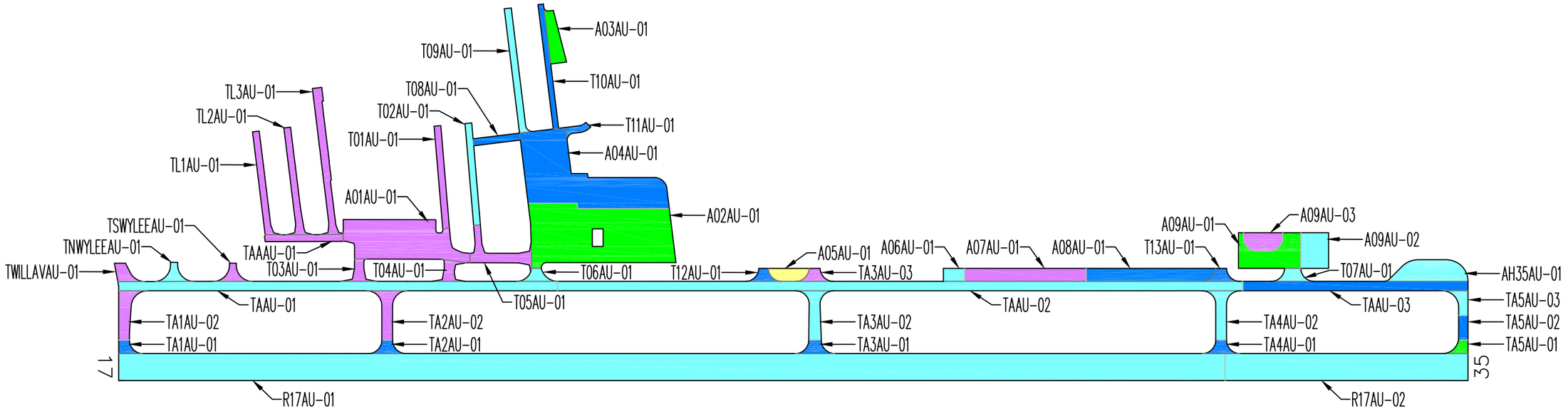
Branch	Section	Inspections			Forecast	
		2012	2015	2018	2023	2028
T11AU	01	64	62	69	58	43
T12AU	01	96	79	66	54	39
T13AU	01	84	80	63	50	36
TA1AU	01	100	70	59	58	56
TA1AU	02	94	89	88	81	79
TA2AU	01	81	74	67	66	64
TA2AU	02	100	92	89	82	79
TA3AU	01	75	65	66	65	63
TA3AU	02	100	92	80	79	79
TA3AU	03	100	90	88	81	79
TA4AU	01	83	59	58	57	55
TA4AU	02	92	80	74	65	52
TA5AU	01	74	81	49	35	24
TA5AU	02	100	90	69	58	43
TA5AU	03	---	89	73	72	70
TAAAU	01	---	---	100	93	84
TAAU	01	100	92	83	79	79
TAAU	02	100	91	73	63	50
TAAU	03	100	89	69	58	43
TL1AU	01	---	---	100	93	84
TL2AU	01	---	---	100	93	84
TL3AU	01	---	---	100	93	84
TNWYLEEAU	01	100	94	75	67	54
TSWYLEEAU	01	100	94	94	85	80
TWILLAVAU	01	100	94	89	82	79

Section PCIs at Aurora State Airport range from a low of 40 (a PCR of “Very Poor”) to a high of 100 (a PCR of “Good”). The area-weighted average PCI for all airport pavements is 77, corresponding to an overall PCR of “Satisfactory”. Figure AU-4 shows how much pavement area is associated with each Pavement Condition Rating category and also shows pavement condition distribution from the inspections conducted in 2012 and 2015.

The primary distresses observed during the inspection were: longitudinal and transverse cracking, weathering, patching, block cracking, alligator cracking, raveling and depressions. The primary distress observed in the concrete pavement was joint spalls, with isolated occurrences of linear cracking.

A graphical representation of the projected PCIs listed in Table 1 is shown in Figure AU-5.

Figure AU-3. Pavement Condition in July 2018.
Aurora State Airport



PCI	PCR
100	GOOD
85	SATISFACTORY
70	FAIR
55	POOR
40	VERY POOR
25	SERIOUS
10	FAILED
0	

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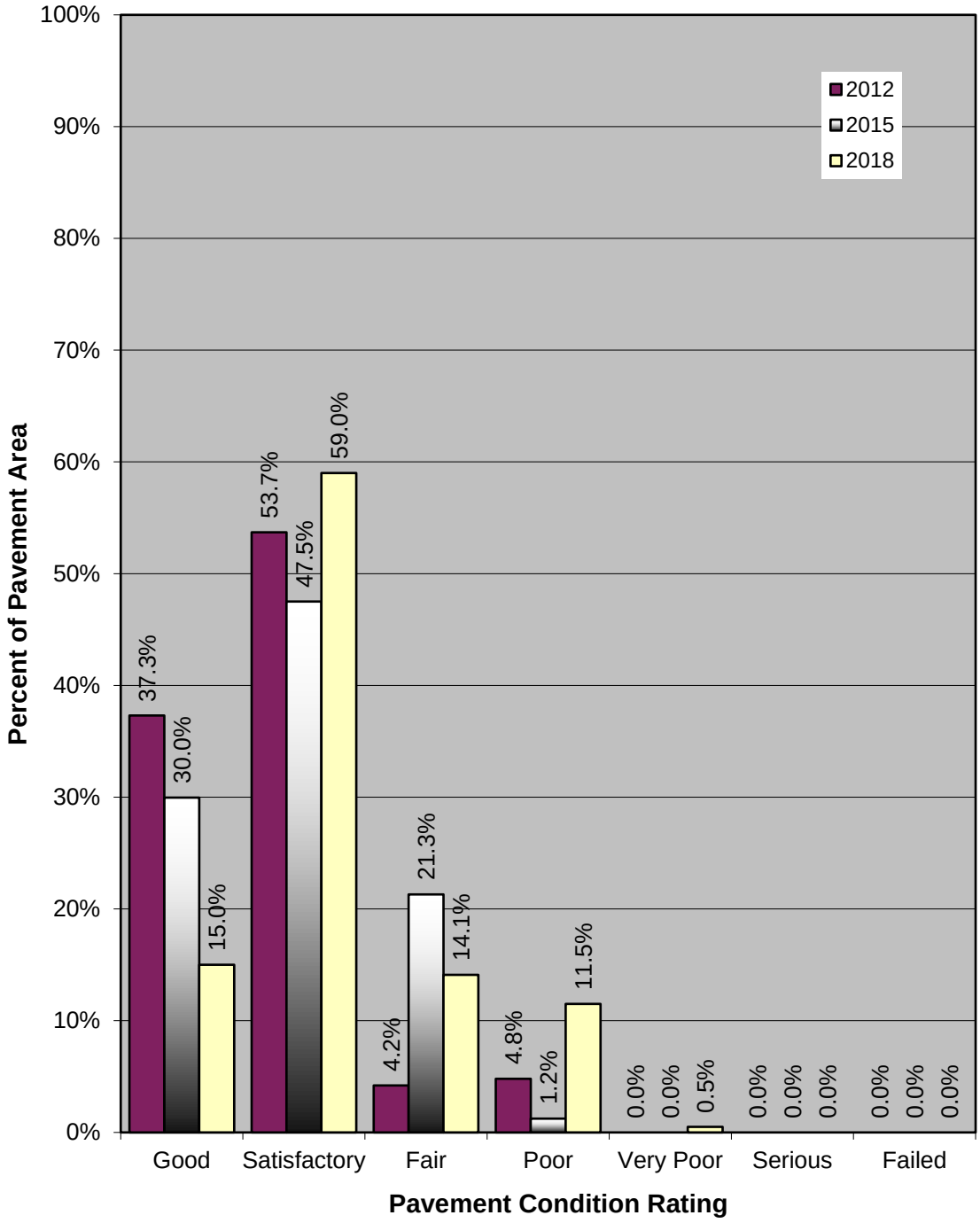
0 200 400 800

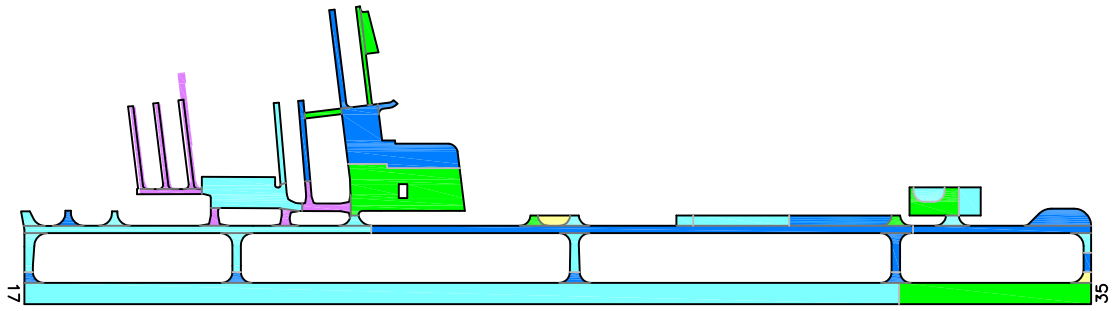
Drawing Date: September 2018

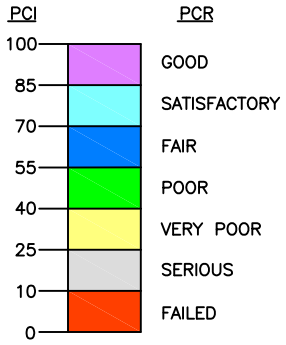
PAVEMENT CONSULTANTS INC.

Figure AU-4. Pavement Condition Distribution
Aurora State Airport

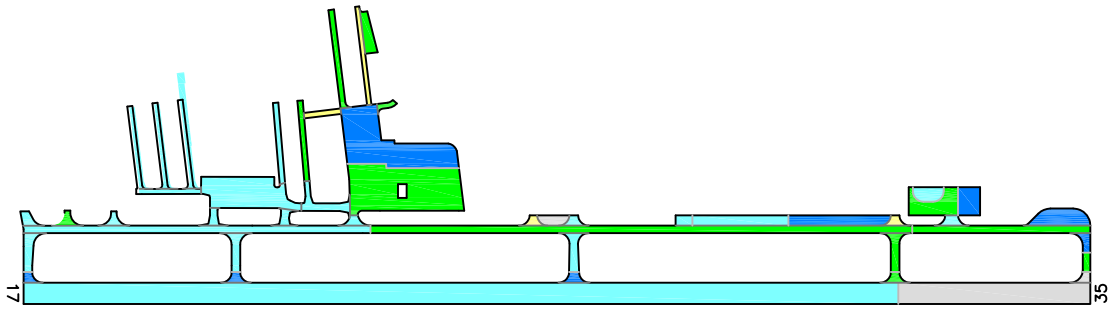


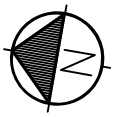
Predicted Condition in 2023.





Predicted Condition in 2028.





Drawing Date: September 2018

PAVEMENT CONSULTANTS INC.

Figure AU-5. Future Pavement Condition.

RECOMMENDATIONS

Data collected during the visual condition survey were used by the PAVER software to generate the Network Maintenance Report contained in Appendix 3. This report identifies, for each pavement section, the recommended localized maintenance activities (i.e.-crack sealing, patching) that should be completed to repair the defects observed during the visual inspection. The repair quantities identified in the report were extrapolated to cover the entire pavement section, based on the distresses measured in the inspected sample units. If the repair activities identified are completed, the pavement deterioration rate will be slowed.

The recommended localized maintenance activities to be applied are selected by the PAVER software based on a Distress Maintenance Policy established for the Oregon airport system. The report results indicate that, over your entire airport, the following quantities of localized maintenance are needed:

- 20,295 linear feet of asphalt concrete crack sealing
- 4 linear feet of asphalt concrete wide crack sealing/repair.

The PAVER software can also identify and schedule recommended global (applied over an entire section) maintenance activities such as fog seals, slurry seals and other surface treatments, as well as major rehabilitation activities such as asphalt concrete overlays and complete reconstruction. PAVER schedules global maintenance on a user-defined interval. To schedule major rehabilitation PAVER uses pavement deterioration models developed during this project. These models are used to estimate future pavement condition and to schedule rehabilitation based on a trigger PCI.

During this project a 5-year program outlining recommended global maintenance and rehabilitation was developed. The program begins in the year 2019 to allow time for project development. These recommendations are presented in Table 2, which identifies the pavement section requiring rehabilitation, the year the action should be completed, the type of action, and an associated cost. This information is also presented graphically in Figure AU-6.

Table 2. Five-Year Global Maintenance and Rehabilitation Plan.

Year	Branch	Section	Action	Area (sf)	Unit Cost ($/sf)	Total Cost ($)
2019	A02AU	01	Slurry Seal	109,649	$0.31	$33,991
2019	A03AU	01	2" AC Overlay	9,162	$2.50	$22,905
2019	A04AU	01	Slurry Seal	87,212	$0.31	$27,036
2019	A05AU	01	4" AC over 6" Crushed Aggregate Base over 13" Aggregate Subbase	6,184	$11.45	$70,807

Table 2. Five-Year Global Maintenance and Rehabilitation Plan.

Year	Branch	Section	Action	Area (sf)	Unit Cost ($/sf)	Total Cost ($)
2019	A06AU	01	Slurry Seal	3,790	$0.31	$1,175
2019	A08AU	01	Slurry Seal	22,503	$0.31	$6,976
2019	A09AU	01	2" AC Overlay	21,705	$2.50	$54,263
2019	A09AU	02	Slurry Seal	13,596	$0.31	$4,215
2019	A09AU	03	Slurry Seal	8,786	$0.31	$2,724
2019	AH35AU	01	Slurry Seal	19,308	$0.31	$5,985
2019	T01AU	01	Slurry Seal	9,478	$0.31	$2,938
2019	T02AU	01	Slurry Seal	9,468	$0.31	$2,935
2019	T06AU	01	Slurry Seal	3,128	$0.31	$970
2019	T07AU	01	Slurry Seal	3,953	$0.31	$1,225
2019	T08AU	01	Slurry Seal	4,516	$0.31	$1,400
2019	T09AU	01	Slurry Seal	12,198	$0.31	$3,781
2019	T10AU	01	2" AC Overlay	9,280	$2.50	$23,200
2019	T11AU	01	Slurry Seal	2,325	$0.31	$721
2019	T12AU	01	Slurry Seal	2,749	$0.31	$852
2019	T13AU	01	Slurry Seal	2,992	$0.31	$928
2019	TA1AU	01	2" AC Overlay	2,537	$2.50	$6,343
2019	TA1AU	02	Slurry Seal	8,740	$0.31	$2,709
2019	TA2AU	01	Slurry Seal	3,073	$0.31	$953
2019	TA2AU	02	Slurry Seal	8,595	$0.31	$2,664
2019	TA3AU	01	Slurry Seal	3,403	$0.31	$1,055
2019	TA3AU	02	Slurry Seal	8,813	$0.31	$2,732
2019	TA3AU	03	Slurry Seal	3,190	$0.31	$989
2019	TA4AU	01	2" AC Overlay	3,324	$2.50	$8,310
2019	TA4AU	02	Slurry Seal	9,028	$0.31	$2,799
2019	TA5AU	01	2" AC Overlay	2,520	$2.50	$6,300
2019	TA5AU	02	Slurry Seal	3,188	$0.31	$988
2019	TA5AU	03	Slurry Seal	3,975	$0.31	$1,232
2019	TAAU	01	Slurry Seal	56,785	$0.31	$17,603
2019	TAAU	02	Slurry Seal	88,885	$0.31	$27,554
2019	TAAU	03	Slurry Seal	29,204	$0.31	$9,053
2019	TNWYLEEAU	01	Slurry Seal	3,465	$0.31	$1,074
2019	TWILLAVAU	01	Slurry Seal	3,777	$0.31	$1,171
					2019 Total	**$362,556**
2021	R17AU	02	Slurry Seal	90,000	$0.31	$27,900
2021	TSWYLEEAU	01	Fog Seal	3,237	$0.19	$615
2021	A01AU	01	Fog Seal	56,334	$0.19	$10,703
2021	R17AU	01	Slurry Seal	410,000	$0.31	$127,100

Table 2. Five-Year Global Maintenance and Rehabilitation Plan.

Year	Branch	Section	Action	Area (sf)	Unit Cost ($/sf)	Total Cost ($)
					2021 Total	**$166,318**
					5-Year Total	**$528,875**

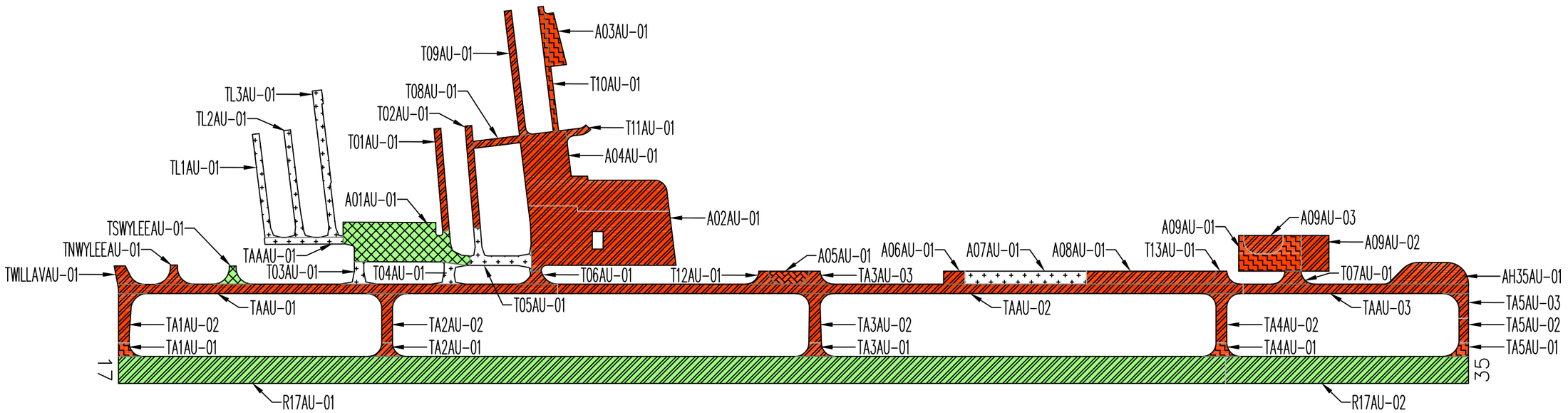
If the global maintenance and/or rehabilitation activities recommended in Table 2 are not completed, the localized maintenance activities identified in the Network Maintenance Report (Appendix 3) for that section should be done. Additionally, for those sections not listed in Table 2 as requiring global maintenance or rehabilitation, the localized maintenance activities outlined in the Network Maintenance Report should be completed. By completing the localized maintenance activities, pavement condition is improved, life is extended, deterioration is slowed and the length of time until major repair or rehabilitation is required is increased.

INSPECTION SCHEDULE

To comply with the inspection schedule requirement of FAA Grant Assurance Number 11, a detailed visual inspection should be conducted every 3 years using the methodology described in ASTM D5430. The next scheduled detailed visual inspection should take place in 2021.

In addition, the FAA requires that a drive-by inspection be conducted monthly to detect unforeseen changes in pavement condition. The results of each drive-by inspection should be recorded and kept in a file. At a minimum, the date of the inspection and an indication of any maintenance performed since the last drive-by inspection should be recorded.

Figure AU-6. Five-Year Pavement Management Plan.
Aurora State Airport



ACTION TIMING

- 2019
- 2020
- 2021
- 2022
- 2023

ACTION

- FOG SEAL
- SLURRY SEAL
- OVERLAY
- RECONSTRUCT
- ROUTINE MAINTENANCE

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Drawing Date: September 2018

PAVEMENT CONSULTANTS INC.

Appendix 1
Branch Condition Report

Branch Condition Report

Pavement Database: ODA_2018 _Final

Branch ID	Number of Sections	Sum Section Length (Ft)	Avg Section Width (Ft)	True Area (SqFt)	Use	Average PCI	Standard Deviation PCI	Weighted Average PCI
A01AU	1	343.00	146.00	56,334.00	APRON	100.00	0.00	100.00
A02AU	1	523.00	200.00	109,649.00	APRON	53.00	0.00	53.00
A03AU	1	197.00	59.00	9,162.00	APRON	49.00	0.00	49.00
A04AU	1	520.00	280.00	87,212.00	APRON	68.00	0.00	68.00
A05AU	1	150.00	48.00	6,184.00	APRON	40.00	0.00	40.00
A06AU	1	79.00	48.00	3,790.00	APRON	82.00	0.00	82.00
A07AU	1	450.00	48.00	21,600.00	APRON	88.00	0.00	88.00
A08AU	1	480.00	48.00	22,503.00	APRON	70.00	0.00	70.00
A09AU	3	479.00	110.67	44,087.00	APRON	70.67	16.21	64.79
AH35AU	1	225.00	80.00	19,308.00	APRON	71.00	0.00	71.00
R17AU	2	5,000.00	100.00	500,000.00	RUNWAY	77.50	5.50	81.02
T01AU	1	380.00	25.00	9,478.00	TAXIWAY	88.00	0.00	88.00
T02AU	1	378.00	25.00	9,468.00	TAXIWAY	74.00	0.00	74.00
T03AU	1	83.00	35.00	3,684.00	TAXIWAY	100.00	0.00	100.00
T04AU	1	75.00	40.00	3,880.00	TAXIWAY	100.00	0.00	100.00
T05AU	1	228.00	35.00	11,678.00	TAXIWAY	100.00	0.00	100.00
T06AU	1	48.00	36.00	3,128.00	TAXIWAY	80.00	0.00	80.00
T07AU	1	48.00	60.00	3,953.00	TAXIWAY	79.00	0.00	79.00
T08AU	1	174.00	25.00	4,516.00	TAXIWAY	64.00	0.00	64.00
T09AU	1	464.00	26.00	12,198.00	TAXIWAY	71.00	0.00	71.00
T10AU	1	464.00	20.00	9,280.00	TAXIWAY	61.00	0.00	61.00
T11AU	1	85.00	25.00	2,325.00	TAXIWAY	69.00	0.00	69.00
T12AU	1	48.00	35.00	2,749.00	TAXIWAY	66.00	0.00	66.00
T13AU	1	40.00	48.00	2,992.00	TAXIWAY	63.00	0.00	63.00
TA1AU	2	232.50	40.00	11,277.00	TAXIWAY	73.50	14.50	81.48
TA2AU	2	232.50	40.00	11,668.00	TAXIWAY	78.00	11.00	83.21
TA3AU	3	283.50	40.00	15,406.00	TAXIWAY	78.00	9.09	78.56
TA4AU	2	232.50	40.00	12,352.00	TAXIWAY	66.00	8.00	69.69
TA5AU	3	232.50	35.00	9,683.00	TAXIWAY	63.67	10.50	65.44
TAAAU	1	290.00	25.00	7,284.00	TAXIWAY	100.00	0.00	100.00
TAAU	3	5,000.00	35.00	174,874.00	TAXIWAY	75.00	5.89	75.58
TL1AU	1	386.00	25.00	9,921.00	TAXIWAY	100.00	0.00	100.00
TL2AU	1	400.00	25.00	10,673.00	TAXIWAY	100.00	0.00	100.00
TL3AU	1	546.00	25.00	15,963.00	TAXIWAY	100.00	0.00	100.00
TNWYLEE	1	66.00	26.00	3,465.00	TAXIWAY	75.00	0.00	75.00
TSWYLEE	1	66.00	25.00	3,237.00	TAXIWAY	94.00	0.00	94.00
TWILLAVA	1	70.00	42.00	3,777.00	TAXIWAY	89.00	0.00	89.00

Pavement Database: ODA_2018 _Final

Use Category	Number of Sections	Total Area (SqFt)	Arithmetic Average PCI	Average STD PCI	Weighted Average PCI
APRON	12	379829.000466786	69.42	17.77	68.68
RUNWAY	2	500000.002380733	77.50	5.50	81.02
TAXIWAY	35	368909.0000595	78.80	14.44	79.61
ALL	49	1248738.00290702	76.45	15.61	76.85

Appendix 2
Section Condition Report

Pavement Database: ODA_2018 _Final *NetworkId: Aurora*

Branch ID	Section ID	Last Const. Date	Surface	Use	Rank	Lanes	True Area (SqFt)	Last Inspection Date	Age At Inspection	PCI
A01AU	01	9/26/2015	AC	APRON	P	0	56,334.00	7/12/2018	3	100
A02AU	01	8/2/2001	AC	APRON	P	0	109,649.00	7/12/2018	17	53
A03AU	01	1/1/1969	AC	APRON	S	0	9,162.00	7/12/2018	49	49
A04AU	01	1/1/2008	AC	APRON	P	0	87,212.00	7/12/2018	10	68
A05AU	01	1/1/1989	AC	APRON	S	0	6,184.00	7/12/2018	29	40
A06AU	01	1/1/2007	AC	APRON	S	0	3,790.00	7/12/2018	11	82
A07AU	01	1/1/1989	PCC	APRON	S	0	21,600.00	7/12/2018	29	88
A08AU	01	1/1/1989	AC	APRON	S	0	22,503.00	7/12/2018	29	70
A09AU	01	1/1/1989	AC	APRON	S	0	21,705.00	7/12/2018	29	49
A09AU	02	6/1/2010	AC	APRON	S	0	13,596.00	7/12/2018	8	75
A09AU	03	6/1/2010	AC	APRON	S	0	8,786.00	7/12/2018	8	88
AH35AU	01	8/1/2008	AC	APRON	P	0	19,308.00	7/12/2018	10	71
R17AU	01	5/2/2005	AC	RUNWAY	P	0	410,000.00	7/12/2018	13	83
R17AU	02	5/1/2005	AAC	RUNWAY	P	0	90,000.00	7/12/2018	13	72
T01AU	01	8/1/2001	AC	TAXIWAY	S	0	9,478.00	7/12/2018	17	88
T02AU	01	8/1/2001	AC	TAXIWAY	S	0	9,468.00	7/12/2018	17	74
T03AU	01	9/26/2015	AC	TAXIWAY	S	0	3,684.00	7/12/2018	3	100
T04AU	01	9/26/2015	AC	TAXIWAY	S	0	3,880.00	7/12/2018	3	100
T05AU	01	9/26/2015	AC	TAXIWAY	S	0	11,678.00	7/12/2018	3	100
T06AU	01	9/3/2008	AC	TAXIWAY	S	0	3,128.00	7/12/2018	10	80
T07AU	01	8/1/2008	AAC	TAXIWAY	S	0	3,953.00	7/12/2018	10	79
T08AU	01	1/1/1989	AC	TAXIWAY	S	0	4,516.00	7/12/2018	29	64
T09AU	01	1/1/1989	AC	TAXIWAY	S	0	12,198.00	7/12/2018	29	71
T10AU	01	1/1/1989	AC	TAXIWAY	S	0	9,280.00	7/12/2018	29	61
T11AU	01	1/1/1989	AC	TAXIWAY	S	0	2,325.00	7/12/2018	29	69
T12AU	01	1/1/2001	AC	TAXIWAY	S	0	2,749.00	7/12/2018	17	66
T13AU	01	1/1/1989	AC	TAXIWAY	S	0	2,992.00	7/12/2018	29	63
TA1AU	01	5/2/2005	AAC	TAXIWAY	P	0	2,537.00	7/12/2018	13	59
TA1AU	02	9/3/2008	AC	TAXIWAY	P	0	8,740.00	7/12/2018	10	88
TA2AU	01	5/2/2005	AAC	TAXIWAY	P	0	3,073.00	7/12/2018	13	67
TA2AU	02	9/3/2008	AC	TAXIWAY	P	0	8,595.00	7/12/2018	10	89
TA3AU	01	5/2/2005	AAC	TAXIWAY	P	0	3,403.00	7/12/2018	13	66
TA3AU	02	9/3/2007	AC	TAXIWAY	P	0	8,813.00	7/12/2018	11	80
TA3AU	03	9/3/2007	AC	TAXIWAY	P	0	3,190.00	7/12/2018	11	88
TA4AU	01	5/2/2005	AAC	TAXIWAY	P	0	3,324.00	7/12/2018	13	58
TA4AU	02	9/3/2007	AC	TAXIWAY	P	0	9,028.00	7/12/2018	11	74
TA5AU	01	5/2/2005	AC	TAXIWAY	P	0	2,520.00	7/12/2018	13	49
TA5AU	02	8/1/2008	AC	TAXIWAY	P	0	3,188.00	7/12/2018	10	69
TA5AU	03	8/1/2008	AAC	TAXIWAY	P	0	3,975.00	7/12/2018	10	73
TAAAU	01	9/3/2016	AC	TAXIWAY	P	0	7,284.00	7/12/2018	2	100
TAAU	01	9/3/2008	AC	TAXIWAY	P	0	56,785.00	7/12/2018	10	83
TAAU	02	9/3/2007	AC	TAXIWAY	P	0	88,885.00	7/12/2018	11	73
TAAU	03	8/1/2008	AC	TAXIWAY	P	0	29,204.00	7/12/2018	10	69
TL1AU	01	9/3/2016	AC	TAXIWAY	S	0	9,921.00	7/12/2018	2	100

TL2AU	01	9/3/2016	AC	TAXIWAY	S	0	10,673.00	7/12/2018	2	100
TL3AU	01	9/3/2016	AC	TAXIWAY	S	0	15,963.00	7/12/2018	2	100
TNWYLEEAU	01	9/3/2008	AC	TAXIWAY	S	0	3,465.00	7/12/2018	10	75
TSWYLEEAU	01	9/3/2008	AC	TAXIWAY	S	0	3,237.00	7/12/2018	10	94
TWILLAVAU	01	9/3/2008	AC	TAXIWAY	P	0	3,777.00	7/12/2018	10	89

Section Condition Report (Summary)

Pavement Database: ODA_2018 _Final

Age Category	Average Age at Inspection	Total Area (SqFt)	Number of Sections	Arithmetic Average PCI	Standard Deviation PCI	Weighted Average PCI
00-02	2	43,841.00	4	100.00	0.00	100.00
03-05	3	75,576.00	4	100.00	0.00	100.00
06-10	10	256,949.00	15	79.33	8.39	75.23
11-15	12	628,563.00	12	70.92	11.13	79.32
16-20	17	131,344.00	4	70.25	12.70	57.31
26-30	29	103,303.00	9	63.89	12.90	66.38
41-50	49	9,162.00	1	49.00	0.00	49.00
ALL	14	1,248,738.00	49	76.45	15.61	76.85

Appendix 3
Network Maintenance Report

Network Maintenance Report
Aurora State Airport

Network	Branch	Section	Distress	Severity	Action	Work Quantity	Unit	Unit Cost	Work Cost	Section Total Cost
Aurora	A02AU	01	Block Cracking	Medium	Crack Sealing - AC	6,404	Ft	$1.50	$9,605	$9,605
Aurora	A05AU	01	Long. & Trans. Cracking	Medium	Crack Sealing - AC	90	Ft	$1.50	$135	$135
Aurora	A06AU	01	Long. & Trans. Cracking	Medium	Crack Sealing - AC	40	Ft	$1.50	$60	$60
Aurora	A08AU	01	Long. & Trans. Cracking	Medium	Crack Sealing - AC	477	Ft	$1.50	$715	$715
Aurora	A09AU	01	Block Cracking	Medium	Crack Sealing - AC	3,308	Ft	$1.50	$4,961	$4,961
Aurora	AH35AU	01	Long. & Trans. Cracking	Medium	Crack Sealing - AC	758	Ft	$1.50	$1,136	$1,136
Aurora	R17AU	02	Long. & Trans. Cracking	Medium	Crack Sealing - AC	3,960	Ft	$1.50	$5,940	$5,940
Aurora	T01AU	01	Long. & Trans. Cracking	Medium	Crack Sealing - AC	20	Ft	$1.50	$30	$30
Aurora	T02AU	01	Long. & Trans. Cracking	Medium	Crack Sealing - AC	190	Ft	$1.50	$285	$285
Aurora	T07AU	01	Long. & Trans. Cracking	Medium	Crack Sealing - AC	40	Ft	$1.50	$60	$60
Aurora	T08AU	01	Long. & Trans. Cracking	Medium	Crack Sealing - AC	120	Ft	$1.50	$180	$180
Aurora	T09AU	01	Long. & Trans. Cracking	Medium	Crack Sealing - AC	260	Ft	$1.50	$390	$390
Aurora	T11AU	01	Long. & Trans. Cracking	Medium	Crack Sealing - AC	50	Ft	$1.50	$75	$75
Aurora	T12AU	01	Long. & Trans. Cracking	Medium	Crack Sealing - AC	120	Ft	$1.50	$180	$180
Aurora	T13AU	01	Long. & Trans. Cracking	Medium	Crack Sealing - AC	110	Ft	$1.50	$165	$165
Aurora	TA1AU	01	Long. & Trans. Cracking	Medium	Crack Sealing - AC	240	Ft	$1.50	$360	$360
Aurora	TA2AU	01	Long. & Trans. Cracking	Medium	Crack Sealing - AC	130	Ft	$1.50	$195	$195
Aurora	TA3AU	01	Long. & Trans. Cracking	Medium	Crack Sealing - AC	154	Ft	$1.50	$230	$230
Aurora	TA3AU	02	Long. & Trans. Cracking	High	Crack Seal - Wide Cracks	1	Ft	$30.00	$30	$30
Aurora	TA4AU	01	Long. & Trans. Cracking	Medium	Crack Sealing - AC	250	Ft	$1.50	$375	$375
Aurora	TA4AU	02	Long. & Trans. Cracking	Medium	Crack Sealing - AC	100	Ft	$1.50	$150	$150
Aurora	TA5AU	01	Block Cracking	Medium	Crack Sealing - AC	384	Ft	$1.50	$576	$576
Aurora	TA5AU	02	Long. & Trans. Cracking	Medium	Crack Sealing - AC	110	Ft	$1.50	$165	$165
Aurora	TA5AU	03	Long. & Trans. Cracking	Medium	Crack Sealing - AC	90	Ft	$1.50	$135	$135
Aurora	TAAU	01	Long. & Trans. Cracking	High	Crack Seal - Wide Cracks	3	Ft	$30.00	$81	$81
Aurora	TAAU	02	Long. & Trans. Cracking	Medium	Crack Sealing - AC	1,795	Ft	$1.50	$2,692	$2,692
Aurora	TAAU	03	Long. & Trans. Cracking	Medium	Crack Sealing - AC	1,038	Ft	$1.50	$1,558	$1,558
Aurora	TNWYLEEAU	01	Long. & Trans. Cracking	Medium	Crack Sealing - AC	60	Ft	$1.50	$90	$90
									Total	$30,555

Appendix 4
Re-Inspection Report

Re-Inspection Report

ODA_2018 _Final
Generated Date 7/26/2018

Network: Aurora **Name:** Aurora State

Branch: A01AU **Name:** Apron 01 Aurora **Use:** APRON **Area:** 56,334 SqFt

Section: 01 of 1 **From:** Taxiway 06 **To:** Tie Down Apron New **Last Const.:** 9/26/2015

Surface: AC **Family:** OR-Cat2-AC-Central-AP-2015 **Zone:** KUAO **Category:** F **Rank:** P

Area: 56,334 SqFt **Length:** 343 Ft **Width:** 146 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 11 **Surveyed:** 4

Conditions: **PCI:** 100

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 5000.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 02 **Type:** R **Area:** 5000.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 06 **Type:** R **Area:** 5000.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 10 **Type:** R **Area:** 4600.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Network: Aurora **Name:** Aurora State

Branch: A02AU **Name:** Apron 02 Aurora **Use:** APRON **Area:** 109,649 SqFt

Section: 01 of 1 **From:** Taxiway 09 **To:** Private Apron **Last Const.:** 8/2/2001

Surface: AC **Family:** OR-Cat2-AC-Central-AP-2015 **Zone:** KSPB **Category:** E **Rank:** P

Area: 109,649 SqFt **Length:** 523 Ft **Width:** 200 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 22 **Surveyed:** 5

Conditions: **PCI:** 53

Inspection Comments:

Sample Number: 03 **Type:** R **Area:** 5000.00 SqFt **PCI:** 54

Sample Comments:

43	BLOCK CR	L	4000.00	SqFt
43	BLOCK CR	M	1000.00	SqFt
57	WEATHERING	L	5000.00	SqFt

Sample Number: 05 **Type:** R **Area:** 5000.00 SqFt **PCI:** 47

Sample Comments:

50	PATCHING	L	1050.00	SqFt
43	BLOCK CR	L	3160.00	SqFt
43	BLOCK CR	M	790.00	SqFt
57	WEATHERING	L	5000.00	SqFt

Sample Number: 11 **Type:** R **Area:** 5000.00 SqFt **PCI:** 54

Sample Comments:

43	BLOCK CR	L	4000.00	SqFt
43	BLOCK CR	M	1000.00	SqFt
57	WEATHERING	L	5000.00	SqFt

Sample Number: 15 **Type:** R **Area:** 5000.00 SqFt **PCI:** 54

Sample Comments:

43	BLOCK CR	L	4000.00	SqFt
43	BLOCK CR	M	1000.00	SqFt
57	WEATHERING	L	5000.00	SqFt

Sample Number: 20 **Type:** R **Area:** 5000.00 SqFt **PCI:** 54

Sample Comments:

43	BLOCK CR	L	4000.00	SqFt
43	BLOCK CR	M	1000.00	SqFt
57	WEATHERING	L	5000.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: A03AU **Name:** Tie Down Apron 03 Aurora **Use:** APRON **Area:** 9,162 SqFt

Section: 01 of 1 **From:** T13AU **To:** End **Last Const.:** 1/1/1969

Surface: AC **Family:** OR-Cat2-AC-Central-AP-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 9,162 SqFt **Length:** 197 Ft **Width:** 59 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 2 **Surveyed:** 2

Conditions: **PCI:** 49

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 3900.00 SqFt **PCI:** 35

Sample Comments:

50	PATCHING	L	1360.00	SqFt
43	BLOCK CR	L	2540.00	SqFt
52	RAVELING	M	2540.00	SqFt

Sample Number: 02 **Type:** R **Area:** 5262.00 SqFt **PCI:** 59

Sample Comments:

52	RAVELING	L	5262.00	SqFt
43	BLOCK CR	L	5262.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: A04AU **Name:** Tie Down Apron 04 Aurora **Use:** APRON **Area:** 87,212 SqFt

Section: 01 of 1 **From:** A02AU **To:** T12AU **Last Const.:** 1/1/2008

Surface: AC **Family:** OR-Cat2-AC-Central-AP-2015 **Zone:** KUAO **Category:** F **Rank:** P

Area: 87,212 SqFt **Length:** 520 Ft **Width:** 280 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 19 **Surveyed:** 5

Conditions: **PCI:** 68

Inspection Comments:

Sample Number: 02 **Type:** R **Area:** 3600.00 SqFt **PCI:** 62

Sample Comments:

43	BLOCK CR	L	2880.00	SqFt
57	WEATHERING	L	3600.00	SqFt

Sample Number: 03 **Type:** R **Area:** 5000.00 SqFt **PCI:** 62

Sample Comments:

43	BLOCK CR	L	4000.00	SqFt
57	WEATHERING	L	5000.00	SqFt

Sample Number: 10 **Type:** R **Area:** 5982.00 SqFt **PCI:** 67

Sample Comments:

57	WEATHERING	L	5982.00	SqFt
43	BLOCK CR	L	2991.00	SqFt

Sample Number: 12 **Type:** R **Area:** 5000.00 SqFt **PCI:** 76

Sample Comments:

48	L & T CR	L	370.00	Ft
57	WEATHERING	L	5000.00	SqFt

Sample Number: 18 **Type:** R **Area:** 5000.00 SqFt **PCI:** 74

Sample Comments:

48	L & T CR	L	420.00	Ft
57	WEATHERING	L	5000.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: A05AU **Name:** Apron 05 Aurora **Use:** APRON **Area:** 6,184 SqFt

Section: 01 of 1 **From:** Taxiway 15 **To:** Taxiway A3 **Last Const.:** 1/1/1989

Surface: AC **Family:** OR-Cat2-AC-Central-AP-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 6,184 SqFt **Length:** 150 Ft **Width:** 48 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 40

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 6184.00 SqFt **PCI:** 40

Sample Comments:

52	RAVELING	M	5256.00	SqFt
48	L & T CR	M	90.00	Ft
57	WEATHERING	L	927.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: A06AU **Name:** Apron 06 Aurora **Use:** APRON **Area:** 3,790 SqFt

Section: 01 of 1 **From:** Taxiway A **To:** East **Last Const.:** 1/1/2007

Surface: AC **Family:** OR-Cat2-AC-Central-AP-2015 **Zone:** KUAO **Category:** K **Rank:** S

Area: 3,790 SqFt **Length:** 79 Ft **Width:** 48 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 82

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 3790.00 SqFt **PCI:** 82

Sample Comments:

48	L & T CR	L	10.00	Ft
48	L & T CR	M	40.00	Ft
57	WEATHERING	L	3790.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: A07AU **Name:** Apron 07 Aurora **Use:** APRON **Area:** 21,600 SqFt

Section: 01 of 1 **From:** Taxiway A **To:** East **Last Const.:** 1/1/1989

Surface: PCC **Family:** OR-Cat2-PCC-Central-AP-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 21,600 SqFt **Length:** 450 Ft **Width:** 48 Ft

Slabs: 78 **Slab Length:** 20 Ft **Slab Width:** 20 Ft **Joint Length:** 1,662 Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 3 **Surveyed:** 3

Conditions: **PCI:** 88

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 27.00 Slabs **PCI:** 84

Sample Comments:

63	LINEAR CR	L	1.00	Slabs
63	LINEAR CR	L	4.00	Slabs
74	JOINT SPALL	M	1.00	Slabs

Sample Number: 02 **Type:** R **Area:** 21.00 Slabs **PCI:** 84

Sample Comments:

63	LINEAR CR	L	2.00	Slabs
63	LINEAR CR	L	1.00	Slabs
74	JOINT SPALL	M	2.00	Slabs

Sample Number: 03 **Type:** R **Area:** 24.00 Slabs **PCI:** 96

Sample Comments:

63	LINEAR CR	L	1.00	Slabs

Network: Aurora **Name:** Aurora State

Branch: A08AU **Name:** Apron 08 Aurora **Use:** APRON **Area:** 22,503 SqFt

Section: 01 of 1 **From:** Taxiway A **To:** East **Last Const.:** 1/1/1989

Surface: AC **Family:** OR-Cat2-AC-Central-AP-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 22,503 SqFt **Length:** 480 Ft **Width:** 48 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 5 **Surveyed:** 3

Conditions: **PCI:** 70

Inspection Comments:

Sample Number: 02 **Type:** R **Area:** 4800.00 SqFt **PCI:** 74

Sample Comments:

48	L & T CR	L	130.00	Ft
48	L & T CR	M	100.00	Ft
57	WEATHERING	L	4800.00	SqFt

Sample Number: 03 **Type:** R **Area:** 4800.00 SqFt **PCI:** 75

Sample Comments:

48	L & T CR	L	75.00	Ft
48	L & T CR	M	75.00	Ft
45	DEPRESSION	L	10.00	SqFt
57	WEATHERING	L	4800.00	SqFt

Sample Number: 04 **Type:** R **Area:** 4800.00 SqFt **PCI:** 60

Sample Comments:

48	L & T CR	L	200.00	Ft
48	L & T CR	M	130.00	Ft
45	DEPRESSION	L	45.00	SqFt
57	WEATHERING	L	4800.00	SqFt
41	ALLIGATOR CR	L	45.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: A09AU **Name:** Apron 09 Aurora **Use:** APRON **Area:** 44,087 SqFt

Section: 01 of 3 **From:** Taxiway 10 **To:** East **Last Const.:** 1/1/1989

Surface: AC **Family:** OR-Cat2-AC-Central-AP-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 21,705 SqFt **Length:** 231 Ft **Width:** 132 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 5 **Surveyed:** 3

Conditions: **PCI:** 49

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 5000.00 SqFt **PCI:** 49

Sample Comments:

43	BLOCK CR	L	2500.00	SqFt
43	BLOCK CR	M	2500.00	SqFt
57	WEATHERING	L	5000.00	SqFt

Sample Number: 02 **Type:** R **Area:** 5000.00 SqFt **PCI:** 49

Sample Comments:

43	BLOCK CR	L	2500.00	SqFt
43	BLOCK CR	M	2500.00	SqFt
57	WEATHERING	L	5000.00	SqFt

Sample Number: 05 **Type:** R **Area:** 4385.00 SqFt **PCI:** 49

Sample Comments:

43	BLOCK CR	L	2193.00	SqFt
43	BLOCK CR	M	2192.00	SqFt
57	WEATHERING	L	4385.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: A09AU **Name:** Apron 09 Aurora **Use:** APRON **Area:** 44,087 SqFt

Section: 02 of 3 **From:** Taxiway 10 **To:** South **Last Const.:** 6/1/2010

Surface: AC **Family:** OR-Cat2-AC-Central-AP-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 13,596 SqFt **Length:** 103 Ft **Width:** 132 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 3 **Surveyed:** 2

Conditions: **PCI:** 75

Inspection Comments:

Sample Number: 02 **Type:** R **Area:** 5150.00 SqFt **PCI:** 90

Sample Comments:

48	L & T CR	L	40.00	Ft
57	WEATHERING	L	5150.00	SqFt

Sample Number: 03 **Type:** R **Area:** 5150.00 SqFt **PCI:** 61

Sample Comments:

41	ALLIGATOR CR	L	200.00	SqFt
57	WEATHERING	L	5150.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: A09AU **Name:** Apron 09 Aurora **Use:** APRON **Area:** 44,087 SqFt

Section: 03 of 3 **From:** Paved Infill **To:** - **Last Const.:** 6/1/2010

Surface: AC **Family:** OR-Cat2-AC-Central-AP-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 8,786 SqFt **Length:** 145 Ft **Width:** 68 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 2 **Surveyed:** 2

Conditions: **PCI:** 88

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 4393.00 SqFt **PCI:** 90

Sample Comments:

48	L & T CR	L	25.00	Ft
57	WEATHERING	L	4393.00	SqFt

Sample Number: 02 **Type:** R **Area:** 4393.00 SqFt **PCI:** 85

Sample Comments:

41	ALLIGATOR CR	L	6.00	SqFt
48	L & T CR	L	3.00	Ft
57	WEATHERING	L	4393.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: AH35AU **Name:** Hold Apron 35 Aurora **Use:** APRON **Area:** 19,308 SqFt

Section: 01 of 1 **From:** Taxiway A **To:** END **Last Const.:** 8/1/2008

Surface: AC **Family:** OR-Cat2-AC-Central-AP-2015 **Zone:** KUAO **Category:** F **Rank:** P

Area: 19,308 SqFt **Length:** 225 Ft **Width:** 80 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 4 **Surveyed:** 3

Conditions: **PCI:** 71

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 3723.00 SqFt **PCI:** 78

Sample Comments:

48	L & T CR	L	100.00	Ft
48	L & T CR	M	90.00	Ft

Sample Number: 02 **Type:** R **Area:** 5964.00 SqFt **PCI:** 73

Sample Comments:

48	L & T CR	L	300.00	Ft
48	L & T CR	M	225.00	Ft

Sample Number: 03 **Type:** R **Area:** 5989.00 SqFt **PCI:** 64

Sample Comments:

48	L & T CR	L	375.00	Ft
48	L & T CR	M	300.00	Ft
57	WEATHERING	L	5989.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: R17AU **Name:** Runway 17/35 Aurora **Use:** RUNWAY **Area:** 500,000 SqFt

Section: 01 of 2 **From:** Runway 17 End **To:** Section 02 **Last Const.:** 5/2/2005

Surface: AC **Family:** OR-Cat2-AC-Central-RW-2015 **Zone:** KUAO **Category:** F **Rank:** P

Area: 410,000 SqFt **Length:** 4,100 Ft **Width:** 100 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 82 **Surveyed:** 6

Conditions: **PCI:** 83

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 5000.00 SqFt **PCI:** 81

Sample Comments:

48 L & T CR L 350.00 Ft

Sample Number: 21 **Type:** R **Area:** 5000.00 SqFt **PCI:** 81

Sample Comments:

48 L & T CR L 350.00 Ft

Sample Number: 38 **Type:** R **Area:** 5000.00 SqFt **PCI:** 82

Sample Comments:

48 L & T CR L 330.00 Ft

Sample Number: 51 **Type:** R **Area:** 5000.00 SqFt **PCI:** 85

Sample Comments:

48 L & T CR L 260.00 Ft

Sample Number: 68 **Type:** R **Area:** 5000.00 SqFt **PCI:** 82

Sample Comments:

48 L & T CR L 320.00 Ft

Sample Number: 81 **Type:** R **Area:** 5000.00 SqFt **PCI:** 84

Sample Comments:

48 L & T CR L 280.00 Ft

Network: Aurora **Name:** Aurora State

Branch: R17AU **Name:** Runway 17/35 Aurora **Use:** RUNWAY **Area:** 500,000 SqFt

Section: 02 of 2 **From:** Section 01 **To:** Runway 35 End **Last Const.:** 5/1/2005

Surface: AAC **Family:** OR-Cat2-AAC-Central-RW-2015 **Zone:** KUAO **Category:** F **Rank:** P

Area: 90,000 SqFt **Length:** 900 Ft **Width:** 100 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 18 **Surveyed:** 5

Conditions: **PCI:** 72

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 5000.00 SqFt **PCI:** 78

Sample Comments:

48	L & T CR	L	300.00	Ft
48	L & T CR	M	50.00	Ft

Sample Number: 06 **Type:** R **Area:** 5000.00 SqFt **PCI:** 65

Sample Comments:

48	L & T CR	M	450.00	Ft

Sample Number: 10 **Type:** R **Area:** 5000.00 SqFt **PCI:** 72

Sample Comments:

48	L & T CR	L	200.00	Ft
48	L & T CR	M	200.00	Ft

Sample Number: 14 **Type:** R **Area:** 5000.00 SqFt **PCI:** 69

Sample Comments:

48	L & T CR	L	200.00	Ft
48	L & T CR	M	250.00	Ft

Sample Number: 17 **Type:** R **Area:** 5000.00 SqFt **PCI:** 76

Sample Comments:

48	L & T CR	L	200.00	Ft
48	L & T CR	M	150.00	Ft

Network: Aurora **Name:** Aurora State

Branch: T01AU **Name:** Taxiway 01 Aurora **Use:** TAXIWAY **Area:** 9,478 SqFt

Section: 01 of 1 **From:** Tie Down Apron New **To:** Hangars **Last Const.:** 8/1/2001

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 9,478 SqFt **Length:** 380 Ft **Width:** 25 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 2 **Surveyed:** 2

Conditions: **PCI:** 88

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 4362.00 SqFt **PCI:** 89

Sample Comments:

48	L & T CR	L	40.00	Ft
57	WEATHERING	L	4362.00	SqFt

Sample Number: 02 **Type:** R **Area:** 5116.00 SqFt **PCI:** 88

Sample Comments:

48	L & T CR	M	20.00	Ft
57	WEATHERING	L	5116.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: T02AU **Name:** Taxiway 02 Aurora **Use:** TAXIWAY **Area:** 9,468 SqFt

Section: 01 of 1 **From:** Tie Down Apron New **To:** Hangars **Last Const.:** 8/1/2001

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 9,468 SqFt **Length:** 378 Ft **Width:** 25 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 2 **Surveyed:** 2

Conditions: **PCI:** 74

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 4378.00 SqFt **PCI:** 71

Sample Comments:

48	L & T CR	L	40.00	Ft
48	L & T CR	M	120.00	Ft
57	WEATHERING	L	4378.00	SqFt
50	PATCHING	L	25.00	SqFt

Sample Number: 02 **Type:** R **Area:** 5090.00 SqFt **PCI:** 77

Sample Comments:

48	L & T CR	L	70.00	Ft
48	L & T CR	M	70.00	Ft
57	WEATHERING	L	5090.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: T03AU **Name:** Taxiway 03 Aurora **Use:** TAXIWAY **Area:** 3,684 SqFt

Section: 01 of 1 **From:** Taxiway A **To:** Apron 01 **Last Const.:** 9/26/2015

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 3,684 SqFt **Length:** 83 Ft **Width:** 35 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 100

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 3684.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Network: Aurora **Name:** Aurora State

Branch: T04AU **Name:** Taxiway 04 Aurora **Use:** TAXIWAY **Area:** 3,880 SqFt

Section: 01 of 1 **From:** Taxiway A **To:** Apron 01 **Last Const.:** 9/26/2015

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 3,880 SqFt **Length:** 75 Ft **Width:** 40 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 100

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 3880.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Network: Aurora **Name:** Aurora State

Branch: T05AU **Name:** Taxiway 05 Aurora **Use:** TAXIWAY **Area:** 11,678 SqFt

Section: 01 of 1 **From:** Apron 01 **To:** Apron 02 **Last Const.:** 9/26/2015

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 11,678 SqFt **Length:** 228 Ft **Width:** 35 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 2 **Surveyed:** 2

Conditions: **PCI:** 100

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 5236.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 02 **Type:** R **Area:** 6441.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Network: Aurora **Name:** Aurora State

Branch: T06AU **Name:** Taxiway 06 Aurora **Use:** TAXIWAY **Area:** 3,128 SqFt

Section: 01 of 1 **From:** TAAU-01 **To:** A02AU-01 **Last Const.:** 9/3/2008

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 3,128 SqFt **Length:** 48 Ft **Width:** 36 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 80

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 3128.00 SqFt **PCI:** 80

Sample Comments:

48	L & T CR	L	160.00	Ft
57	WEATHERING	L	3128.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: T07AU **Name:** Taxiway 07 Aurora **Use:** TAXIWAY **Area:** 3,953 SqFt

Section: 01 of 1 **From:** TAAU **To:** Private Apron **Last Const.:** 8/1/2008

Surface: AAC **Family:** OR-Cat2-AAC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 3,953 SqFt **Length:** 48 Ft **Width:** 60 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 79

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 3953.00 SqFt **PCI:** 79

Sample Comments:

48	L & T CR	L	40.00	Ft
48	L & T CR	M	40.00	Ft
57	WEATHERING	L	3953.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: T08AU **Name:** Taxiway 08 Aurora **Use:** TAXIWAY **Area:** 4,516 SqFt

Section: 01 of 1 **From:** Taxiway 05 **To:** Apron 05 **Last Const.:** 1/1/1989

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 4,516 SqFt **Length:** 174 Ft **Width:** 25 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 64

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 4516.00 SqFt **PCI:** 64

Sample Comments:

41	ALLIGATOR CR	L	80.00	SqFt
48	L & T CR	M	120.00	Ft
48	L & T CR	L	200.00	Ft

Network: Aurora **Name:** Aurora State

Branch: T09AU **Name:** Taxiway 09 Aurora **Use:** TAXIWAY **Area:** 12,198 SqFt

Section: 01 of 1 **From:** Apron 05 **To:** End **Last Const.:** 1/1/1989

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 12,198 SqFt **Length:** 464 Ft **Width:** 26 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 2 **Surveyed:** 2

Conditions: **PCI:** 71

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 6864.00 SqFt **PCI:** 68

Sample Comments:

48	L & T CR	L	240.00	Ft
48	L & T CR	M	260.00	Ft
57	WEATHERING	L	6864.00	SqFt

Sample Number: 02 **Type:** R **Area:** 5334.00 SqFt **PCI:** 74

Sample Comments:

48	L & T CR	L	440.00	Ft
57	WEATHERING	L	5334.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: T10AU **Name:** Taxiway 10 Aurora **Use:** TAXIWAY **Area:** 9,280 SqFt

Section: 01 of 1 **From:** Apron 05 **To:** End **Last Const.:** 1/1/1989

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 9,280 SqFt **Length:** 464 Ft **Width:** 20 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 2 **Surveyed:** 2

Conditions: **PCI:** 61

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 5280.00 SqFt **PCI:** 64

Sample Comments:

52	RAVELING	L	5280.00	SqFt
48	L & T CR	L	440.00	Ft
57	WEATHERING	L	5280.00	SqFt

Sample Number: 02 **Type:** R **Area:** 4000.00 SqFt **PCI:** 59

Sample Comments:

57	WEATHERING	L	4000.00	SqFt
48	L & T CR	L	270.00	Ft
50	PATCHING	L	90.00	SqFt
52	RAVELING	L	4000.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: T11AU **Name:** Taxiway 11 Aurora **Use:** TAXIWAY **Area:** 2,325 SqFt

Section: 01 of 1 **From:** Apron 05 **To:** End **Last Const.:** 1/1/1989

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 2,325 SqFt **Length:** 85 Ft **Width:** 25 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 69

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 2325.00 SqFt **PCI:** 69

Sample Comments:

48	L & T CR	L	60.00	Ft
48	L & T CR	M	50.00	Ft
50	PATCHING	L	80.00	SqFt
57	WEATHERING	L	2325.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: T12AU **Name:** Taxiway 12 Aurora **Use:** TAXIWAY **Area:** 2,749 SqFt

Section: 01 of 1 **From:** Taxiway A **To:** End **Last Const.:** 1/1/2001

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 2,749 SqFt **Length:** 48 Ft **Width:** 35 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 66

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 2749.00 SqFt **PCI:** 66

Sample Comments:

48	L & T CR	L	250.00	Ft
48	L & T CR	M	120.00	Ft
57	WEATHERING	L	2749.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: T13AU **Name:** Taxiway 13 Aurora **Use:** TAXIWAY **Area:** 2,992 SqFt

Section: 01 of 1 **From:** Taxiway A **To:** End **Last Const.:** 1/1/1989

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 2,992 SqFt **Length:** 40 Ft **Width:** 48 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 63

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 2992.00 SqFt **PCI:** 63

Sample Comments:

48	L & T CR	L	120.00	Ft
48	L & T CR	M	110.00	Ft
57	WEATHERING	L	2543.00	SqFt
57	WEATHERING	M	449.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: TA1AU **Name:** Taxiway A1 Aurora **Use:** TAXIWAY **Area:** 11,277 SqFt

Section: 01 of 2 **From:** Runway 17 End **To:** TA1AU-01 **Last Const.:** 5/2/2005

Surface: AAC **Family:** OR-Cat2-AAC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** P

Area: 2,537 SqFt **Length:** 50 Ft **Width:** 40 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 59

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 2537.00 SqFt **PCI:** 59

Sample Comments:

48	L & T CR	M	240.00	Ft
57	WEATHERING	L	2537.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: TA1AU **Name:** Taxiway A1 Aurora **Use:** TAXIWAY **Area:** 11,277 SqFt

Section: 02 of 2 **From:** TA1AU-01 **To:** TAAU-01 **Last Const.:** 9/3/2008

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** P

Area: 8,740 SqFt **Length:** 183 Ft **Width:** 40 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 2 **Surveyed:** 2

Conditions: **PCI:** 88

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 4574.00 SqFt **PCI:** 89

Sample Comments:

48	L & T CR	L	60.00	Ft
57	WEATHERING	L	4574.00	SqFt

Sample Number: 02 **Type:** R **Area:** 4166.00 SqFt **PCI:** 86

Sample Comments:

48	L & T CR	L	110.00	Ft
57	WEATHERING	L	4166.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: TA2AU **Name:** Taxiway A2 Aurora **Use:** TAXIWAY **Area:** 11,668 SqFt

Section: 01 of 2 **From:** Runway 17/35 **To:** TA2AU-02 **Last Const.:** 5/2/2005

Surface: AAC **Family:** OR-Cat2-AAC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** P

Area: 3,073 SqFt **Length:** 50 Ft **Width:** 40 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 67

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 3073.00 SqFt **PCI:** 67

Sample Comments:

48	L & T CR	L	130.00	Ft
48	L & T CR	M	130.00	Ft
57	WEATHERING	L	3073.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: TA2AU **Name:** Taxiway A2 Aurora **Use:** TAXIWAY **Area:** 11,668 SqFt

Section: 02 of 2 **From:** TA2AU-01 **To:** TAAU-01 **Last Const.:** 9/3/2008

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** P

Area: 8,595 SqFt **Length:** 183 Ft **Width:** 40 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 2 **Surveyed:** 2

Conditions: **PCI:** 89

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 4595.00 SqFt **PCI:** 90

Sample Comments:

48	L & T CR	L	30.00	Ft
57	WEATHERING	L	4595.00	SqFt

Sample Number: 02 **Type:** R **Area:** 4000.00 SqFt **PCI:** 88

Sample Comments:

48	L & T CR	L	80.00	Ft
57	WEATHERING	L	4000.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: TA3AU **Name:** Taxiway A3 Aurora **Use:** TAXIWAY **Area:** 15,406 SqFt

Section: 01 of 3 **From:** Runway 17/35 **To:** TA3AU-02 **Last Const.:** 5/2/2005

Surface: AAC **Family:** OR-Cat2-AAC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** P

Area: 3,403 SqFt **Length:** 50 Ft **Width:** 40 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 66

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 3324.00 SqFt **PCI:** 66

Sample Comments:

48	L & T CR	L	110.00	Ft
48	L & T CR	M	150.00	Ft
57	WEATHERING	L	3324.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: TA3AU **Name:** Taxiway A3 Aurora **Use:** TAXIWAY **Area:** 15,406 SqFt

Section: 02 of 3 **From:** TA3AU-01 **To:** TAAU-02 **Last Const.:** 9/3/2007

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** P

Area: 8,813 SqFt **Length:** 183 Ft **Width:** 40 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 2 **Surveyed:** 2

Conditions: **PCI:** 80

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 4403.00 SqFt **PCI:** 82

Sample Comments:

48	L & T CR	L	190.00	Ft
57	WEATHERING	L	4403.00	SqFt

Sample Number: 02 **Type:** R **Area:** 4410.00 SqFt **PCI:** 78

Sample Comments:

48	L & T CR	L	160.00	Ft
48	L & T CR	H	1.00	Ft
57	WEATHERING	L	4410.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: TA3AU **Name:** Taxiway A3 Aurora **Use:** TAXIWAY **Area:** 15,406 SqFt

Section: 03 of 3 **From:** TAAU-02 **To:** End **Last Const.:** 9/3/2007

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** P

Area: 3,190 SqFt **Length:** 51 Ft **Width:** 40 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 88

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 3190.00 SqFt **PCI:** 88

Sample Comments:

48	L & T CR	L	60.00	Ft
57	WEATHERING	L	3190.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: TA4AU **Name:** Taxiway A4 Aurora **Use:** TAXIWAY **Area:** 12,352 SqFt

Section: 01 of 2 **From:** Runway 17/35 **To:** TA4AU-02 **Last Const.:** 5/2/2005

Surface: AAC **Family:** OR-Cat2-AAC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** P

Area: 3,324 SqFt **Length:** 50 Ft **Width:** 40 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 58

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 3324.00 SqFt **PCI:** 58

Sample Comments:

48	L & T CR	L	150.00	Ft
48	L & T CR	M	250.00	Ft
57	WEATHERING	L	3324.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: TA4AU **Name:** Taxiway A4 Aurora **Use:** TAXIWAY **Area:** 12,352 SqFt

Section: 02 of 2 **From:** TA4AU-01 **To:** TAAU-02 **Last Const.:** 9/3/2007

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** P

Area: 9,028 SqFt **Length:** 183 Ft **Width:** 40 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 2 **Surveyed:** 2

Conditions: **PCI:** 74

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 4685.00 SqFt **PCI:** 83

Sample Comments:

48	L & T CR	L	180.00	Ft
57	WEATHERING	L	4685.00	SqFt

Sample Number: 02 **Type:** R **Area:** 4343.00 SqFt **PCI:** 64

Sample Comments:

50	PATCHING	L	880.00	SqFt
48	L & T CR	L	120.00	Ft
48	L & T CR	M	100.00	Ft
57	WEATHERING	L	4343.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: TA5AU **Name:** Taxiway A5 Aurora **Use:** TAXIWAY **Area:** 9,683 SqFt

Section: 01 of 3 **From:** TA5AU-02 **To:** Runway 35 End **Last Const.:** 5/2/2005

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** P

Area: 2,520 SqFt **Length:** 50 Ft **Width:** 35 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 49

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 2520.00 SqFt **PCI:** 49

Sample Comments:

43	BLOCK CR	L	1260.00	SqFt
43	BLOCK CR	M	1260.00	SqFt
57	WEATHERING	L	2520.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: TA5AU **Name:** Taxiway A5 Aurora **Use:** TAXIWAY **Area:** 9,683 SqFt

Section: 02 of 3 **From:** TA5AU-01 **To:** TA5AU-03 **Last Const.:** 8/1/2008

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** P

Area: 3,188 SqFt **Length:** 91 Ft **Width:** 35 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 69

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 3188.00 SqFt **PCI:** 69

Sample Comments:

48	L & T CR	L	110.00	Ft
48	L & T CR	M	110.00	Ft
57	WEATHERING	L	3188.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: TA5AU **Name:** Taxiway A5 Aurora **Use:** TAXIWAY **Area:** 9,683 SqFt

Section: 03 of 3 **From:** Taxiway A **To:** TA5-02 **Last Const.:** 8/1/2008

Surface: AAC **Family:** OR-Cat2-AAC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** P

Area: 3,975 SqFt **Length:** 92 Ft **Width:** 35 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 73

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 3975.00 SqFt **PCI:** 73

Sample Comments:

48	L & T CR	L	90.00	Ft
48	L & T CR	M	90.00	Ft
57	WEATHERING	L	3975.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: TAAAU **Name:** Taxiway AA Aurora **Use:** TAXIWAY **Area:** 7,284 SqFt

Section: 01 of 1 **From:** TL01 **To:** TL03 **Last Const.:** 9/3/2016

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** P

Area: 7,284 SqFt **Length:** 290 Ft **Width:** 25 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 2 **Surveyed:** 2

Conditions: **PCI:** 100

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 3512.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 02 **Type:** R **Area:** 3772.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Network: Aurora **Name:** Aurora State

Branch: TAAU **Name:** Taxiway A Aurora **Use:** TAXIWAY **Area:** 174,874 SqFt

Section: 01 of 3 **From:** TA1AU-02 **To:** T12AU-01 **Last Const.:** 9/3/2008

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** P

Area: 56,785 SqFt **Length:** 1,626 Ft **Width:** 35 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 11 **Surveyed:** 4

Conditions: **PCI:** 83

Inspection Comments:

Sample Number: 02 **Type:** R **Area:** 5250.00 SqFt **PCI:** 80

Sample Comments:

48	L & T CR	L	260.00	Ft
57	WEATHERING	L	5250.00	SqFt

Sample Number: 04 **Type:** R **Area:** 5250.00 SqFt **PCI:** 87

Sample Comments:

48	L & T CR	L	120.00	Ft
57	WEATHERING	L	5250.00	SqFt

Sample Number: 06 **Type:** R **Area:** 5250.00 SqFt **PCI:** 90

Sample Comments:

48	L & T CR	L	40.00	Ft
57	WEATHERING	L	5250.00	SqFt

Sample Number: 09 **Type:** R **Area:** 5250.00 SqFt **PCI:** 76

Sample Comments:

48	L & T CR	L	250.00	Ft
48	L & T CR	H	1.00	Ft
57	WEATHERING	L	5250.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: TAAU **Name:** Taxiway A Aurora **Use:** TAXIWAY **Area:** 174,874 SqFt

Section: 02 of 3 **From:** TAAU-01 **To:** TA4AU-02 **Last Const.:** 9/3/2007

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** P

Area: 88,885 SqFt **Length:** 2,540 Ft **Width:** 35 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 17 **Surveyed:** 5

Conditions: **PCI:** 73

Inspection Comments:

Sample Number: 03 **Type:** R **Area:** 5250.00 SqFt **PCI:** 71

Sample Comments:

48	L & T CR	L	150.00	Ft
48	L & T CR	M	150.00	Ft
45	DEPRESSION	L	6.00	SqFt
57	WEATHERING	L	5250.00	SqFt

Sample Number: 07 **Type:** R **Area:** 5250.00 SqFt **PCI:** 74

Sample Comments:

48	L & T CR	L	110.00	Ft
48	L & T CR	M	110.00	Ft
57	WEATHERING	L	5250.00	SqFt

Sample Number: 11 **Type:** R **Area:** 5250.00 SqFt **PCI:** 74

Sample Comments:

48	L & T CR	L	450.00	Ft
57	WEATHERING	L	5250.00	SqFt

Sample Number: 14 **Type:** R **Area:** 5250.00 SqFt **PCI:** 70

Sample Comments:

48	L & T CR	L	210.00	Ft
48	L & T CR	M	160.00	Ft
57	WEATHERING	L	5250.00	SqFt

Sample Number: 16 **Type:** R **Area:** 5250.00 SqFt **PCI:** 74

Sample Comments:

57	WEATHERING	L	5250.00	SqFt
48	L & T CR	L	100.00	Ft
48	L & T CR	M	110.00	Ft

Network: Aurora **Name:** Aurora State

Branch: TAAU **Name:** Taxiway A Aurora **Use:** TAXIWAY **Area:** 174,874 SqFt

Section: 03 of 3 **From:** TA4AU-01 **To:** TAAU-04 **Last Const.:** 8/1/2008

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** P

Area: 29,204 SqFt **Length:** 834 Ft **Width:** 35 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 6 **Surveyed:** 3

Conditions: **PCI:** 69

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 5250.00 SqFt **PCI:** 67

Sample Comments:

48	L & T CR	L	250.00	Ft
48	L & T CR	M	220.00	Ft
57	WEATHERING	L	5250.00	SqFt

Sample Number: 02 **Type:** R **Area:** 5250.00 SqFt **PCI:** 68

Sample Comments:

48	L & T CR	L	280.00	Ft
48	L & T CR	M	200.00	Ft
57	WEATHERING	L	5250.00	SqFt

Sample Number: 04 **Type:** R **Area:** 5250.00 SqFt **PCI:** 72

Sample Comments:

48	L & T CR	L	150.00	Ft
48	L & T CR	M	140.00	Ft
57	WEATHERING	L	5250.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: TL1AU **Name:** Taxilane 01 Aurora **Use:** TAXIWAY **Area:** 9,921 SqFt

Section: 01 of 1 **From:** TAA **To:** Hangars **Last Const.:** 9/3/2016

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 9,921 SqFt **Length:** 386 Ft **Width:** 25 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 2 **Surveyed:** 2

Conditions: **PCI:** 100

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 4648.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 02 **Type:** R **Area:** 5273.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Network: Aurora **Name:** Aurora State

Branch: TL2AU **Name:** Taxilane 02 Aurora **Use:** TAXIWAY **Area:** 10,673 SqFt

Section: 01 of 1 **From:** TAA **To:** Hangars **Last Const.:** 9/3/2016

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 10,673 SqFt **Length:** 400 Ft **Width:** 25 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 2 **Surveyed:** 2

Conditions: **PCI:** 100

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 4990.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 02 **Type:** R **Area:** 5682.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Network: Aurora **Name:** Aurora State

Branch: TL3AU **Name:** Taxilane 03 Aurora **Use:** TAXIWAY **Area:** 15,963 SqFt

Section: 01 of 1 **From:** TAA **To:** Hangars **Last Const.:** 9/3/2016

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 15,963 SqFt **Length:** 546 Ft **Width:** 25 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 3 **Surveyed:** 2

Conditions: **PCI:** 100

Inspection Comments:

Sample Number: 02 **Type:** R **Area:** 5823.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Sample Number: 03 **Type:** R **Area:** 5561.00 SqFt **PCI:** 100

Sample Comments:

<No Distress>

Network: Aurora **Name:** Aurora State

Branch: TNWYLEEAU **Name:** North Wylee Taxiway Aurora **Use:** TAXIWAY **Area:** 3,465 SqFt

Section: 01 of 1 **From:** TAAU-01 **To:** Hangars **Last Const.:** 9/3/2008

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 3,465 SqFt **Length:** 66 Ft **Width:** 26 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 75

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 3465.00 SqFt **PCI:** 75

Sample Comments:

48	L & T CR	L	50.00	Ft
48	L & T CR	M	60.00	Ft
57	WEATHERING	L	3465.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: TSWYLEEAU **Name:** South Wylee Taxiway Aurora **Use:** TAXIWAY **Area:** 3,237 SqFt

Section: 01 of 1 **From:** TAAU-01 **To:** Hangars **Last Const.:** 9/3/2008

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** S

Area: 3,237 SqFt **Length:** 66 Ft **Width:** 25 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 94

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 3237.00 SqFt **PCI:** 94

Sample Comments:

57	WEATHERING	L	3237.00	SqFt

Network: Aurora **Name:** Aurora State

Branch: TWILLAVAU **Name:** Willamette Aviation Taxiway Aurora **Use:** TAXIWAY **Area:** 3,777 SqFt

Section: 01 of 1 **From:** TAAU-01 **To:** Hangars **Last Const.:** 9/3/2008

Surface: AC **Family:** OR-Cat2-AC-Central-TW-2015 **Zone:** KUAO **Category:** F **Rank:** P

Area: 3,777 SqFt **Length:** 70 Ft **Width:** 42 Ft

Slabs: **Slab Length:** Ft **Slab Width:** Ft **Joint Length:** Ft

Shoulder: **Street Type:** **Grade:** 0 **Lanes:** 0

Section Comments:

Last Insp. Date: 7/12/2018 **TotalSamples:** 1 **Surveyed:** 1

Conditions: **PCI:** 89

Inspection Comments:

Sample Number: 01 **Type:** R **Area:** 3777.00 SqFt **PCI:** 89

Sample Comments:

48	L & T CR	L	30.00	Ft
57	WEATHERING	L	3777.00	SqFt

GRI
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Beaverton, OR 97008-7172
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September 16, 2019

Century West Engineering Corporation
5331 SW Macadam Avenue, Suite 287
Portland, OR 97239

Attention: James Kirby, PE
Senior Project Manager

SUBJECT: Pavement Classification Number (PCN) Evaluation of Runway 17-35
Aurora State Airport (UAO)
Aurora, Oregon

As requested, GRI conducted a pavement evaluation at Aurora State Airport (UAO) in support of the Oregon Department of Aviation (ODA) to develop a pavement classification number (PCN) for Runway 17-35.

PROJECT DESCRIPTION

Our work included review of relevant ODA records for Runway 17-35, falling weight deflectometer (FWD) testing, core explorations, and engineering analyses in accordance with Federal Aviation Administration (FAA) Advisory Circular 150/5335-5C, *Standardized Method of Reporting Airport Pavement Strength – PCN*. According to the FAA, the PCN is a number that expresses the load-carrying capacity of a pavement for unrestricted operations. We determined the PCN using the Technical Evaluation Method specified in Advisory Circular 150/5335-5C.

BACKGROUND

Based on information provided in the ODA pavement evaluation/maintenance management program report prepared by Pavement Consultant Inc. in 2018, a 4,100-ft-long segment on the north end of the runway was first constructed in 1943 and in 1993, a 900-ft-long extension was built to the south. The last major rehabilitation on the runway was conducted in 2005 and generally consisted of a 2- to 3-in. overlay.

The current Airport Master Record, FAA Form 5010, lists the gross weight limit for a single-wheel, main-gear aircraft and a dual-wheel, main-gear aircraft at 30,000 and 45,000 lbs, respectively. UAO currently does not have an established PCN.

FIELD WORK

Site Reconnaissance

A visual pavement reconnaissance was performed by GRI engineers on August 12, 2019, to assess the general surface condition of the pavements within the project and to identify core exploration locations.

Falling Weight Deflectometer Tests

GRI conducted FWD testing on August 20, 2019, along the full length of the runway. The testing was conducted in accordance with FAA Advisory Circular 150/5370-11b, *Use of Nondestructive Testing in the Evaluation of Airport Pavements,* using our KUAB 2m Model 150 FWD device.

FWD testing was completed along test lines located at 7 ft west and 12 ft east of the runway centerline. The tests were spaced at approximately 200-ft intervals within the runway keel section. The approximate locations of the test lines are shown on Figure 1.

The FWD test procedures are described in Appendix A. The data were normalized to a 30,000-lb load basis and the FWD deflection data are shown in Table 1A.

We also reviewed the load-response data measured by the FWD to provide a preliminary understanding of the overall stiffness of the pavement structure. Although this information does not provide information about the stiffness of individual soil and pavement layers, it does provide a quick assessment of the overall stiffness of the pavement system to gauge the variability of pavement stiffness within a particular pavement facility. Impact stiffness modulus (ISM) is inversely proportional to deflection and is therefore a direct measurement of the combined stiffness, or resistance to deflection induced by FWD loading, of the pavement and subgrade soils. As such, it is usually a relative measure of the pavement's ability to support loads, i.e., high ISM modulus values usually correspond to high pavement strength and vice versa. The profile of relative pavement strength along the two FWD test lines, as measured by resistance to deflection under FWD loading, is plotted for each FWD test location on Figure 4A. Additional discussion regarding ISM is provided in Appendix A.

Coring Explorations

General. On August 20, 2019, GRI conducted three core explorations, all of which were located over cracks. The approximate locations of the explorations are shown on the Site Plan, Figure 1. Details of our field investigations are further discussed in Appendix A of this report and the core explorations are summarized in Table 1.

Table 1: SUMMARY OF CORING EXPLORATION RESULTS

Core No.	FWD Test No.	Test Line	Station	Asphalt Concrete Thickness, in.	Aggregate Base Thickness, in.	Drilled Over a Crack?	Depth of Crack, in.
B-1	26	7 ft west	56+81	8.75	15.00	Yes	2.50
B-2	16	7 ft west	39+51	9.00	15.00	Yes	3.25
B-3	32	12 ft east	19+41	9.00	15.00	Yes	2.50

Existing Pavement Conditions

Overall, the pavement surface of Runway 17-35 appears to be in good condition. The primary distresses observed on the runway are low- to medium-severity longitudinal cracking, primarily at paving-panel joints or along the centerline; low-severity weathering; and isolated low-severity alligator cracking within the gear paths.

Since the alligator cracking within the gear paths (noted above) is a load-associated distress, in our opinion, it warranted further investigation and we therefore conducted the three core explorations in areas of alligator cracking on the runway. As shown in Table 1 and the photo logs on Figures 1A through 3A in Appendix A, the cracking is top down and extends to a depth of 2.5 in. in cores B-1 and B-3 and to a depth of 3.25 in. in B-2. These types of cracks may be induced by excessive shear stresses imposed by aircraft wheel loads at the runway surface and can typically be repaired by milling to the depth of cracking and overlaying. In our opinion, pavement exhibiting this type of distress should be rehabilitated when the cracking progresses to the point that spalling begins to occur and therefore represents a significant Foreign Object Damage (FOD) potential. The core samples also exhibit delamination (separation of asphalt concrete [AC] layers) at a depth of 2.5 and 3.25 in. in cores B-2 and B-3, respectively. The depth of delamination generally agrees with the thickness of the 2005 overlay.

DESIGN PROCEDURES AND ANALYSIS

Traffic Loading

Century West Engineering Corporation (CWE) provided an estimate of the aircraft traffic-volume data consisting of the number of operations (i.e., either an arrival or departure) for Runway 17-35 in 2018 from the FAA Traffic Flow Management System Counts (TFMSC). Our traffic-loading estimate is based on an annual growth rate of 1.58% per year, which is based on the aviation forecasts provided in the current master plan for UAO (WHPacific, 2012).

The COMFAA 3.0 software used to compute the PCN has inputs for each aircraft type (in the mix), which include the type of aircraft, gross weight, and number of annual departures over a 20-year period. The program does not take into account the annual growth rate, so we calculated the total departures from 2020 to 2040 to determine the equivalent annual number of departures for the analysis. The aircraft mix and annual number of departures we input into COMFAA are provided in Table 2.

Table 2: RUNWAY 17-35: AIRCRAFT TYPES AND DEPARTURE VOLUMES

Aircraft Type	Maximum Takeoff Weight, lbs	Design Aircraft for COMFAA	2018 Annual Operations	2040 Annual Operations	Values Entered into COMFAA	
					Equivalent Airplane	Annual # of Departures
Bombardier Global Express	92,500	Gulfstream G-V	50	61	Gulfstream G-V	64
Gulfstream G600	91,600	Gulfstream G-V	2	3		
Gulfstream V	76,850	Gulfstream G-IV	2	3	Gulfstream G-IV	7
Gulfstream IV	73,200	Gulfstream G-IV	2	3		
Dassault Falcon 900	45,503	Falcon-900	68	83	Falcon-900	83
Bombardier Challenger 600	45,100	Challenger CL-604	58	70	Challenger CL-604	176
Bombardier Challenger 300	38,850	Challenger CL-604	88	106		
Dassault Falcon 2000	41,000	Falcon-2000	34	42	Falcon-2000	42
Dassault Falcon 50	37,480	Falcon-50	276	332	Falcon-50	424
Dassault Falcon 20	28,650	Falcon-50	76	92		
Cessna Citation 750	36,600	Citation X	104	126	Citation X	292

Aircraft Type	Maximum Takeoff Weight, lbs	Design Aircraft for COMFAA	2018 Annual Operations	2040 Annual Operations	Values Entered into COMFAA	
					Equivalent Airplane	Annual # of Departures
Cessna Citation 680	30,775	Citation X	138	167		
Hawker 800	28,000	Hawker-800	34	42	Hawker-800	42
Gulfstream G150	26,100	D-35	80	97	D-35	97
Astra 1125	24,650	D-30	96	117	D-30	117
Cessna Citation 650	22,000	Citation VI/VII	98	119	Citation VI/VII	119
Learjet 60	23,500	Learjet-55	30	36		
Learjet 55	21,500	Learjet-55	4	6	Learjet-55	57
Learjet 75	21,500	Learjet-55	12	15		
Learjet 45	20,500	Learjet-35A/65A	110	133		
Learjet 35	18,000	Learjet-35A/65A	8	10	Learjet-35A/65A	254
Learjet 31	15,500	Learjet-35A/65A	92	111		
Cessna Citation 560	20,000	Citation 550B	704	847	Citation 550B	1,102
Cessna Citation 550	13,300	Citation 550B	212	255		
Phenom 300/ Embraer 300	17,968	D-25	56	68	D-25	68
		Total Operations:	**2,434**			**2,944**

Backcalculation Analysis of FWD Test Data

The elastic moduli of the subgrade soil at the boring locations were backcalculated from the FWD test data. The average minus-one standard deviation subgrade moduli for each analysis unit (design modulus) are shown at the bottom of the backcalculation analysis results in Table 2A in Appendix A.

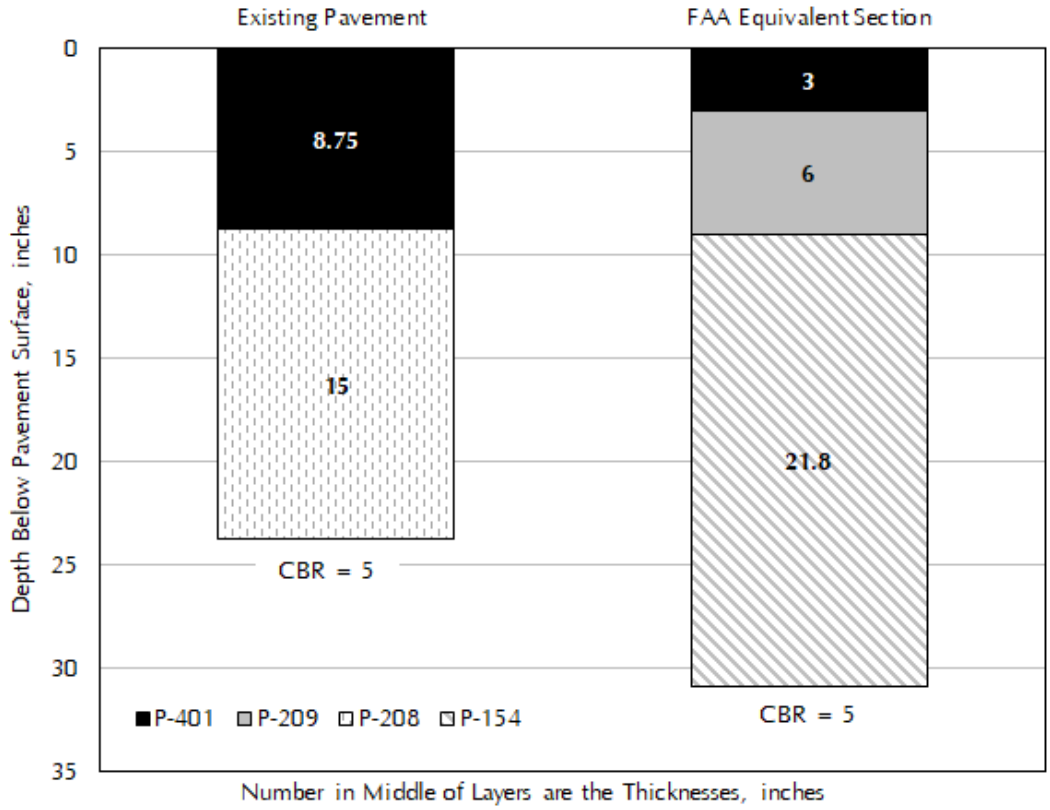
PAVEMENT CLASSIFICATION NUMBER (PCN) CALCULATIONS

As requested by the ODA, we calculated the PCN for Runway 17-35 for each aircraft in the fleet mix based on the critical pavement-layer thickness and subgrade-support characteristics developed herein. The California bearing ratio (CBR) used in the PCN analysis is based on the backcalculated design modulus from Analysis Unit 2 in Table 2A in Appendix A and was calculated using the typical correlation between CBR and Resilient Modulus (M_r) and the correlation adopted by the FAA in Advisory Circular 150/5320-6F, *Airport Pavement Design and Evaluation*, which is represented by the following:

$$CBR = M_r / 1{,}500$$

The analysis was conducted using the FAA's Support Spreadsheet, COMFAA 3.0. The pavement-layer thicknesses were converted into an equivalent pavement section using the appropriate subgrade-support code and the default values for the conversion factors given in Advisory Circular 150/5335-5C. Based on our analysis, the equivalent pavement section is also shown on the following figure.

EQUIVALENT PAVEMENT SECTION FOR RUNWAY 17-35



Results of the PCN computations summarized in Table 3 are based on the departure traffic provided by CWE. For Runway 17-35, we recommend publishing the PCN value shown in Table 3. The corresponding PCN elements of the runway are summarized in Form 5010 (Table 1B) in Appendix B.

Table 3: RECOMMENDED UPDATES TO FAA FORM 5010 FOR UAO RUNWAY 17-35

		Aircraft Gross Weight, thousands lbs	
Runway	**PCN**	**Single Wheel Main Gear**	**Dual Wheel Main Gear**
17-35	40/F/C/X/T	102	145

Our recommended single-wheel, main-gear and dual-wheel, main-gear aircraft gross weights are 102,000 and 143,000 lbs, respectively. The increase in wheel-load capacity (as compared to the current Airport Master Record, FAA Form 5010) is likely due to the increased structural capacity related to the 2005 overlay. Additional discussion regarding the PCN methodology and reporting is provided in Appendix B.

LIMITATIONS

This pavement report has been prepared for use by the Oregon Department of Aviation and Century West Engineering Corporation and should not be relied upon by any other entity without the written permission of an authorized representative. The scope is limited to the specific project and location described herein, and our description of the project represents our understanding of the significant aspects of the project relevant to the analysis of the pavements at the time of publication.

PCN system is only intended as a method that airport operators can use to evaluate acceptable operations of aircraft. It is not intended as a pavement design or pavement evaluation procedure, nor does it restrict or replace the methodology used to design or evaluate a pavement structure.

Our work has been performed in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in the locale. The results and conclusions submitted in this report are based on the data obtained from our sources of information discussed in this report. No other warranty, expressed or implied, is made.

Please contact the undersigned if you have any questions regarding this report or any other pavement considerations associated with this project.

Submitted for GRI,

Renews 12/2020

Michael J. Maloney, PE
Principal

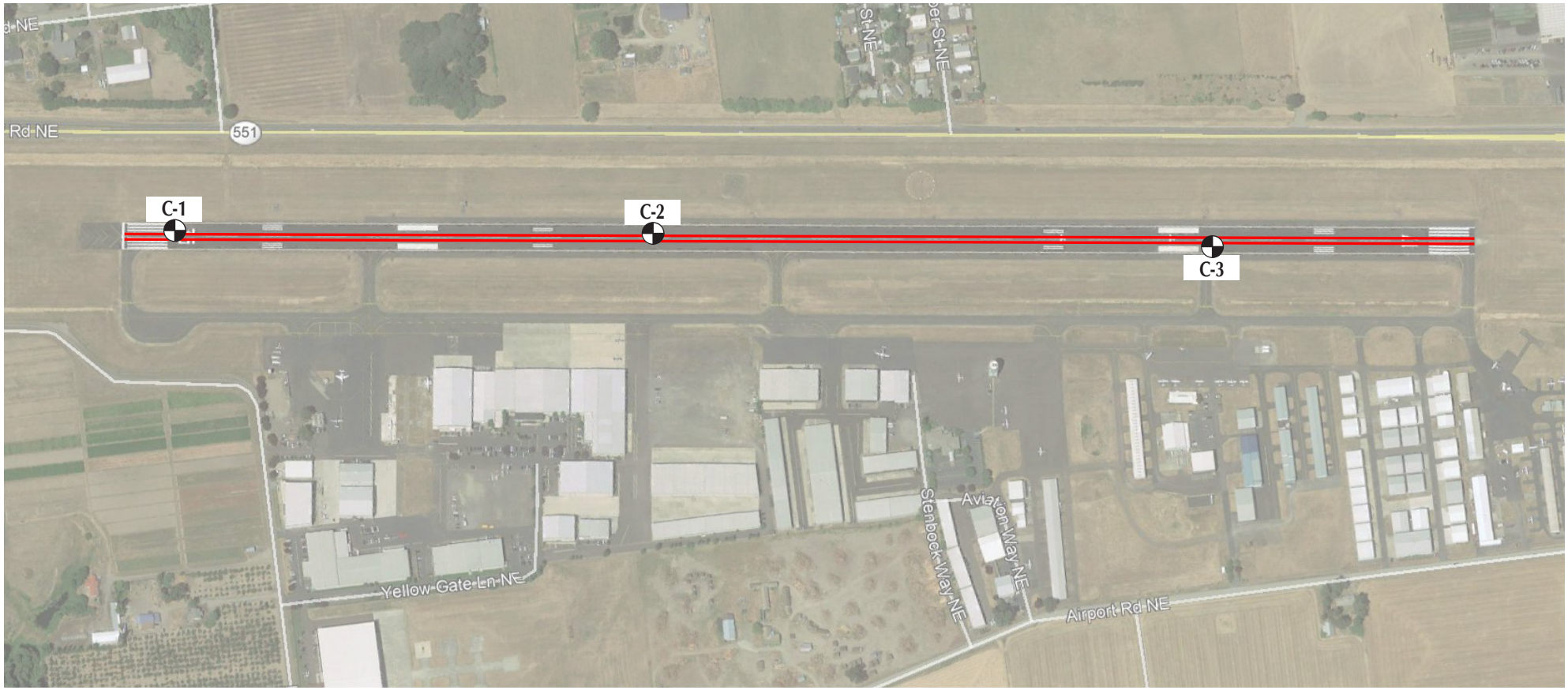
Lindsi A. Hammond, PE
Associate

This document has been submitted electronically.

References

WHPacific, Inc., 2012, Aurora State Airport, Airport Master Plan Update.

Pavement Consultants Inc., 2018, 2018 Pavement Evaluation / Maintenance Management Program: Aurora State Airport.



PAVEMENT CORE COMPLETED BY GRI
(AUGUST 20, 2019)

FWD TESTING COMPLETED BY GRI
(AUGUST 20, 2019)

SITE PLAN FROM GOOGLE EARTH (IMAGE DATE JULY 2018)

North

0 600 1,200 FT

GRI

CENTURY WEST ENGINEERING CORPORATION
AURORA STATE AIRPORT – RUNWAY 17-35 PCN EVALUATION

SITE PLAN

SEP. 2019 JOB NO. 6289 FIG. 1

APPENDIX A

Field Explorations and FWD Data

APPENDIX A

FIELD EXPLORATIONS AND FWD DATA

FIELD EXPLORATIONS

Existing pavement and subsurface conditions on Runway 17-35 were investigated by GRI on August 20, 2019, with three core explorations, designated B-1 through B-3. The approximate locations of the explorations are shown on the Site Plan, Figure 1. The field exploration and laboratory programs completed for this project are described below.

Pavement Core Explorations

The pavement was cored at each exploration location to assist in evaluation of the type of cracking and/or the thickness and condition of the asphalt concrete (AC). The pavement was cored using an electric drill owned and operated by GRI. Photographs of the core locations and core samples are shown on Figures 1A through 3A. Below the AC, we excavated to a maximum total depth of 24 in. below ground surface to observe the condition of the aggregate base (AB) and subgrade, if encountered. The subgrade was not encountered during our explorations and the AB was classified as silty sandy gravel ranging from angular to rounded and up to 1 to 1.5 in. in diameter.

FWD DATA

Falling weight deflectometer (FWD) tests were conducted by GRI on August 20, 2019, using our KUAB Model 150 FWD. The annual reference calibration for the FWD was accomplished in October 2019 at the KUAB manufacturing facility in Savoy, Illinois.

The FWD testing on Runway 17-35 was accomplished along test lines located at 7 ft west and 12 ft east of the runway centerline. The tests were completed at approximately 200-ft intervals within the keel section of the runway.

General

Geodetic coordinates of all test locations were measured from GPS signal using a submeter-capable Trimble™ GPS receiver with the antenna mounted on the FWD above the load plate.

The FWD load is generated by a two-mass/two-buffer, falling-weight system that produces a nearly haversine-shaped load-pulse waveform. The buffer and weight combination used for these tests produces a load rise time of approximately 14 milliseconds with an equivalent haversine frequency of approximately 32 Hz. The load pulse was applied to the pavement surface through a 450-mm-diameter (8.86-in.-radius), four-part, segmented plate designed to apply uniform surface pressure distribution despite irregularities in the pavement surface. Air temperature and pavement surface temperature (the latter measured by infrared thermometer) were recorded for each test.

Test Data

The average deflections from the two nominal 32,000-lb impact loads were linearly normalized to a 30-kip (30,000-lb) load basis and are tabulated in Table 1A of this appendix. The measurement units for the test

data are distance in feet, deflections in mil units (1 mil = 0.001 in.), load in pounds, sensor distance in inches, load plate radius in inches, and temperature in degrees Fahrenheit.

Impact Stiffness Modulus (ISM)

The Impact Stiffness Modulus (ISM) shown in units of kips per square inch (ksi) is the composite stiffness, or dynamic plate bearing modulus, of all the materials beneath the pavement/roadway surface. It is computed using the Boussinesq formula for surface deflection beneath the center of a uniformly loaded circular area on a linear-elastic half space, with a Poisson's ratio of 0.50. The surface deflection measured at the center of the FWD load plate (D0) was used to compute the surface modulus. The magnitude of the ISM is inversely proportional to deflection and comparable to the elastic modulus. The difference between the pavement ISM and elastic modulus is that the elastic modulus represents the elastic load-deformation response of an individual pavement layer or the subgrade soil, whereas the pavement ISM represents the composite elastic load-deformation response of all materials (pavement layers and subgrade soil) below the pavement surface. Therefore, the ISM (as computed from the deflection measured beneath the FWD load plate) cannot be taken as representative of the elastic modulus of any single pavement layer or the subgrade soil. However, since it is a measurement of the combined stiffness of the pavement structure and subgrade soil, it is often useful for evaluation of variation in pavement stiffness and for assessment of relative pavement strength. Plots of the ISMs are shown on Figure 4A.

Table 1A - FWD NORMALIZED DEFLECTION TEST DATA
RUNWAY 17-35: AURORA STATE AIRPORT (UAO)

Test Section: RW 17-35
Start Point: North edge of runway, 10+00
Test Date: 8/20/2019
Test File: 6289-Aurora Airport.fwd
Load Plate Radius, in: 8.86
Sensor Distance, in: 0 12 18 24 36 48 60 72

Deflections Normalized to 30000 lbf Basis

Test No.	Test Station	Test Line	Core	D 1, mils	D 2, mils	D 3, mils	D 4, mils	D 5, mils	D 6, mils	D 7, mils	D 8, mils	Surface Temp., °F	Time	Surface Modulus, Ksi	ISM, kips/in	Comments
1	10+50	7' w		28.54	24.85	21.17	18.56	13.73	10.05	7.37	5.54	68	1:24:59	57	1,051	7' west
2	12+50	7' w		25.28	20.28	16.82	14.62	10.56	7.81	5.80	4.50	71	1:26:36	64	1,187	
3	14+49	7' w		30.42	25.52	21.55	18.73	13.50	9.84	7.24	5.55	71	1:27:52	53	986	
4	16+51	7' w		29.35	24.82	20.94	18.25	13.29	9.74	7.15	5.47	71	1:29:09	55	1,022	
5	18+50	7' w		24.65	20.46	17.12	14.81	10.62	7.71	5.71	4.47	71	1:30:14	66	1,217	
6	20+56	7' w		27.93	22.60	18.54	15.81	11.05	7.98	5.87	4.66	71	1:31:20	58	1,074	
7	22+50	7' w		25.72	21.22	17.71	15.34	11.10	8.13	6.06	4.70	71	1:32:26	63	1,166	
8	24+51	7' w		26.54	21.58	17.98	15.18	10.67	7.71	5.71	4.47	71	1:33:33	61	1,130	
9	26+53	7' w		26.28	20.74	17.15	14.64	10.47	7.67	5.83	4.64	70	1:34:39	62	1,142	
10	28+55	7' w		26.82	22.10	18.49	15.98	11.58	8.49	6.34	4.95	71	1:35:42	60	1,119	
11	30+54	7' w		26.27	21.60	18.22	15.84	11.70	8.66	6.45	4.96	71	1:37:01	62	1,142	
12	32+54	7' w		30.95	25.88	21.81	19.07	13.97	10.26	7.67	5.78	71	1:38:07	52	969	
13	34+52	7' w		36.96	27.64	22.18	18.81	13.26	9.67	7.12	5.56	71	1:39:22	44	812	
14	36+57	7' w		32.41	26.67	22.42	19.26	13.87	10.02	7.26	5.44	70	1:40:28	50	926	
15	38+52	7' w		28.76	23.55	19.60	16.84	12.06	8.67	6.34	4.88	70	1:41:38	56	1,043	
16	39+51	7' w	B-2	34.09	27.13	22.55	19.48	14.13	10.46	7.65	5.72	70	1:43:21	47	880	B-2
17	40+51	7' w		27.27	22.43	18.67	16.13	11.60	8.44	6.11	4.75	70	1:44:29	59	1,100	
18	42+51	7' w		31.58	25.74	21.56	18.44	13.11	9.35	6.80	5.10	70	1:45:38	51	950	
19	44+51	7' w		29.21	23.02	18.77	15.98	11.24	7.90	5.76	4.52	70	1:46:46	55	1,027	
20	46+50	7' w		29.41	23.54	19.35	16.44	11.40	7.92	5.78	4.50	70	1:47:53	55	1,020	
21	48+52	7' w		28.25	23.01	19.08	16.26	11.38	8.17	6.06	4.66	70	1:49:02	57	1,062	
22	50+52	7' w		39.77	29.04	22.94	19.04	12.53	8.69	6.21	4.86	70	1:50:10	41	754	
23	52+50	7' w		34.37	27.28	22.48	18.86	12.83	8.94	6.47	5.08	70	1:51:20	47	873	
24	54+51	7' w		44.23	34.59	27.53	22.75	14.74	9.70	6.77	5.20	69	1:52:33	37	678	
25	56+40	7' w		37.32	28.83	22.75	18.62	11.88	7.81	5.61	4.42	67	1:53:49	43	804	
26	56+81	7' w	B-1	35.88	28.79	23.20	19.31	12.57	8.38	5.79	4.55	70	1:55:03	45	836	B-1
27	58+50	7' w		35.45	27.78	22.05	18.05	11.74	7.82	5.60	4.34	65	1:56:22	46	846	5875=s end end 7' west
28	11+50	12' e		25.22	21.35	18.22	15.93	11.88	8.90	6.66	5.09	68	2:05:27	64	1,190	12' east
29	13+50	12' e		30.01	25.29	21.29	18.67	13.66	10.11	7.43	5.70	70	2:07:03	54	1,000	
30	15+51	12' e		30.03	25.22	21.26	18.42	13.46	9.89	7.28	5.64	70	2:08:15	54	999	
31	17+53	12' e		28.42	22.94	19.00	16.27	11.53	8.38	6.20	4.83	70	2:09:28	57	1,056	
32	19+41	12' e	B-3	34.02	25.85	20.87	17.26	11.79	8.33	6.13	4.74	70	2:13:56	48	882	B-3
33	21+50	12' e		21.06	17.31	14.42	12.49	9.07	6.79	5.19	4.17	70	2:16:05	77	1,425	
34	23+52	12' e		25.55	21.01	17.53	15.14	11.13	8.27	6.23	4.95	70	2:17:18	63	1,174	
35	25+52	12' e		21.98	17.91	15.02	13.04	9.69	7.31	5.60	4.43	69	2:18:26	74	1,365	
36	27+51	12' e		26.27	20.79	16.87	14.33	10.21	7.48	5.62	4.44	69	2:19:33	62	1,142	
37	29+50	12' e		34.66	28.16	23.24	19.76	13.95	10.10	7.48	5.79	69	2:20:42	47	866	

Table 1A - FWD NORMALIZED DEFLECTION TEST DATA
RUNWAY 17-35: AURORA STATE AIRPORT (UAO)

Deflections Normalized to 30000 lbf Basis

Test No.	Test Station	Test Line	Core	D 1, mils	D 2, mils	D 3, mils	D 4, mils	D 5, mils	D 6, mils	D 7, mils	D 8, mils	Surface Temp., °F	Time	Surface Modulus, Ksi	ISM, kips/in	Comments
38	31+52	12' e		27.24	22.35	18.84	16.39	12.19	9.20	6.99	5.47	69	2:21:52	59	1,101	
39	33+49	12' e		26.34	21.87	18.38	15.90	11.64	8.78	6.71	5.25	69	2:23:00	61	1,139	
40	35+53	12' e		24.64	20.22	16.91	14.67	10.73	8.01	6.08	4.83	69	2:24:09	66	1,218	
41	37+51	12' e		29.65	24.86	20.96	18.32	13.45	9.99	7.38	5.60	69	2:25:16	55	1,012	
42	39+50	12' e		25.27	21.38	17.99	15.86	11.68	8.77	6.56	5.13	69	2:26:26	64	1,187	
43	41+51	12' e		25.80	21.67	18.35	15.90	11.67	8.62	6.43	4.94	69	2:27:34	63	1,163	
44	43+50	12' e		27.58	23.19	19.57	17.18	12.51	9.22	6.76	5.14	69	2:28:38	59	1,088	
45	45+51	12' e		26.22	21.41	17.71	15.13	10.72	7.77	5.72	4.51	69	2:29:48	62	1,144	
46	47+54	12' e		28.02	22.49	18.48	15.60	10.83	7.75	5.68	4.46	69	2:30:56	58	1,071	
47	49+51	12' e		27.34	22.44	18.36	15.67	11.04	7.94	5.90	4.62	69	2:32:04	59	1,097	
48	51+53	12' e		30.35	24.69	20.12	17.00	11.60	8.11	5.96	4.66	69	2:33:11	53	988	
49	53+55	12' e		31.95	26.02	21.17	17.69	11.99	8.46	6.17	4.85	69	2:34:18	51	939	
50	55+50	12' e		36.26	28.03	22.28	18.48	12.16	8.34	6.04	4.75	69	2:35:31	45	827	
51	57+51	12' e		32.67	26.40	21.38	17.62	11.50	7.75	5.50	4.31	67	2:36:47	49	918	5878=s end end 12' east

Table 2A - BACKCALCULATION ANALYSIS SUMMARY
RUNWAY 17-35: AURORA STATE AIRPORT (UAO)

Runway 17-35: Aurora State Airport (UAO)
Based on FWD Testing Conducted: 8/20/2019
Start Station: North edge of runway, 10+00

FWD Test #	Test Station	Test Line	Core Exploration	Analysis Unit	D0, mils	AC Thickness, inches	AB Thickness, inches	Subgrade Modulus, psi
1	10+50	7' w		1	28.54	9.00	15.00	10,402
2	12+50	7' w		1	25.28	9.00	15.00	15,441
3	14+49	7' w		1	30.42	9.00	15.00	11,553
4	16+51	7' w		1	29.35	9.00	15.00	11,570
5	18+50	7' w		1	24.65	9.00	15.00	12,902
6	20+56	7' w		1	27.93	9.00	15.00	11,768
7	22+50	7' w		1	25.72	9.00	15.00	14,630
8	24+51	7' w		1	26.54	9.00	15.00	12,567
9	26+53	7' w		1	26.28	9.00	15.00	15,004
10	28+55	7' w		1	26.82	9.00	15.00	14,486
11	30+54	7' w		1	26.27	9.00	15.00	13,228
12	32+54	7' w		1	30.95	9.00	15.00	10,155
13	34+52	7' w		1	36.96	9.00	15.00	9,847
14	36+57	7' w		1	32.41	9.00	15.00	10,365
15	38+52	7' w		1	28.76	9.00	15.00	10,556
16	39+51	7' w	B-2	1	34.09	9.00	15.00	9,726
17	40+51	7' w		1	27.27	9.00	15.00	10,489
18	42+51	7' w		1	31.58	9.00	15.00	11,108
19	44+51	7' w		1	29.21	9.00	15.00	11,314
20	46+50	7' w		1	29.41	9.00	15.00	11,087
21	48+52	7' w		1	28.25	9.00	15.00	14,129
22	50+52	7' w		2	39.77	8.75	15.00	8,814
23	52+50	7' w		2	34.37	8.75	15.00	9,367
24	54+51	7' w		2	44.23	8.75	15.00	6,713
25	56+40	7' w		2	37.32	8.75	15.00	9,796
26	56+81	7' w	B-1	2	35.88	8.75	15.00	7,615
27	58+50	7' w		2	35.45	8.75	15.00	9,512
28	11+50	12' e		1	25.22	9.00	15.00	12,541
29	13+50	12' e		1	30.01	9.00	15.00	11,399
30	15+51	12' e		1	30.03	9.00	15.00	9,781
31	17+53	12' e		1	28.42	9.00	15.00	11,645
32	19+41	12' e	B-3	1	34.02	9.00	15.00	10,977
33	21+50	12' e		1	21.06	9.00	15.00	17,720
34	23+52	12' e		1	25.55	9.00	15.00	13,364
35	25+52	12' e		1	21.98	9.00	15.00	14,811
36	27+51	12' e		1	26.27	9.00	15.00	14,236
37	29+50	12' e		1	34.66	9.00	15.00	11,837
38	31+52	12' e		1	27.24	9.00	15.00	10,942
39	33+49	12' e		1	26.34	9.00	15.00	11,421
40	35+53	12' e		1	24.64	9.00	15.00	14,477
41	37+51	12' e		1	29.65	9.00	15.00	10,835
42	39+50	12' e		1	25.27	9.00	15.00	11,501
43	41+51	12' e		1	25.80	9.00	15.00	13,236
44	43+50	12' e		1	27.58	9.00	15.00	11,913

Table 2A - BACKCALCULATION ANALYSIS SUMMARY
RUNWAY 17-35: AURORA STATE AIRPORT (UAO)

FWD Test #	Test Station	Test Line	Core Exploration	Analysis Unit	D0, mils	AC Thickness, inches	AB Thickness, inches	Subgrade Modulus, psi
45	45+51	12' e		1	26.22	9.00	15.00	12,250
46	47+54	12' e		1	28.02	9.00	15.00	11,825
47	49+51	12' e		1	27.34	9.00	15.00	12,606
48	51+53	12' e		2	30.35	8.75	15.00	11,238
49	53+55	12' e		2	31.95	8.75	15.00	10,326
50	55+50	12' e		2	36.26	8.75	15.00	9,761
51	57+51	12' e		2	32.67	8.75	15.00	9,341

Statistical Summary

Structural Unit#	From Sta	To Sta	PAVER PMP Unit	Average D0, mils	Average AC Thickness, in.	Average AB Thickness, in.	Average Subgrade Modulus, psi
1	0+00	49+51	R17AU-01	28.10	9.00	15.00	12,235
2	0+00	58+50	R17AU-02	35.83	8.75	15.00	9,248

Design Subgrade Resilient Modulus

Structural Unit #	From	To	PAVER PMP Unit	Average Subgrade Modulus, psi	Standard Deviation, psi	Average Subgrade – Standard Deviation, psi	CBR, Mr (psi)/1500
1	10+50	49+51	R17AU-01	12,235	1,800	10,435	7
2	50+52	58+50	R17AU-02	9,248	1,294	7,955	5

Core B-1 (RW 17-35 8′ West of Centerline, Station 56+81, FWD 26)

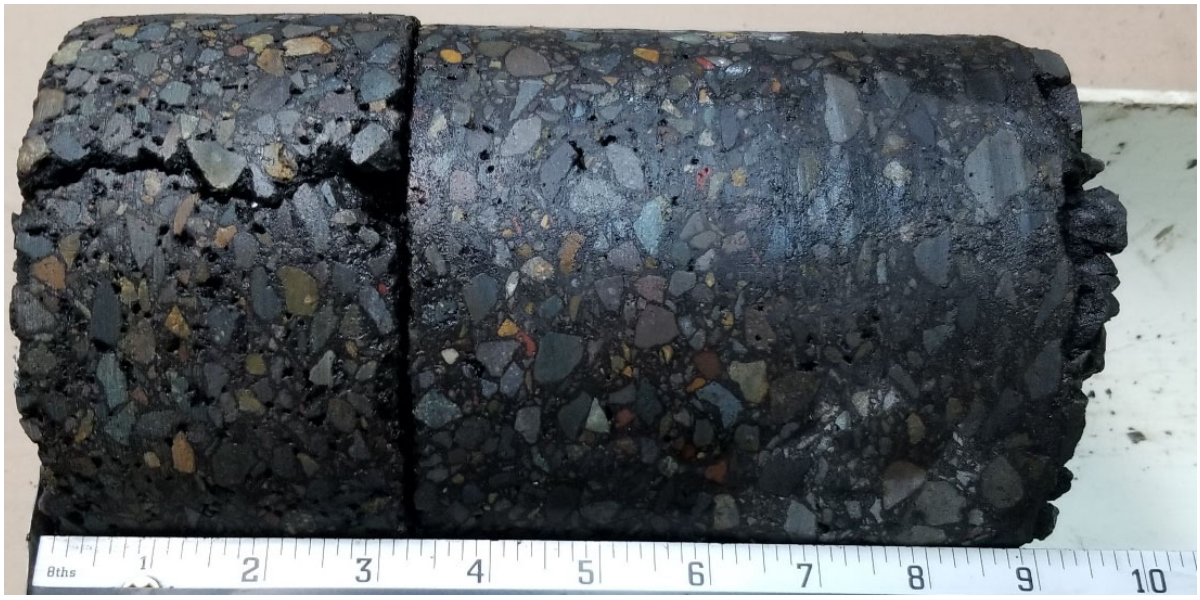
B-1 (Pavement Core Sample, 8.75 in.)

GRI

PAVEMENT CORE PHOTOGRAPHS

SEP. 2019 JOB NO. 6289 FIG. 1A

Core B-2 (RW 17-35 8′ West of Centerline, Station 39+51, FWD 16)



B-2 (Pavement Core Sample, 9.0 in.)

GRI

PAVEMENT CORE PHOTOGRAPHS

SEP. 2019 JOB NO. 6289 FIG. 2A

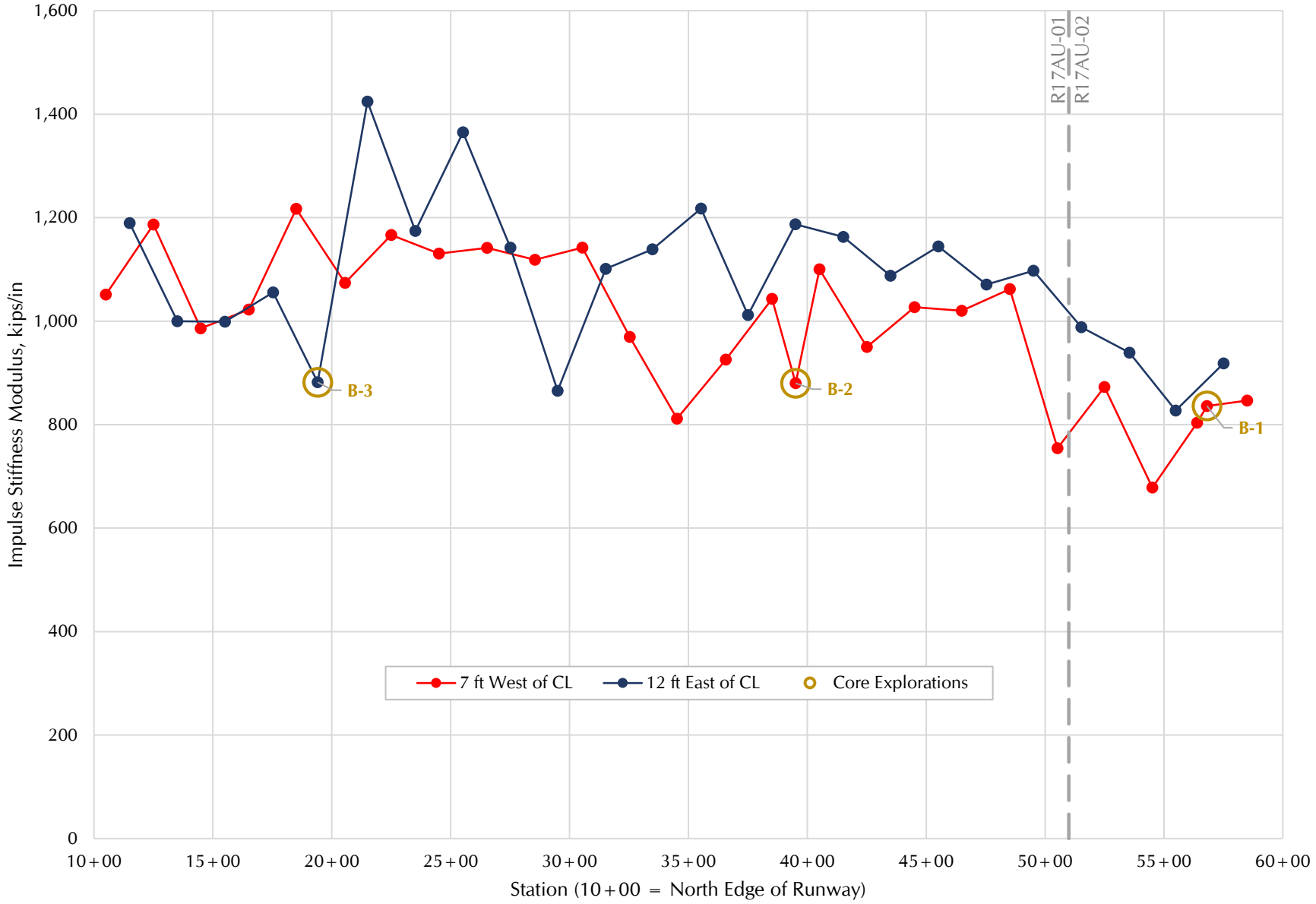
Core B-3 (RW 17-35 12′ East of Centerline, Station 19+41, FWD 32)

B-3 (Pavement Core Sample, 9.0 in.)

GRI

PAVEMENT CORE PHOTOGRAPHS

SEP. 2019 JOB NO. 6289 FIG. 3A



GRI

IMPULSE STIFFNESS MODULUS

SEP. 2019 JOB NO. 6289 FIG. 4A

APPENDIX B

Pavement Classification Number Analysis

APPENDIX B

PAVEMENT CLASSIFICATION NUMBER ANALYSIS

BACKGROUND

In 2014, the FAA instituted a requirement that Part 139-certified airports be assigned pavement classification number (PCN) data. The PCN is required because the United States is a member state of the International Civil Aviation Organization (ICAO), the international regulatory body for air traffic. ICAO adopted the Aircraft Classification Number (ACN)-Pavement Classification Number (ACN-PCN) method to allow any airport a standardized method for reporting the effect of aircraft that use the facility, as well as the load-carrying capacity of the pavement (ICAO, 1999).

The ACN is a number that expresses the relative effect of an aircraft at a given configuration on a pavement structure for a specified standard subgrade strength. Conversely, the PCN is defined as a number that expresses the load-carrying capacity of a pavement for unrestricted operations. Therefore, the ACN-PCN system is structured so that a pavement with a particular PCN value can support unlimited repetitions of an aircraft that has an ACN equal to or less than the pavement's PCN value.

In the ACN/PCN method, the PCN, pavement type, subgrade strength category, tire pressure category, and evaluation method are all reported together. A code system has been implemented to allow an abbreviated presentation of the necessary information. The pavement type is abbreviated "R" for rigid (portland cement concrete [PCC]) and "F" for flexible (AC) pavements. Four subgrade categories, A, B, C, and D, indicate high, medium, low, and ultra-low subgrade strengths, respectively. The four tire-pressure categories, W, X, Y, and Z, indicate high, medium, low, and very low tire pressures, respectively. The evaluation methods are T for a technical evaluation and U for an evaluation based on the type and weight of the aircraft that commonly use the airfield. For example, the PCN code 90/F/C/W/T indicates that the PCN number is 90, that the pavement is flexible, that there is a low-strength subgrade, that high-pressure tires are allowed, and that a technical evaluation was performed to determine the PCN rating.

METHODOLOGY

As noted above, the pavement strength evaluation was accomplished in accordance with the Technical Method described in Advisory Circular 150/5335-5C. To complete the analysis, the following information was used for Runway 17-35:

> **Aircraft Traffic Volume:** The traffic volume estimate was provided by Century West Engineering Corporation in terms of operations for Runway 17-35. The COMFAA 3.0 program includes a library of standard aircraft types, and we used the default gear weight for each aircraft in the aircraft fleet mix.
>
> **Pavement Structure:** As noted earlier herein, the pavement thickness and subgrade support characteristics were estimated based on the FWD backcalculation results and core explorations.

The results of our PCN analysis are summarized in Form 5010 – Airport Master Record (Table 1B) and presented on Figure 1B of this appendix.

Reference

ICAO, 1999, Aerodrome standards – aerodrome design and operations, Annex 14, Third Edition.

Table 1B - FORM 5010 AIRPORT MASTER RECORD

- ( ) A Flexible Category (CBR 15)
- ( ) B Flexible Category (CBR 10)
- (•) C Flexible Category (CBR 6)
- ( ) D Flexible Category (CBR 3)

TIRE PRESSURE

- ( ) W Unlimited
- (•) X 254 psi
- ( ) Y 145 psi
- ( ) Z 73 psi

METHOD USED

- ( ) Using Aircraft
- (•) Technical

Project info

Aurora State Airport

- ( ) A Rigid Category (k 552 pci)
- ( ) B Rigid Category (k 295 pci)
- ( ) C Rigid Category (k 147 pci)
- ( ) D Rigid Category (k 74 pci)

AIRCRAFT GEAR TYPE IN TRAFFIC MIX

- [x] S (single wheel gear)
- [x] D (dual wheel gear)
- [ ] 2D (dual tandem wheel gear)
- [ ] 3D (triple tandem wheel gear) e.g B-777
- [ ] DDT or W/B (tandem gear under wing AND tandem gear under body) e.g. B-747, A-340-600, A-380

Airport LOC-ID	UAO
Pavement ID	RW 17-35

Enter PCN 40

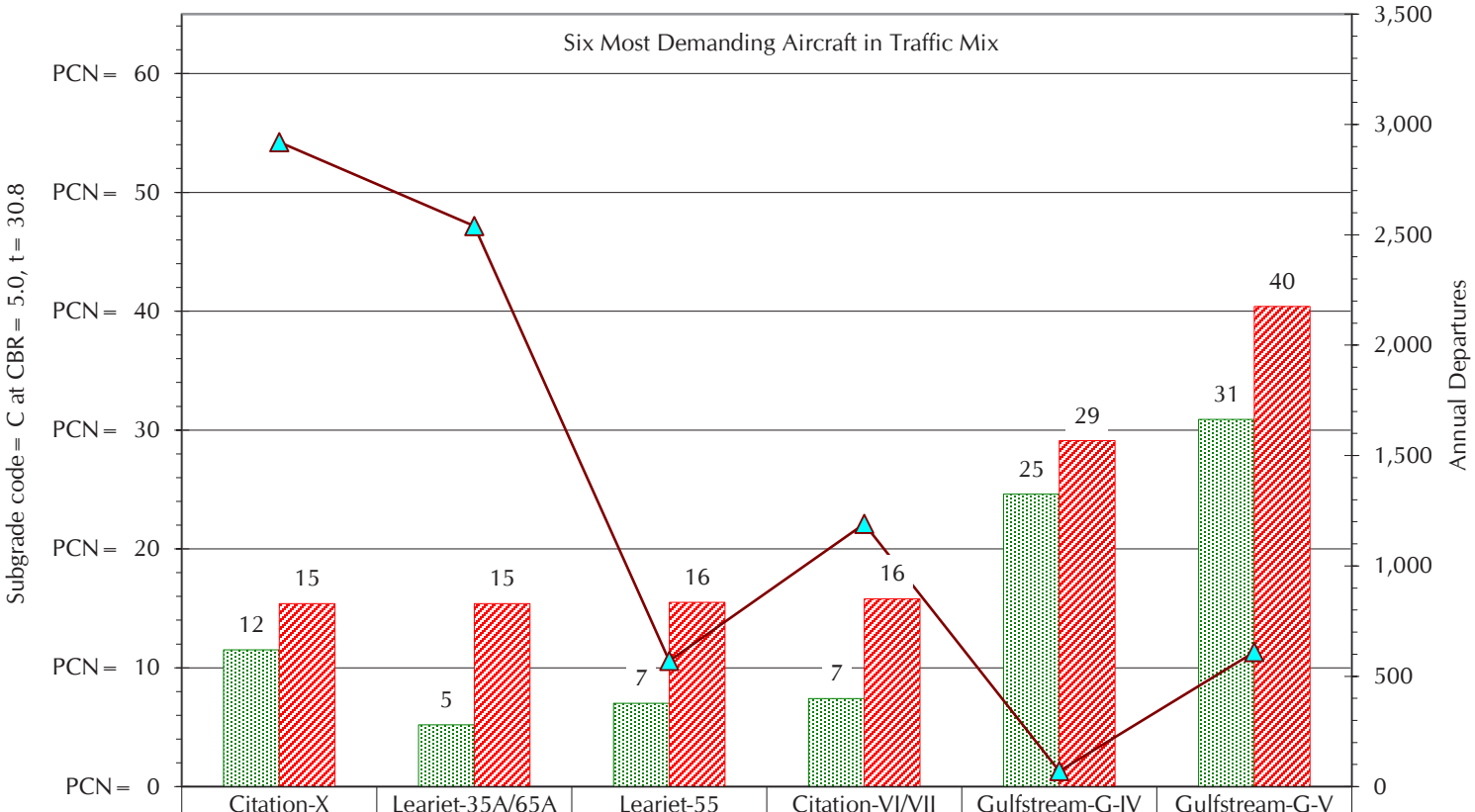
IF 3D or W/B Gear Checked, #38 = PCN
Please Add Data Element #38 Remark

Form 5010 Data Element	Gross Weight and PCN
#35 S gear	102
#36 D gear	143
#37 DT gear	
#38 DDT gear	
#39 PCN	40/F/C/X/T

3D	
2D/2D2	
2D/3D2W	
2D/3D2B	

Report Minimum Gross Weight

Airport LOC-ID	Pavement ID	#35 S GW	#36 D GW	#37 DT GW	#38 DDT GW	#39 PCN
UAO	17-35	102	143			40/F/C/X/T



	Citation-X	Learjet-35A/65A	Learjet-55	Citation-VI/VII	Gulfstream-G-IV	Gulfstream-G-V
1. Aircraft ACN at traffic mix GW	11.5	5.2	7.0	7.4	24.6	30.9
2. Calculated PCN at CDF max. GW	15.4	15.4	15.5	15.8	29.1	40.4
3. Annual Departures from traffic mix	2,920	2,540	570	1,190	70	610

GRI

PAVEMENT CLASSIFICATION CHART

SEP. 2019 JOB NO. 6289 FIG. 1B

Memo

To:	**Heather Peck, Projects and Programs Director, Oregon Department of Aviation**
From:	**James Kirby, PE, Century West Engineering**
Date:	**September 4th, 2020**
Project:	**Aurora State Airport - Runway Pavement Considerations for Overweight Landings**
Re:	**Evaluation and Recommendations**

The Oregon Department of Aviation (ODA) has requested that Century West Engineering assess the existing information concerning Runway 17-35 at Aurora State Airport (UAO) and provide recommendations on further consideration of overweight landing requests there. A review of existing conditions, recent structural evaluation work, and qualitative factors related to the surface condition follows:

Existing conditions

The most recent ODA Pavement Evaluation Program (PEP) report prepared by Pavement Consultant Inc. (dated 2018) shows the existing Runway 17-35 pavement is comprised of two major sections. The largest being the 4,100' long Northern section of the runway, first constructed in 1943. The 900' long Southern extension was constructed in 1993. During the last major project in 2005, the entire length of the runway received a 2" to 3" overlay.

The PEP reports that the pavement surface of Runway 17-35 is in "satisfactory" condition with a weighted average Pavement Condition Index of 81. The primary distresses present on the runway are low- to medium-severity longitudinal cracking, low-severity weathering, and isolated low-severity alligator cracking. The longitudinal cracking is located primarily at paving joints created during the 2005 overlay project and sealed most recently in August of 2020. The alligator cracking is located in the gear path for the larger business jet aircraft using the airport.

When design for the 2005 project was being contemplated, FAA had limited the structural capacity input used in the design to 30,000 lbs (single wheel main gear) and 45,000 lbs (dual wheel main gear). It was determined that the existing pavement met those design criteria and as that project was not intended to increase runway capacity, the overlay was limited in depth. The 2" to 3" overlay was able to address surface conditions and combined with milling, extend the overall pavement section's life considerably. No additional structural testing of the final section was conducted at that time and as a result, the

current Airport Master Record (FAA Form 5010) lists the 30,000 lbs single wheel and 45,000 lbs dual wheel numbers as the gross weight limitations for the runway pavement.

Recent Structural Evaluations

In August of 2019, GRI performed a pavement evaluation of Runway 17-35 at UAO to determine the existing Pavement Classification Number (PCN). That project included review of ODA historical pavement records, falling weight deflectometer testing, pavement cores, and related analysis. The guidance provided in FAA Advisory Circular 150/5335-5C, Standardized Method of Reporting Airport Pavement Strength – PCN, was used to calculate the final PCN based on this work.

The reported PCN indicated that the existing pavement's structural capacity was greater than the 30,000 lbs single wheel and 45,000 lbs dual wheel numbers published in the Airport Master Record. GRI recommended that the single-wheel, main-gear and dual-wheel, main-gear aircraft gross weights be increased to 102,000 and 143,000 lbs, respectively based on the new PCN calculation. They hypothesized in their report that the 2005 overlay resulted in additional pavement section depth that likely increased the structural capacity. As design thicknesses for various portions of the pavement section are rounded up and factors of safety are built into the design process, these likely factored into the existing structure having increased capacity over the design numbers as well.

Overweight Landings

For aircraft exceeding the published pavement strength ratings, ODA requires submission of a Weight Limit Waiver Request and Liability Release Form prior to use of the airport. This anticipates that individual landings and takeoffs will be considered in light of the Runway strength rating and may be allowed on an individual basis. There have been a number of such requests approved in the last five years from operators of Gulfstream aircraft such as the GIV, GV, and GVI as well as Global Express aircraft.

The PCN calculation which yielded the GRI recommendation to increase the gross weight limits for the Runway does have some caveats that need to be considered. It should be noted that the PCN system is used as a method for airport operators to determine whether or not individual aircraft operations may be acceptable on their pavements. As such, it does not provide a mechanism to evaluate the cumulative damage from repeated aircraft operations of a specific type, size or configuration. In short, it does not provide a substitute for a pavement design or evaluation of changes in fleet mix, each which must be considered separately.

We looked at a representative fleet mix to see if an additional large aircraft might significantly reduce pavement life. Taking into account GRI's pavement strength assessment, it is unlikely that isolated operations of the aircraft that have made requests for overweight landings previously would significantly reduce the pavement life. Those aircraft gross takeoff weights are under the calculated pavement strengths so the effect of individual operations would be minimal.

However, large shifts in fleet mix to heavier aircraft should be considered carefully in light of the cumulative effect that major fleet changes have on pavement life. To evaluate the effect, a fleet mix could be created for the airport that included all operations broken out by specific aircraft type and configuration. Then that fleet mix could have one or more aircraft of interest added to the mix with their proposed operational counts and the cumulative effects on the pavement section could be quantified. The concerns noted by GRI in their report about the condition of the existing overlay however, preclude the use of that approach in any meaningful way.

Other Considerations

GRI noted low severity alligator cracking within the gear paths that warranted further examination. Pavement cores were drilled in those areas and the cracking was found to be top-down. GRI also noted delamination of the top course of asphalt (from the 2005 overlay). This type of cracking and delamination is indicative of shear stresses at the pavement surface from aircraft wheel loading during landing and hard braking.

These observations make looking at an individual aircraft's cumulative effect on pavement life problematic as those effects may not result in the most likely failure mode for the runway pavement. The FAA does not have an accepted approach for modelling shear stresses or delamination of overlays in a quantifiable way. Variability in the degree of delamination over the runway surface also presents a unique problem. We can examine what operations may make those situations worse however. Surface shear stresses result when aircraft tires contact the pavement surface and significant friction forces are generated. Examples are initial contact with the pavement surface at the touchdown point and hard wheel braking during rollout. Aircraft with large tire contact areas and heavier weights would be worse in this regard. Even lighter aircraft such a DC-3 when fitted with larger tires put the runway overlay at greater risk for shear failure due to their larger tire contact area.

Recommendations

Evaluation of waiver requests for aircraft exceeding the existing published pavement strength ratings provides ODA with a valuable tool to control further runway degradation. However, a qualitative approach is likely the best way to maintain overall pavement condition as long as possible when overweight operations are being considered. Individual or limited operations of aircraft with gross weights over the published maximums and under those weights indicated by the PCN calculations are likely negligible. Significant additional operations of aircraft in that weight range may warrant additional and specific study. We would also recommend that any overweight landing request be considered in light of the potential for shear stress failures in the form of overlay delamination and FOD generation from low-severity alligator cracking worsening on the runway.

In general, we would recommend that the runway be inspected more frequently to monitor pavement conditions at those locations where alligator cracking was noted. This would include the wheel paths along the length of the runway as well as the width of the runway in the landing areas at both ends. If

worsening alligator cracking, significant new transverse cracking, random cracking, or FOD generation is noted, further pavement inspection and assessment would be recommended as well.

Finally, we would also recommend ODA consider putting together a formal action plan for what steps would be taken should a surface failure occur. Should a failure happen, at best, significant FOD would be generated requiring shutdown and cleanup. At worst, a catastrophic failure along the weakened delamination plane may displace part of the runway surface and require a lengthier shutdown and significant repair. Coordinating with potential repair contractors or other local agency resources (ODOT, Marion county road crews, etc.) that might be brought in to address an immediate pavement need is an important consideration in reducing runway closure length.

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MEMORANDUM

To: James Kirby, PE / Century West Engineering **Date:** June 8, 2021

GRI Project No.: 6488-A

From: Lindsi Hammond, PE

Re: Pavement Evaluation
Aurora Airport Runway 17/35 Remaining Structural Life Evaluation
Aurora, Oregon

As requested, GRI performed engineering analyses to determine the remaining structural life of Runway 17/35 at Aurora State Airport (UAO) in support of the Oregon Department of Aviation (ODA). This work was completed as a follow-up to the report titled "Pavement Classification Number (PCN) Evaluation of Runway 17-35," issued on November 12, 2019 (2019 PCN Report). As discussed in Federal Aviation Administration (FAA) Advisory Circular 150/5335-5C titled *Standardized Method of Reporting Airport Pavement Strength – PCN*, the PCN system has significant limitations such that the analysis consolidates the entire fleet mix into one representative aircraft and that the PCN should not be used to replace a structural evaluation or pavement design due to the complex nature and engineering judgment required beyond the outputs of the FAA software programs.

Our work included reviewing relevant ODA records for Runway 17/35, performing a multilayered backcalculation analysis using the falling weight deflectometer (FWD) data that were used to assist us in delivering our 2019 PCN Report, and evaluating the structural remaining life in general accordance with the FAA Advisory Circular 150/5320-6F, *Airport Pavement Design and Evaluation*, and the FAA pavement evaluation software, FAARFIELD (FAA Rigid and Flexible Iterative Elastic Layered Design) v1.42. Additional background data and analysis results are provided in Appendices A and B, respectively.

STRUCTURAL LIFE OF EXISTING PAVEMENT

The structural life of the existing pavement is calculated by the FAA design procedure based on traffic loading (i.e., aircraft fleet mix), structural properties of the existing pavement (thickness and modulus), and subgrade strength, as determined from investigation and testing of the pavement materials and subgrade soils. The structural life calculated in this manner only applies to the amount of time the existing pavement could support the forecasted traffic loading until its structural capacity decreases to the extent strengthening or reconstruction is required. Structural life does *not* account for deterioration in surface conditions or factors that can affect the integrity or functional life of the pavement system.

PAVEMENT FUNCTIONAL LIFE/PAVEMENT INTEGRITY

Pavement functional life is the period before the surface condition deteriorates to the state where there is significant potential for foreign object debris (FOD), which is the primary factor controlling the need for rehabilitation.

The functional life and integrity of asphalt concrete (AC) pavements are primarily controlled by 1) surface cracking that originates at the pavement surface and is typically confined to the upper pavement layers of the pavement system, 2) joint cracking, or 3) delamination of AC layers that can influence accelerated deterioration. Surface cracking may occur due to thermally induced movement, moisture exposure, and/or hardening of asphalt cement due to oxidation. Traffic loading, particularly with high tire pressures and heavily weighted aircraft, can initiate surface cracking and be an exacerbating factor in propagation and deterioration, especially when the upper AC layers exhibit delamination. In addition to the above factors, joint cracking is often caused by reduced compaction near the joint or mechanical and temperature segregation during asphalt construction.

ANALYSIS

We evaluated the remaining structural life of Runway 17/35 based on four traffic-loading scenarios, which included 1) current aircraft fleet mix; 2) current aircraft fleet mix plus 64 monthly operations of a Gulfstream G650ER (G650ER) at 103,600 pounds; 3) current aircraft fleet mix plus 64 monthly operations of a G650ER at 83,500 pounds; and 4) current aircraft fleet mix plus 64 monthly operations of a G650ER at 75,000 pounds. The aircraft fleet mix is provided in Tables 1A and 2A of Appendix A.

RESULTS

Based on the current aircraft fleet mix, the existing runway should be scheduled for rehabilitation within the next 10 years (e.g., sooner than the estimated remaining structural life). Table 1 shows our recommended timeframe for rehabilitation or reconstruction based on the results of the analysis in combination with the current integrity/functional life of the pavement system. Runway 17/35 exhibits delamination of the upper 2 inches to 3 inches of AC. In our opinion, the delamination in combination with the presence of fatigue cracking contributes to recommending a reduced remaining structural life. Additional details are provided in Appendix B.

Table 1: RECOMMENDED TIME UNTIL REHABILITATION/RECONSTRUCTION

Current Fleet Mix	Additional G650ER Operations @ 103,600 pounds	Additional G650ER Operations @ 83,500 pounds	Additional G650ER Operations @ 75,000 pounds
10 years	0 years	Within 5 years	Within 10 years

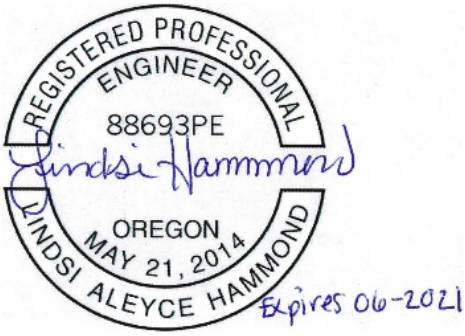
LIMITATIONS

This memorandum has been prepared for use by the Oregon Department of Aviation and Century West Engineering Corporation and should not be relied upon by any other entity without the written permission of an authorized representative. The scope is limited to the specific project and location described herein, and our description of the project represents our understanding of the significant aspects of the project relevant to the analysis of the pavements at the time of publication. In the event any changes in the parameters as outlined in this memorandum are planned, we should be given the opportunity to review the changes and modify or reaffirm the conclusions and recommendations of this memorandum in writing.

The conclusions and recommendations submitted in this memorandum are based on the data obtained from the subsurface explorations referenced in this memorandum and other sources of information discussed herein. In the performance of subsurface investigations, specific information is obtained at specific locations at specific times. However, it is acknowledged variations in soil conditions may exist between exploration locations. This memorandum does not reflect any variations that may occur between these explorations. The nature and extent of variation may not become evident until construction and/or after additional field explorations. Additionally, our work has been performed in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in the locale. No other warranty, expressed or implied, is made.

Please contact the undersigned if you have any questions.

Submitted for GRI,



Lindsi Hammond, PE
Principal

Todd Scholz, PE
Principal

This document has been submitted electronically.

6488-A UAO REMAINING STRUCTURAL LIFE MEMO

APPENDIX A

Pavement Evaluation Background Data

APPENDIX A

PAVEMENT EVALUATION BACKGROUND DATA

A.1 BACKGROUND

Based on the information provided in the ODA pavement evaluation/maintenance management program report prepared by Pavement Consultants Inc. in 2018, the runway was constructed in two phases. The 4,100 foot-long segment on the north end of the runway was first constructed in 1943, which is referred to herein as Analysis Unit 1. In 1993, a 900-foot-long extension was built to the south, which is referred to herein as Analysis Unit 2. The locations of Analysis Units 1 and 2 are shown on Figure 1A. The last major rehabilitation on the runway was conducted in 2005 and generally consisted of a 2- to 3-inch-thick overlay. Based on the construction history provided in the 2018 ODA report, the runway was constructed with 6 inches to 8 inches of asphalt concrete (AC), whereas the results from the 2019 core explorations found 8¾ inches to 9 inches of AC. The aggregate base and subbase ranges from 15 inches to 49 inches, which was not field-verified during the 2019 project.

As discussed in the 2019 PCN Report, GRI observed isolated areas of low-severity fatigue cracking (i.e., alligator cracking) within the aircraft landing gear paths on Runway 17/35. Also, the extracted core specimens exhibited delamination (separation of asphalt concrete [AC] layers) at a depth that generally agrees with the thickness of the 2005 overlay. The cores also showed top-down cracking to the same depth as the delamination. The presence of these distresses indicates material degradation, which can impact the integrity of the pavement system and structural performance.

A.2 TRAFFIC LOADING

The 2019 PCN Report listed aircraft traffic-volume data consisting of the number of operations (i.e., either an arrival or departure) for Runway 17/35 in 2018 from the FAA Traffic Flow Management System Counts (TFMSC). Our traffic-loading estimate is based on escalating the traffic volumes to the year 2041 for a 20-year period using an annual growth rate of 1.58% per year, which is based on the aviation forecasts provided in the current master plan for UAO (WHPacific, 2012). The aircraft fleet mix is provided in Table 1A. Based on the existing aircraft fleet mix, over 99%, based on the number of annual departures, operate at a gross takeoff weight of less than 50,000 pounds.

Table 1A: CURRENT AIRCRAFT TYPES AND DEPARTURE VOLUMES

Aircraft Type	Gross Takeoff Weight, pounds	Design Aircraft for FAARFIELD	2021 Annual Operations	2041 Annual Operations	Values Entered into FAARFIELD	
					Equivalent Airplane	2021 Annual # of Departures
Gulfstream G600	91,600	Gulfstream G-V	3	3	Gulfstream G-V	2
Gulfstream V	76,850	Gulfstream G-IV	3	3	Gulfstream G-IV	4
Gulfstream IV	73,200	Gulfstream G-IV	3	3		
Dassault Falcon 900	45,500	Falcon-900	72	84	Falcon-900	42
Bombardier Challenger 600	45,100	Challenger CL-604	61	71	Challenger CL-604	91
Bombardier Challenger 300	38,850	Challenger CL-604	93	110		
Dassault Falcon 2000	41,000	Falcon-2000	36	42	Falcon-2000	21
Dassault Falcon 50	37,480	Falcon-50	290	338	Falcon-50	216
Dassault Falcon 20	28,650	Falcon-50	80	98		
Cessna Citation 750	36,600	Citation X	110	128	Citation X	150
Cessna Citation 680	30,775	Citation X	145	169		
Hawker 800	28,000	Hawker-800	36	42	Hawker-800	21
Gulfstream G150	26,100	D-35	84	98	D-35	49
Astra 1125	24,650	D-30	101	118	D-30	59
Cessna Citation 650	22,000	Citation VI/VII	103	120	Citation VI/VII	61
Learjet 60	23,500	Learjet-55	32	37	Learjet-55	30
Learjet 55	21,500	Learjet-55	5	6		
Learjet 75	21,500	Learjet-55	13	15		
Learjet 45	20,500	Learjet-35A/65A	116	135	Learjet-35A/65A	131
Learjet 35	18,000	Learjet-35A/65A	9	10		
Learjet 31	15,500	Learjet-35A/65A	97	113		
Cessna Citation 560	20,000	Citation 550B	738	860	Citation 550B	561
Cessna Citation 550	13,300	Citation 550B	223	260		
Phenom 300/ Embraer 300	17,968	D-25	59	69	D-25	35

In addition to the current aircraft fleet mix we also evaluated the impact of adding a G650ER at three different weights as shown in Table 2A.

Table 2A: ADDITIONAL AIRCRAFT TYPES AND DEPARTURE VOLUMES

Aircraft Type	Gross takeoff Weight, pounds	Design Aircraft for FAARFIELD	2021 Annual Operations	2041 Annual Operations	Values Entered into FAARFIELD	
					Equivalent Airplane	2021 Annual # of Departures
Gulfstream G650ER	103,600	Gulfstream G-V	768	895	Gulfstream G-V	448
Gulfstream G650ER	83,500	Gulfstream G-V	768	895	Gulfstream G-V	448
Gulfstream G650ER	75,000	Gulfstream G-V	768	895	Gulfstream G-V	448

A.3 BACKCALCULATION

A.3.1 FWD Data

Falling weight deflectometer (FWD) tests were conducted by GRI on August 20, 2019, using our KUAB Model 150 FWD. The annual reference calibration for the FWD was accomplished in October 2019 at the KUAB manufacturing facility in Savoy, Illinois.

The FWD testing on Runway 17/35 was accomplished along test lines located at 7 feet west and 12 feet east of the runway centerline. The tests were completed at approximately 200-foot intervals within the keel section of the runway. This work was performed as a part of the "Pavement Classification Number (PCN) Evaluation of Runway 17-35" project, which the report was issued on November 12, 2019 (2019 PCN Report).

A.3.2 Overview of Backcalculation Analysis Procedure

The FWD deflection data were analyzed to backcalculate the in-situ equivalent elastic moduli of the pavement layers and subgrade soil following the guidelines of ASTM D5858 and Federal Aviation Administration (FAA) Advisory Circular 150/5370-11B. This analysis was accomplished using our PAVBACK iterative, elastic, layered backcalculation analysis software. The software calculates deflections using the Boussinesq-Odemark method of an equivalent thickness (Ullidtz, 1998). Pavement layer moduli are determined through an iterative search process using the MINPACK-1 (More et al., 1980) version of the Levenberg-Marquardt non-linear least-squares minimization algorithm with the objective of minimizing the root mean squared deflection error (RMSE), as computed by:

$$RMSE = \sqrt{\frac{1}{n}\sum_{j=1}^{n}\left(d_j - w_j\right)^2} \qquad (1)$$

where:

dj = Measured deflection at sensor j; (j = 1, ..., n = number of sensors)

wj = Calculated deflection at sensor j

PAVBACK solutions were validated by comparing the calculated and measured values of asphalt tensile strain and subgrade compressive strain/stress. The deflection test data and corresponding measured values of strain and stress used for the validation were obtained from data published in a report about backcalculation analysis of deflection tests conducted on an instrumented pavement test section (Ullidtz, ASTM STP 1375, 2000). The reported deflection measurements were inputted into PAVBACK to backcalculate the moduli of the pavement layers and subgrade in the test section. The moduli backcalculated by PAVBACK were then used to calculate asphalt tensile strain and subgrade compressive strain/stress for the FWD load corresponding to the reported measured stress and strain values. The calculated strains and stress were found to agree nearly exactly with the reported measured strain and stress values (within ±10% of the measured values).

A.3.3 Backcalculation Models

We modeled the pavement as a multilayered elastic three-layered system to backcalculate the equivalent elastic moduli (as applicable) of the AC, aggregate base (AB) and/or aggregate subbase (ASB), and subgrade soil. We used the pavement layer thicknesses reported in our 2019 PCN Report from the shallow core explorations in the backcalculation analysis. Furthermore, the data was separated into two analysis units based on the differing construction as discussed previously.

The multilayered backcalculation analysis uses mathematical optimization techniques to calculate the equivalent elastic modulus values of the pavement layers and subgrade soil to minimize the difference between deflections calculated according to the analysis model and the deflections measured in the field. This analysis is conducted by an iterative approach beginning with an assumed set of layer moduli. Pavement surface deflections are calculated according to elastic layer theory using these initial layer moduli. The computed deflections are compared with the measured deflections, and the initial layer moduli are adjusted to reduce the differences between the calculated and measured deflections. The adjusted moduli are then used to start the next analysis iteration. The iteration process continues until the computed, and measured deflections match within a specified tolerance or until the adjustment to the solution values is less than a specified tolerance. The "goodness of fit" between the measured and computed deflections is measured by the RMSE, which is calculated using the percent difference between the measured and calculated deflections relative to the measured deflection and is roughly a measure of the relative percent error per deflection sensor.

For the analysis, we used the average subgrade modulus less one standard deviation from the backcalculation results to estimate the design subgrade moduli for each analysis unit.

A.3.4 Backcalculation Analysis Results

The backcalculation analysis results are tabulated in Table 3A for Runway 17/35. These results include the layer thicknesses, backcalculated moduli with the AC moduli normalized to a

pavement temperature of 82 °F and loading frequency of 2 Hertz (discussed below), equivalent P-401 AC thicknesses (discussed below), and the RMSE values of the backcalculation solutions.

The backcalculated AC moduli were normalized using the Asphalt Institute's predictive equation (Finn et al., 1982) to correspond to a pavement temperature of 82 °F and loading frequency of 2 Hertz. These normalization conditions are based on the design pavement temperature for UAO and the equivalent loading frequency of taxiing aircraft as determined by the U.S. Army Corps of Engineers (COE) airfield design procedure, which is the basis for the Advisory Circular 150/5320-6F design procedures. The modulus of new AC for the same normalizing conditions is 200 kips per square inch (ksi), as predicted by the COE airfield design procedure. This is the same value as the modulus assigned to P-401 AC surface course in the FAARFIELD software. Therefore, backcalculated normalized AC moduli of less than 200 ksi indicate the structural value of the existing AC is lower than the new P-401 AC surface course.

Since the FAARFIELD software does not allow for changing the modulus of AC surface course or base course except by entering the AC as an undefined material, the backcalculated normalized moduli for existing AC cannot be directly used in structural analysis by the FAARFIELD software. In order to overcome this limitation, the thickness of existing AC with a normalized backcalculated modulus of less than 200 ksi was adjusted (reduced from the actual thickness) so the flexural stiffness of the adjusted AC section at a modulus of 200 ksi is the same as the flexural stiffness of the actual AC section at the normalized backcalculated moduli. The adjusted thickness is calculated by the following equation derived from the method of equivalent thickness:

$$T_{eq} = T_{ac}\left(E_{ac}/200\right)^{1/3} \quad (2)$$

where:

T_{eq} = Equivalent P-401 AC (at 200-ksi modulus) thickness, inches

T_{ac} = Actual thickness of AC, inches

E_{ac} = Backcalculated AC modulus normalized to 82 °F and 2 Hertz, ksi ≤ 200 ksi

$\left(E_{ac}/200\right)^{1/3}$ = AC thickness to P-401 thickness conversion factor

This adjustment ensures the computed stresses and strains for layers below the AC layer reflect the reduced structural capacity of the existing AC, corresponding to its normalized backcalculated modulus being lower than the 200-ksi modulus assigned by FAARFIELD for AC surface course. Note that the thickness adjustment is only applied downward and not upward; therefore, the structural analysis becomes more conservative when the normalized backcalculated modulus of

AC is greater than 200 ksi. The calculated AC thickness conversion factors and equivalent P-401 AC thicknesses are included with the tabulated backcalculation analysis results.

References

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More, J. J., Garbow, B. S., and Hillstrom, K. E., 1980, User Guide for MINPACK-1, Argonne National Laboratory.

Ullidtz, P., 1998, Modelling Flexible Pavement Response and Performance, Polyteknisk Forlag.

Ullidtz, P., 2000, Will Nonlinear Backcalculation Help? Nondestructive Testing of Pavements and Backcalculation of Moduli: Third Volume, ASTM STP 1375, D. Tayabji and E. O. Lukanen, Eds, American Society for Testing and Materials, pp. 14-22.

Table 3A - MULTILAYER BACKCALCULATION ANALYSIS SUMMARY
RUNWAY 17/35: AURORA STATE AIRPORT (UAO)

Runway 17/35: Aurora State Airport (UAO)
Based on FWD Testing Conducted: 8/20/2019 [Report Titled "*Pavement Classification Number (PCN) Evaluation of Runway 17-35*" issued on November 12, 2019]
Start Station: North edge of runway, 10+00

FWD Test #	Test Station	Test Line	Core Exploration	Analysis Unit	Center Deflection (D_0), mils	AC Thickness, inches	AB/ASB Thickness, inches	AC Modulus @ 82°F & 2 Hz, psi	AB Modulus, psi	Subgrade M_R at 6 psi Deviator Stress, psi	Existing AC Thickness to P-401 Thickness Conversion Factor	Equivalent P-401 AC (@ 200 ksi) Thickness, inches
1	10+50	7 feet w		1	28.54	9.00	15.00	199,573	34,592	10,402	1.00	8.99
2	12+50	7 feet w		1	25.28	9.00	15.00	129,400	64,221	15,441	0.86	7.78
3	14+49	7 feet w		1	30.42	9.00	15.00	159,107	36,513	11,553	0.93	8.34
4	16+51	7 feet w		1	29.35	9.00	15.00	166,815	39,633	11,570	0.94	8.47
5	18+50	7 feet w		1	24.65	9.00	15.00	182,973	44,396	12,902	0.97	8.74
6	20+56	7 feet w		1	27.93	9.00	15.00	136,993	39,213	11,768	0.88	7.93
7	22+50	7 feet w		1	25.72	9.00	15.00	158,978	49,948	14,630	0.93	8.34
8	24+51	7 feet w		1	26.54	9.00	15.00	155,524	37,967	12,567	0.92	8.28
9	26+53	7 feet w		1	26.28	9.00	15.00	122,045	50,461	15,004	0.85	7.63
10	28+55	7 feet w		1	26.82	9.00	15.00	152,341	47,589	14,486	0.91	8.22
11	30+54	7 feet w		1	26.27	9.00	15.00	144,662	60,171	13,228	0.90	8.08
12	32+54	7 feet w		1	30.95	9.00	15.00	140,076	44,596	10,155	0.89	7.99
13	34+52	7 feet w		1	36.96	9.00	15.00	61,910	45,388	9,847	0.68	6.09
14	36+57	7 feet w		1	32.41	9.00	15.00	121,697	41,002	10,365	0.85	7.63
15	38+52	7 feet w		1	28.76	9.00	15.00	135,420	42,673	10,556	0.88	7.90
16	39+51	7 feet w	B-2	1	34.09	9.00	15.00	82,735	56,700	9,726	0.75	6.71
17	40+51	7 feet w		1	27.27	9.00	15.00	141,083	48,581	10,489	0.89	8.01
18	42+51	7 feet w		1	31.58	9.00	15.00	121,645	39,640	11,108	0.85	7.63
19	44+51	7 feet w		1	29.21	9.00	15.00	105,805	45,644	11,314	0.81	7.28
20	46+50	7 feet w		1	29.41	9.00	15.00	124,285	36,411	11,087	0.85	7.68
21	48+52	7 feet w		1	28.25	9.00	15.00	138,708	37,945	14,129	0.89	7.97
22	50+52	7 feet w		2	39.77	8.75	15.00	60,512	33,025	8,814	0.67	5.87
23	52+50	7 feet w		2	34.37	8.75	15.00	113,342	28,356	9,367	0.83	7.24
24	54+51	7 feet w		2	44.23	8.75	15.00	80,066	18,997	6,713	0.74	6.45
25	56+40	7 feet w		2	37.32	8.75	15.00	87,111	21,059	9,796	0.76	6.63
26	56+81	7 feet w	B-1	2	35.88	8.75	15.00	117,034	20,889	7,615	0.84	7.32
27	58+50	7 feet w		2	35.45	8.75	15.00	91,355	22,326	9,512	0.77	6.74
28	11+50	12 feet e		1	25.22	9.00	15.00	172,552	54,943	12,541	0.95	8.57
29	13+50	12 feet e		1	30.01	9.00	15.00	147,564	43,263	11,399	0.90	8.13
30	15+51	12 feet e		1	30.03	9.00	15.00	148,549	39,794	9,781	0.91	8.15
31	17+53	12 feet e		1	28.42	9.00	15.00	125,716	42,941	11,645	0.86	7.71
32	19+41	12 feet e	B-3	1	34.02	9.00	15.00	80,430	34,690	10,977	0.74	6.64
33	21+50	12 feet e		1	21.06	9.00	15.00	185,230	57,106	17,720	0.97	8.77
34	23+52	12 feet e		1	25.55	9.00	15.00	145,745	53,157	13,364	0.90	8.10
35	25+52	12 feet e		1	21.98	9.00	15.00	149,035	74,897	14,811	0.91	8.16
36	27+51	12 feet e		1	26.27	9.00	15.00	112,695	49,426	14,236	0.83	7.43
37	29+50	12 feet e		1	34.66	9.00	15.00	102,930	33,377	11,837	0.80	7.21
38	31+52	12 feet e		1	27.24	9.00	15.00	124,820	61,287	10,942	0.85	7.69
39	33+49	12 feet e		1	26.34	9.00	15.00	145,949	51,343	11,421	0.90	8.10
40	35+53	12 feet e		1	24.64	9.00	15.00	149,184	53,878	14,477	0.91	8.16
41	37+51	12 feet e		1	29.65	9.00	15.00	136,435	47,933	10,835	0.88	7.92
42	39+50	12 feet e		1	25.27	9.00	15.00	171,828	51,898	11,501	0.95	8.56
43	41+51	12 feet e		1	25.80	9.00	15.00	166,029	48,784	13,236	0.94	8.46
44	43+50	12 feet e		1	27.58	9.00	15.00	156,236	46,762	11,913	0.92	8.29
45	45+51	12 feet e		1	26.22	9.00	15.00	141,024	43,126	12,250	0.89	8.01

Table 3A - MULTILAYER BACKCALCULATION ANALYSIS SUMMARY
RUNWAY 17/35: AURORA STATE AIRPORT (UAO)

FWD Test #	Test Station	Test Line	Core Exploration	Analysis Unit	Center Deflection (D_0), mils	AC Thickness, inches	AB/ASB Thickness, inches	AC Modulus @ 82°F & 2 Hz, psi	AB Modulus, psi	Subgrade M_R at 6 psi Deviator Stress, psi	Existing AC Thickness to P-401 Thickness Conversion Factor	Equivalent P-401 AC (@ 200 ksi) Thickness, inches
46	47+54	12 feet e		1	28.02	9.00	15.00	124,960	37,437	11,825	0.85	7.69
47	49+51	12 feet e		1	27.34	9.00	15.00	139,375	36,694	12,606	0.89	7.98
48	51+53	12 feet e		2	30.35	8.75	15.00	137,690	27,259	11,238	0.88	7.73
49	53+55	12 feet e		2	31.95	8.75	15.00	131,769	24,002	10,326	0.87	7.61
50	55+50	12 feet e		2	36.26	8.75	15.00	88,169	25,673	9,761	0.76	6.66
51	57+51	12 feet e		2	32.67	8.75	15.00	125,325	19,556	9,341	0.86	7.49

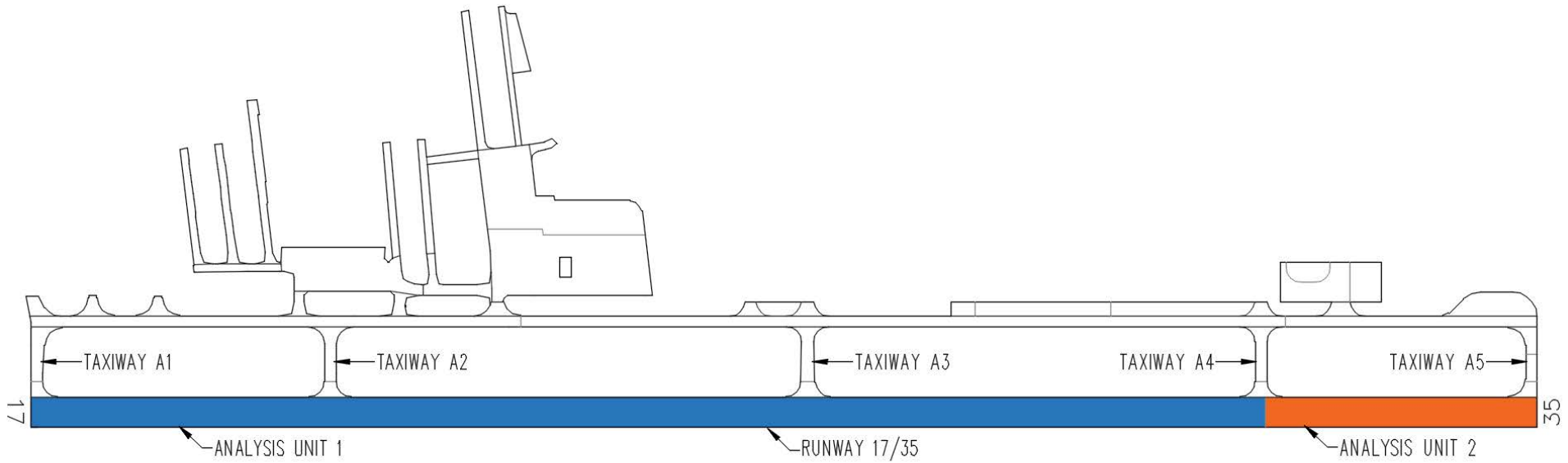
Abbreviations: M_R = Resilient Modulus; psi = Pounds per Square Inch; ksi = Kips per Square Inch; AC = Asphalt Concrete; AB = Aggregate Base; ASB = Aggregate Subbase; e = east of centerline; w = west of centerline; Hz = Hertz; °F = Degree Fahrenheit; PMP = Pavement Management Program

Statistical Summary

Structural Unit#	From Sta	To Sta	PAVER PMP Unit	Average D0, mils	Average AC Thickness, inches	Average AB/ASB Thickness, inches	Average AC Modulus @ 82°F & 2 Hz, psi	Average AB Modulus, psi	Average Subgrade M_R at 6 psi Deviator Stress, psi	Average Equivalent P-401 AC (@ 200 ksi) Thickness, inches
1	0+00	49+51	R17AU-01	28.10	9.00	15.00	139,221	46,488	12,235	7.9
2	0+00	58+50	R17AU-02	35.83	8.75	15.00	103,237	24,114	9,248	7.0
All	0+00	58+50	ALL	29.61	8.95	15.00	132,165	42,101	11,650	7.7

Design Subgrade Resilient Modulus

Structural Unit #	From	To	PAVER PMP Unit	Average Subgrade M_R at 6 psi Deviator Stress, psi	Standard Deviation, psi	Average Subgrade Less One Standard Deviation, psi	CBR, M_R (psi)/1500
1	10+50	49+51	R17AU-01	12,235	1,800	10,435	7.0
2	50+52	58+50	R17AU-01	9,248	1,294	7,955	5.3
All	0+00	58+50	ALL	11,650	2,081	9,569	6.4



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NOT TO SCALE

GRI

CENTURY WEST ENGINEERING
UAO RUNWAY 17/35 EVALUATION

SITE PLAN

JUN. 2021 JOB NO. 6488 FIG. 1A

APPENDIX B

Remaining Structural Life Analysis

APPENDIX B

REMAINING STRUCTURAL LIFE ANALYSIS

B.1 REMAINING STRUCTURAL LIFE

We estimated the remaining pavement life of Runway 17/35, also referred to as "remaining structural life," using the FAA evaluation procedure and Version 1.42 of the FAARFIELD pavement-design software program. The results are based on the current traffic loading, growth rates, structural properties of the existing pavement (thickness and modulus), and subgrade stiffness determined from the previous pavement-core explorations and FWD deflection test data from the 2019 PCN Report, pavement and subgrade soils laboratory testing, and backcalculation analysis.

Remaining structural life of AC pavements is based on an analysis of the cumulative damage factor (CDF) for two modes of pavement failure: rutting due to excessive vertical compressive strain at the top of the subgrade, and fatigue cracking due to excessive horizontal strain in the bottom of the AC layer. Structural life calculated in this manner only applies to how long the existing pavement would support the forecast aircraft fleet mix until its structural capacity decreases to the extent that strengthening, or reconstruction is required to avoid significant risk of structural damage by heavily loaded aircraft. Since structural life does not account for deterioration in the bound-pavement layer, pavement structures can have calculated structural lives well in excess of a typical design period. Furthermore, the results, even though they meet the desired remaining life, may not be realistic from a material-degradation standpoint due to the presence of delamination, stripping, and/or cracking distress.

We have presented the FAARFIELD outputs showing the calculated remaining structural life of Runway 17/35 on Figures 1B to 2B for Analysis Unit 1 and on Figures 3B to 4B for Analysis Unit 2 in this appendix. The results are also summarized in Table 1B below. We found that Analysis Unit 2, which encompasses the runway extension between Taxiways A4 to A5 has a significantly lower remaining structural life as compared to Analysis Unit 1. The shorter life is likely due to the thinner AC section and lower subgrade moduli. If a G650ER is added to the fleet mix, we calculated the remaining structural life to range from 1 year to 14 years, depending on the operational weight. We assume that the G650ER will require the full length of the runway to operate, and therefore Analysis Unit 2 controls the remaining structural life.

Additionally, due to the presence of delamination in the upper 2 inches to 3 inches of AC and cracking distress located in the landing gear path, it is our opinion, that the calculated remaining structural life results provided in Table 1B may be reduced due to the deteriorated condition of the AC. The addition of larger aircraft generally heavier than 50,000 pounds may further accelerate the pavement deterioration resulting in the development of foreign object debris (FOD) and

ultimately requiring rehabilitation sooner. In our opinion, under the current traffic loading without the operation of a G650ER the runway will require rehabilitation in approximately 10 years even though the remaining structural life is approximately 20 years. If the G650ER plans to operate on a regular basis at maximum gross weight (i.e., 103,600 pounds), we recommend rehabilitating the runway prior to operation because the runway will likely require structural strengthening. If the G650ER operates at a lower weight, we recommend planning a rehabilitation project within the next five years due to the condition of the AC. Table 1 presented above shows our recommended timeframe until rehabilitation/reconstruction, which is based on the results structural analysis results from FAARFIELD analysis and the functional condition of the runway materials.

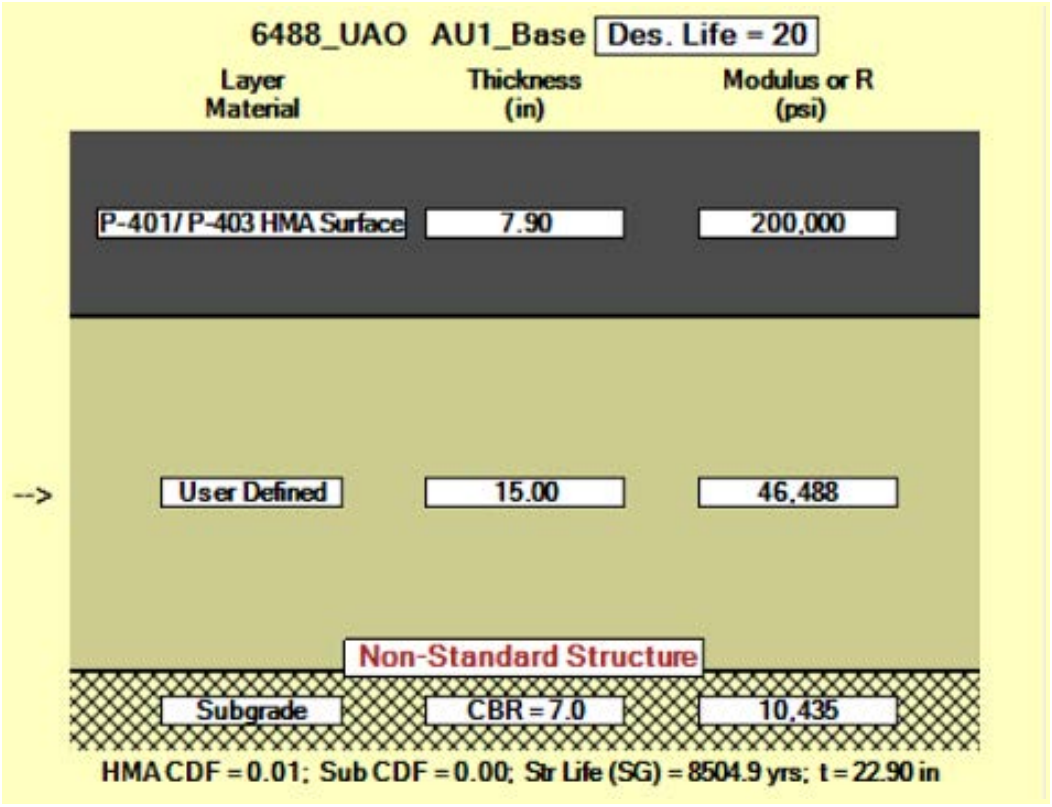
Table 1B: SUMMARY OF REMAINING STRUCTURAL LIFE RESULTS

		Remaining Life, years[(a)]			
	Analysis Unit	Current Fleet Mix	Additional G650ER Operations @ 103,600 pounds	Additional G650ER Operations @ 83,500 pounds	Additional G650ER Operations @ 75,000 pounds
(1)	Runway 17/35 Taxiway A1 to A4	>20	>20	>20	>20
(2)	Runway 17/35 Taxiway A4 to A5	>20	1	6	14

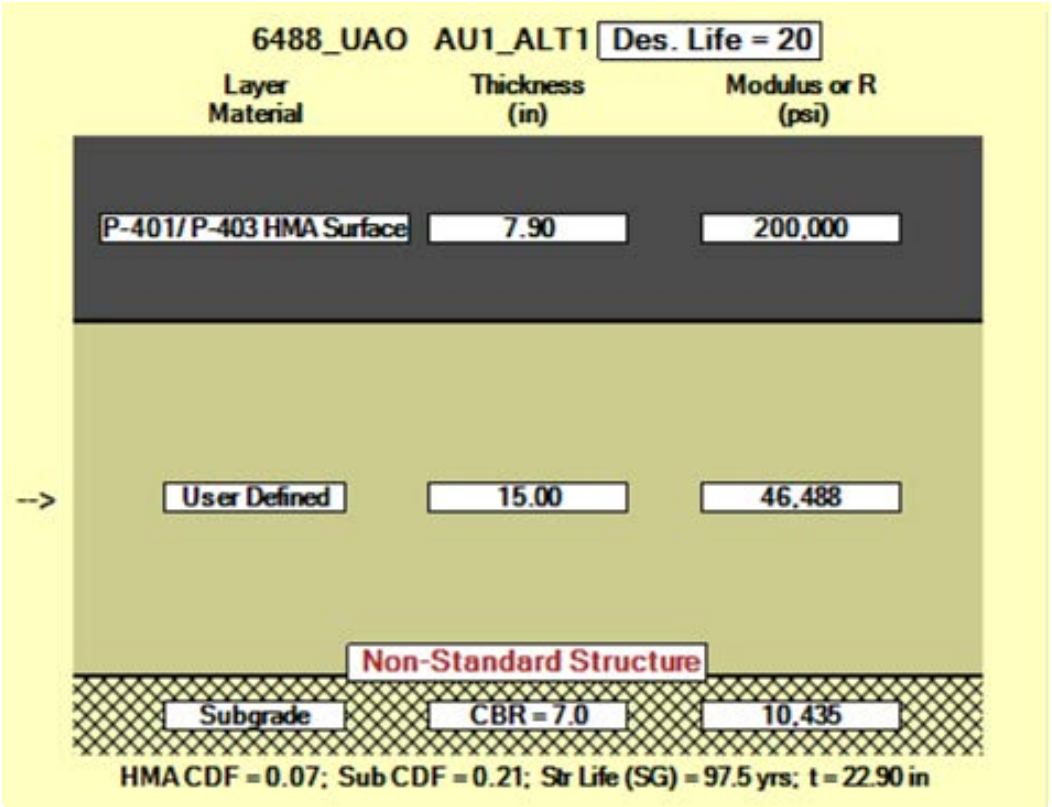
Note:

a) The remaining structural life may be well in excess of the reasonable timeframe that the runway may warrant rehabilitation or reconstruction from a material-degradation standpoint (i.e., delamination, stripping, or cracking distress).

We developed our results using limited subsurface condition data collected to assist us in developing the abovementioned 2019 PCN Report. The 2019 fieldwork only included three shallow core explorations, which were terminated at 24 inches below the ground surface. At each core exploration, we did not encounter subgrade. In order to refine the remaining life evaluation or to develop rehabilitation or reconstruction design recommendations, we recommend performing deeper borings in order to quantify the total aggregate base thickness and to classify the subgrade. The results from additional boring explorations may change the results of the remaining life results presented above.

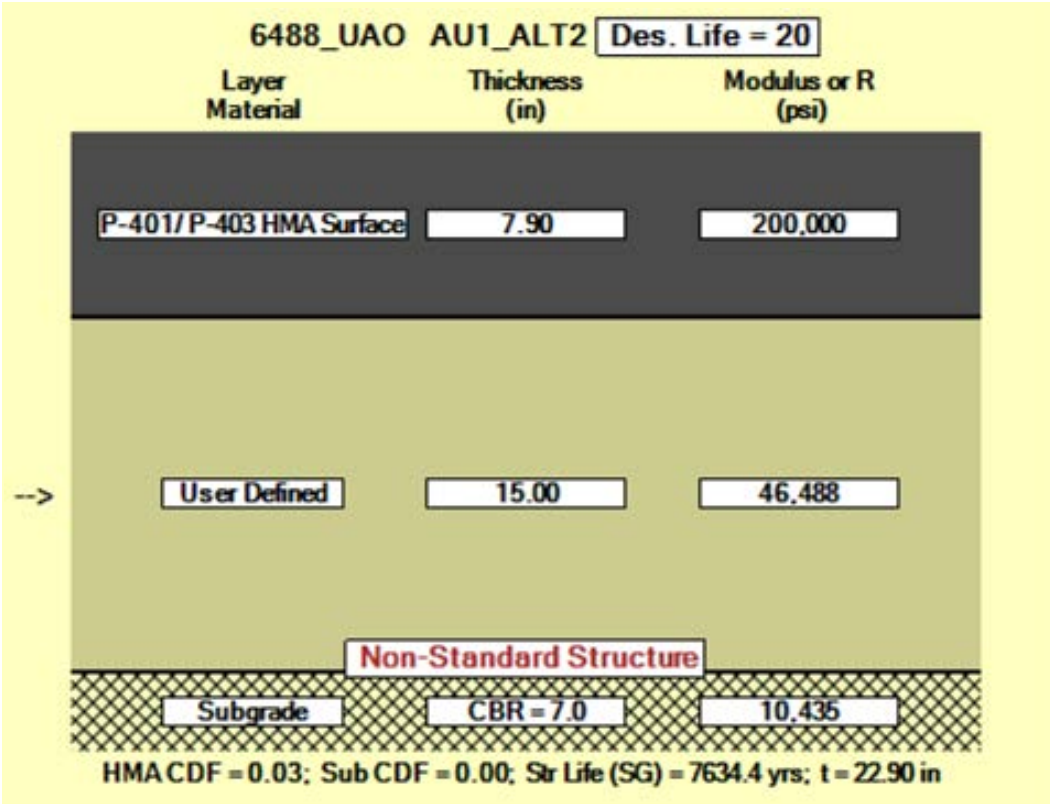


ANALYSIS UNIT 1 – CURRENT FLEET MIX

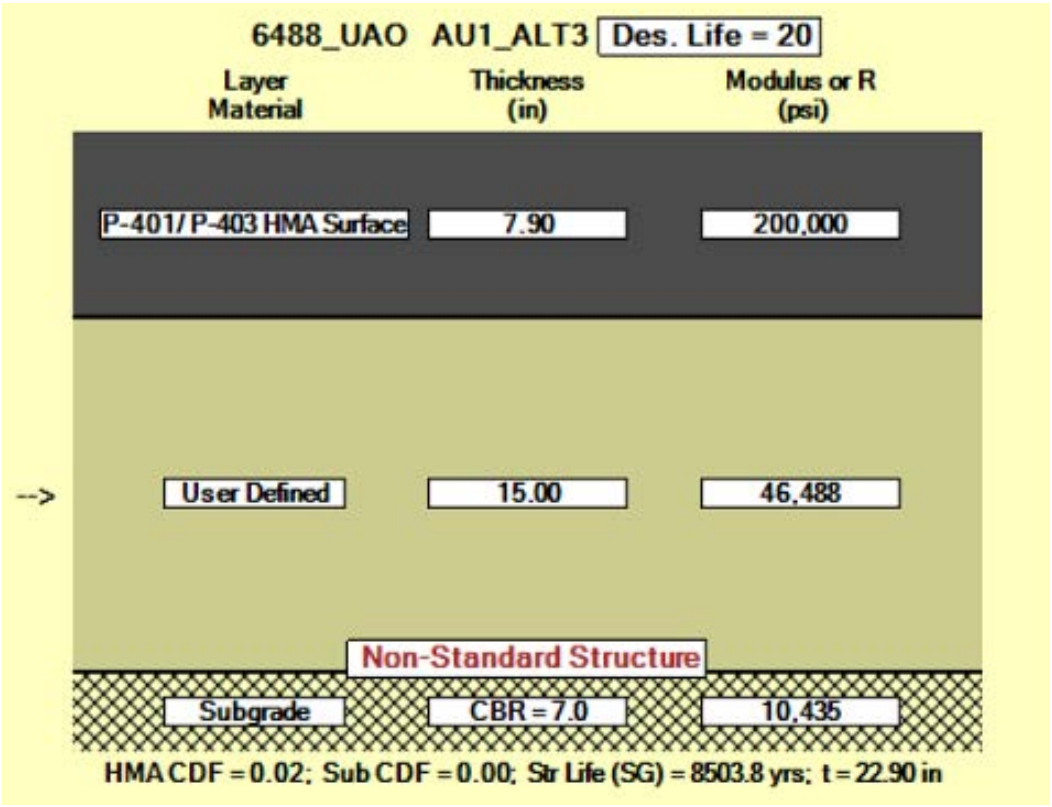


ANALYSIS UNIT 1 – CURRENT FLEET MIX + 64 MONTHLY OPERATIONS OF A G650ER @ 103,600 POUNDS

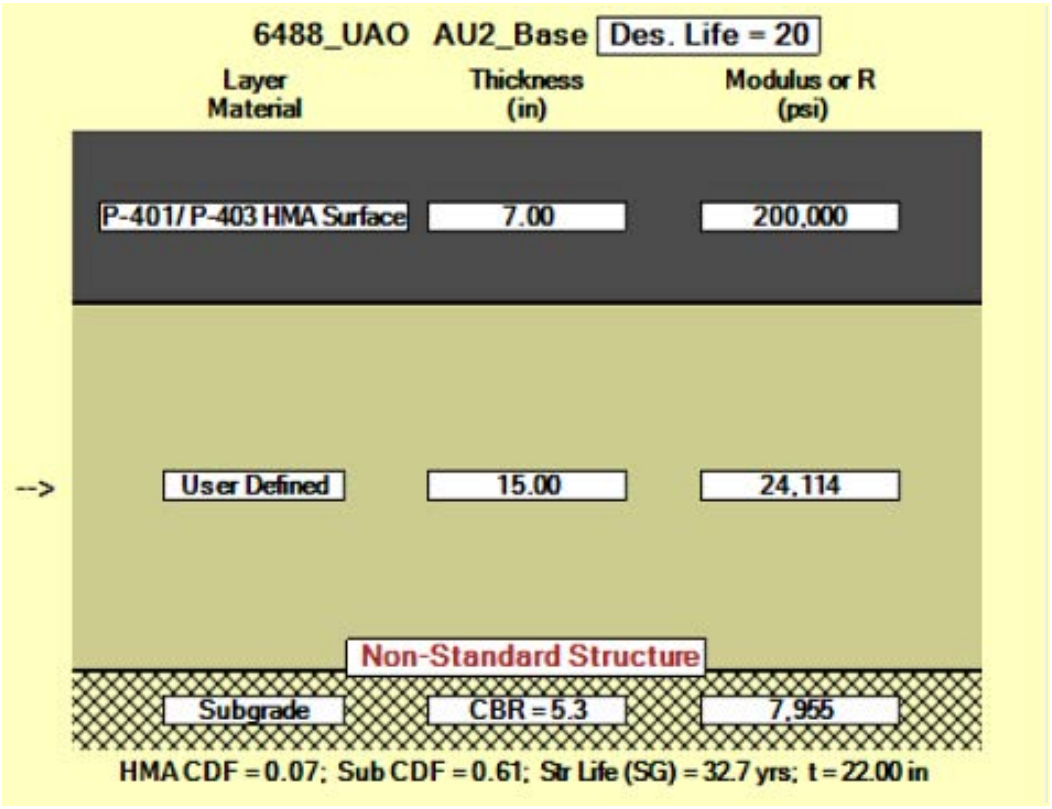
FAARFIELD REMAINING STRUCTURAL LIFE RESULTS



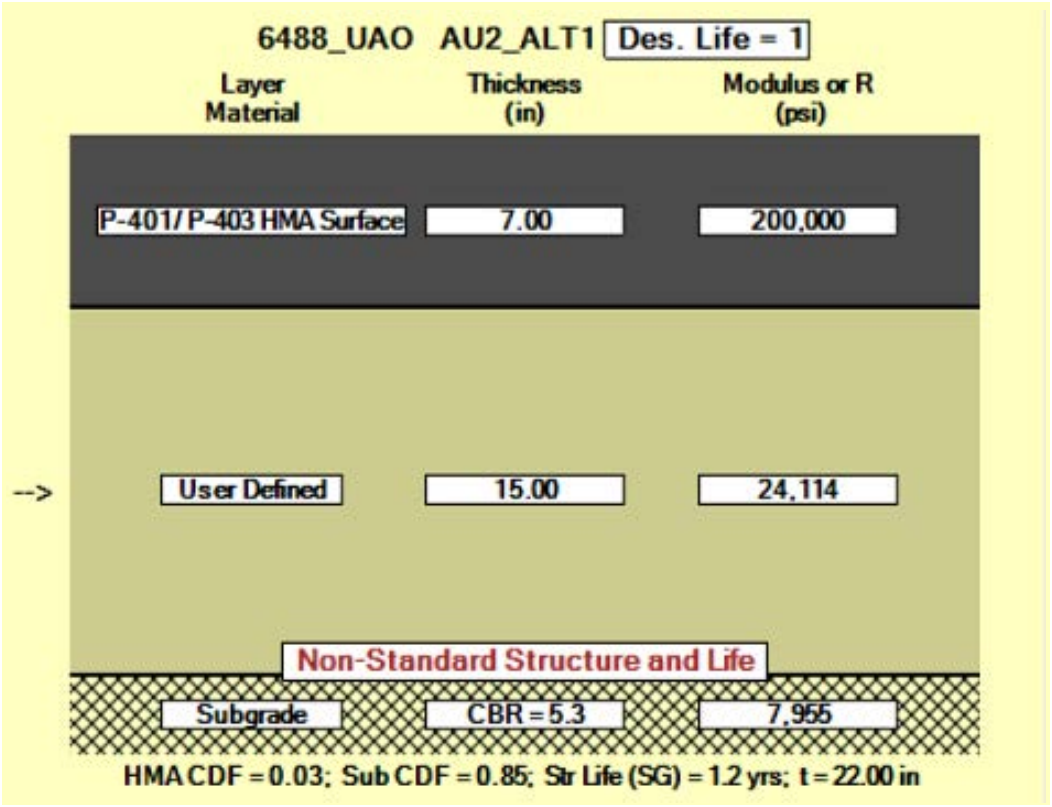
ANALYSIS UNIT 1 – CURRENT FLEET MIX + 64 MONTHLY OPERATIONS OF A G650ER @ 83,500 POUNDS



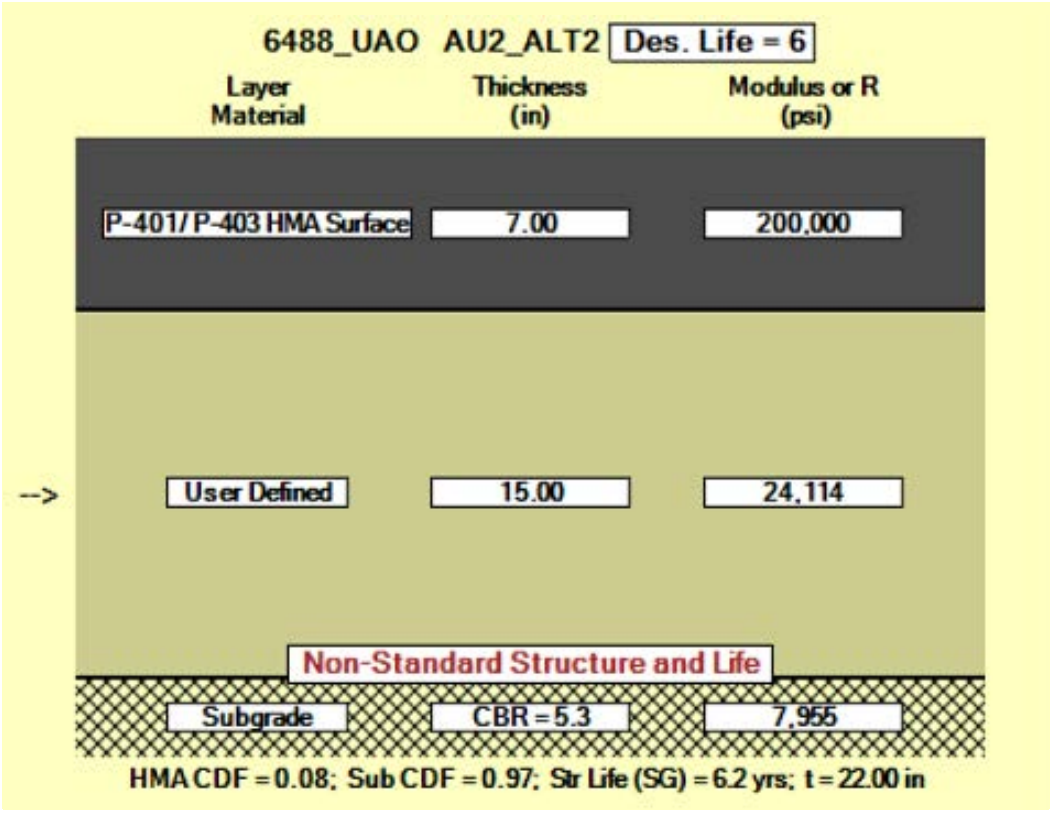
ANALYSIS UNIT 1 – CURRENT FLEET MIX + 64 MONTHLY OPERATIONS OF A G650ER @ 75,000 POUNDS



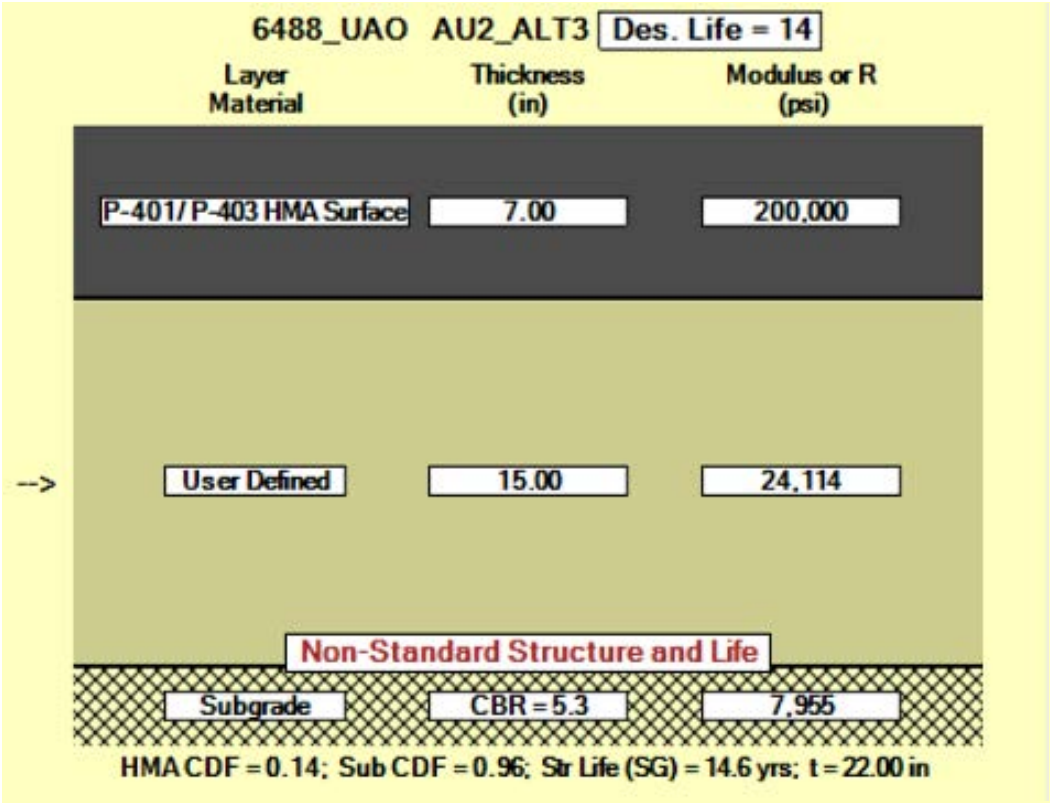
ANALYSIS UNIT 2 – CURRENT FLEET MIX



ANALYSIS UNIT 2 – CURRENT FLEET MIX + 64 MONTHLY OPERATIONS OF A G650ER @ 103,600 POUNDS



ANALYSIS UNIT 2 – CURRENT FLEET MIX + 64 MONTHLY OPERATIONS OF A G650ER @ 83,500 POUNDS



ANALYSIS UNIT 2 – CURRENT FLEET MIX + 64 MONTHLY OPERATIONS OF A G650ER @ 75,000 POUNDS