Alaska DOT&PF

Data Modernization and Innovation Office
Pavement Management and Preservation
5800 East Tudor Road, Anchorage AK 99507-1286

Alaska Airport
Pavement Management Program
2024 Statewide Summary Report

For further information about this report, please contact the Alaska DOT&PF Pavement Management and Preservation Office as follows:

Point of Contact	Phone	Email	Date Published
Mr. Andrew Pavey, Pavement Management Engineer	(907) 269 6213	andrew.pavey@alaska.gov	April 2025

ACKNOWLEDGEMENTS

Acknowledgement is due to the consultant team that supported Alaska Department of Transportation and Public Facilities (Alaska DOT&PF) in the effort of implementing the Alaska Airport Pavement Management Program: Mr. John Duval of Duval Engineering with subconsultants Mr. Newton Bingham and Mr. Jim Horn of NJB Engineering and Mr. Tyler Rossow, Mr. Ryan Wordekemper, and Mr. Ryan Barr of TR Consulting Services. TR Consulting Services personnel conducted a majority of the pavement condition index (PCI) surveys at the participating airports, while the entire consultant team participated in the data analysis and developing this Statewide Summary Report.

Special thanks are due to Mr. Andrew Pavey, Pavement Management Engineer for Alaska DOT&PF, who managed the implementation of the Alaska Airport Pavement Management Program. Mr. Pavey coordinated supplying construction documents to the consultant team and he also conducted the PCI surveys for numerous airports.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

EXECUTIVE SUMMARY

Alaska Department of Transportation and Public Facilities Program Background

Airports participating in the Airport Improvement Program (AIP) Grant Program are required by the Federal Aviation Administration (FAA) to develop and implement a pavement maintenance program to be eligible for funding per FAA Advisory Circular (AC) 150/5380-6C *Guidelines and Procedures for Maintenance of Airport Pavements* and AC 150/5380-7B *Airport Pavement Management Program (PMP)*. This program requires detailed inspection of airport pavement conditions annually, or every three years if the pavement is inspected according to the Pavement Condition Index (PCI) survey procedure specified in ASTM D5340-20 *Standard Test Method for Airport Pavement Condition Index Surveys*.

The Alaska Department of Transportation and Public Facilities (Alaska DOT&PF) has fully implemented a comprehensive Pavement Management Program in accordance with AC 150/5380-7B. This initiative involved conducting pavement inspections, mapping, database administration, engineering analysis, and budgeting and prioritization activities across 54 paved public-use airports located in three regions (Northern, Central, and Southcoast) throughout the state of Alaska.

The primary objective of the PMP is to implement a data-driven system that allows cost-effective planning, budgeting, and project prioritization for maintenance and rehabilitation of airport pavements in Alaska. The findings of this PMP—alternative budget scenarios—are presented in this report and can be utilized by Alaska DOT&PF and the FAA to identify, prioritize, budget, and schedule pavement maintenance, repair, and major rehabilitation projects.

Summary of Results

Guidelines set by the Alaska State Legislature require airports to maintain minimum PCI condition ratings of 70 for runways and 60 for taxiways and aprons. Between the fall of 2022 through the fall of 2024, Alaska DOT&PF and contract personnel conducted pavement inspections at all 54 paved airports maintained by the State of Alaska.

Since the inspections occur on a three-year cycle, it is important to display the results in present-day form. This means that even though the inspections are spaced over several years, the data is adjusted to reflect current conditions, ensuring that decision-makers have the most accurate information available.

Thus, the tables and figures shown throughout this report represent data predicted as of October 1, 2024. The predictions are based on the inspection data and incorporate factors such as anticipated pavement deterioration and planned maintenance activities. This forward-looking approach helps in proactive planning and resource allocation for pavement maintenance and rehabilitation.

The overall area-weighted average condition for Statewide Alaska airport system is **72** or **Satisfactory**, according to the scale shown in Table 1.

Table 1—Pavement Condition Index Scale and Color Legend

ASTM PCI Color Legend	PCI Range	PCI Rating
	85-100	Good
	70-84	Satisfactory
	55-69	Fair
	40-54	Poor
	25-39	Very Poor
	10-24	Serious
	0-9	Failed

Figure 1 summarizes the pavement condition for the 54 paved airports within the PMP. The pavement condition distribution by area is 31% Good, 32% Satisfactory, 24% Fair, 9% Poor, 4% Very Poor, 1% Serious, and less than 1% Failed.

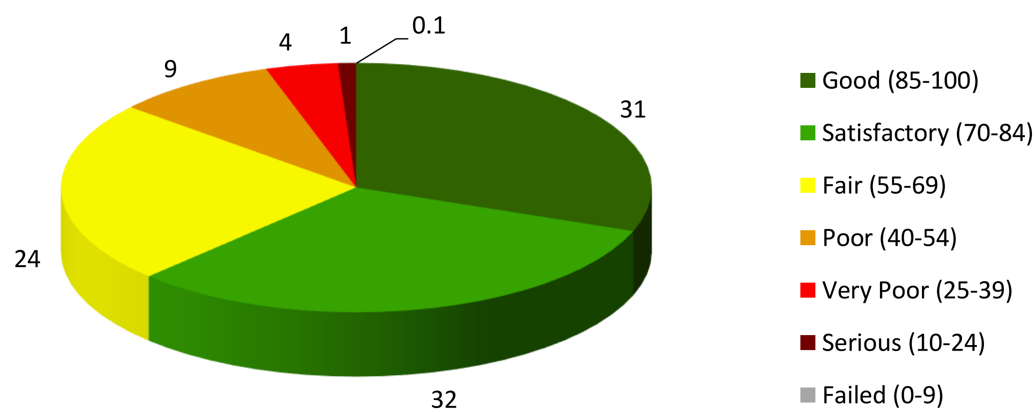


Figure 1—Statewide Alaska Airport PCI Survey Results by Percent Area

Five-Year Rehabilitation Needs

PAVER is a decision-making tool for the development of cost-effective maintenance and rehabilitation (M&R) alternatives. The software can identify when and where M&R work is required and how much it will cost. M&R plans can be developed either by assuming an annual budget or by identifying a desired pavement condition.

We used PAVER to develop and analyze six alternative budget scenarios over a five-year period from 2025 to 2029. The purpose of these alternatives is to develop funding scenarios and determine the resulting PCI as well as the effect on M&R backlog. The backlog is the total unfunded M&R requirements, which can be further described as the accumulation of sections that are under the critical PCI and require major M&R.

The best way to determine this value is to look at the stopgap maintenance plan (patching and crack sealing only), where no major M&R is performed. Since no funding is being allocated to major M&R, the unfunded amount in the first year is the program's current backlog. This value is **$1.09B** and can be seen as the overall M&R backlog of major work and can be used as a reference point to evaluate the effectiveness of each budget scenario.

Based on our five-year analysis, the following conclusions for each of the six scenarios are listed below and summarized in Table 2.

Scenario 1. **Eliminate Backlog in 5 Years**: The current (2024) M&R backlog for the 54 airports in the Alaska Airport PMP is $1.09B. An average annual expenditure of **$372M** is necessary to achieve the goal of eliminating the backlog over a five-year period. This level of investment would result in an average PCI of **86** in 2029. The total amount funded over the five-year analysis period is **$1,858M** and would result in a backlog of **zero** dollars.

Scenario 2. **Target PCI 75**: To increase the current average condition of the airport pavement system to a PCI of 75, an average annual budget of **$218M** is required over a period of five years. At this level of investment, the PCI at the end of the five-year analysis period will be **76**. The total amount funded over the five-year analysis period is **$1,092M** and would result in a backlog of **$941M.**

Scenario 3. **Maintain Current PCI of 72**. To stabilize the condition of the airport pavement system at its current PCI of 72, an average annual budget of **$168M** is required over a period of five years. At this level of investment, the PCI at the end of the five-year analysis period will be **73**. The total amount funded over the five-year analysis period is **$842M** and would result in a backlog of **$1,241M.**

Scenario 4. **Target PCI 70**: To keep the average condition of the airport pavement system to a PCI of 70, an average annual budget of **$123M** is required over a period of five years. At this level of investment, the PCI at the end of the five-year analysis period will be **71**. The total amount funded over the five-year analysis period is **$614M** and would result in a backlog of **$1,502M.**

Scenario 5. Maintain Current Budget: Alaska DOT&PF expends approximately **$109.25M** per year for pavement M&R. Funding sources for this budget include federal AIP funds in addition to state funds. At this level of investment, the PCI at the end of the five-year analysis period will be **70**. The total amount funded over the five-year analysis period is **$546M** and would result in a backlog of **$1,584M.**

Scenario 6. Stopgap Maintenance Only: If only stopgap maintenance, such as patching and crack sealing, is performed for the next five years, the annual expenditure will be an average of **$19M**. At this level of investment, the PCI at the end of the five-year analysis period will drop to **60**. The total amount funded over the five-year analysis period is **$96M** and would result in the backlog increasing from $1.09B to **$2,460M.**

Table 2—Summary of Five-Year Budget Analyses

Scenario	Title	Description	Annual Funded M&R ($M)	Total Five-Year Funded M&R ($M)	Resulting Backlog ($M)	Resulting PCI
1	**Eliminate Backlog**	Eliminate the M&R backlog for the airport pavement system after five years.	372	1,858	0.00	86
2	**Target PCI 75**	Increase the average PCI of the airport pavement system to 75.	218	1,092	941	76
3	**Maintain Current PCI 72**	Stabilize the average PCI of the airport pavement system at the current level of 72.	168	842	1,241	73
4	**Target PCI 70**	Maintain the average PCI of the airport pavement system to 70.	123	614	1,502	71
5	**Maintain Current Budget**	Maintain M&R funding at the current annual budget.	109.25	546	1,584	70
6	**Stopgap Maintenance Only**	Perform only the minimum maintenance needed to maintain safe pavements.	19	96	2,460	60

Figure 2 shows the consequence of the six alternative budget scenarios on the resulting condition of the Alaska airport pavement system over the five-year period 2025 to 2029.

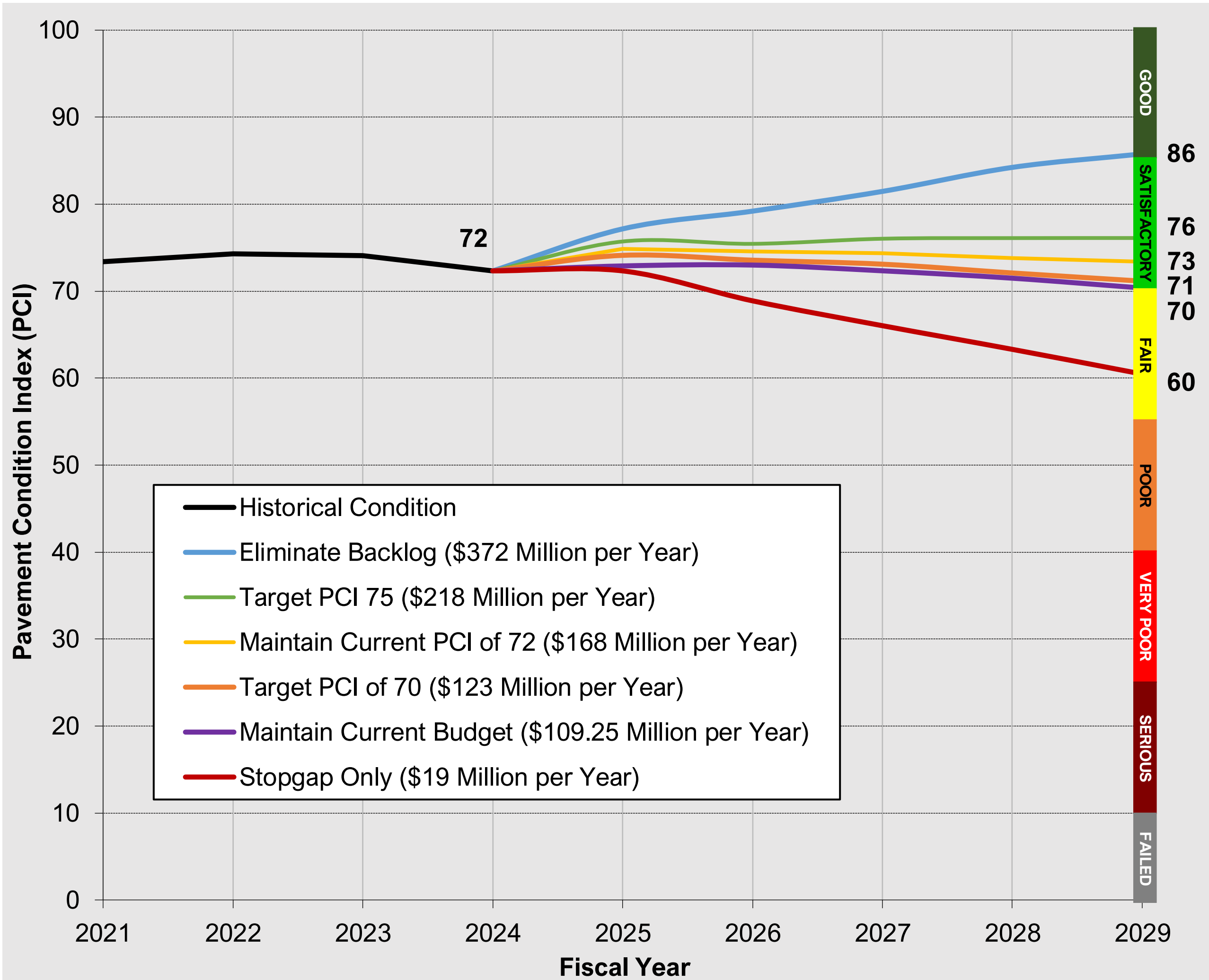


Figure 2—Consequence of Alternative Pavement M&R Budget Scenarios

Recommendations

We recommend that Alaska DOT&PF target a PCI of 70 for the Alaska airport pavement system. M&R activities planned and programmed by the Department in past years, and funded by the FAA through the AIP program, have resulted in a relatively high average PCI of 72 across a system of 54 airports in Alaska. This is a remarkable achievement and Alaska DOT&PF should take stock of the relatively high condition of its airport pavement system.

With an average PCI of 72, the pavement system's condition is approaching the critical PCI of 70. Although the PCI is still above this critical threshold, the pavement system will benefit more from a sustained program of pavement preservation rather than major repair work. The pavement preservation approach takes advantage of lower-cost technologies, such as seal coats, to preserve and protect a structurally sound pavement in a relatively high state of condition. Since pavement preservation treatments cost only a fraction of the price of major work, such as mill/overlay, the preservation approach is to apply these treatments "early and often." Routine, regular application of seal coats, in concert with crack sealing and patching, is a widely accepted strategy of preserving the high condition of a pavement network at a reasonable cost.

For this reason, we strongly recommend that Alaska DOT&PF adopt Budget Scenario 4—Target PCI 70. At an annual cost of $123M, this scenarios budget allocation is approximately 13 percent higher than the current annual budget of $109.25M for pavement M&R. This is a modest increase in annual cost, but at the same time represents a very cost-effective alternative to some of the other scenarios summarized in Table 2Table 28. In addition, Budget Scenario 4—Target PCI 70 will reduce backlog growth by approximately $80M over the five-year period as compared to Budget Scenario 5—Maintain Current Budget.

Consistent with guidance in the FAA handbook, any additional funding can be directed toward an annual seal coat program. This initiative aims to preserve the pavements in good and fair conditions, ensuring their longevity and functionality. By investing in routine maintenance through seal coating, the lifespan of the infrastructure can be protected and extended, ultimately providing a safer and more reliable transportation network.

INTRODUCTION

Background

Alaska is a vast state that is heavily reliant upon air transportation to serve its citizens. At 586,412 square miles, Alaska is the largest state in the United States of America.[1] Even larger than the state itself is the airspace controlled by the FAA Alaskan Region, which amounts to 2,427,971 square miles.[2]

In terms of passenger traffic, the FAA reports for 2023 a total of 5,107,220 enplanements at Alaska airports, broken down as follows.

Table 3—2023 Enplanements at Alaska Airports

Airport Classification	2023 Enplanements
Primary	4,727,382
Non-primary Commercial Service	200,632
General Aviation	179,206
Total	**5,107,220**

The 2023 enplanements are approximately seven times (7x) the population of the state. This is a considerably higher ratio than in the lower 48 contiguous states where the typical ratio of annual enplanements to population is two (2x). Nearly 85% of the communities rely on air transportation for year-round access for transportation, medical supplies, food, and mail.[3] Clearly, aviation plays a critical transportation role in serving communities in the State of Alaska.[4]

Alaska boasts a multitude of climate zones that are influenced by four main factors:

- Northerly latitude
- Elevation above sea level
- Proximity to the ocean
- Seasonal distribution of sea ice along western and northern boundaries[5]

An extensive variety of aircraft use Alaska airports, from small single engine aircraft to passenger jet and military aircraft. The typical general aviation (GA) aircraft operated in Alaska is relatively small, such as the Cessna C206 Stationair with a maximum takeoff weight of 3,789 lb.[6]

[1] State of Alaska (2024), “Geography of Alaska,” Alaska Kids’ Corner, Official Alaska State Website, accessed on January 20, 2024: https://alaska.gov/Kids/learn/aboutgeography.htm.
[2] Federal Aviation Administration (2023), “Alaskan Region Aviation Fact Sheet,” FAA Alaskan Region, accessed on January 20, 2024: https://www.faa.gov/sites/faa.gov/files/2023_Alaskan_Region_Aviation_Fact_Sheet.pdf.
[3] State of Alaska (2024), “Alaska Cornerstone Plan”, Official Alaska State Website, accessed on January 20, 2024: https://dot.alaska.gov/documents/FAA_Strategic_Plan_AAIP.pdf
[4] Federal Aviation Administration (2022), “CY2022 Enplanements at All Airports,” FAA Airports, Planning & Capacity, accessed on January 20, 2024: https://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/cy22_all_enplanements.
[5] National Oceanic and Atmospheric Administration (2022), “Alaska,” NOAA National Centers for Environmental Information, State Climate Summaries 2022, accessed on January 20, 2024: https://statesummaries.ncics.org/chapter/ak/.
[6] Cessna (2024), “Cessna Turbo Stationair HD Specifications,” Textron Aviation, accessed on January 20, 2024: https://cessna.txtav.com/en/piston/cessna-turbo-stationair-hd#_model-specs.

Another typical GA aircraft is the Beechcraft King Air 260, a twin-turboprop regional airliner with a maximum takeoff weight of 12,500 lb.[7] Military frequently use Alaska airports for training and other purposes. The Lockheed C-130 cargo aircraft, with a maximum operating weight of 155,000 lb., is commonly sighted at airports throughout the state.[8] At commercial airports throughout Alaska, including Kodiak, Atka, Iliamna, Fairbanks, and Juneau, large aircraft operate regularly, including the Boeing B737 with a maximum takeoff weight of 195,200 lbs. (B737-9 MAX).[9] The variety of aircraft utilizing the airport system in Alaska is extensive.

In the face of the challenges of geography, climate, and aircraft traffic variation, Alaska DOT&PF must plan, budget, and schedule pavement M&R projects to ensure that its system of airports remains capable of serving as a critical transportation link for Alaskan communities.

Purpose and History of Program

Airport pavement infrastructure represents a large capital investment in the State of Alaska, whose major objective is to build and maintain safe, strong, smooth, and skid-resistant pavement surfaces for aircraft. As soon as construction is complete, pavements begin gradual deterioration due to surface weathering, fatigue, drainage, and differential movement of pavement layers. Faulty construction techniques, sub-standard materials, or poor workmanship can accelerate this deterioration process. Over time, pavements may also be subjected to loads much greater than those for which they were originally designed, or they may experience a considerable increase in aircraft traffic volume, both of which contribute to premature pavement deterioration.

Pavement condition is assessed using the PCI methodology as defined in the FAA Advisory Circular 150/5380-7B *Airport Pavement Management Program (PMP)* using the documented procedures set forth by ASTM D5340-20 *Standard Test Method for Airport Pavement Condition Index Surveys.* Pavement deterioration, in accordance with ASTM D5340-20, is characterized in terms of distinct distress types, severity level of distress, and quantity of distress. This information is utilized to calculate a PCI value that represents the overall condition of the pavement in a numeric index that ranges from 0 (a condition category of “Failed”) to 100 (“Good”). The PCI methodology analyzes an overall measure of the pavement condition and provides an indication of the degree of maintenance, repair, or rehabilitation efforts that will be required to sustain functional pavement.

Around the year 2000, Alaska DOT&PF implemented PCI inspections to understand the pavement conditions at public airports within the Alaska Aviation System (AAS), to systematically update pavement infrastructure information, and to assist airport operators with recommendations of pavement maintenance, repair, and major rehabilitation needs. Alaska DOT&PF selected the industry available non-proprietary software package known as PAVER (formerly MicroPAVER). The PAVER Pavement Management System (PMS) was developed by the U.S. Army Corps of Engineers Construction Engineering Research Laboratory and was sponsored by the FAA, Federal Highway Administration, U.S. Army, U.S. Air Force, and U.S. Navy to meet the objectives of an effective pavement management system.

[7] Beechcraft (2024), “King Air 260 Specifications,” Textron Aviation, accessed on January 20, 2024: https://beechcraft.txtav.com/en/king-air-260.

[8] US Army Corps of Engineers (2015), “Aircraft Characteristics for Airfield Pavement Design and Evaluation, Air Force and Army Aircraft, TSC Report 13-2, Change 1, Transportation Systems Center, Omaha, Nebraska.

[9] Boeing Commercial Airplanes (2024), “737 MAX—Airplane Characteristics for Airport Planning,” Document No. D6-38A004, Rev J, Seal Beach, California, downloaded on February 10, 2025: https://www.boeing.com/commercial/airports/plan_manuals.page.

Federal Aviation Administration

Airports participating in the AIP Grant Program are required by the FAA to develop and implement a PMP to be eligible for continued funding. FAA AC 150/5380-6C and AC 150/5380-7B provide guidance on these requirements.

To properly implement an airport PMP, Alaska DOT&PF performs detailed inspection of airport pavement conditions by trained personnel. The FAA requires inspections to be performed annually using the PASER method. If pavement inspection is conducted using the PCI survey procedure in accordance with ASTM D5340, the FAA allows the inspection interval to increase to every three years.

Pavement Management Program Implementation

The PMP addresses the requirements of maintaining an effective pavement management program for all participating airports. Network-level management of pavement assets provides insight into the overall condition of the network (current and future), short-term and long-term budget needs, and knowledge of the pavement assets that are under consideration for projects. A network-level evaluation can support the identification of maintenance, repair, and major rehabilitation needs and budgetary planning-level opinions of probable construction costs.

The key elements of an effective pavement management program include, but are not limited to:

- Establish a pavement inventory with pavement structure and pavement condition information
- Utilize an objective and repeatable process for evaluating PCI
- Capability to customize M&R policies and prioritization
- Capability to model both past and future pavement conditions
- M&R planning with ability to specify budget constraints or target PCI goals

METHODOLOGY

An effective PMP incorporates both the regular collection of pavement condition information and the historical records from State of Alaska staff. This chapter of the report defines the specific methods utilized as part of the PMP System Implementation to meet the requirements of an effective PMP as defined by the FAA AC 150/5380-7B.

Airport Pavement Database

The Alaska Airport PMP utilizes the database capabilities in the PAVER 7.1.3 software program. The PAVER database includes a network-level inventory of the participating airport's eligible pavements. PAVER consists of a set of engineering tools for conducting pavement condition surveys, predicting past and future conditions, and developing work plans with the objective of optimizing spending. PAVER is non-proprietary, industry standard software that has been in use since the late 1970s when it was developed to inventory and manage M&R for the vast Department of Defense pavement network. It is a state-of-the-art scalable platform that can be used for agencies of any size.

Airport Pavement Inventory

The current Alaska Airport PAVER database encompasses approximately 109 million square feet (SF) of airport pavement (1.8 million sf of which is considered inactive or closed and is not included in the summary results) across three distinct Alaska DOT&PF regions. Figure 3 displays the 54 paved public-use airports within their respective region. Table 4 lists the 54 airports, their respective inspection year, the number of active paved runways, and their respective inventoried pavement area.

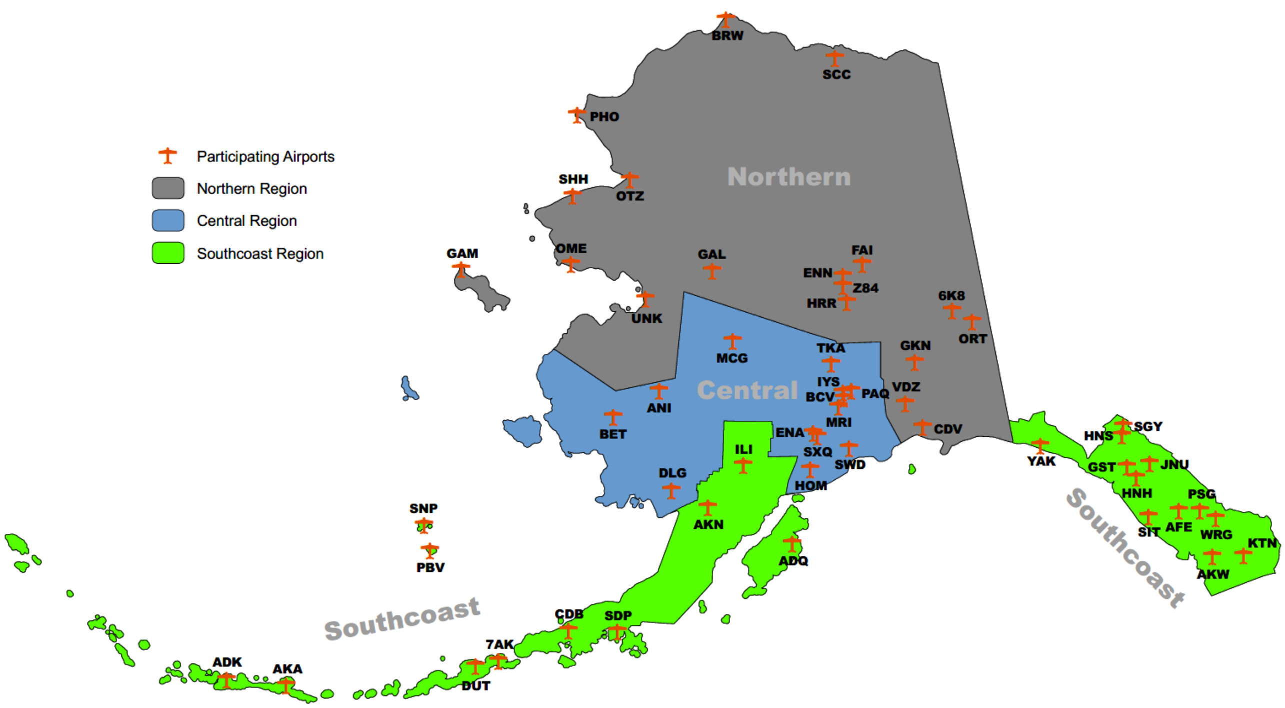


Figure 3—Alaska Airport Locations Relative to Alaska DOT&PF Regions

Table 4—Alaska DOT&PF Paved Public Use Airports

FAA ID	Airport Name	PCI Inspection Year	Number of Active Paved Runways	Airport Pavement Area (million square ft)
Northern Region				
BRW	Barrow	2024	1	2.47
Z84	Clear	2023	1	0.64
CDV	Cordova	2024	1	1.90
SCC	Deadhorse	2023	1	3.02
FAI	Fairbanks	2024	2	9.64
GAL	Galena	2024	1	2.11
GAM	Gambell	2024	1	0.56
GKN	Gulkana	2023	1	0.92
HRR	Healy River	2023	1	0.49
OTZ	Kotzebue	2024	1	1.99
ENN	Nenana*	2022	1	0.87
OME	Nome	2024	2	2.97
ORT	Northway	2022	1	0.79
PHO	Point Hope	2024	1	0.45
SHH	Shishmaref	2024	1	0.48
6K8	Tok Junction	2022	1	0.41
UNK	Unalakleet	2024	2	1.51
VDZ	Valdez	2022	1	2.36
Central Region				
ANI	Aniak	2024	1	1.10
BET	Bethel	2024	2	4.31
BCV	Birchwood	2024	2	1.99
DLG	Dillingham	2023	1	1.97
HOM	Homer	2020	1	1.96
ENA	Kenai*	2024	1	4.25
MCG	McGrath	2023	1	1.31
MRI	Merrill*	2024	2	3.86
PAQ	Palmer*	2022	2	3.65
SWD	Seward	2024	2	1.20
SXQ	Soldotna*	2024	1	3.09
TKA	Talkeetna	2023	1	0.80
IYS	Wasilla*	2024	1	1.81

*Indicates local, non-state-owned airports

Table 4—Alaska DOT&PF Paved Public Use Airports (cont.)

FAA ID	Airport Name	PCI Inspection Year	Number of Active Paved Runways	Airport Pavement Area (million square ft)
Southcoast Region				
ADK	Adak	2023	1	4.04
7AK	Akutan	2024	1	0.45
AKA	Atka	2023	1	0.59
CDB	Cold Bay	2023	2	3.13
GST	Gustavus	2023	2	2.44
HNS	Haines	2024	1	1.08
HNH	Hoonah	2024	1	0.60
ILI	Iliamna	2022	2	1.71
JNU	Juneau*	2024	1	4.89
AFE	Kake	2024	1	0.53
KTN	Ketchikan	2022	1	2.36
AKN	King Salmon	2024	2	3.20
AKW	Klawock	2022	1	0.90
ADQ	Kodiak	2023	3	4.40
PSG	Petersburg	2022	1	1.44
PBV	Saint George	2023	1	0.93
SNP	Saint Paul	2023	1	1.31
SDP	Sand Point	2023	1	1.36
SIT	Sitka	2022	1	2.12
SGY	Skagway	2024	1	1.00
DUT	Unalaska	2024	1	0.92
WRG	Wrangell	2022	1	1.48
YAK	Yakutat	2024	2	3.53

*Indicates local, non-state-owned airports

In addition to the pavement inventory, we also collected a series of tabular data on an individual airport basis, capturing unique information to enhance the Airport PMP. We developed a way to store, categorize, and compare copious data collected and stored in PAVER as well as the FAA, Alaska Aviation System Plan (AAPS), and Western Regional Climate Center (WRCC) websites. The information was then used to help develop custom prediction models, unit costs, and maintenance and rehabilitation planning. **Appendix A** showcases the attribute table that was developed.

Pavement Definition

An effective pavement management program must establish a pavement hierarchy in which a pavement network can be subdivided into smaller, manageable working units. The functional use of each pavement, as well as information from historical construction documents are used to help define the limits of the smaller working units. A critical input for a pavement inventory and network definition is the date of last major construction or rehabilitation, as this type of work will reset the PCI of that pavement area to a value of 100. The following paragraphs define the common terms used in PMPs and explain their application for this implementation.

Pavement Network - A pavement network is a logical unit for organizing pavements into a structure for the purpose of pavement management. For the PMP, a network represents an individual airport's pavement assets that are maintained by Alaska DOT&PF.

Pavement Branch - A pavement branch is a readily identifiable part of the pavement network that has a distinct functional classification. For example, within an airport pavement network, each runway, taxiway, and apron are separate branches. Each branch consists of one or more sections, each with distinct pavement characteristics.

Pavement Section - A pavement section is defined by its characteristics, which include surface type (asphalt or concrete), rank (primary, secondary, tertiary), pavement structure (material type and thickness), construction history, age, condition, and traffic type and/or volume. The section is the smallest management unit of a pavement network where maintenance, repair, or major rehabilitation treatments are considered.

Pavement Sample Unit - A pavement sample unit is a distinct subdivision of a pavement section that has a standard size range of 5,000 contiguous sf (±2,000 sf) for asphalt pavements or 20 contiguous slabs (±8 slabs) for concrete pavements. A sample unit is the smallest subdivision of a pavement network and is physically inspected during field assessments to establish the PCI. Depending on the total number of sample units within a section, a corresponding number of sample units must be inspected (at a minimum), as shown in Table 5.

Table 5—Sampling Rate

Number of Total Sample Units in Section	Sampling Rate
1 to 5	1
6 to 10	2
11 to 15	3
16 to 40	4
Over 40	10%

Pavement Work History

In accordance with the FAA AC 150/5380-7B, it is best practice that airports maintain records of all construction and maintenance (preventive, stopgap, and major) related to the pavement infrastructure. These records should consist of:

- Location and limits of repair/construction
- Types and severities of repaired distresses
- Work type, date, material, thickness, cost; and
- Supporting documents (e.g., contract documents, construction drawings, as-builts, specifications, bid tabulations, and photograph records).

Alaska DOT&PF staff with the assistance of participating airport staff were asked to provide documentation regarding the historical work performed at each airport, most importantly construction drawings and bid tabulations. This information is used to identify location, limits, work type, pavement cross-sections, and the associated construction costs. The historical data collected during this task was entered into the PAVER database. The database includes the following fields for historical information:

- Project name / number (AIP project number)
- Work Category (localized, global, major)
- Work type performed (i.e., reconstruction, mill and overlay, surface seal, crack seal, etc.)
- Date of construction/rehabilitation
- Pavement surface type (asphalt concrete, portland cement concrete)
- Section area (limits of work)
- Comments (pavements cross-section)

The PMP PAVER database accuracy is limited to the recorded documentation provided by the State and participating airport staff. State planners should rely on this information as a planning tool and defer to final as-built plans, record drawings, and/or engineer's construction report for pavement construction records.

Pavement Traffic

A pavement section's structural integrity is designed to meet the needs of the user (commercial service, general aviation, air cargo, and/or military) by providing a safe, smooth, operational surface. Pavement deterioration occurs gradually from aircraft loading and environmental conditions. The aircraft fleet mix data for each airport was taken from the Alaska Aviation System Plan (AASP). FAA AC 150/5320-6F provides guidance on incorporation of aircraft traffic fleet mix data.

Pavement Condition Index

The PCI survey is a standardized procedure for visually inspecting pavement samples by recording distress types, quantities, and severities in accordance with the methods described in ASTM D5340-20 and FAA AC 150/5380-7B.

For each inspected sample, the quantity and severity of defined distresses are recorded and analyzed in accordance with ASTM D5340-20, which identifies 17 flexible pavement (AC) distress types and 16 rigid pavement (PCC) distress types. Table 6 identifies these distress types.

Table 6—PAVER Distress Codes for Flexible and Rigid Pavements

Code	AC Pavement Distresses	Code	PCC Pavement Distresses
41	Alligator Cracking	61	Blowup
42	Bleeding	62	Corner Break
43	Block Cracking	63	Linear Cracking
44	Corrugation	64	Durability Cracking
45	Depression	65	Joint Seal Damage
46	Jet Blast	66	Small Patch
47	Joint Reflection Cracking	67	Large Patch & Utility Cut
48	Longitudinal & Transverse Cracking	68	Popouts
49	Oil Spillage	69	Pumping
50	Patching	70	Scaling
51	Polished Aggregate	71	Faulting
52	Raveling	72	Shattered Slab
53	Rutting	73	Shrinkage Cracking
54	Shoving	74	Joint Spalling
55	Slippage Cracking	75	Corner Spalling
56	Swell	76	Alkali Silica Reaction (ASR)
57	Weathering		

The PAVER User Guide's clarifies that each distress type falls into one of three categories, as displayed in Table 7.

Table 7—Pavement Distress Categories

Distress Category	AC Distress Type	PCC Distress Type
Load	• Alligator Cracking • Rutting	• Corner Break • Linear Cracking • Shattered Slab
Climate/ Durability	• Block Cracking • Joint Reflection Cracking • Longitudinal and Transverse Cracking • Patching • Raveling • Weathering	• Blowup • Durability Cracking • Joint Seal Damage

Table 7—Pavement Distress Categories (cont.)

Distress Category	AC Distress Type	PCC Distress Type
Other (Construction/ Drainage/ Material)	• Bleeding • Corrugation • Depression • Jet Blast • Oil Spillage • Polished Aggregate • Shoving • Slippage Cracking • Swell	• Small Patch • Large Patch and Utility Cut • Popouts • Pumping • Scaling • Faulting • Shrinkage Cracking • Joint Spalling • Corner Spalling • Alkali Silica Reaction

Any given distress may have more than one cause. For example, depression may be caused by inadequate compaction during construction, or by subgrade softening due to environmental factors, or even by prolonged point loads. In addition, a distress may be initiated by one cause but may progress to a distress of higher severity by another cause. Therefore, engineering judgment is critical in analyzing the actual cause or causes of the distress.

To obtain the section PCI, the distresses and PCI of each inspected sample unit get extrapolated over the entire section. Distresses found in sample units classified as "additional," which are defined as non-representative instead of random, are not extrapolated over the entire section but merely added to the extrapolated quantity. Table 8 gives a detailed description of each PCI rating category and shows the seven-category PCI scale.

Section 4.1 of ASTM D5340-20 governing PCI surveys offers this caution:

> *"The PCI is a numerical indicator that rates the surface condition of the pavement. The PCI provides a measure of the present condition of the pavement based on the distress observed on the surface of the pavement which also indicates the structural integrity and surface operational condition (localized roughness and safety). The PCI cannot measure the structural capacity; neither does it provide direct measurement of skid resistance or roughness. It provides an objective and rational basis for determining maintenance and repair needs and priorities. Continuous monitoring of the PCI is used to establish the rate of pavement deterioration, which permits early identification of major rehabilitation needs. The PCI provides feedback on pavement performance for validation or improvement of current pavement design and maintenance procedures."* [10]

Therefore, it is imperative that engineers and planners treat the PCI as a tool that will assist them during the M&R planning process. Any major project should always be preceded by an up-to-date detailed project level evaluation of the pavement in order re-evaluate maintenance needs prior to the project design process.

[10] ASTM International (2020), *Standard Test Method for Airport Pavement Condition Index Surveys*, D5340-20, Volume 04.03: Road And Paving Materials; Vehicle-pavement Systems, West Conshohocken, Pennsylvania.

Table 8—PCI Rating Scale

ASTM PCI Color Legend	PCI Range	Work Type	PCI Ratings and Definition
	85-100	**Preventative Maintenance**	**Good:** Pavement has minor or no distresses and should require only routine maintenance.
	70-84	**Preventative / Corrective Maintenance**	**Satisfactory:** Pavement has scattered low-severity distresses that should require only routine maintenance.
	55-69	**Rehabilitation**	**Fair:** Pavement has a combination of low- and medium-severity distresses. Near-term maintenance and repair needs may range from routine to major.
	40-54	**Reconstruct**	**Poor:** Pavement has low-, medium-, and high-severity distress that cause some operational problems. Near-term M&R needs will be major.
	25-39		**Very Poor:** Pavement has medium- and high-severity distresses that cause considerable maintenance & operational problems. Near-term M&R needs will be major.
	10-24		**Serious:** Pavement has high-severity distresses that cause operational restrictions; immediate repairs are needed.
	0-9		**Failed:** Pavement deterioration has progressed to the point that safe aircraft operations are no longer possible; complete reconstruction is required.

A pavement life cycle is the relationship between its condition and age. A properly designed pavement will usually have a slow deterioration rate during the first part of its life, then at some age and condition value, the pavement's deterioration rate will increase rapidly. This point in the life of a pavement is called the critical condition or critical PCI. Identifying the critical PCI and performing M&R before it reaches this point is the key to saving M&R dollars, as the cost to repair pavements increases dramatically beyond this point. Critical PCI values represent a condition level above which Alaska DOT&PF managers should strive to maintain for as long as possible.

Guidelines set by the Alaska State Legislature require maintaining minimum PCI condition ratings of 70 for runways and 60 for taxiways and aprons. Climate variation, variability in available funding and remote geographic locations provide a continuous challenge for maintenance and construction needs of Alaska airports.

Figure 4 shows a typical pavement life cycle, asserting that if preventive maintenance is performed while the PCI is above critical, the cost will be significantly lower than waiting to repair pavements until after deterioration has accelerated.

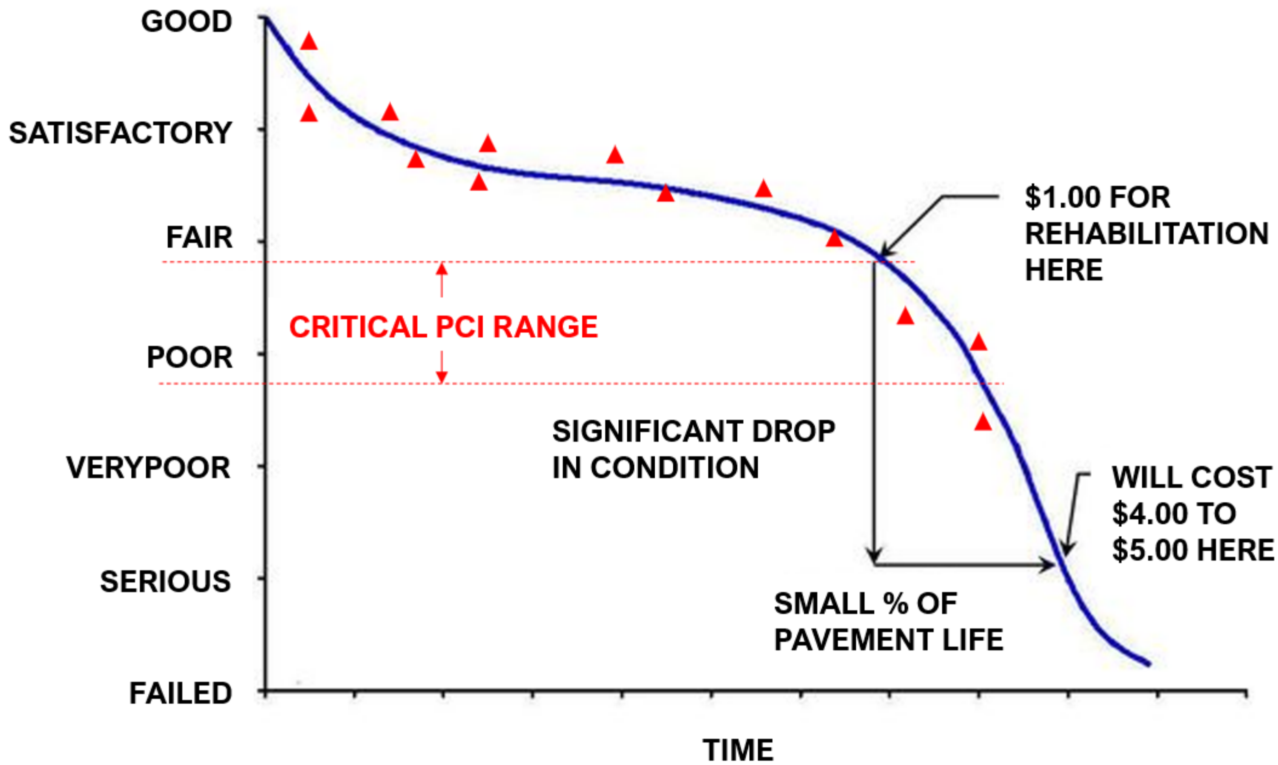


Figure 4—Typical Pavement Deterioration Curve[11]

*Figure is for conceptual purposes only – costs depicted are not specific to Alaska airport pavements

[11] Pavement Management for Airports, Roads, and Parking Lots, M.Y. Shahin, Second Edition, Springer, 2005.

PREDICTION MODELS

Pavement prediction models, also known as performance models or family curves, are generated within PAVER based on an analysis of historical PCI survey data and construction records. Pavements in the same region with similar characteristics such as branch use and surface type generally follow the same deterioration life cycle pattern. Similar pavements are grouped into families and performance models are generated for each family by analyzing numerous PCI vs. pavement age data points from historical inspections. A deterioration curve is fit to the data and its correlation is evaluated based on statistical measures.

The same family curve generated using the look-back procedure described above can be used in a forward-looking capacity to predict future pavement conditions. For a particular future year, one can use the performance model to predict the future condition of a pavement section. Then the future PCI is compared to established PCI trigger values to determine whether the pavement section is eligible for pavement preservation, major work, or reconstruction.

Custom Prediction Models

Initial performance models developed for the Alaska PMP received further successive refinements after careful review and analysis of the historical PCI survey data. We also consulted with Alaska DOT&PF maintenance and operations (M&O) staff to understand the availability of pavement treatment capabilities, geography, susceptibility to severe storm events and access to the road network to improve the accuracy of the models. Through this process, 15 unique performance models were developed and are summarized in Table 9. Additional information on the development of performance models is presented in **Appendix B.**

In the Central Region, we refined the performance curves based on a geographic distinction between East and West. This distinction considers several factors. For example, Central Region—West airports are subject to severe storm events more frequently than airports in the East region. Additionally, West region airports generally do not have access to the road network, which affects the type and frequency of pavement M&R that can be conducted.

In the Northern Region, a similar distinction was found to exist between Coastal and Interior subregions. Northern Region—Coastal airports are subject to more frequent severe storm events and are not accessible through the road network. In contrast, Northern Region—Interior airports experience dry weather and permafrost.

In the Southcoast Region, three subregional distinctions were developed around the relative deterioration rate based on the slope of the runway straight line deterioration curve, resulting in six performance models for asphalt pavements in the Southcoast Region. Some Southcoast airports demonstrated decades of performance with less than one PCI point per year deterioration of runway pavements, while other airports experience a deterioration rate of two PCI points per year or more. These differences were not clearly linked to the specific geographical location of the airport; therefore, the subregional distinction is based solely on the deterioration rate.

Finally, all asphalt pavement prediction models were refined to distinguish between branch use, with one model for runways and another for parking aprons and taxiways. This refinement doubled the number of family curves for asphalt pavements from 7 to 14. Additionally, a single custom model was created for use with concrete pavements throughout the State of Alaska, bringing the total number of performance models to 15.

Table 9—Alaska PMP Prediction Models

<table>
<tr><th>Alaska DOT&PF Region</th><th>Sub Region</th><th>Branch Use</th></tr>
<tr><td rowspan="4">Central</td><td rowspan="2">East</td><td>Runway</td></tr>
<tr><td>Apron / Taxiway</td></tr>
<tr><td rowspan="2">West</td><td>Runway</td></tr>
<tr><td>Apron / Taxiway</td></tr>
<tr><td rowspan="4">Northern</td><td rowspan="2">Coastal</td><td>Runway</td></tr>
<tr><td>Apron / Taxiway</td></tr>
<tr><td rowspan="2">Interior</td><td>Runway</td></tr>
<tr><td>Apron / Taxiway</td></tr>
<tr><td rowspan="6">Southcoast</td><td rowspan="2">Low Runway Deterioration</td><td>Runway</td></tr>
<tr><td>Apron / Taxiway</td></tr>
<tr><td rowspan="2">Moderate Runway Deterioration</td><td>Runway</td></tr>
<tr><td>Apron / Taxiway</td></tr>
<tr><td rowspan="2">High Runway Deterioration</td><td>Runway</td></tr>
<tr><td>Apron / Taxiway</td></tr>
<tr><td colspan="3">All Concrete</td></tr>
</table>

AIRPORT PAVEMENT CONDITIONS

Airport Pavement Inspections

Alaska DOT&PF began the process of implementing a comprehensive PMP beginning in 2022, which involves conducting PCI inspections in conformance with ASTM D5340 and FAA AC 150/5380-6B. The pavements at all 54 airports in the Alaska Airport PMP have received up-to-date pavement inspections conducted by Alaska DOT&PF and contract personnel. Since the inspections occur on a three-year cycle, it is important to display the results in present-day form. This means that even though the inspections are spaced over several years, the data is adjusted to reflect current conditions, ensuring that decision-makers have the most accurate information available. Thus, the tables and figures shown throughout this report represent data predicted as of October 1, 2024. The predictions are based on the inspection data and incorporate factors such as anticipated pavement deterioration and planned maintenance activities. This forward-looking approach helps in proactive planning and resource allocation for pavement maintenance and rehabilitation.

Alaska Statewide Summary of Airport Pavement Condition

The overall average pavement condition of the Alaska airport system is **72** or **“Satisfactory”**. As shown in Figure 5, the pavement condition distribution by area is 31% “Good”, 32% “Satisfactory”, 24% “Fair”, 9% “Poor”, 4% “Very Poor”, 1% “Serious”, and less than 1% “Failed”.

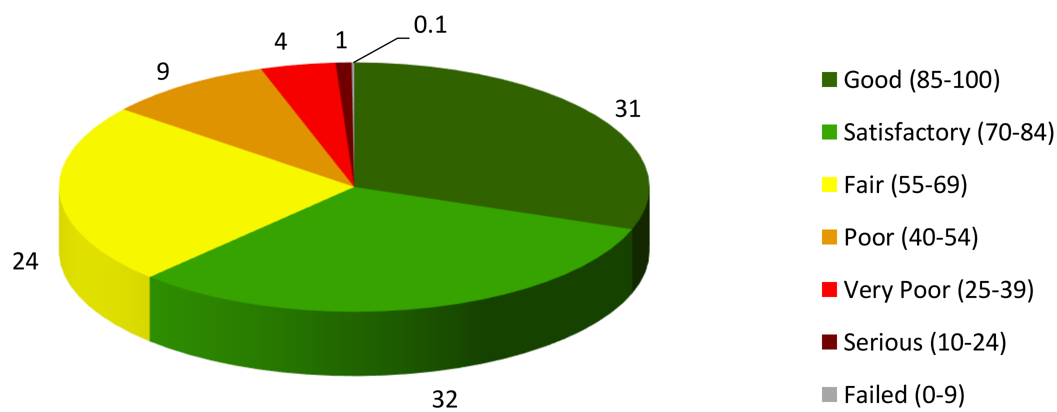


Figure 5—Alaska Airport PCI Summary

An analysis of the Alaska airport pavement condition with respect to pavement age is presented in Table 10 and Figure 6 as follows. Unsurprisingly, across the system, PCI deteriorates with pavement age.

Table 10—Alaska Airport Condition by Age of Pavement

Age at Time of Report (yrs)	Pavement Area (sf)	Pavement Area (%)	Sections	Sections (%)	PCI
00-02	13,373,919	12.4	138	13.1	93
03-05	3,899,936	3.6	37	3.5	90
06-10	21,032,430	19.6	209	19.8	83
11-15	20,969,830	19.5	176	16.7	72
16-20	21,517,698	20.0	203	19.3	68
21-25	10,275,095	9.6	127	12.0	62
26-30	5,864,765	5.5	64	6.1	52
31-35	5,215,703	4.9	46	4.4	49
36-40	1,395,916	1.3	20	1.9	46
41-50	1,699,765	1.6	20	1.9	48
Over 50	2,194,905	2.0	14	1.3	42
All Inspected	**107,439,962**	**100**	**1,054**	**100**	**72**

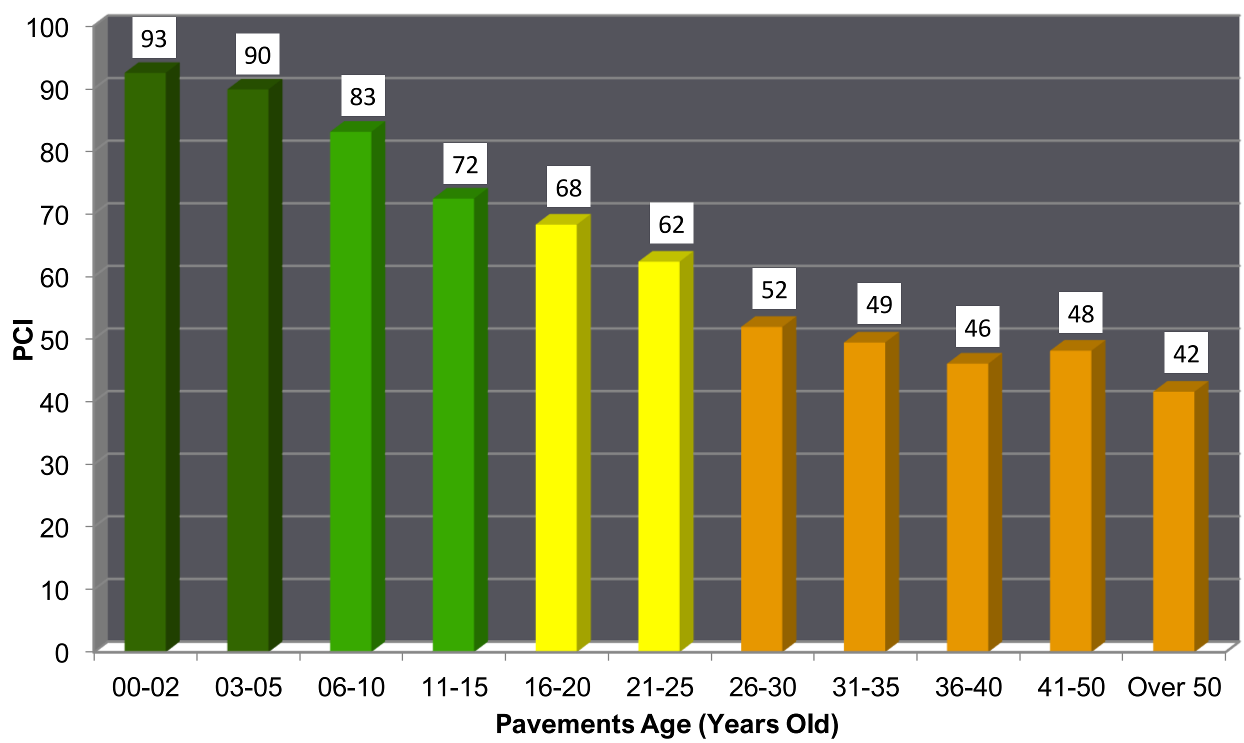


Figure 6—Alaska Airport Condition by Age

Alaska Regional Summaries of Airport Pavement Condition

Figure 7 through Figure 9 present the area-weighted pavement conditions distribution by area for each of the three Regions, Northern, Central, and Southcoast (respectively).

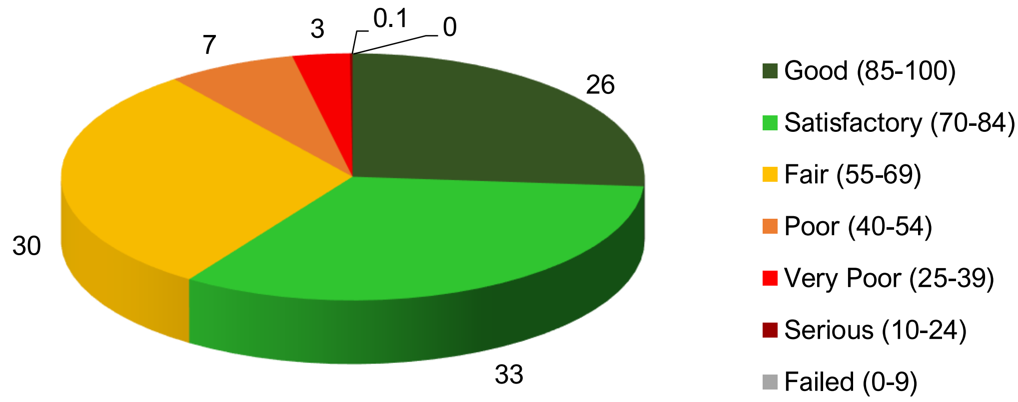


Figure 7—Northern Region Airport PCI Results by Percent Area

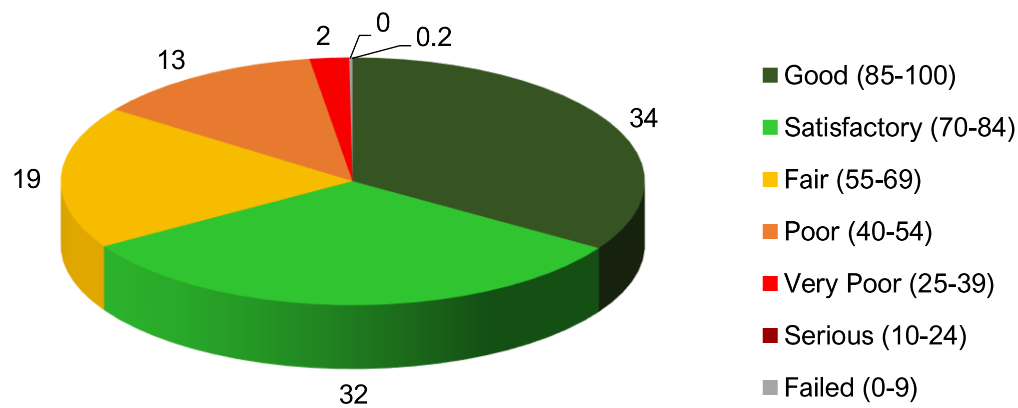


Figure 8—Central Region Airport PCI Results by Percent Area

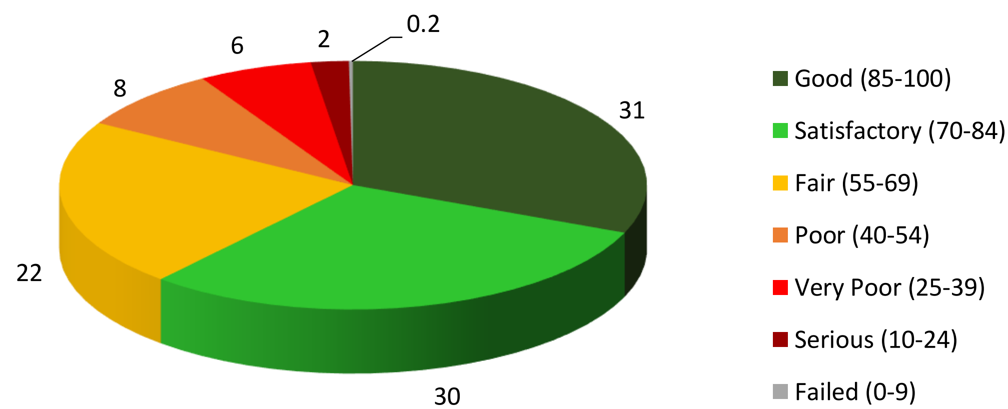


Figure 9—Southcoast Region Airport PCI Results by Percent Area

Figure 10 and Figure 11 present the regional-level area-weighted pavement conditions displayed by branch use and section rank (respectively).

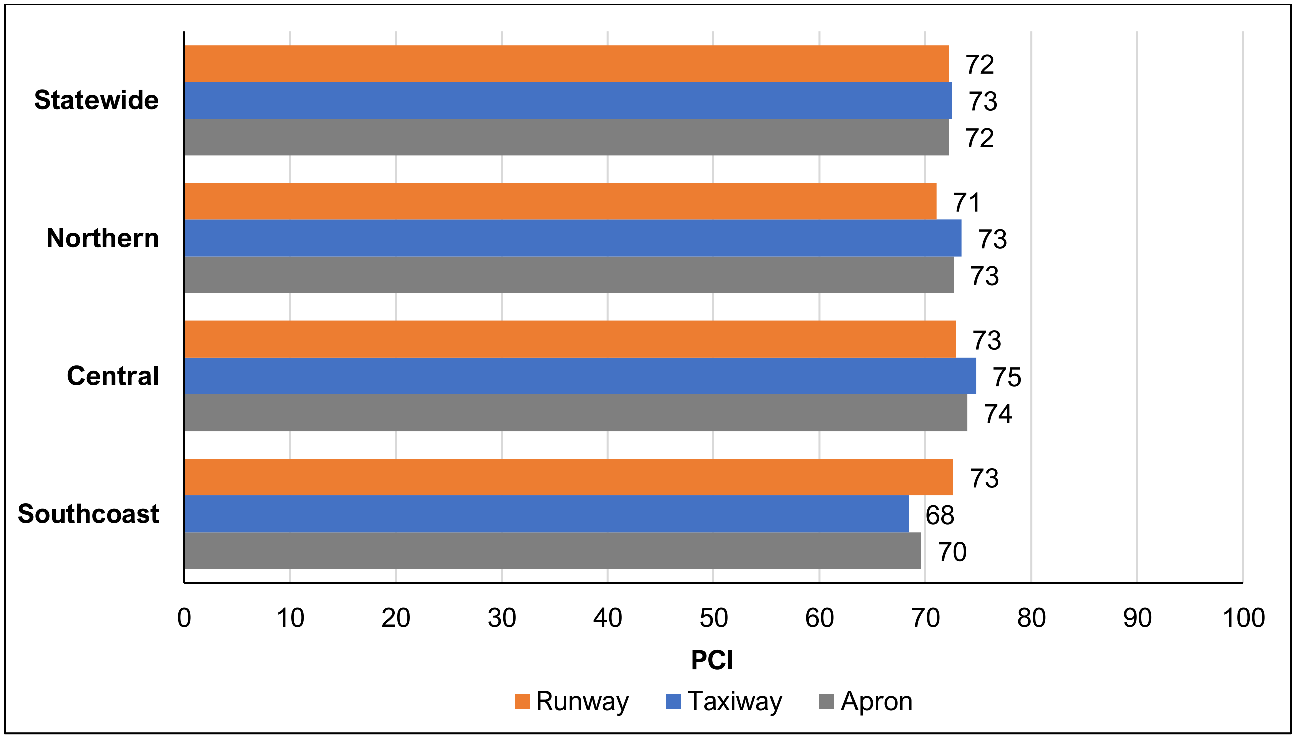


Figure 10—Alaska Airport Pavement Condition by Branch Use

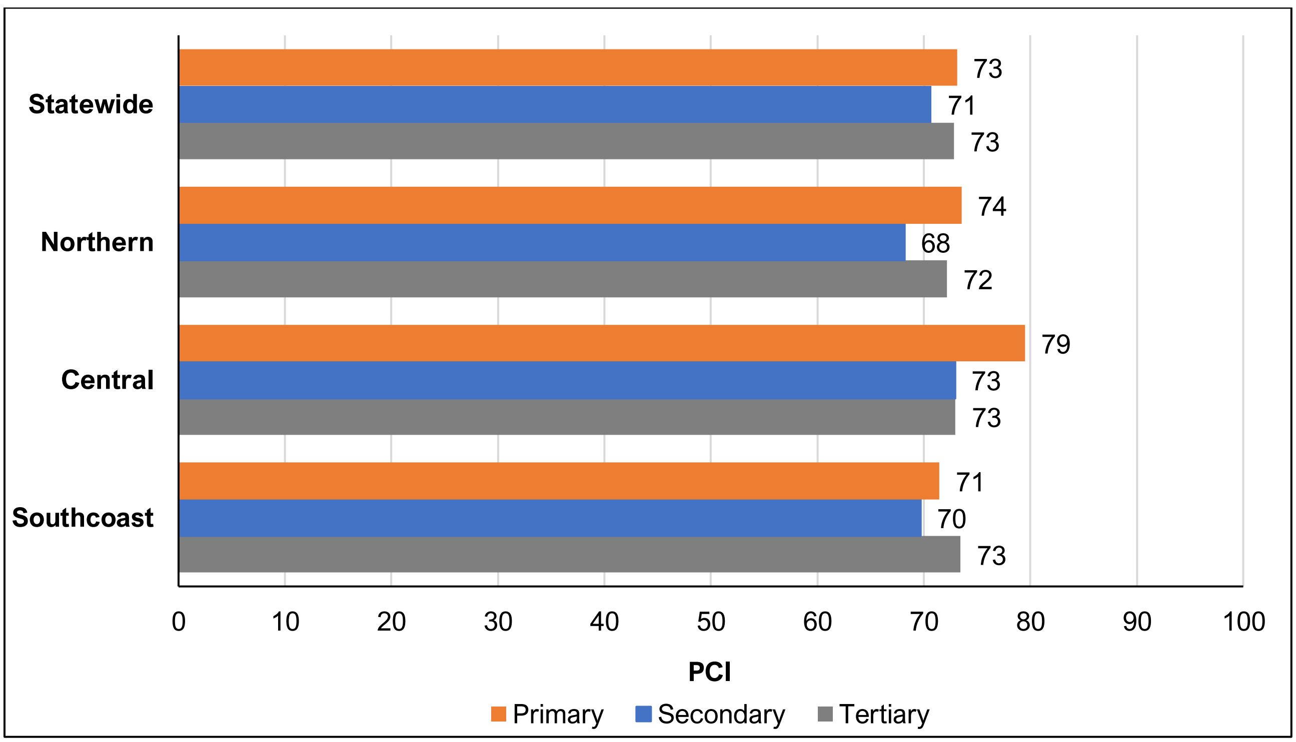


Figure 11—Alaska Airport Pavement Condition by Section Rank

Table 11 summarizes the pavement conditions by airport and branch use.

Table 11—Pavement Condition Summary by Airport and Branch Use

FAA ID	Airport	Runway PCI	Taxiway PCI	Apron PCI	Network PCI
Northern Region					
BRW	Barrow	86	76	54	74
Z84	Clear	50	60	50	51
CDV	Cordova	66	80	86	71
SCC	Deadhorse	71	74	69	72
FAI	Fairbanks	74	74	78	76
GAL	Galena	73	76	71	72
GAM	Gambell	76	83	85	78
GKN	Gulkana	75	75	84	77
HRR	Healy River	37	45	40	40
OTZ	Kotzebue	84	87	91	87
ENN	Nenana*	63	60	57	61
OME	Nome	92	67	69	83
ORT	Northway	32	40	48	37
PHO	Point Hope	97	99	99	98
SHH	Shishmaref	63	82	77	65
6K8	Tok Junction	27	56	60	46
UNK	Unalakleet	57	59	61	58
VDZ	Valdez	52	75	74	65
Central Region					
ANI	Aniak	87	89	88	87
BET	Bethel	87	82	68	78
BCV	Birchwood	78	87	72	77
DLG	Dillingham	79	79	76	78
HOM	Homer	48	77	74	61
ENA	Kenai*	50	67	75	65
MCG	McGrath	87	86	67	81
MRI	Merrill*	69	71	86	77
PAQ	Palmer*	85	69	64	70
SWD	Seward	53	58	60	56
SXQ	Soldotna*	94	81	79	83
TKA	Talkeetna	78	80	79	79
IYS	Wasilla*	63	67	76	71

*Indicates local, non-state-owned airports

Table 11—Pavement Condition Summary by Airport and Branch Use (cont.)

FAA ID	Airport	Runway PCI	Taxiway PCI	Apron PCI	Network PCI
Southcoast Region					
ADK	Adak	33	33	86	39
7AK	Akutan	89	80	82	87
AKA	Atka	71	78	79	72
CDB	Cold Bay	87	84	80	86
GST	Gustavus	95	95	95	95
HNS	Haines	56	66	85	69
HNH	Hoonah	51	52	61	56
ILI	Iliamna	56	61	65	59
JNU	Juneau*	73	75	69	72
AFE	Kake	90	68	61	83
KTN	Ketchikan	64	86	84	74
AKN	King Salmon	82	69	58	74
AKW	Klawock	71	69	69	70
ADQ	Kodiak	72	62	39	66
PSG	Petersburg	67	73	80	70
PBV	Saint George	82	78	84	82
SNP	Saint Paul	84	79	78	82
SDP	Sand Point	81	75	83	81
SIT	Sitka	88	66	80	82
SGY	Skagway	62	64	64	63
DUT	Unalaska	87	29	22	57
WRG	Wrangell	69	72	84	73
YAK	Yakutat	63	70	46	59

*Indicates local, non-state-owned airports

Pavement Condition Forecast

Utilizing the prediction models described previously, we used PAVER to forecast pavement conditions over a 10-year period spanning from 2025 to 2034, assuming that only routine preventive maintenance is performed on the pavements. Table 12 and Figure 12 are the 5-year and 10-year state and regional PCI forecasts in tabular and graphical format, respectively. The PCI for the Central and Southcoast Regions stay the same moving into 2025 due to ongoing construction on Homer, Juneau, and Kodiak.

Table 12—Alaska Airport Pavement 10-Year PCI Forecast

Region	Current	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Statewide	72	71	69	67	65	63	62	60	58	57	55
Northern	72	69	67	65	63	61	59	57	56	54	52
Central	74	74	72	70	68	66	65	63	62	61	59
Southcoast	71	71	69	67	65	63	61	60	58	56	54

5-Year PCI **10-Year PCI**

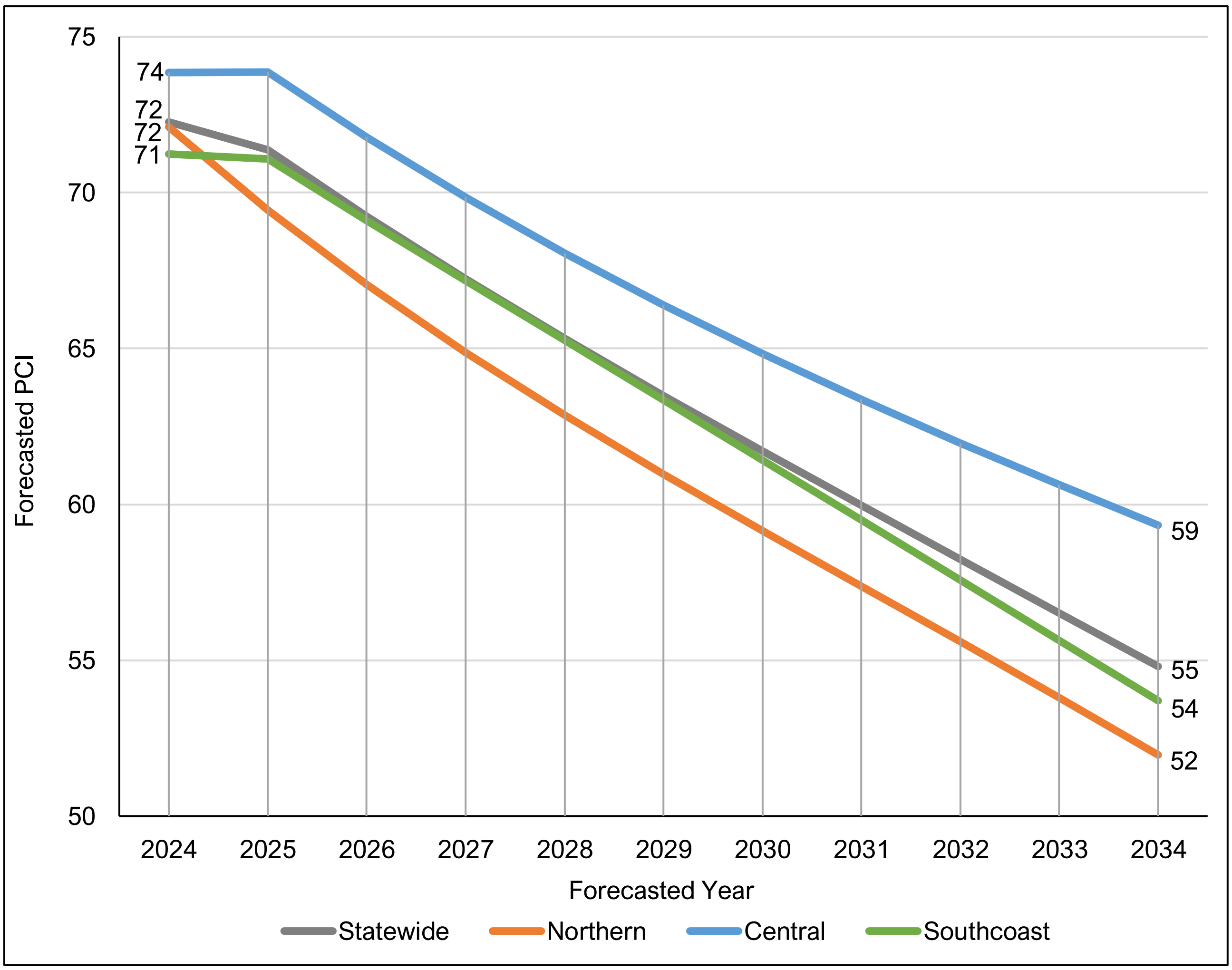


Figure 12—Alaska Airport Pavement 10-Year PCI Forecast

Individual Airport Pavement Inspection Reports

Detailed reports for each individual airport pavement network are generated after their inspection. For airport pavement inspection reports published starting in 2023, the organization of the reports is as follows:

- Airport Maps
    - Pavement Condition Index
    - Sample Unit PCI
    - 5-Year Predicted PCI
    - 10-Year Predicted PCI
    - Pavement Age at Inspection
    - Pavement Crack Seal Condition
- Airport Pavement Inspection Notes by Branch
- Branch Condition Report
- Branch Use Condition Report
- Section Condition Report
- Section Condition Report (Summary by Age Category)
- Work History Report
- Physical Property Data Table
- Pavement Classification Rating (PCR)
- References

Individual airport reports can be found on the Alaska Department of Transportation and Public Facilities website https://dot.alaska.gov/stwddes/asset_mgmt/airport_pave.shtml. Under the "**Airports Pavement Condition Data"** window there is a dropdown list in which you can access the latest Airport Pavement Condition Reports for each of the 54 airports.

MAINTENANCE AND REHABILITATION (M&R) PLANNING

For the PMP to be effective, the program must be unique to Alaska DOT&PF maintenance policies, M&R prioritization, and construction unit costs. Each of these factors will influence the development of long-term M&R strategies, including their associated budgetary requirements. Therefore, it is essential that the information in the database is accurate so that the proper long-term M&R strategy can ultimately be selected. The following tables regarding distress maintenance policies, M&R prioritization, and unit costs were customized specifically for the Alaska DOT&PF PAVER database.

Maintenance and Rehabilitation Work Types

PAVER uses four (4) distinct work type policies when applying funds for M&R planning. Each policy is defined below and describes which pavement they will be applied to.

- **Localized Preventive M&R** - Defined as distress maintenance activities performed with the primary objective of slowing the rate of deterioration. This policy is applied to pavements above the critical PCI.

- **Localized Stopgap (Safety) M&R -** Stopgap M&R is defined as the localized M&R needed to keep the pavement operational in a safe condition. This policy is applied to pavements below the critical PCI.

- **Global Preventive M&R -** Defined as activities applied to entire pavement sections with the primary objective of slowing the rate of deterioration. This policy is applied to pavements above the critical PCI.

- **Major M&R -** Activities applied to the entire pavement section to correct or improve existing structural or functional requirements. It is also used to upgrade pavements below the critical PCI.

Distress Maintenance Policies

Distress maintenance policies are used to determine what work will be recommended per recorded distress in any given section. The two types of localized maintenance policies are preventive and stopgap. Preventive policies are for sections having a PCI value above the critical value and are designed to provide preventive repair when it is beneficial to the life of the pavement. Stopgap policies are for sections that have a PCI below the critical value and are designed to repair any safety hazards to keep the pavement in operational condition. Table 13 and Table 14 list the localized preventive and stopgap maintenance policies for AC and PCC pavements, respectively. These policies are used to determine the localized maintenance recommendations in this PMP.

Table 13—AC Pavement Localized Preventive and Stopgap Maintenance and Repair Policy

Distress	Severity	Description	Preventive Work Type	Stopgap Work Type
41	Low	Alligator Cracking	-	-
41	Medium	Alligator Cracking	Patching - AC Deep	-
41	High	Alligator Cracking	Patching - AC Deep	Patching - AC Deep
42	N/A	Bleeding	Patching - AC Shallow	-
43	Low	Block Cracking	-	-
43	Medium	Block Cracking	Crack Sealing – AC	-
43	High	Block Cracking	Patching - AC Deep	Crack Sealing - AC
44	Low	Corrugation	Patching - AC Shallow	-
44	Medium	Corrugation	Patching - AC Shallow	-
44	High	Corrugation	Patching - AC Shallow	Patching - AC Shallow
45	Low	Depression	Patching - AC Deep	-
45	Medium	Depression	Patching - AC Deep	-
45	High	Depression	Patching - AC Deep	Patching - AC Deep
46	N/A	Jet Blast	-	-
47	Low	Jt. Reflective Cracking	-	-
47	Medium	Jt. Reflective Cracking	Crack Sealing - AC	-
47	High	Jt. Reflective Cracking	Crack Sealing - AC	Crack Sealing - AC
48	Low	L&T Cracking	-	-
48	Medium	L&T Cracking	Crack Sealing - AC	-
48	High	L&T Cracking	Crack Sealing - AC	Crack Sealing - AC
49	N/A	Oil Spillage	Patching - AC Deep	-
50	Low	Patching	-	-
50	Medium	Patching	Patching - AC Deep	-
50	High	Patching	Patching - AC Deep	Patching - AC Deep
51	N/A	Polished Aggregate	-	-
52	Low	Raveling	-	-
52	Medium	Raveling	-	-
52	High	Raveling	Patching - AC Shallow	Patching - AC Shallow
53	Low	Rutting	Patching - AC Deep	-
53	Medium	Rutting	Patching - AC Deep	-
53	High	Rutting	Patching - AC Deep	Patching - AC Deep
54	Low	Shoving	Grinding (Localized)	-
54	Medium	Shoving	Grinding (Localized)	-
54	High	Shoving	Grinding (Localized)	Grinding (Localized)
55	N/A	Slippage Cracking	Patching - AC Deep	Patching - AC Deep
56	Low	Swelling	Patching - AC Deep	-
56	Medium	Swelling	Patching - AC Deep	-
56	High	Swelling	Patching - AC Deep	Patching - AC Deep
57	Low	Weathering	-	-
57	Medium	Weathering	-	-
57	High	Weathering	-	-

(-) No action required—monitor pavement.

Table 14—PCC Pavement Localized Preventive and Stopgap Maintenance and Repair Policy

Distress	Severity	Description	Preventive Work Type	Stopgap Work Type
61	Low	Blow-up	Patching - PCC Full Depth	-
61	Medium	Blow-up	Patching - PCC Full Depth	Patching - PCC Full Depth
61	High	Blow-up	Patching - PCC Full Depth	Slab Replacement - PCC
62	Low	Corner Break	Crack Sealing - PCC	-
62	Medium	Corner Break	Patching - PCC Full Depth	-
62	High	Corner Break	Patching - PCC Full Depth	Patching - PCC Full Depth
63	Low	Linear Cracking	-	-
63	Medium	Linear Cracking	Crack Sealing - PCC	Crack Sealing - PCC
63	High	Linear Cracking	Patching - PCC Partial Depth	Patching - PCC Full Depth
64	Low	Durability Cracking	-	-
64	Medium	Durability Cracking	Patching - PCC Full Depth	Patching - PCC Full Depth
64	High	Durability Cracking	Slab Replacement - PCC	Slab Replacement - PCC
65	Low	Jt. Seal Damage	-	-
65	Medium	Jt. Seal Damage	Joint Seal (Localized)	-
65	High	Jt. Seal Damage	Joint Seal (Localized)	-
66	Low	Small Patch	-	-
66	Medium	Small Patch	Patching - PCC Partial Depth	-
66	High	Small Patch	Patching - PCC Partial Depth	Patching - PCC Partial Depth
67	Low	Large Patch	-	-
67	Medium	Large Patch	Patching - PCC Full Depth	-
67	High	Large Patch	Patching - PCC Full Depth	Patching - PCC Full Depth
68	N/A	Popouts	-	-
69	N/A	Pumping	Joint Seal (Localized)	-
70	Low	Scaling	-	-
70	Medium	Scaling	Patching - PCC Partial Depth	-
70	High	Scaling	Slab Replacement - PCC	Slab Replacement - PCC
71	Low	Faulting	-	-
71	Medium	Faulting	Grinding (Localized)	-
71	High	Faulting	Grinding (Localized)	Grinding (Localized)
72	Low	Shattered Slab	-	-
72	Medium	Shattered Slab	Slab Replacement - PCC	-
72	High	Shattered Slab	Slab Replacement - PCC	Slab Replacement - PCC
73	N/A	Shrinkage Cracking	-	-
74	Low	Joint Spall	-	-
74	Medium	Joint Spall	Patching - PCC Partial Depth	-
74	High	Joint Spall	Patching - PCC Partial Depth	Patching - PCC Partial Depth
75	Low	Corner Spall	-	-
75	Medium	Corner Spall	Patching - PCC Partial Depth	-
75	High	Corner Spall	Patching - PCC Partial Depth	Patching - PCC Partial Depth
76	Low	ASR	-	-
76	Medium	ASR	Slab Replacement - PCC	-
76	High	ASR	Slab Replacement - PCC	Slab Replacement - PCC

(-) No action required—monitor pavement.

Pavement Branch Use and Section Rank Prioritization

Pavement branches and sections are prioritized to establish their relative importance during the M&R budget analysis. The highest priority branch use for any airport is the runway, followed by taxiways and then aprons. Section rank refers to the relative importance assigned to multiple pavements having the same branch use. Each pavement section is assigned a rank of primary (P), secondary (S) or tertiary (T). As an example, an airport with two runways might rank the more heavily used jet service runway as primary and the general aviation runway as secondary or tertiary.

The combination of the branch use and the section rank is used to define the priority of each section during the M&R budget analysis. Table 15 presents the branch use and section rank prioritization matrix used in budget analysis for the Alaska Airport PMP.

Table 15—M&R Work Priority by Branch Use and Section Rank

Branch Use	Section Rank		
	Primary	Secondary	Tertiary
Runway	1	3	7
Taxiway	2	4	8
Apron	5	6	9

Unit Costs

Derivation of appropriate pavement M&R unit costs is not trivial and is described in full in a separate report, **Appendix C**. A brief description of the process follows.

First, pavement unit costs were derived from a sample of actual construction projects completed by Alaska DOT&PF during the period 2005 to 2024. We carefully reviewed the projects, assigned them to a category of work, removed any miscellaneous costs unrelated to pavement M&R (i.e., fencing, access roads, building, generators, etc.), and computed a unit cost for the pavement treatment based on the pavement area constructed. We then developed a method of standardizing pavement M&R costs around the state to a specific location—Anchorage—by use of published heating fuel prices. Lastly, we ensured that unit costs were inflation adjusted to a standard year of analysis—2024.

Through this process, unit costs for a range of pavement M&R treatments were developed for three categories: Localized Pavement Preservation and Corrective Maintenance (Table 16), Global Surface Treatments (Table 17) , and Major Rehabilitation or Reconstruction (Table 18). These unit costs are used for a variety of purposes in PAVER including the analysis of alternative M&R budget scenarios.

Table 16—Anchorage Localized M&R Work Unit Costs

Localized Work Type	Cost	Units
Crack Sealing - AC	$5.15	ft
Grinding (Localized)	$9.89	ft
Joint Seal (Localized)	$5.15	ft
Patching - AC Deep	$14.42	sf
Patching - AC Shallow	$6.69	sf
Crack Sealing - PCC	$5.15	ft
Patching - PCC Full Depth	$51.50	sf
Patching - PCC Partial Depth	$13.39	sf
Slab Replacement - PCC	$37.08	sf

Table 17—Anchorage Global M&R Work Unit Costs

Global Work Type	Cost ($/sf)
Emulsified Asphalt Seal Coat (P-608)	$1.24
Rapid Cure Seal Coat (P-608-R)	$1.24
Sand Seal (P-633)	$1.24

Table 18—Anchorage Major M&R Work Unit Costs

Rehabilitation Work Type	Unit Cost ($/sf)
Minor Rehabilitation - AC	$11.58
Major Rehabilitation - AC	$18.32
Complete Reconstruction - AC	$38.32
Minor Rehabilitation - PCC	$28.94
Major Rehabilitation - PCC	$39.27
Complete Reconstruction - PCC	$81.42

Cost by Condition

The policies in Table 13 and Table 14 are used in the budget plans and represent what localized repair (maintenance) is needed immediately. While this is helpful knowledge for an engineer, pavement manager, or M&O staff, planning a five-year budget requires incorporation of work categories like major M&R. A five-year work plan computes the required budget by applying the cost to repair based on PCI.

The PAVER software (versions 7.1 and greater) introduced capabilities to model these localized costs by plotting the inspection PCI vs. the localized cost per area to repair using the distress maintenance policies. PAVER then applies segmented lines of best fit to the data points and automatically generates cost by condition tables. Table 19 shows the Anchorage-based AC and PCC preventive maintenance cost by condition while Table 20 presents the Anchorage-based AC and PCC stopgap maintenance cost by condition.

Table 19—Anchorage Localized Preventive Cost ($/sf) by Condition Values

Condition	AC	PCC
0	$6.18	$7.83
10	$3.30	$4.53
20	$1.65	$2.88
30	$0.98	$1.85
40	$0.48	$1.24
50	$0.20	$0.78
60	$0.12	$0.41
70	$0.07	$0.12
80	$0.04	$0.05
90	$0.02	$0.02
100	$0.00	$0.00

Table 20—Anchorage Localized Stopgap Cost ($/sf) by Condition Values

Condition	AC	PCC
0	$1.24	$24.72
10	$0.88	$12.36
20	$0.57	$6.18
30	$0.34	$2.06
40	$0.19	$0.62
50	$0.09	$0.12
60	$0.05	$0.04
70	$0.02	$0.01
80	$0.00	$0.00
90	$0.00	$0.00
100	$0.00	$0.00

The major M&R cost by condition is a relationship between minor and major M&R requirements for a range of PCI values. Pavement sections with PCI values greater than 70 generally require preventive/preservation treatments while pavements with PCI values less than 30 require complete reconstruction. As such, the associated costs are near constant for PCI values at or above 70 and at or below 30. For PCI values between 70 and 55 pavements require minor rehabilitation while PCI values between 55 and 30 require major rehabilitation. Rehabilitation allows for additional work such as patching, milling or any other remedial work that must be accomplished prior to an overlay. As such, the rehabilitation costs of pavements with a PCI between 70 and 30 are interpolated. Table 21 presents the Anchorage-based AC and PCC major M&R cost by condition.

Table 21—Anchorage Major M&R Cost ($/sf) by Condition Values

Condition	AC	PCC
0	$38.32	$81.42
10	$38.32	$81.42
20	$38.32	$81.42
30	$38.32	$81.42
40	$31.68	$68.46
50	$25.05	$55.49
60	$18.42	$42.53
70	$11.78	$29.56
80	$11.69	$29.20
90	$11.63	$29.05
100	$11.58	$28.94

Five-Year Rehabilitation Needs

PAVER is a decision-making tool for the development of cost-effective maintenance and rehabilitation (M&R) alternatives. The software can identify when and where M&R work is required and how much it will cost. M&R plans can be developed either by assuming an annual budget or by identifying a desired pavement condition.

We used PAVER to develop and analyze six alternative budget scenarios over a five-year period from 2025 to 2029. The purpose of these alternatives is to develop funding scenarios and determine the resulting PCI as well as the effect on M&R backlog. The backlog is the total unfunded M&R requirements, which can be further described as the accumulation of sections that are under the critical PCI and require major M&R.

The best way to determine this value is to look at the stopgap maintenance plan (patching and crack sealing only), where no major M&R is performed. Since no funding is being allocated to major M&R, the unfunded amount in the first year is the program's current backlog. This value is **$1.09B** and can be seen as the overall M&R backlog of major work and can be used as a reference point to evaluate the effectiveness of each budget scenario.

Budget Scenario 1—Eliminate Backlog in Five Years

An average annual expenditure of **$372M** is necessary to achieve the goal of eliminating the backlog over a five-year period. This level of investment would result in an average PCI of **86**. The total amount funded over the five-year analysis period is **$1,858M** and would result in a backlog of **zero** dollars. A summary of this budget is presented in Table 22**.**

Table 22—Budget Scenario 1—Eliminate Backlog in Five Years ($M)

Date of Plan	Funded M&R Work Type				Total Funded M&R	Total Unfunded M&R	Total Funded & Unfunded M&R	PCI	
	Localized Stopgap	Localized Preventive	Global	Major				Before Work	After Work
2025	$8.58	$9.07	$5.48	$359.09	$382	$791	$1,174	72	77
2026	$7.65	$9.96	$1.06	$363.61	$382	$554	$936	75	79
2027	$2.35	$9.49	$1.02	$369.41	$382	$355	$738	77	81
2028	$0.83	$8.63	$0.79	$371.59	$382	$94	$476	79	84
2029	$0.00	$8.55	$0.54	$320.74	$330	$0	$330	82	86
Total	**$19**	**$46**	**$9**	**$1,784**	**$1,858**	**-**	**$1,858**	**72**	**86**

Figure 13 displays the impact on the PCI over time with respect to the total funded and unfunded M&R.

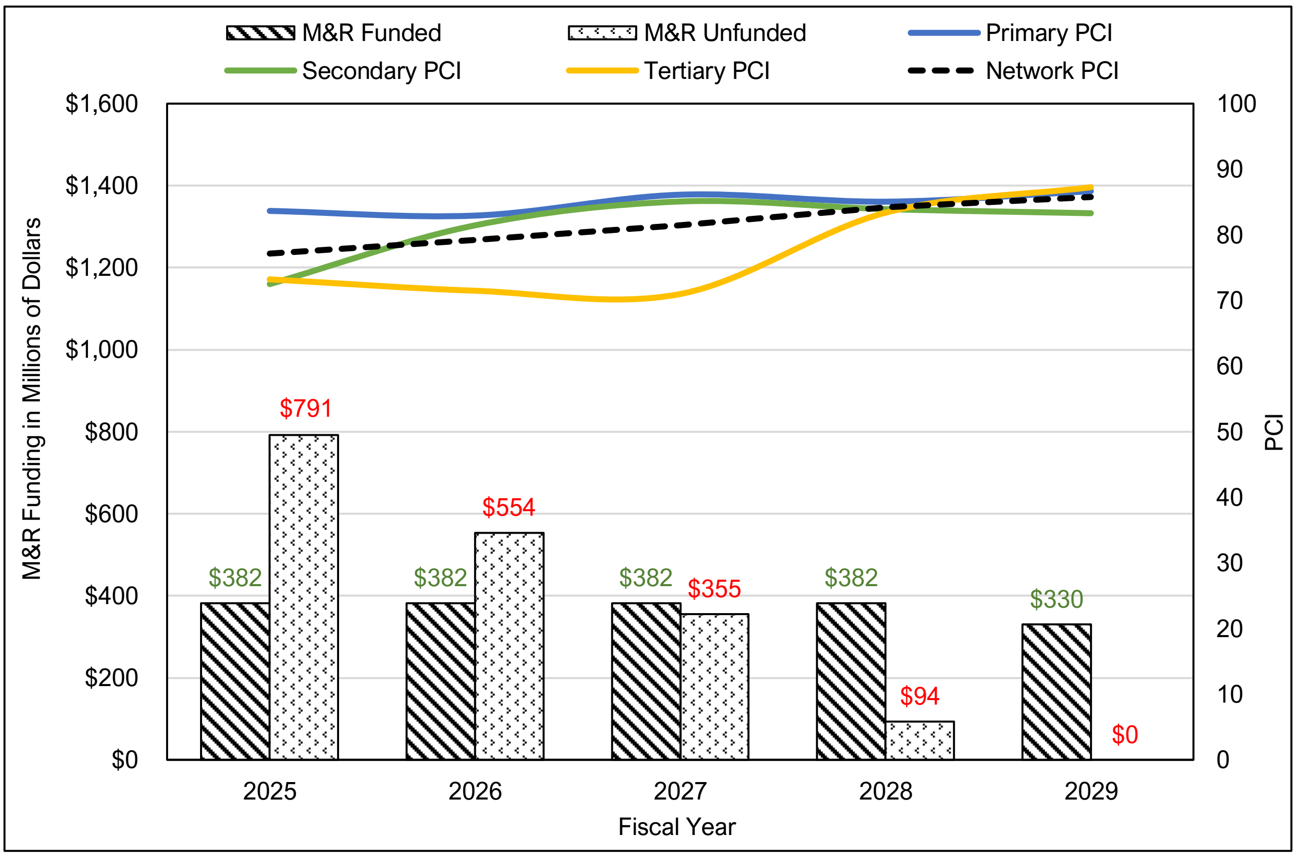


Figure 13—Budget Scenario 1—Eliminate Backlog in Five Years

Budget Scenario 2—Target PCI 75

To increase the current average condition of the airport pavement system to a PCI of 75, an average annual budget of **$218M** is required over a period of five years. At this level of investment, the PCI at the end of the five-year analysis period will be **76**. The total amount funded over the five-year analysis period is **$1,092M** and would result in a backlog of **$941M.** A summary of this budget is presented in Table 23.

Table 23—Budget Scenario 2—Target PCI 75 ($M)

Date of Plan	Funded M&R Work Type				Total Funded M&R	Total Unfunded M&R	Total Funded & Unfunded M&R	PCI	
	Localized Stopgap	Localized Preventive	Global	Major				Before Work	After Work
2025	$9.88	$9.07	$5.48	$194.04	$218	$956	$1,175	72	76
2026	$10.44	$9.94	$1.06	$197.04	$218	$894	$1,112	73	75
2027	$11.94	$9.37	$1.02	$196.11	$218	$900	$1,119	73	76
2028	$13.13	$8.30	$0.79	$196.21	$218	$858	$1,076	74	76
2029	$14.69	$7.93	$0.54	$195.30	$218	$941	$1,160	74	76
Total	**$60**	**$45**	**$9**	**$979**	**$1,092**	**-**	**$2,034**	**72**	**76**

Figure 14 displays the impact on the PCI over time with respect to the total funded and unfunded M&R.

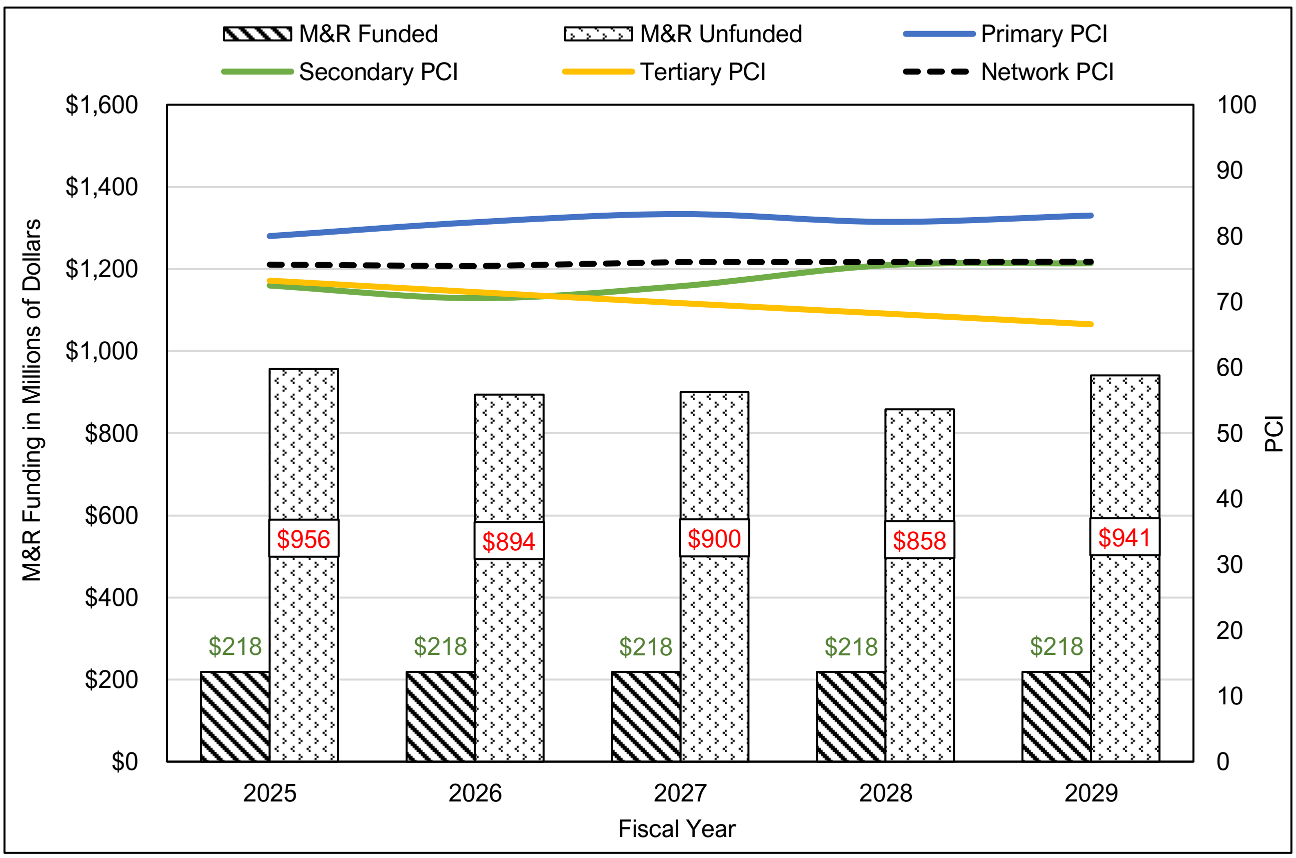


Figure 14—Budget Scenario 2—Target PCI 75

Budget Scenario 3—Maintain Current PCI of 72

To stabilize the condition of the airport pavement system at its current PCI of 72, an average annual budget of **$168M** is required over a period of five years. At this level of investment, the PCI at the end of the five-year analysis period will be **73**. The total amount funded over the five-year analysis period is **$842M** and would result in a backlog of **$1,241M.** A summary of this budget is presented in Table 24.

Table 24—Budget Scenario 3—Maintain Current PCI ($M)

Date of Plan	Funded M&R Work Type				Total Funded M&R	Total Unfunded M&R	Total Funded & Unfunded M&R	PCI	
	Localized Stopgap	Localized Preventive	Global	Major				Before Work	After Work
2025	$10.02	$9.07	$5.48	$143.76	$168	$1,007	$1,175	72	75
2026	$11.55	$9.92	$1.06	$145.89	$168	$1,001	$1,169	73	75
2027	$13.38	$9.34	$1.02	$144.68	$168	$1,063	$1,232	72	74
2028	$14.77	$8.22	$0.79	$144.65	$168	$1,082	$1,250	72	74
2029	$18.38	$7.70	$0.54	$141.76	$168	$1,241	$1,409	72	73
Total	**$68**	**$44**	**$9**	**$721**	**$842**	**-**	**$2,083**	**72**	**73**

Figure 15 displays the impact on the PCI over time with respect to the total funded and unfunded M&R.

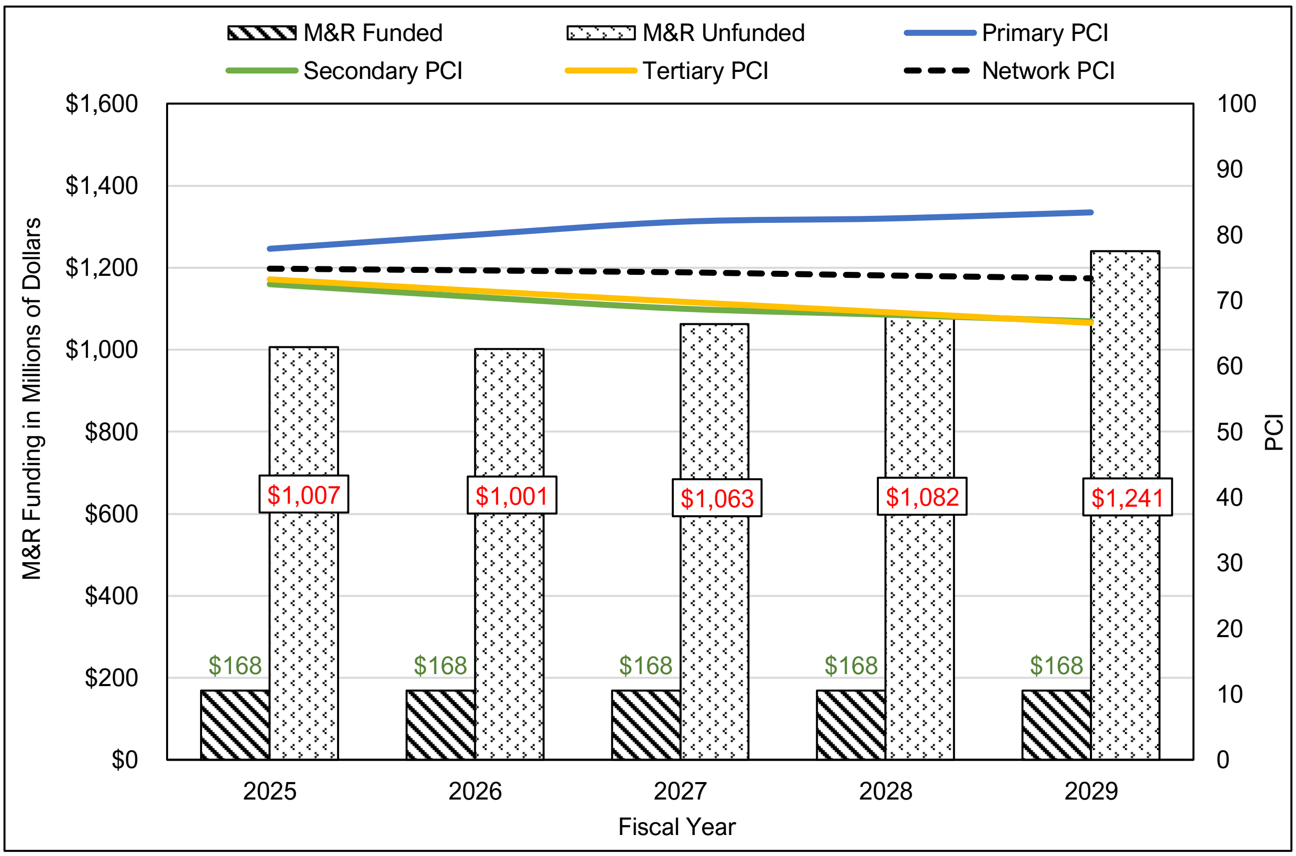


Figure 15—Budget Scenario 3—Maintain Current PCI

Budget Scenario 4—Target PCI 70

To keep the average condition of the airport pavement system to a PCI of 70, an average annual budget of **$123M** is required over a period of five years. At this level of investment, the PCI at the end of the five-year analysis period will be **71.** The total amount funded over the five-year analysis period is **$614M** and would result in a backlog of **$1,502M.** A summary of this budget is presented in Table 25.

Table 25—Budget Scenario 4—Target PCI 70 ($M)

Date of Plan	Funded M&R Work Type				Total Funded M&R	Total Unfunded M&R	Total Funded & Unfunded M&R	PCI	
	Localized Stopgap	Localized Preventive	Global	Major				Before Work	After Work
2025	$10.13	$9.07	$5.48	$98.22	$123	$1,052	$1,175	72	74
2026	$12.15	$9.90	$1.06	$99.78	$123	$1,096	$1,219	72	74
2027	$14.80	$9.15	$1.02	$97.93	$123	$1,211	$1,334	71	73
2028	$17.25	$8.11	$0.79	$96.71	$123	$1,284	$1,407	71	72
2029	$21.45	$7.67	$0.54	$93.21	$123	$1,502	$1,625	70	71
Total	**$76**	**$44**	**$9**	**$486**	**$614**	**-**	**$2,116**	**72**	**71**

Figure 16 displays the impact on the PCI over time with respect to the total funded and unfunded M&R.

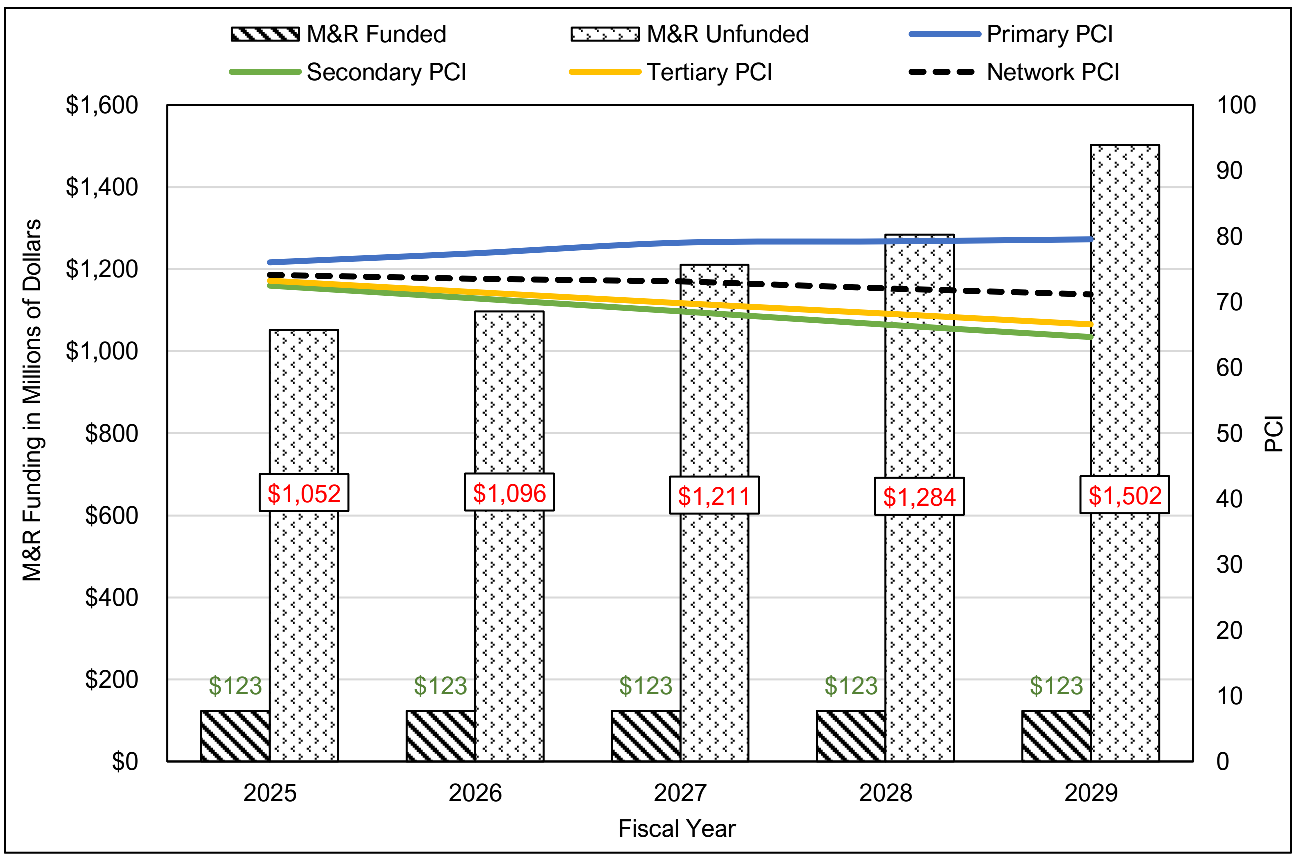


Figure 16—Budget Scenario 4—Target PCI 70

Budget Scenario 5—Maintain Current Budget

Alaska DOT&PF expends approximately **$109.25M** per year for pavement M&R. Funding sources for this budget include federal AIP funds in addition to state funds. At this level of investment, the PCI at the end of the five-year analysis period will be **70.** The total amount funded over the five-year analysis period is **$546M** and would result in a backlog of **$1,584M.** A summary of this budget is presented in Table 26.

Table 26—Budget Scenario 5—Maintain Current Budget ($M)

Date of Plan	Funded M&R Work Type				Total Funded M&R	Total Unfunded M&R	Total Funded & Unfunded M&R	PCI	
	Localized Stopgap	Localized Preventive	Global	Major				Before Work	After Work
2025	$10.14	$9.07	$0.03	$90.00	$109	$1,060	$1,170	72	73
2026	$12.23	$9.83	$5.99	$81.15	$109	$1,124	$1,233	71	73
2027	$14.95	$8.87	$1.02	$84.39	$109	$1,256	$1,365	71	72
2028	$18.02	$8.05	$0.79	$82.36	$109	$1,349	$1,458	70	71
2029	$22.42	$7.77	$0.54	$78.51	$109	$1,584	$1,693	69	70
Total	**$78**	**$44**	**$8**	**$416**	**$546**	**-**	**$2,130**	**72**	**70**

Figure 17 displays the impact on the PCI over time with respect to the total funded and unfunded M&R.

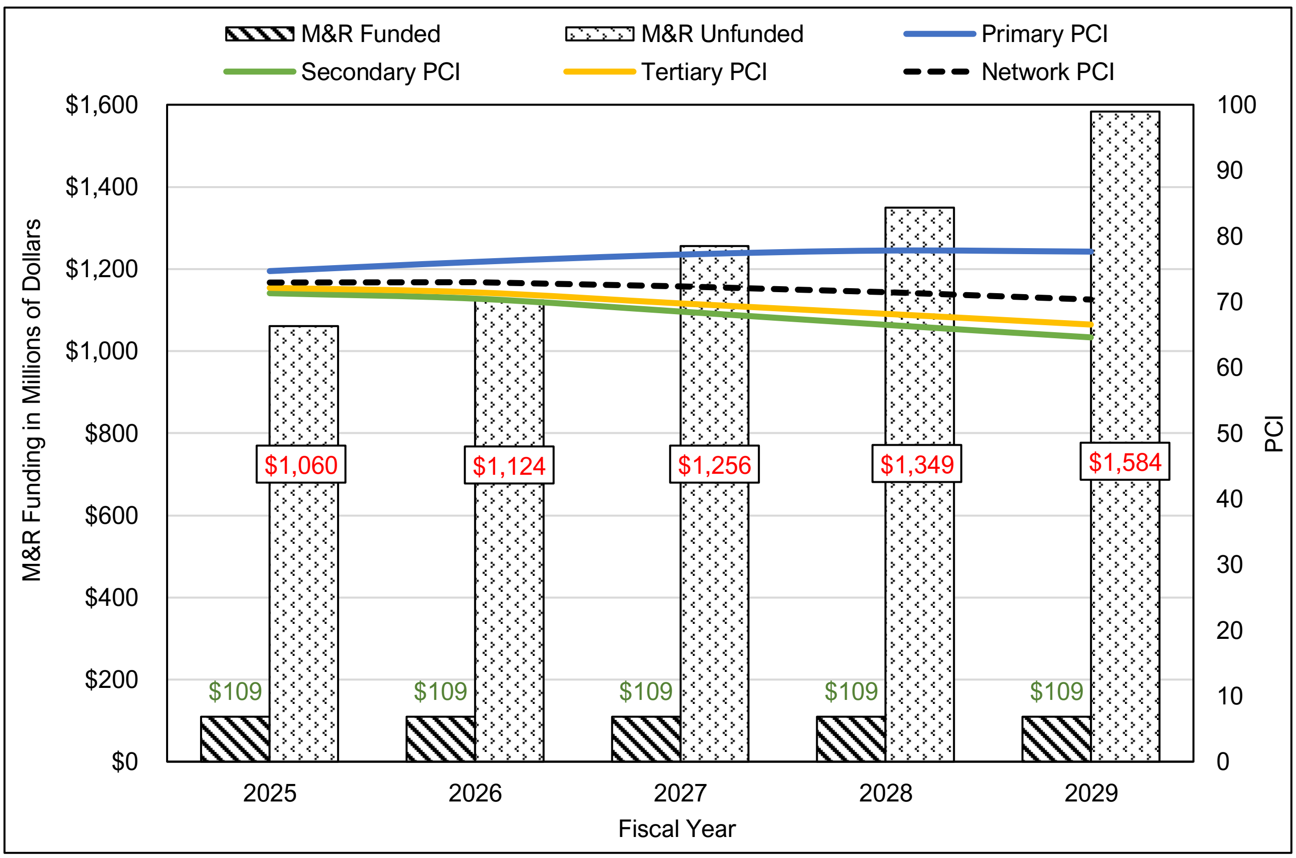


Figure 17—Budget Scenario 5—Maintain Current Budget

Budget Scenario 6—Stopgap Maintenance Only

If only stopgap maintenance, such as patching and crack sealing, is performed for the next five years, the annual expenditure will be an average of **$19M**. At this level of investment, the PCI at the end of the five-year analysis period will drop to **60**. The total amount funded over the five-year analysis period is **$96M** and would result in the backlog increasing from $1.09B to **$2,460M**. A summary of this budget is presented in Table 27Table 27.

Table 27—Budget Scenario 6—Stopgap Maintenance Only ($M)

Date of Plan	Funded M&R Work Type				Total Funded M&R	Total Unfunded M&R	Total Funded & Unfunded M&R	PCI	
	Localized Stopgap	Localized Preventive	Global	Major				Before Work	After Work
2025	$10.27	-	-	-	$10	$1,095	$1,105	72	72
2026	$13.32	-	-	-	$13	$1,348	$1,361	69	69
2027	$17.80	-	-	-	$18	$1,815	$1,833	66	66
2028	$23.44	-	-	-	$23	$2,147	$2,170	63	63
2029	$30.95	-	-	-	$31	$2,460	$2,491	60	60
Total	**$96**	**-**	**-**	**-**	**$96**	**-**	**$2,556**	**72**	**60**

Figure 18 displays the impact on the PCI over time with respect to the total funded and unfunded M&R.

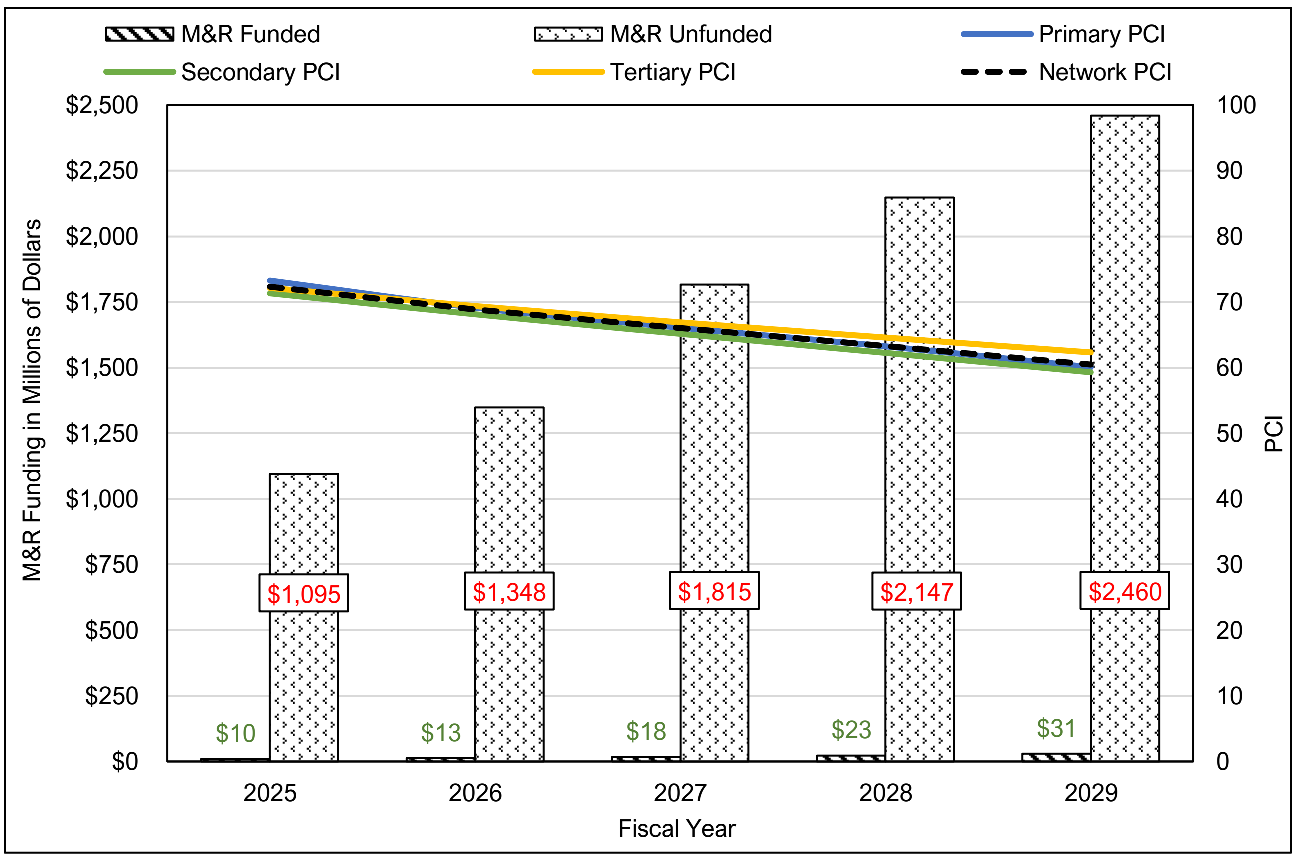


Figure 18—Budget Scenario 6—Stopgap Maintenance Only

PAVEMENT CLASSIFICATION RATINGS

Pavement Classification Ratings (PCR) were computed for 22 runways evaluated in 2023 and 10 runways in 2024. Please refer to **Appendix D** for a discussion of the methodology used and a summary of the PCRs for these airports.

CONCLUSIONS

The Alaska Airport PMP is fully implemented using the PAVER software. Of the 54 public-use airports with paved runways represented in the PMP, all have received FAA-compliant PCI inspections, database inventory updates, GIS map updates, and related activities during the period 2022 to 2024.

We conclude that the area-weighted average pavement condition of the Alaska airport system is **72** or **Satisfactory** condition. This rating represents the actively utilized pavements on the airside portion of all airports participating in the PMP. A small area of closed or inactive pavement facilities were excluded from analysis.

We further conclude that the 2024 M&R backlog for the 54 paved, public-use airports in the Alaska Airport PMP is **$1,095M**.

We used the Alaska Airport PMP to predict future pavement conditions over the five-year period from 2025 to 2029. We analyzed six alternative budget scenarios that established various constraints including budget levels and resulting pavement conditions. Based on our five-year analysis, the following conclusions for each of the six scenarios are presented in Table 28.

Table 28—Summary of Five-Year Budget Analyses

Scenario	Title	Description	Annual Funded M&R ($M)	Total Five-Year Funded M&R ($M)	Resulting Backlog ($M)	Resulting PCI
1	**Eliminate Backlog**	Eliminate the M&R backlog for the airport pavement system after five years.	372	1,858	0.00	86
2	**Target PCI 75**	Increase the average PCI of the airport pavement system to 75.	218	1,092	941	76
3	**Maintain Current PCI 72**	Stabilize the average PCI of the airport pavement system at the current level of 72.	168	842	1,241	73
4	**Target PCI 70**	Maintain the average PCI of the airport pavement system to 70.	123	614	1,502	71
5	**Maintain Current Budget**	Maintain M&R funding at the current annual budget.	109.25	546	1,584	70
6	**Stopgap Maintenance Only**	Perform only the minimum maintenance needed to maintain safe pavements.	19	96	2,460	60

Figure 19 shows the consequence of the six alternative budget scenarios on the resulting condition of the Alaska airport pavement system over the five-year period 2025 to 2029.

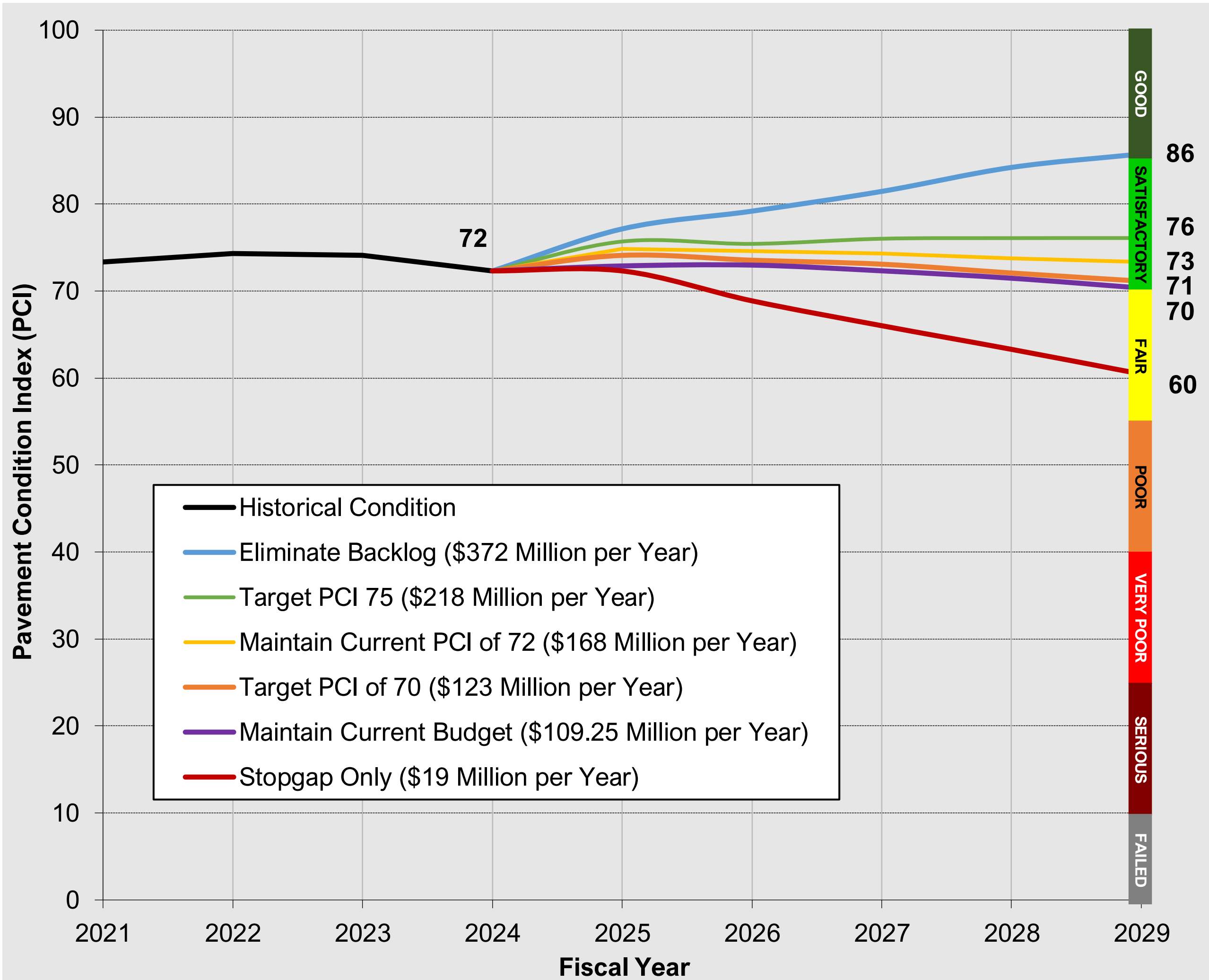


Figure 19—Consequence of Alternative Pavement M&R Budget Scenarios

RECOMMENDATIONS

Adopt Budget Scenario No. 4—Target PCI 70

We recommend that Alaska DOT&PF target a PCI of 70 for the Alaska airport pavement system. M&R activities planned and programmed by the Department in past years, and funded by the FAA through the AIP program, have resulted in a relatively high average PCI of 72 across a system of 54 airports in Alaska. This is a remarkable achievement and Alaska DOT&PF should take stock of the relatively high condition of its airport pavement system.

With an average PCI of 72, the pavement system's condition is approaching the critical PCI of 70. Although the PCI is still above this critical threshold, the pavement system will benefit more from a sustained program of pavement preservation rather than major repair work. The pavement preservation approach takes advantage of lower-cost technologies, such as seal coats, to preserve and protect a structurally sound pavement in a relatively high state of condition. Since pavement preservation treatments cost only a fraction of the price of major work, such as mill/overlay, the preservation approach is to apply these treatments "early and often." Routine, regular application of seal coats, in concert with crack sealing and patching, is a widely accepted strategy of preserving the high condition of a pavement network at a reasonable cost.

For this reason, we strongly recommend that Alaska DOT&PF adopt Budget Scenario 4—Target PCI 70. At an annual cost of $123M, this scenarios budget allocation is approximately 13 percent higher than the current annual budget of $109.25M for pavement M&R. This is a modest increase in annual cost, but at the same time represents a very cost-effective alternative to some of the other scenarios summarized in Table 28Table 28. In addition, Budget Scenario 4—Target PCI 70 will reduce backlog growth by approximately $80M over the five-year period as compared to Budget Scenario 5—Maintain Current Budget.

Consistent with guidance in the FAA handbook, any additional funding can be directed toward an annual seal coat program. This initiative aims to preserve the pavements in good and fair conditions, ensuring their longevity and functionality. By investing in routine maintenance through seal coating, the lifespan of the infrastructure can be protected and extended, ultimately providing a safer and more reliable transportation network.

Continuing Pavement Management Plan Implementation

This report is being submitted in the second year of a three-year project to fully implement the Alaska Airport PMP across 54 airports. The PAVER database is fully implemented and has been used to produce the results discussed in this report. Alaska DOT&PF has made great strides toward its goals in this arena. We recommend that the Department continues its efforts to fully implement the Alaska Airport PMP across the entire system of 54 airports. On an annual basis, the Department should update essential components of the Alaska Airport PMP to ensure that the PMP can provide reliable decision support in analysis of various M&R budget alternatives. Some of these activities include:

- Utilize the most current version of the PAVER software.
- Update and maintain detailed records on localized, global, and major pavement construction projects (year, scope, cost, construction documents).
- Adjust inventory records to reflect recent changes due to construction.
- Update airport traffic data and fleet mix, including the type and number of operations of the range of aircraft using the pavement at each airport.
- Verify or update current distress maintenance policies.

- Update unit costs, which can vary year-to-year based on inflation, fuel costs, construction methods and materials.
- Update prediction models to forecast future pavement conditions more accurately. Pavement deterioration is affected by many factors including environment, surface condition, structural condition, and changes in the aircraft fleet mix.

In the event that Alaska DOT&PF continues the same level of M&R funding during the five-year period from 2025 to 2029, **Appendix E** provides the PAVER-recommended M&R work plan details for Budget Scenario No. 5—Maintain Current Budget.

Continue PCI Survey Inspections

We recommend that Alaska DOT&PF continue to perform annual PCI surveys on one-third of the airports in the Alaska PMP. Inspections should conform to ASTM D5340. Pavement inspections allow the Department to regularly monitor conditions and update airport pavement facility records.

Potential Cost-Effective Improvements

Analysis of potential cost-effective improvements will be provided in subsequent Cost Reports and Statewide Summary Reports after more inspections have been completed and additional data can be analyzed.

♦ ♦ ♦

Appendix A

Alaska Airport

Pavement Management Program

2024 Attribute Table

April 2025

TABLE OF CONTENTS

LIST OF FIGURES

GLOSSARY OF TERMS AND ABBREVIATIONS

AASP: Alaska Aviation System Plan.

AC: Asphalt Concrete Pavement.

AIP: Airport Improvement Program.

CS: Commercial Service air transport.

DOT&PF: Department of Transportation and Public Facilities.

FAA: Federal Aviation Administration.

GA: General Aviation air transport.

HMA: Hot Mix Asphalt.

ICAO: International Civil Aviation Organization.

ICAO Code: consists of 4 letters. Certain classifications among countries and regions are used in creating these codes. The first letter stands for the region in which the airport is located, the second is for the country. The other two letters are generally given in order.

Maintenance Provider

> **Contract**: includes airports owned and operated by DOT&PF but with day-to-day maintenance activities provided through DOT&PF funded contract. Contract airports may still require some maintenance services to be provided by DOT&PF as well as possibly other contractors i.e. electrical, building, heavy re-surfacing repairs, large scale brushing, or other repairs that may be outside the scope of the scope of the standard maintenance contract.
> **DOT M&O**: includes airports with onsite DOT&PF maintenance crews or airports maintained by DOT&PF crews from satellite maintenance stations.
> **Local Sponsor**: includes airports not owned and/or operated by DOT&PF.
> **N/A**: includes airports where ownership and/or maintenance is uncertain.

M&O District: Maintenance and Operations District.

NPIAS: National Plan of Integrated Airport Systems.

> **FAA NPIAS**: The Federal Aviation Administration National Plan of Integrated Airport Systems identifies airports, the roles they serve, and eligibility for federal funding under the Airport Improvement Program (AIP).
> **AASP NPIAS**: The Alaska Aviation System Plan classifications take into account the unique characteristics of Alaska to further clarify the specific role an airport fulfills in the state transportation system.

OR&EE: Overrun and Elephant Ear describe areas on a runway with limited aviation operations.

Part 139: U.S. airports serving certain air carrier operations are required to be certificated by the Federal Aviation Administration.

PCC: Portland cement concrete pavement.

PMP: Pavement Management Program.

WRCC: Western Regional Climate Center.

INTRODUCTION

This report documents the development of tabular data collected on an individual airport basis for use in the Airport PMP. We created a way to store, categorize, and compare copious data collected from PAVER as well as the Federal Aviation Administration (FAA), Alaska Aviation System Plan (AASP), and the Western Regional Climate Center (WRCC) websites. The information was then used to help develop custom prediction models, unit costs, and maintenance and rehabilitation plans. Table 1 through Table 7 group data into categories to sort the information on a per airport basis.

Table 1 - General PAVER and Airport Information

PAVER Network ID	Airport Name	FAA Site ID	FAA ID	ICAO Code	NPIAS Number	Network Area (SF) as of (10/01/2024)
Adak	Adak Airport	50009.*A	ADK	PADK	02-0001	4,036,542
Akutan	Akutan Airport	50022.1*A	7AK	PAUT	02-0005	445,948
Aniak	Aniak Airport	50038.*A	ANI	PANI	02-0019	1,099,403
Atka	Atka Airport	50040.5*A	AKA	PAAK	02-0394	590,000
Barrow	Wiley Post-Will Rogers Airport	50054.3*A	BRW	PABR	02-0026	2,466,328
Bethel	Bethel Airport	50061.1*A	BET	PABE	02-0029	4,305,386
Birchwood	Birchwood Airport	50069.*A	BCV	PABV	02-0034	1,994,695
Clear	Clear Airport	50109.01*A	Z84	PACL	02-0420	635,013
Cold Bay	Cold Bay Airport	50114.*A	CDB	PACD	02-0065	3,129,240
Cordova	Merle K. (Mudhole) Smith Airport	50124.*A	CDV	PACV	02-0067	1,900,713
Deadhorse	Deadhorse Airport	50140.7*A	SCC	PASC	02-0339	3,023,013
Dillingham	Dillingham Airport	50153.*A	DLG	PADL	02-0078	1,966,900
Fairbanks	Fairbanks International Airport	50219.*A	FAI	PAFA	02-0096	9,639,257
Galena	Galena Airport	50258.*A	GAL	PAGA	02-0102	2,105,726
Gambell	Gambell Airport	50260.*A	GAM	PAGM	02-0103	564,150
Gulkana	Gulkana Airport	50281.*A	GKN	PAGK	02-0110	924,952
Gustavus	Gustavus Airport	50284.*A	GST	PAGS	02-0111	2,439,952
Haines	Haines Airport	50296.*A	HNS	PAHN	02-0112	1,055,266
Healy R.	Healy River Airport	50308.*A	HRR	PAHV	02-0414	489,782
Homer	Homer Airport	50320.*A	HOM	PAHO	02-0122	1,962,513
Hoonah	Hoonah Airport	50321.01*A	HNH	PAOH	02-0125	597,958
Iliamna	Iliamna Airport	50340.*A	ILI	PAIL	02-0132	1,713,282
Juneau	Juneau International Airport	50385.*A	JNU	PAJN	02-0133	4,889,678
Kake	Kake Airport	50393.01*A	AFE	PAFE	02-0398	528,469
Kenai	Kenai Municipal Airport	50410.*A	ENA	PAEN	02-0142	4,246,828
Ketchikan	Ketchikan International Airport	50412.03*A	KTN	PAKT	02-0144	2,363,965
KingSalmon	King Salmon Airport	50416.*A	AKN	PAKN	02-0148	3,202,332
Klawock	Klawock Airport	50420.01*A	AKW	PAKW	02-0154	896,900
Kodiak	Kodiak Airport	50425.*A	ADQ	PADQ	02-0158	4,399,012
Kotzebue	Kotzebue (Ralph Wein Memorial) Airport	50429.*A	OTZ	PAOT	02-0160	1,985,801
McGrath	McGrath Airport	50467.*A	MCG	PAMC	02-0176	1,311,478
Merrill	Merrill Field	50035.*A	MRI	PAMR	02-0015	3,864,020
Nenana	Nenana Municipal Airport	50524.*A	ENN	PANN	02-0191	870,345
Nome	Nome Airport	50540.*A	OME	PAOM	02-0199	2,965,700
Northway	Northway Airport	50544.*A	ORT	PAOR	02-0203	794,814
Palmer	Palmer Airport (Palmer, Alaska)	50584.*A	PAQ	PAAQ	02-0211	3,651,288
Petersburg	Petersburg (James A. Johnson) Airport	50590.2*A	PSG	PAPG	02-0340	1,440,226
Point Hope	Point Hope Airport	50601.*A	PHO	PAPO	02-0226	454,414
Sand Point	Sand Point Airport	50684.4*A	SDP	PASD	02-0253	1,363,350
Seward	Seward Airport	50696.*A	SWD	PAWD	02-0259	1,204,641
Shishmaref	Shishmaref Airport	50701.01*A	SHH	PASH	02-0404	475,032
Sitka	Sitka Rocky Gutierrez Airport	50703.*A	SIT	PASI	02-0268	2,117,332
Skagway	Skagway Airport	50704.*A	SGY	PAGY	02-0270	1,003,684
Soldotna	Soldotna Municipal Airport	50713.2*A	SXQ	PASX	02-0274	3,088,691
StGeorge	Saint George Airport	50680.4*A	PBV	PAPB	02-0416	932,650
StPaul	Saint Paul Airport	50682.*A	SNP	PASN	02-0277	1,311,035
Talkeetna	Talkeetna Airport	50738.*A	TKA	PATK	02-0287	804,604
Tok	Tok Junction Airport	50764.72*A	6K8	PFTO	02-0412	407,098
Unalakleet	Unalakleet	50799.*A	UNK	PAUN	02-0309	1,508,949
Unalaska	Unalaska/Dutch Harbor Airport	50801.*A	DUT	PADU	02-0082	919,344
Valdez	Valdez Airport	50825.1*A	VDZ	PAVD	02-0311	2,355,748
Wasilla	Wasilla Airport	50870.3*A	IYS	PAWS	02-0417	1,807,157
Wrangell	Wrangell Airport	50905.2*A	WRG	PAWG	02-0323	1,481,277
Yakutat	Yakutat Airport	50920.*A	YAK	PAYA	02-0327	3,534,815

Table 2 - Family Curves / Models and Deterioration

PAVER Network ID	Family Model Sub Region	Number of Paved Runways	Runway Straight Line Deterioration (No OR&EE)	Runway 6100 – AC (No OR&EE)	Runway 6200 – AC (No OR&EE)	Runway 6200 - PCC (No OR&EE)	Runway 6300 - AC (No OR&EE)
Adak	Southcoast Med/High Deterioration	2	2.06	1.95	2.25		
Akutan	Southcoast Low Deterioration	1	0.67	0.67			
Aniak	Central West	1	4.30	4.3			
Atka	Southcoast High Deterioration	1	3.69	3.69			
Barrow	Northern Coastal	1	4.29	4.29			
Bethel	Central West	2	2.89	2.93			3.03
Birchwood	Central East	2	1.61	1.67	1.56		
Clear	Northern Interior	1	1.80	1.80			
Cold Bay	Southcoast Medium Deterioration	2	1.61	1.72	0.82		
Cordova	Northern Interior	1	1.50	1.50			
Deadhorse	Northern Coastal	1	4.33	4.33			
Dillingham	Central West	1	3.56	3.56			
Fairbanks	Northern Interior	2	2.26	2.32	2.33		
Galena	Northern Interior	1	1.94	1.94			
Gambell	Northern Coastal	1	2.50	2.50			
Gulkana	Northern Interior	1	2.40	2.40			
Gustavus	Southcoast Medium Deterioration	2	1.09	0.87	1.34		
Haines	Southcoast Medium Deterioration	1	1.57	1.57			
Healy R.	Northern Interior	1	2.28	2.28			
Homer	Central East	1	1.69	1.69			
Hoonah	Southcoast Medium Deterioration	1	1.45	1.45			
Iliamna	Southcoast High Deterioration	2	2.07	2.09	2.06		
Juneau	Southcoast High Deterioration	1	2.51	2.51			
Kake	Southcoast Medium Deterioration	1	1.56	1.56			
Kenai	Central East	1	4.00	4.00			
Ketchikan	Southcoast High Deterioration	1	3.21	3.21			
KingSalmon	Southcoast Med/High Deterioration	2	2.92	1.41	3.88		
Klawock	Northern Coastal	1	1.41	1.41			
Kodiak	Southcoast Med/High Deterioration	3	2.22	2.75	1.62		2.2
Kotzebue	Northern Coastal	1	3.41	3.41			
McGrath	Central West	1	2.83	2.83			
Merrill	Central East	2	2.02	2.05	2.00		
Nenana	Northern Interior	1	1.68	1.68			
Nome	Northern Coastal	2	3.36	3.61	3.21		
Northway	Northern Interior	1	5.47	5.47			
Palmer	Central East	2	1.70	1.75	1.51		
Petersburg	Southcoast High Deterioration	1	2.69	2.69			
Point Hope	Northern Coastal	1	3.85	3.85			
Sand Point	Southcoast Low Deterioration	1	0.56	0.56			
Seward	Central East	2	1.45	1.38	1.51		
Shishmaref	Northern Coastal	1	5.26	5.26			
Sitka	Southcoast Medium Deterioration	1	1.72	1.72			
Skagway	Southcoast Medium Deterioration	1	1.73	1.73			
Soldotna	Central East	1	2.00	2.00			
StGeorge	Southcoast Low Deterioration	1	0.37	0.37			
StPaul	Southcoast Low Deterioration	1	0.49	0.49			
Talkeetna	Central East	1	2.38	2.38			
Tok	Northern Interior	1	4.22	4.22			
Unalakleet	Northern Coastal	2	3.19	2.92	3.33		
Unalaska	Southcoast Medium Deterioration	1	5.89	5.89			
Valdez	Northern Interior	1	2.77	2.77			
Wasilla	Central East	1	1.87	1.87			
Wrangell	Southcoast High Deterioration	1	2.16	2.16			
Yakutat	Southcoast High Deterioration/PCC	2	2.46	3.82	0.95	0.78	

Table 3 - Alaska Department of Transportation Information

PAVER Network ID	Region	M&O District	AASP Classification	Maintenance Provider	AASP NPIAS Airport Category	AASP NPIAS Airport Sub Category
Adak	Southcoast	Kodiak-Aleutian	Community Off-Road	DOT M&O	CS	Nonprimary
Akutan	Southcoast	Kodiak-Aleutian	Community Off-Road	DOT M&O	GA	Basic
Aniak	Central	Southwest	Regional Hub	DOT M&O	CS	Non hub
Atka	Southcoast	Kodiak-Aleutian	Community Off-Road	Contract	GA	Basic
Barrow	Northern	Dalton	Regional Hub	DOT M&O	CS	Non hub
Bethel	Central	Southwest	Regional Hub	DOT M&O	CS	Non hub
Birchwood	Central	Anchorage	Local High Activity	DOT M&O	GA	Local
Clear	Northern	Denali / Rural	Local Low Activity	DOT M&O	GA	Unclassified
Cold Bay	Southcoast	Kodiak-Aleutian	Regional Hub	DOT M&O	CS	Nonprimary
Cordova	Northern	Valdez	Regional Hub	DOT M&O	CS	Non hub
Deadhorse	Northern	Dalton	Regional Hub	DOT M&O	CS	Non hub
Dillingham	Central	Southwest	Regional Hub	DOT M&O	CS	Non hub
Fairbanks	Northern	AIAS	Medium & Small Hub	DOT M&O	CS	Small Hub
Galena	Northern	Denali / Rural	Regional Hub	DOT M&O	CS	Nonprimary
Gambell	Northern	Western	Community Off-Road	Contract	CS	Nonprimary
Gulkana	Northern	Tazlina	Community On-Road	DOT M&O	GA	Local
Gustavus	Southcoast	Southeast	Regional Hub	DOT M&O	CS	Non hub
Haines	Southcoast	Southeast	Community On-Road	DOT M&O	CS	Non hub
Healy R.	Northern	Denali / Rural	Community On-Road	DOT M&O	GA	Basic
Homer	Central	Kenai Peninsula	Regional Hub	DOT M&O	CS	Non hub
Hoonah	Southcoast	Southeast	Community Off-Road	DOT M&O	CS	Nonprimary
Iliamna	Southcoast	Kodiak-Aleutian	Regional Hub	DOT M&O	CS	Nonprimary
Juneau	Southcoast	-	Medium & Small Hub	Local Sponsor	CS	Non hub
Kake	Southcoast	Southeast	Community Off-Road	DOT M&O	GA	Basic
Kenai	Central	-	Regional Hub	Local Sponsor	CS	Non hub
Ketchikan	Southcoast	Southeast	Regional Hub	Contract	CS	Non hub
KingSalmon	Southcoast	Kodiak-Aleutian	Regional Hub	DOT M&O	CS	Non hub
Klawock	Southcoast	Southeast	Community Off-Road	DOT M&O	CS	Non hub
Kodiak	Southcoast	Kodiak-Aleutian	Regional Hub	DOT M&O	CS	Non hub
Kotzebue	Northern	Western	Regional Hub	DOT M&O	CS	Non hub
McGrath	Central	Southwest	Regional Hub	DOT M&O	GA	Local
Merrill	Central	-	Local High Activity	-	CS	Non hub
Nenana	Northern	-	Local High Activity	-	GA	Basic
Nome	Northern	Western	Regional Hub	DOT M&O	CS	Non hub
Northway	Northern	Tok	Community On-Road	DOT M&O	GA	Basic
Palmer	Central	-	Community On-Road	-	GA	Local
Petersburg	Southcoast	Southeast	Regional Hub	DOT M&O	CS	Non hub
Point Hope	Northern	Western	Community Off-Road	Contract	CS	Nonprimary
Sand Point	Southcoast	Kodiak-Aleutian	Community Off-Road	DOT M&O	CS	Nonprimary
Seward	Central	Kenai Peninsula	Community On-Road	DOT M&O	GA	Local
Shishmaref	Northern	Western	Community Off-Road	Contract	CS	Nonprimary
Sitka	Southcoast	Southeast	Regional Hub	DOT M&O	CS	Non hub
Skagway	Southcoast	Southeast	Community On-Road	DOT M&O	CS	Nonprimary
Soldotna	Central	-	Local High Activity	-	GA	Local
StGeorge	Southcoast	Kodiak-Aleutian	Community Off-Road	Contract	GA	Basic
StPaul	Southcoast	Kodiak-Aleutian	Community Off-Road	Contract	CS	Nonprimary
Talkeetna	Central	Matanuska-Susitna	Community On-Road	DOT M&O	GA	Local
Tok	Northern	Tok	Community On-Road	DOT M&O	GA	Local
Unalakleet	Northern	Western	Regional Hub	DOT M&O	CS	Non hub
Unalaska	Southcoast	Kodiak-Aleutian	Regional Hub	DOT M&O	CS	Non hub
Valdez	Northern	Valdez	Regional Hub	DOT M&O	CS	Non hub
Wasilla	Central	-	Local High Activity	-	GA	Local
Wrangell	Southcoast	Southeast	Regional Hub	DOT M&O	CS	Non hub
Yakutat	Southcoast	Southeast	Regional Hub	DOT M&O	CS	Non hub

Table 4 - Federal Aviation Administration Information

PAVER Network ID	NPIAS Airport Category	Airport Category	Enplanements (CY23)	Enplanements (CY22)	Enplanements (CY21)	Enplanements (CY20)*	Enplanements (CY19)
Adak	GA	Basic	2,149	2,616	2,205	1,611	3,159
Akutan	GA	Basic	2,236	1,739	1,275	1,057	3,068
Aniak	CS	Local	4,707	4,971	3,935	2,672	13,854
Atka	GA	Basic	318	246	183	102	271
Barrow	CS	Non hub	41,579	37,530	31,898	22,238	46,289
Bethel	CS	Non hub	153,548	142,256	105,877	64,648	160,874
Birchwood	GA	Local	No Data	No Data	No Data	No Data	6
Clear	GA	Unclassified	No Data	No Data	No Data	No Data	No Data
Cold Bay	CS	Local	3,023	3,240	3,814	6,323	8,004
Cordova	CS	Non hub	18,244	16,844	15,058	10,264	19,388
Deadhorse	CS	Non hub	82,296	73,334	64,245	67,676	71,822
Dillingham	CS	Non hub	34,815	33,151	25,988	13,900	35,486
Fairbanks	CS	Small Hub	548,679	513,160	450,694	233,484	562,420
Galena	CS	Local	11,758	10,381	7,978	4,166	11,870
Gambell	GA	Basic	3,142	2,842	1,963	1,707	3,477
Gulkana	GA	Local	303	420	408	150	31
Gustavus	CS	Non hub	9,584	10,179	10,305	2,959	11,130
Haines	CS	Local	6,306	7,253	7,206	4,093	10,013
Healy R.	GA	Basic	1,656	1,431	558	166	147
Homer	CS	Non hub	34,682	35,407	30,972	9,677	46,367
Hoonah	CS	Local	5,790	5,950	5,575	4,472	8,056
Iliamna	CS	Local	5,749	4,280	3,933	2,900	6,446
Juneau	CS	Non hub	440,279	403,587	306,512	164,447	459,191
Kake	CS	Local	3,605	No Data	2,552	1,642	3,509
Kenai	CS	Non hub	67,062	75,180	68,044	33,053	95,239
Ketchikan	CS	Non hub	148,645	143,786	117,728	65,793	137,090
KingSalmon	CS	Non hub	38,021	37,874	29,914	17,254	44,244
Klawock	CS	Non hub	16,733	16,167	14,157	10,077	12,980
Kodiak	CS	Non hub	85,183	82,913	72,905	40,218	85,655
Kotzebue	CS	Non hub	60,124	56,851	46,305	30,633	67,876
McGrath	GA	Local	2,575	2,700	2,228	1,207	2,388
Merrill	CS	Non hub	30,269	31,905	22,907	23,025	26,505
Nenana	GA	Basic	3	No Data	24	No Data	10
Nome	CS	Non hub	66,883	62,785	46,645	30,274	65,087
Northway	GA	Basic	No Data	No Data	No Data	No Data	No Data
Palmer	GA	Local	2	32	1	7	214
Petersburg	CS	Non hub	24,921	23,955	20,690	11,726	23,479
Point Hope	CS	Local	4,052	3,572	2,844	2,012	4,151
Sand Point	GA	Basic	2,818	2,552	1,874	1,176	4,385
Seward	GA	Local	6	10	14	21	6
Shishmaref	CS	Local	3,477	3,552	2,822	1,603	4,072
Sitka	CS	Non hub	96,214	94,648	80,366	38,343	90,839
Skagway	CS	Local	4,953	5,293	3,082	1,807	8,044
Soldotna	GA	Local	2	19	15	9	4
StGeorge	GA	Basic	274	247	198	108	389
StPaul	GA	Basic	1,775	1,769	1,533	652	3,056
Talkeetna	GA	Local	No Data	7	No Data	No Data	2
Tok	GA	Local	486	406	298	277	202
Unalakleet	CS	Local	8,312	8,137	6,594	4,359	15,911
Unalaska	CS	Non hub	19,201	21,034	19,099	10,072	27,232
Valdez	CS	Local	4,235	5,557	5,195	1,116	9,401
Wasilla	GA	Local	16	No Data	No Data	28	7
Wrangell	CS	Non hub	14,323	13,337	12,100	7,102	14,776
Yakutat	CS	Non hub	12,105	12,139	10,899	5,959	12,808

*Enplanement values were affected due to COVID

Table 5 – Alaska Weather Conditions[1]

PAVER Network ID	Frozen Months	Frost Depth (Ft)	Temp: Max (°C)	Temp: Min (°C)	Annual Precipitation (in)	Runway Bound Base (Y/N)
Adak	0	0	16	-3	54.1	N
Akutan	0	0	27	-15	61	N
Aniak	6.5	Perm F	29	-48	19	N
Atka	3	1	16	-3	61	N
Barrow	8.2	Perm F	24	-46	5.4	N
Bethel	6.2	Perm F	29	-43	19.7	N
Birchwood	5.5	7	29	-32	15	Y
Clear	6.5	Perm F	29	-48	13	N
Cold Bay	3	2	22	-21	38	N
Cordova	2	1.5	27	-29	91	N
Deadhorse	8	Perm F	24	-46	4	N
Dillingham	6	9.5	29	-34	25	Y
Fairbanks	6.5	Perm F	32	-51	11.7	N
Galena	7	Perm F	29	-51	13	N
Gambell	7.5	Perm F	18	-30	18	N
Gulkana	6.5	Perm F	29	-48	11.8	N
Gustavus	4	2	29	-26	56	N
Haines	4	3	32	-26	48	N
Healy R.	6.5	10	29	-43	15	N
Homer	4.5	4	24	-26	23.9	N
Hoonah	0	0	26.7	-15.0	62	N
Iliamna	5	10	27	-40	25.6	N
Juneau	2	1	29	-24	67	N
Kake	3.5	1.5	24	-18	54	N
Kenai	5	6	27	-40	19	N
Ketchikan	0	0	29	-18	154	N
KingSalmon	5.5	7	28	-40	21.4	Y
Klawock	0	0	21	-9	88	N
Kodiak	3	0.5	24	-18	59	Y
Kotzebue	7	Perm F	27	-46	10	N
McGrath	6.5	10	29	-51	18.1	Y
Merrill	6	7	32	-34	16.4	N
Nenana	7	Perm F	32	-51	11	N
Nome	6.5	Perm F	27	-43	16	N
Northway	6.5	Perm F	29	-54	10	N
Palmer	5	6	27	-34	16	N
Petersburg	0	0	27	-23	105	N
Point Hope	8	Perm F	21	-46	6	N
Sand Point	0	0	21	-15	45	N
Seward	5	3	29	-23	69.7	N
Shishmaref	8	Perm F	18	-29	11	N
Sitka	0	0	24	-13	86	N
Skagway	4	3	29	-23	26	N
Soldotna	5.5	7	24	-34	17	N
StGeorge	5	7	16	-23	24.3	Y
StPaul	5	7	16	-23	24.3	Y
Talkeetna	6.4	10	29	-43	26.5	N
Tok	6.5	Perm F	32	-54	10	N
Unalakleet	7	Perm F	29	-43	13	N
Unalaska	0	0	27	-15	61	N
Valdez	4	2	24	-21	67.9	N
Wasilla	5	7	27	-37	18	N
Wrangell	0	0	28	-21	82	N
Yakutat	4	1.5	27	-26	140.4	N

[1]Temperature and Precipitation data collected using (https://wrcc.dri.edu/summary/Climsmak.html)

Table 6 - Form 5010 and Airport Questionnaire

PAVER Network ID	Part 139 (Y/N)	On Road Network (Y/N)	Crack Seal Frequency (Years)	Seal EQ Onsite (Y/N/M)	Treatment Candidate (Y/N)	Runway Year Paved	Runway current Age on 10/01/24
Adak	Y	N	none	Y	Y	6/1/1990	34.4
Akutan	N	N	5	N	Y	8/31/2012	12.1
Aniak	N	N	3	Y	N	7/6/2019	5.2
Atka	N	N	none	N	Y	9/1/2009	15.1
Barrow	Y	N	1	Y	N	7/1/2022	2.3
Bethel	Y	N	1	Y	N	7/1/2023	1.3
Birchwood	N	Y	5	M	Y	9/1/2012	12.1
Clear	N	Y	5	N	Y	9/1/1996	28.1
Cold Bay	Y	N	none	N	Y	8/15/2018	6.1
Cordova	Y	N	1	Y	Y	9/1/1998	26.1
Deadhorse	Y	Y	1	Y	Y	8/1/2012	12.2
Dillingham	Y	N	1	Y	Y	7/1/2018	6.3
Fairbanks	Y	Y	1	Y	Y	7/1/2008	16.3
Galena	N	N	3	Y	Y	7/1/2018	6.3
Gambell	N	N	5	M	N	7/11/2018	6.2
Gulkana	N	Y	3	N	N	6/1/2007	17.3
Gustavus	Y	Y	none	N	Y	8/1/2022	2.2
Haines	N	Y	none	N	N	9/1/1992	32.1
Healy R.	N	Y	3	N	Y	8/31/1996	28.1
Homer	Y	Y	1	M	N	9/1/1997	27.1
Hoonah	N	N	none	N	Y	8/4/2002	22.2
Iliamna	N	N	Bi-annual	Y	Y	8/1/2003	21.2
Juneau	Y	Y	1	Y	Y	4/1/2015	9.5
Kake	N	N	none	N	N	9/1/2018	6.1
Kenai	Y	Y	3	N	Y	8/1/2006	18.2
Ketchikan	Y	Y	3	N	Y	8/1/2008	16.2
KingSalmon	Y	N	annual	Y	Y	7/14/2018	6.2
Klawock	N	N	none	N	N	9/1/2008	16.1
Kodiak	Y	Y	none	N	Y	8/1/2012	12.2
Kotzebue	Y	N	1	Y	N	9/1/2011	13.1
McGrath	N	N	3	Y	N	8/1/2022	2.2
Merrill	N	Y	3	N	Y	6/1/2005	19.3
Nenana	N	Y	3	N	Y	8/7/2003	21.2
Nome	Y	Y	1	Y	Y	7/1/2022	2.3
Northway	N	Y	3	N	Y	9/1/2009	15.1
Palmer	N	Y	3	N	Y	7/11/2017	7.2
Petersburg	Y	N	none	N	Y	8/1/2010	14.2
Point Hope	N	N	5	M	N	7/1/2024	0.3
Sand Point	Y	N	none	N	Y	6/1/2006	18.3
Seward	N	Y	5	M	Y	9/1/1983	41.1
Shishmaref	N	N	5	Y	N	8/17/2016	8.1
Sitka	Y	N	none	N	N	9/1/2012	12.1
Skagway	N	Y	none	N	Y	8/1/2000	24.2
Soldotna	N	Y	3	N	Y	6/1/2022	2.3
StGeorge	N	N	none	N	Y	8/30/2006	18.1
StPaul	N	N	none	N	Y	7/1/2005	19.3
Talkeetna	N	Y	5	M	Y	8/1/2017	7.2
Tok	N	Y	5	N	Y	7/25/2008	16.2
Unalakleet	N	N	5	Y	Y	8/1/2009	15.2
Unalaska	Y	N	1	Y	Y	8/1/2014	10.2
Valdez	Y	Y	1	Y	Y	9/30/2006	18.0
Wasilla	N	Y	3	N	Y	8/1/2021	3.2
Wrangell	Y	N	none	M	Y	6/1/2007	17.3
Yakutat	Y	N	none	M	Y	3/16/2016	8.6

Table 7 – Maintenance and Rehabilitation Information

PAVER Network ID	Crack Seal (Y/N)	Cold Patch (Y/N)	HMA Patch (Y/N)	Seal Coat (Y/N)	HMA Overlay (Y/N)	Mill & Fill (Y/N)	Mill, Stabilize Base, Pave (Y/N)	Reconst. Rebuild Str Sect. (Y/N)	Fuel Factor Group	Fuel Factor
Adak	Y	Y	N	Y	Y	Y	N	N	Southcoast Island	2.08
Akutan	Y	Y	N	Y	Y	Y	N	N	Southcoast	1.20
Aniak	Y	Y	N	Y	Y	Y	Y	Y	Western / Northern	1.96
Atka	Y	Y	N	Y	Y	Y	Y	N	Southcoast Island	2.08
Barrow	Y	Y	N	Y	Y	Y	Y	Y	Western / Northern	1.84
Bethel	Y	Y	N	Y	Y	Y	Y	Y	Western / Northern	1.82
Birchwood	Y	Y	Y	Y	Y	Y	Y	N	Anchorage	1.00
Clear	Y	Y	N	Y	Y	Y	N	N	Central Interior	1.08
Cold Bay	Y	Y	N	Y	Y	Y	Y	N	Southcoast	1.23
Cordova	Y	Y	N	Y	Y	Y	Y	N	Central Interior	1.26
Deadhorse	Y	Y	N	Y	Y	Y	Y	Y	Western / Northern	1.96
Dillingham	Y	Y	N	Y	Y	Y	N	N	Western / Northern	1.75
Fairbanks	Y	Y	Y	Y	Y	Y	Y	Y	Central Interior	1.09
Galena	Y	Y	N	Y	Y	Y	Y	Y	Western / Northern	2.14
Gambell	Y	Y	N	Y	Y	Y	Y	Y	Northwest	1.78
Gulkana	Y	Y	N	Y	Y	Y	Y	Y	Central Interior	1.02
Gustavus	Y	Y	N	Y	Y	Y	Y	N	Southcoast	1.26
Haines	Y	Y	N	Y	Y	Y	Y	N	Southcoast	1.26
Healy R.	Y	Y	N	Y	Y	Y	Y	N	Central Interior	1.12
Homer	Y	Y	Y	Y	Y	Y	Y	N	Central Interior	1.17
Hoonah	Y	Y	N	Y	Y	Y	Y	N	Southcoast	1.36
Iliamna	Y	Y	N	Y	Y	Y	Y	N	Western / Northern	1.97
Juneau	Y	Y	Y	Y	Y	Y	Y	N	Southcoast	1.30
Kake	Y	Y	N	Y	Y	Y	Y	N	Southcoast	1.61
Kenai	Y	Y	Y	Y	Y	Y	Y	N	Central Interior	1.17
Ketchikan	Y	Y	N	Y	Y	Y	Y	N	Southcoast	1.32
KingSalmon	Y	Y	N	Y	Y	Y	Y	N	Southcoast	1.31
Klawock	Y	Y	N	Y	Y	Y	Y	N	Southcoast	1.31
Kodiak	Y	Y	Y	Y	Y	Y	N	N	Southcoast	1.24
Kotzebue	Y	Y	N	Y	Y	Y	Y	-	Western / Northern	2.08
McGrath	Y	Y	N	Y	Y	Y	N	N	Western / Northern	2.15
Merrill	Y	Y	N	Y	Y	Y	Y	-	Anchorage	1.00
Nenana	Y	Y	N	Y	Y	Y	N	N	Central Interior	1.09
Nome	Y	Y	N	Y	Y	Y	Y	-	Northwest	1.54
Northway	Y	Y	N	Y	Y	Y	N	N	Central Interior	1.13
Palmer	Y	Y	Y	Y	Y	Y	Y	N	Anchorage	1.00
Petersburg	Y	Y	N	Y	Y	Y	Y	-	Southcoast	1.35
Point Hope	Y	Y	N	Y	Y	Y	N	N	Western / Northern	1.99
Sand Point	Y	Y	N	Y	Y	Y	Y	N	Southcoast	2.70
Seward	Y	Y	N	Y	Y	Y	Y	Y	Central Interior	2.70
Shishmaref	Y	Y	N	Y	Y	Y	Y	N	Northwest	1.33
Sitka	Y	Y	N	Y	Y	Y	Y	-	Southcoast	1.17
Skagway	Y	Y	N	Y	Y	Y	Y	N	Southcoast	1.31
Soldotna	Y	Y	Y	Y	Y	Y	Y	Y	Central Interior	1.33
StGeorge	Y	Y	N	Y	Y	Y	N	N	Southcoast Island	1.26
StPaul	Y	Y	N	Y	Y	Y	N	N	Southcoast Island	1.17
Talkeetna	Y	Y	N	Y	Y	Y	Y	Y	Central Interior	1.17
Tok	Y	Y	N	Y	Y	Y	N	N	Central Interior	1.13
Unalakleet	Y	Y	N	Y	Y	Y	N	N	Northwest	1.54
Unalaska	Y	Y	N	Y	Y	Y	Y	Y	Southcoast	1.52
Valdez	Y	Y	Y	Y	Y	Y	Y	Y	Central Interior	1.07
Wasilla	Y	Y	Y	Y	Y	Y	N	N	Anchorage	1.00
Wrangell	Y	Y	N	Y	Y	Y	Y	Y	Southcoast	1.37
Yakutat	Y	Y	N	Y	Y	Y	Y	Y	Southcoast	1.26

♦ ♦ ♦

Appendix B

Alaska Airport
Pavement Management Program

2024 Prediction Model Report

April 2025

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

Pavement prediction models, also known as performance models or family curves, are developed within the PAVER software by analyzing historical data from PCI surveys and construction records. Pavements in the same region with similar characteristics, such as branch use and surface type, generally follow similar deterioration patterns. By grouping these pavements with similar characteristics into families, analysts can generate performance models for each family by examining numerous PCI versus pavement age data points from historical inspections. A deterioration curve is fitted to this data, and its correlation is evaluated using statistical measures.

The same family curve generated using the look-back procedure described above can be used in a forward-looking capacity to predict future pavement conditions as shown in Figure 1. For a particular future year, one can use the performance model to predict the future condition of a pavement section. The predicted future PCI is then compared to predefined PCI trigger values to determine whether the pavement section qualifies for preservation, major work, or reconstruction.

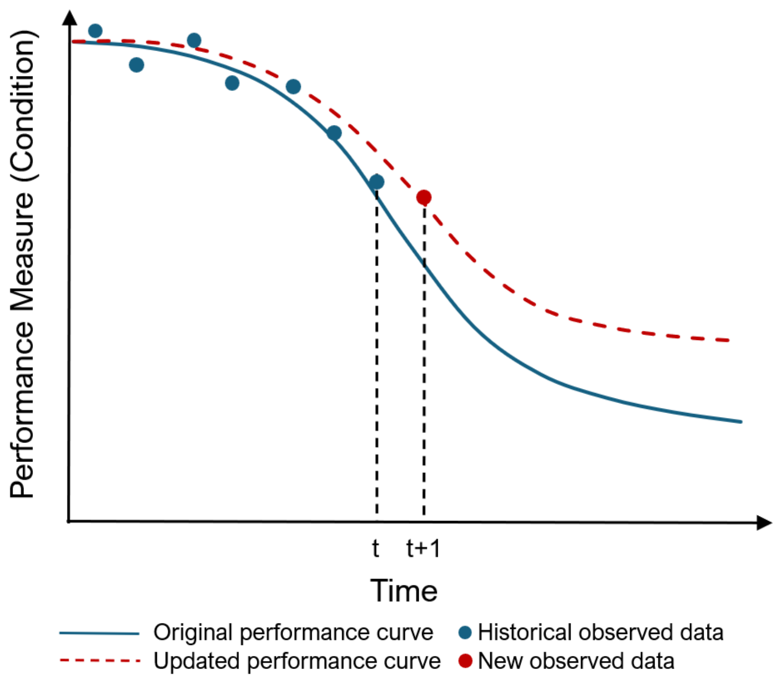


Figure 1—Development of an Updated Performance Curve from Historical Data

DEVELOPMENT OF CUSTOM PREDICTION MODELS FOR ALASKA PMP

From the fall of 2022 to the fall of 2024, Alaska DOT&PF and contracted personnel conducted pavement inspections at all 54 paved airports maintained by the State of Alaska. All data collected during these inspections have been used to produce the models included in this report. Initial performance models developed for the Alaska PMP underwent further successive refinements after careful review and analysis of the historical PCI survey data. We also consulted with Alaska DOT&PF maintenance and operations (M&O) staff to understand the availability of pavement treatment capabilities, geography, susceptibility to severe storm events, and access to the road network to improve the accuracy of the models.

Step 1—Group Airports by Alaska DOT&PF Region

The first attempt at refining the prediction models involved grouping airports together by each of the three regions designated by the Alaska DOT&PF (Northern, Central, Southcoast) shown in Figure 2.

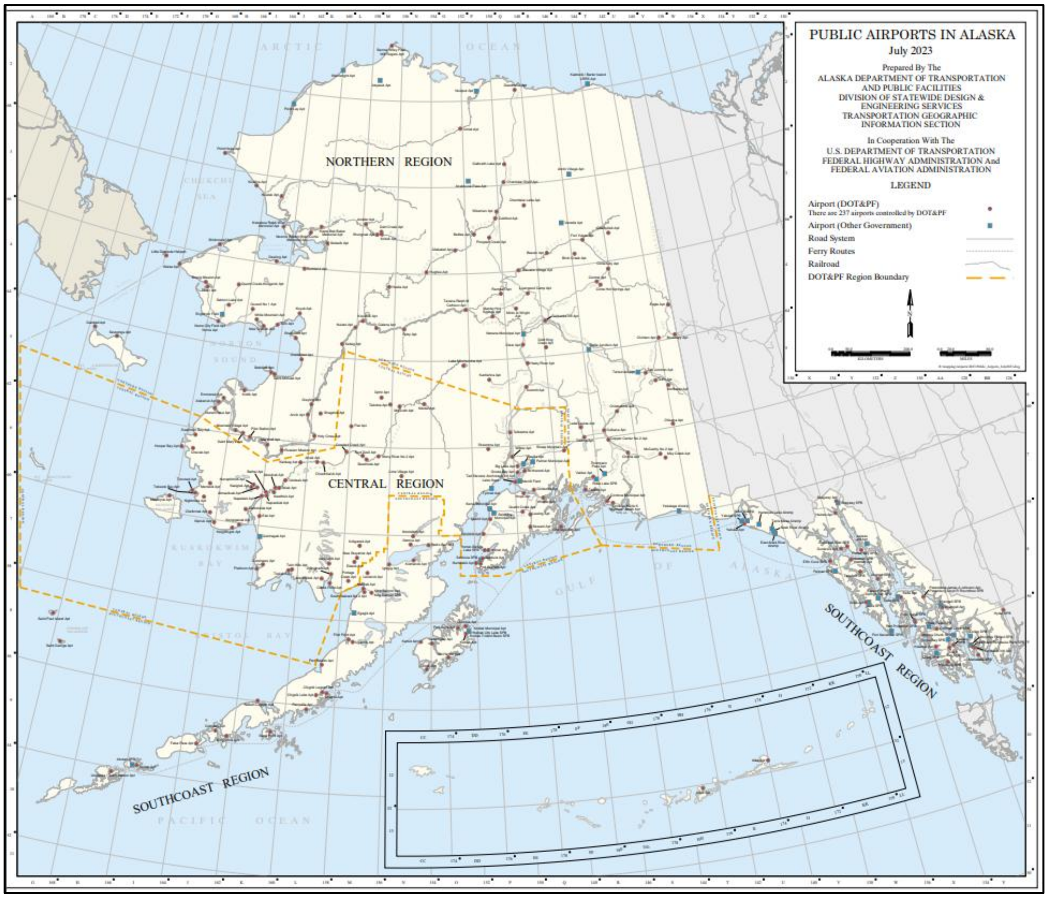


Figure 2—Alaska DOT&PF Region Boundaries[1]

Step 2—Separate Air Carrier Airports from General Aviation Airports

In addition to separating airports by Alaska DOT&PF administrative regions, we distinguished between airports that provide air carrier passenger operations and those airports that did not. The FAA provides an Airport Operating Certificate to airports to allow them to serve airlines providing passenger operations. These Part 139 certificated airports are required to comply with safety and emergency response requirements that are not required at general aviation airports.[2]

We created groups of airports based on the distinctions described in steps 1 and 2 and created runway prediction models for each group. While some improvement was noted, the prediction models still contained a significant number of outlier data points, indicating that further refinement was necessary.

[1]State of Alaska (2024), "Public Airports in Alaska", Official Alaska State Website, accessed on January 20, 2024: https://dot.alaska.gov/stwddes/gis/dataproducts/Public_Airports.pdf

[2] Federal Aviation Administration (2024), "Part 139 Airport Certification," US Department of Transportation, webpage, accessed on January 24, 2024 at: https://www.faa.gov/airports/airport_safety/part139_cert#guidance

Step 3—Create Subregional Categories

Refinement of the family curves continued by comparison and contrast of past performance among the airports within each of the three regions. In Step 3 we took a closer look at the geographical differences within each region to determine whether further geographic separation would improve the performance models. We developed a straight-line deterioration model for each airport and used this measure to confirm the geographical groupings within each region.

Central Region: We established a boundary in the Central Region that separates airports in the East from those in the West, as shown in Figure 3. The boundary separates airports in the East Subregion (highlighted blue), including the Kenai Peninsula and the vicinity around Anchorage north to Talkeetna, from those in the West Subregion. Upon establishing this boundary, the following distinguishing characteristics became apparent for most of the airports within the East and West Subregions:

Table 1—Central Region Airport Characteristics

Characteristic	East Subregion	West Subregion
On Alaska Road Network	Yes	No
Air Carrier Passenger Service	No	Yes
No. of Frozen Months per Year	<= 6	>= 6
Frost Penetration (ft)	< 7 avg	> 7 or permafrost
Runway PCI Straight-Line Deterioration (pts/yr)	2	3.5

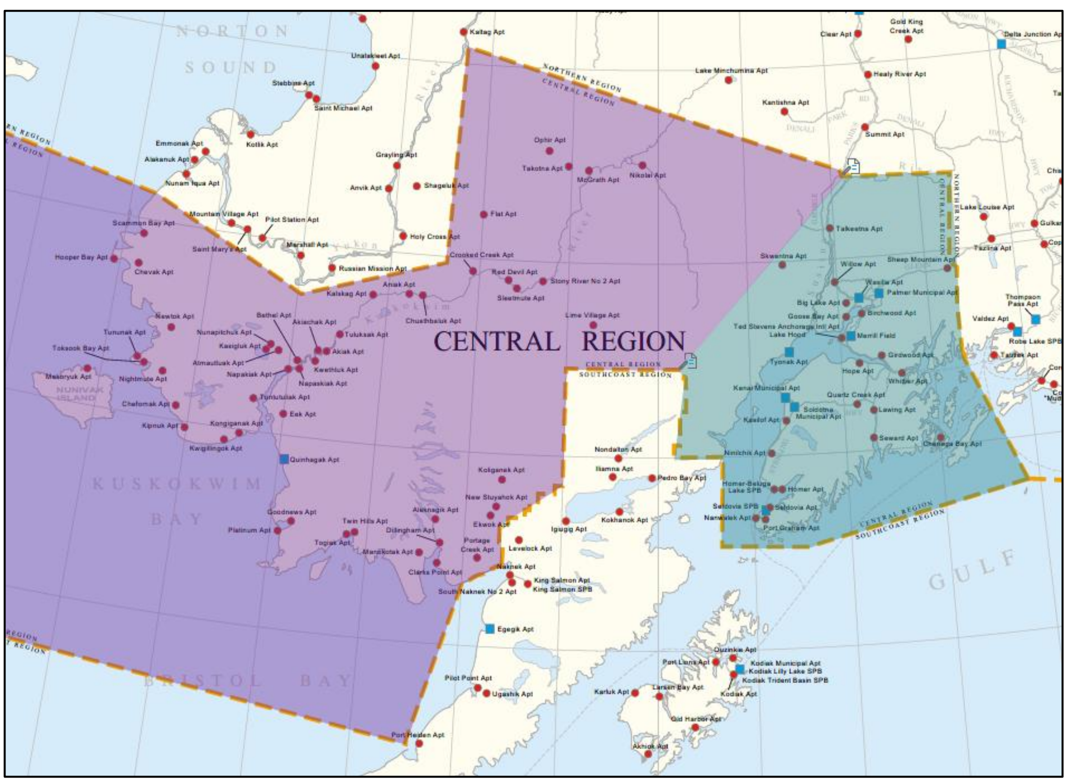


Figure 3—Alaska Central East and West Subregions

Northern Region: In a similar manner, for the Central Region we established a boundary within the Northern Region to distinguish between those airports in a Coastal zone (highlighted red) in contrast to those in the Interior (highlighted blue) as shown in Figure 4. Based on a review of weather data and passenger enplanement statistics, it became apparent that the airports experience differences in environmental conditions and rates of pavement deterioration. The following distinguishing characteristics are apparent for most of the airports within the Coastal and Interior Subregions:

Table 2—Northern Region Airport Characteristics

Characteristic	Coastal Subregion	Interior Subregion
Western or Dalton M&O Districts	Yes	No
No. of Frozen Months per Year	>= 7	<= 7
On Alaska Road Network	No	Yes
Runway PCI Straight-Line Deterioration (pts/yr)	3.8	2

There were several outlier airports that did not exactly meet these subregional definitions. The outlier airports (highlighted grey) are all within the Tok M&O District, have runway PCIs of less than 40 and have very high runway straight-line deterioration rates. We excluded these outlier data points during the development of the Coastal and Interior Subregion prediction models.

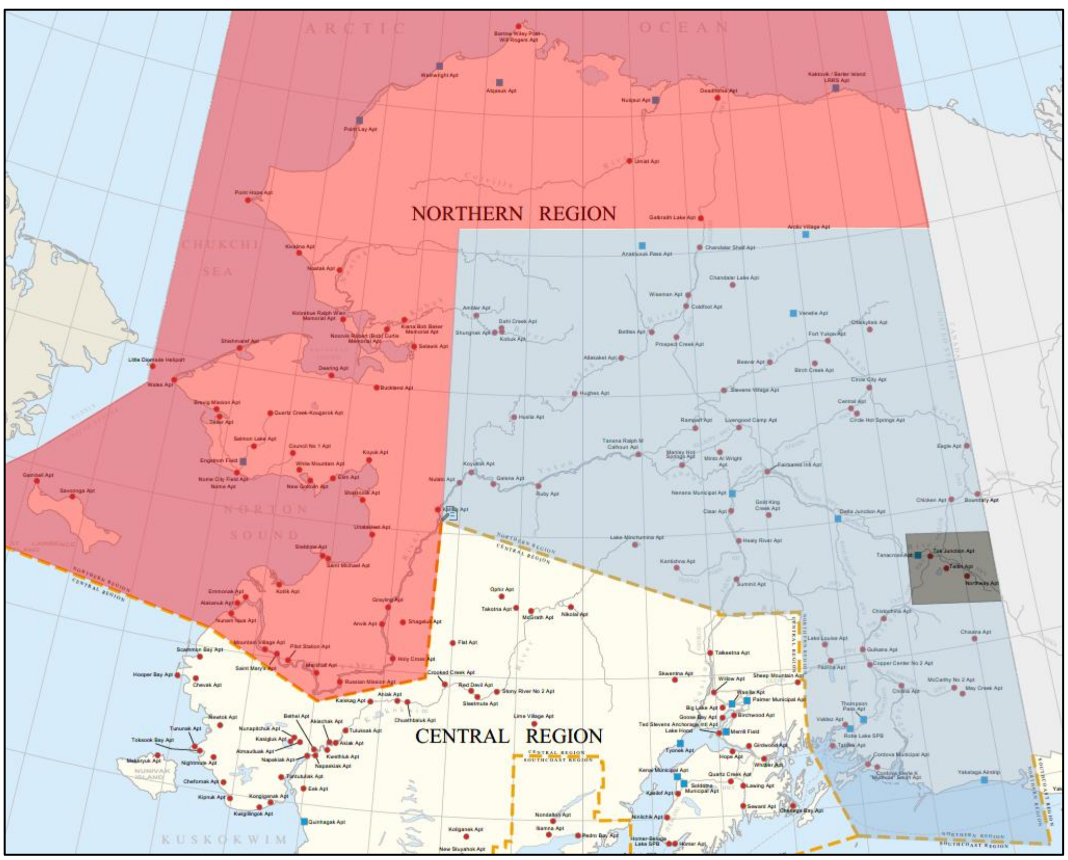


Figure 4—Alaska Northern Subregions

Southcoast Region: The Southcoast region is a vast geographic area that includes the Aleutian Island chain. We initially attempted to refine the performance models around geographic differences, such as Aleutian Island and Continental, but since all the airports in the Southcoast region are influenced by cold, wet weather patterns due to their proximity to the water, the underlying rationale for the geographic separation did not make as much sense as for the other regions. Furthermore, when we attempted an East and West boundary, we observed that the generated prediction models did not conform well to the traditional shape of a pavement deterioration curve and had a high number of outlier data points.

Rather than rely on geographic difference, we explored the direct use of the runway straight-line PCI deterioration model as a method of categorizing each individual runway within the region as shown in Table 3. Of the 23 airports in the Southcoast Region, seven have multiple runways. Since these runways do not always have the same deterioration rate, so we generated a straight-line deterioration rate for each runway. This resulted in three distinct ranges of runway deterioration. A low rate of deterioration less than 1 PCI point per year (highlighted green), a moderate deterioration rate between 1 and 2 PCI points per year (highlighted orange), and a high rate of deterioration of more than 2 PCI points per year (highlighted yellow) as shown in Figure 5.

Table 3—Southcoast Region Airport Characteristics

Characteristic	Low	Moderate	High
Runway PCI Straight-Line Deterioration (pts/yr)	< 1	1-2	> 2

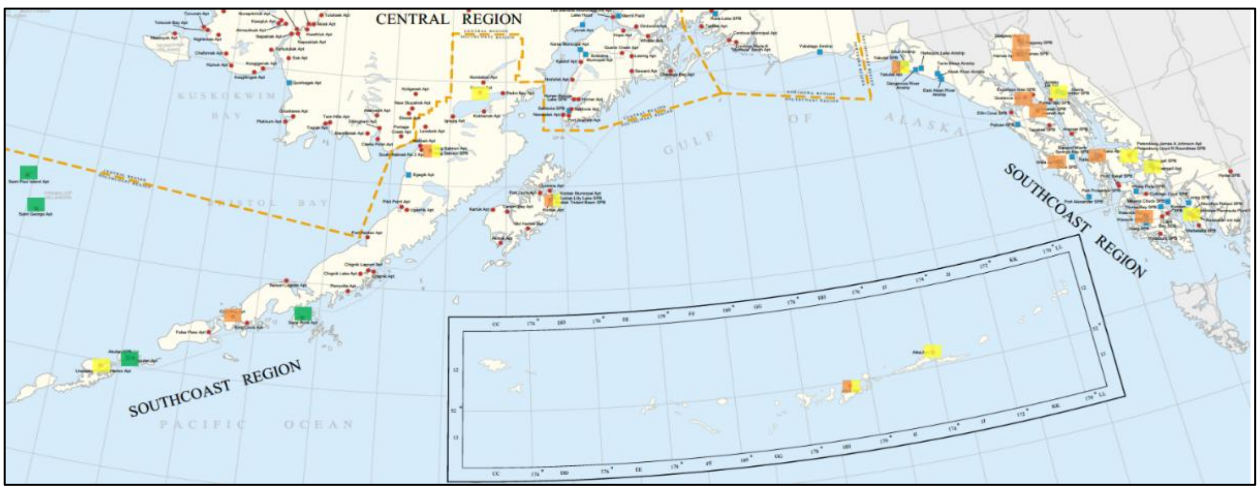


Figure 5—Alaska Southcoast Subregions

Step 4—Prediction Model for Concrete Pavements

The last area of refinement within the Alaska PMP was to separate out airport pavement sections constructed of portland cement concrete (PCC) from those constructed of asphalt concrete (AC). PCC pavements represent less than two percent of the pavements within the Alaska PMP by area, so a single concrete model was developed for use by all concrete pavements.

PREDICTION MODEL SUMMARY

Through a series of sequential refinements and analysis, we grouped the airports in the Alaska PMP into a total of seven categories for use in categorizing AC pavements. For each AC pavement category, we developed two prediction models based on branch use as either a runway or apron/taxiway pavement. This resulted in 14 models for AC airport pavements. With the addition of a single PCC model, this resulted in a total of 15 unique family curves developed for use in the Alaska PMP, as shown in Table 4. Additionally, Table 2 in Appendix A (page 4) shows each airport with respect to the prediction model sub region they are assigned to.

Table 4—Alaska PMP Prediction Models

<table>
<tr><th>Alaska DOT&PF Region</th><th>Sub Region</th><th>Branch Use</th></tr>
<tr><td rowspan="4">Central</td><td rowspan="2">East</td><td>Runway</td></tr>
<tr><td>Apron / Taxiway</td></tr>
<tr><td rowspan="2">West</td><td>Runway</td></tr>
<tr><td>Apron / Taxiway</td></tr>
<tr><td rowspan="4">Northern</td><td rowspan="2">Coastal</td><td>Runway</td></tr>
<tr><td>Apron / Taxiway</td></tr>
<tr><td rowspan="2">Interior</td><td>Runway</td></tr>
<tr><td>Apron / Taxiway</td></tr>
<tr><td rowspan="6">Southcoast</td><td rowspan="2">Low Runway Deterioration</td><td>Runway</td></tr>
<tr><td>Apron / Taxiway</td></tr>
<tr><td rowspan="2">Moderate Runway Deterioration</td><td>Runway</td></tr>
<tr><td>Apron / Taxiway</td></tr>
<tr><td rowspan="2">High Runway Deterioration</td><td>Runway</td></tr>
<tr><td>Apron / Taxiway</td></tr>
<tr><td colspan="3">All Concrete</td></tr>
</table>

Figure 6 through Figure 20 are graphical depictions of the family curves in the PAVER software. Each prediction model is characterized by an equation and relevant statistics that describe the closeness of fit.

Central East

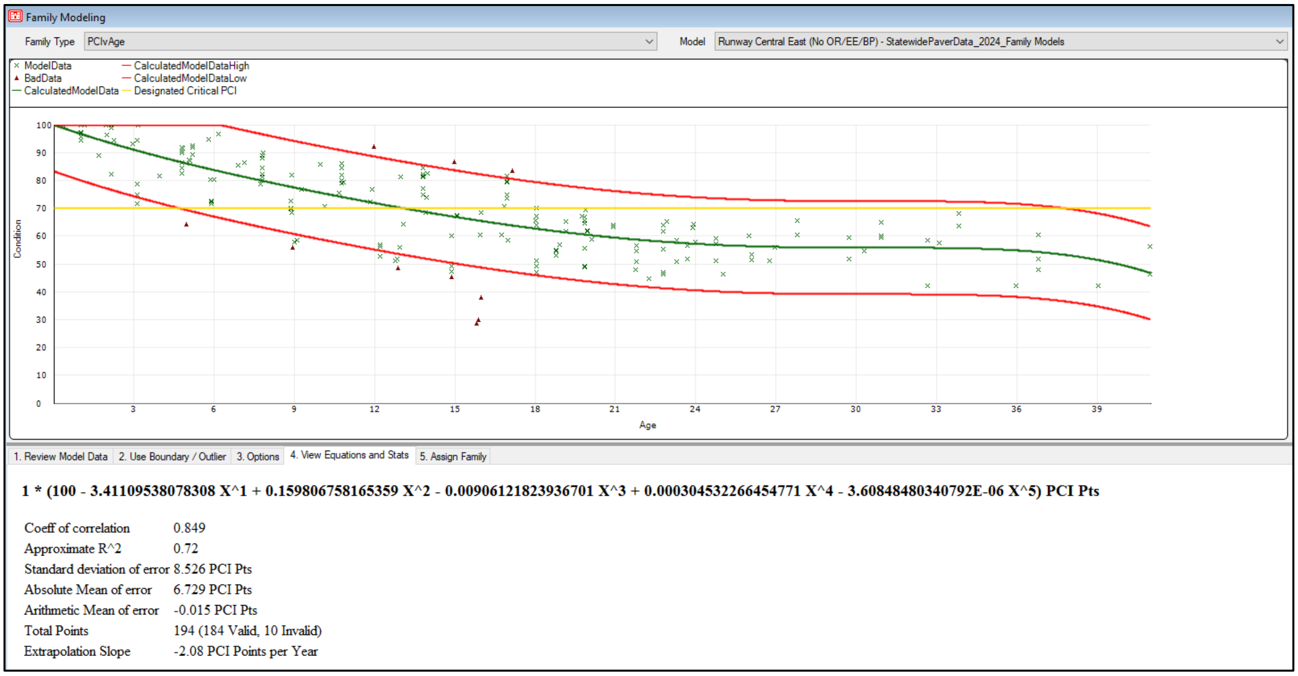


Figure 6—Central East Runway Model

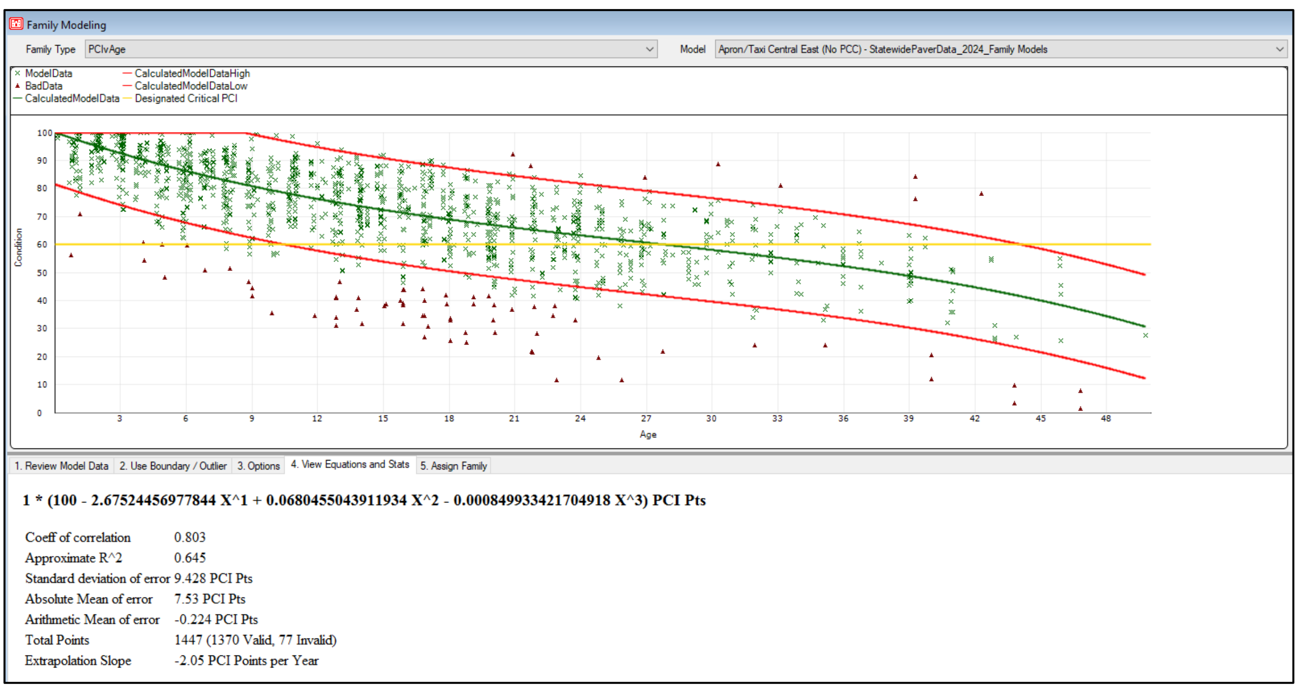


Figure 7—Central East Apron and Taxiway Model

Central West

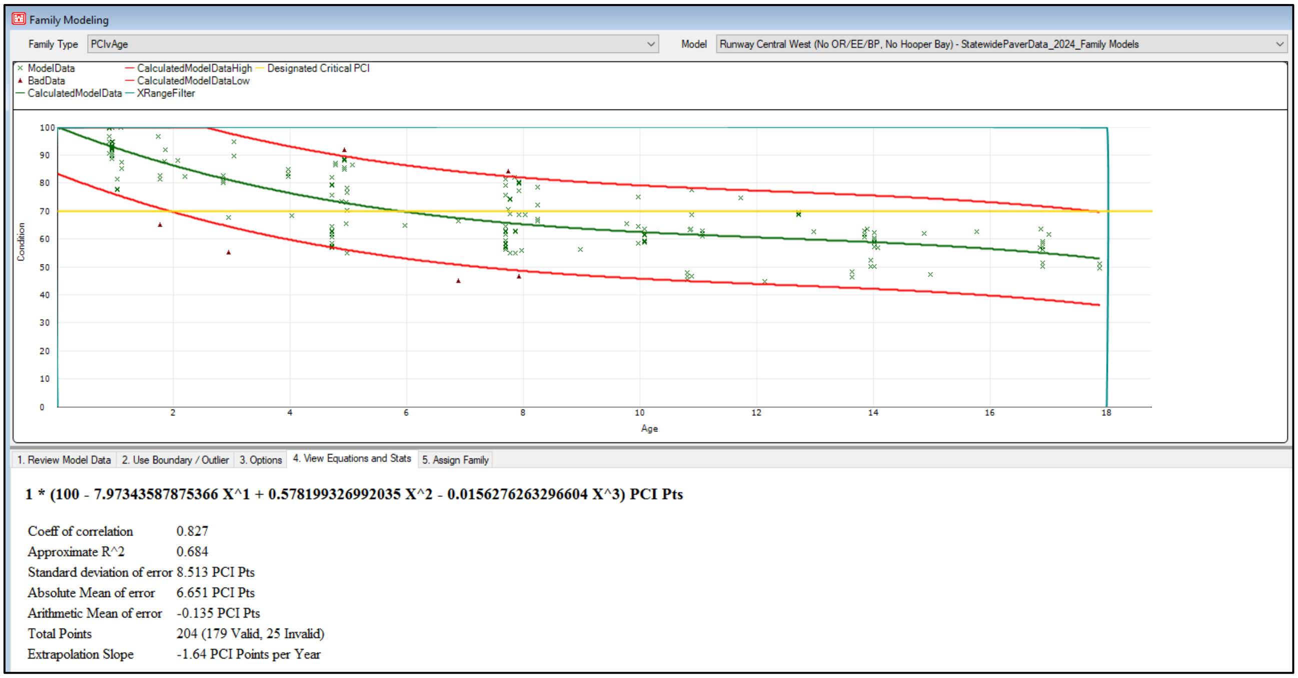


Figure 8—Central West Runway Model

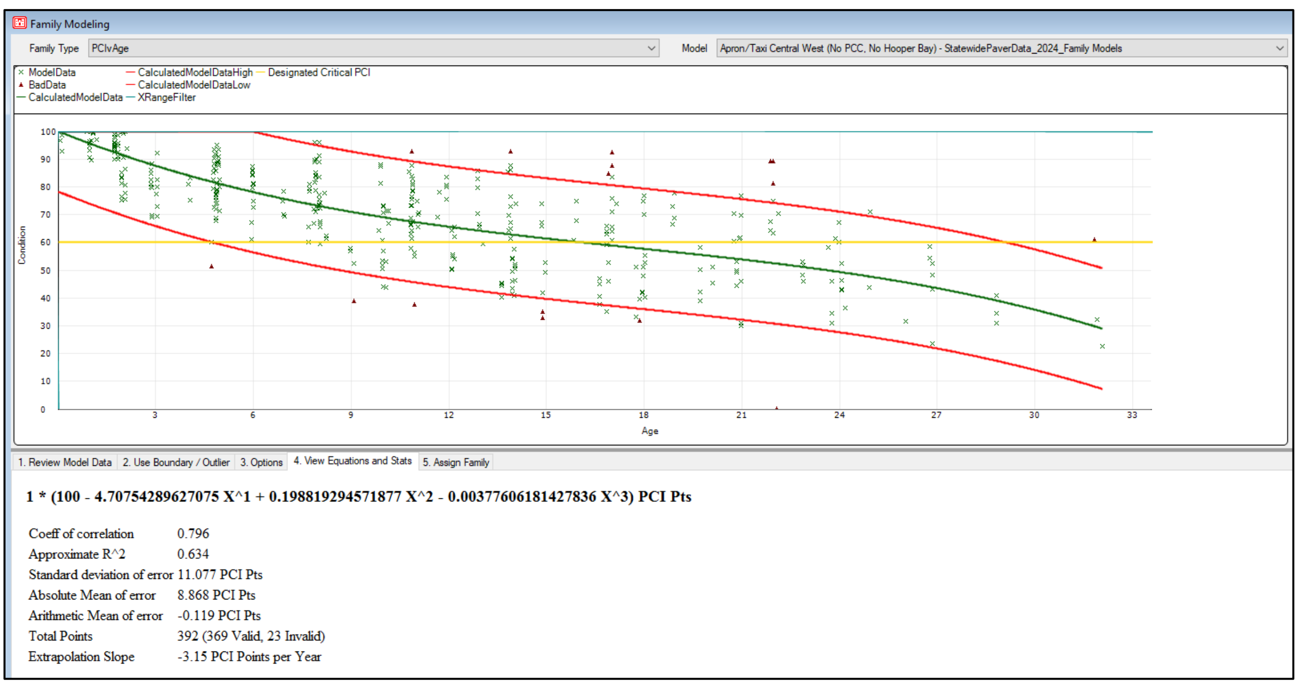
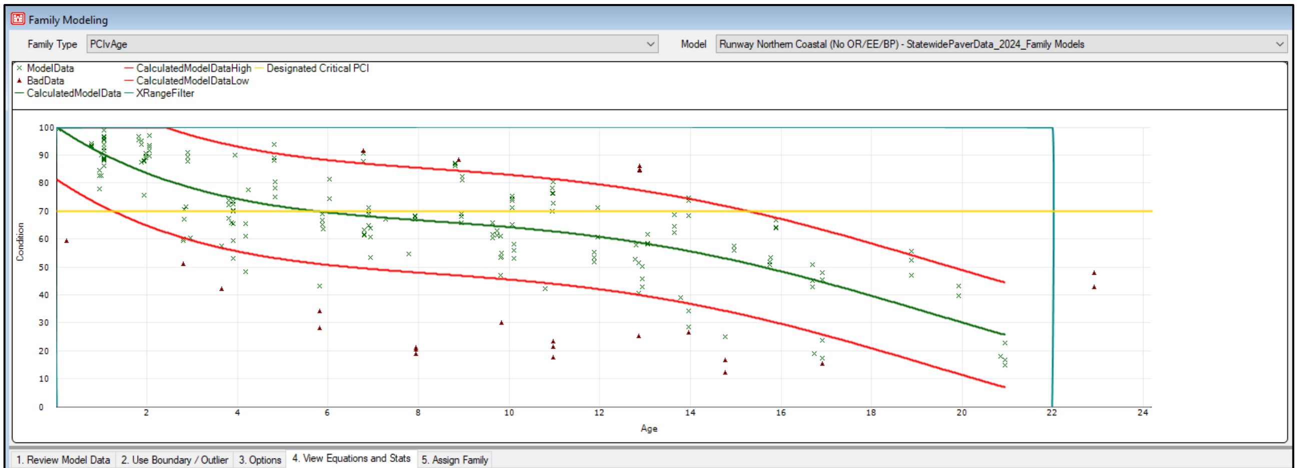


Figure 9—Central West Apron and Taxiway Model

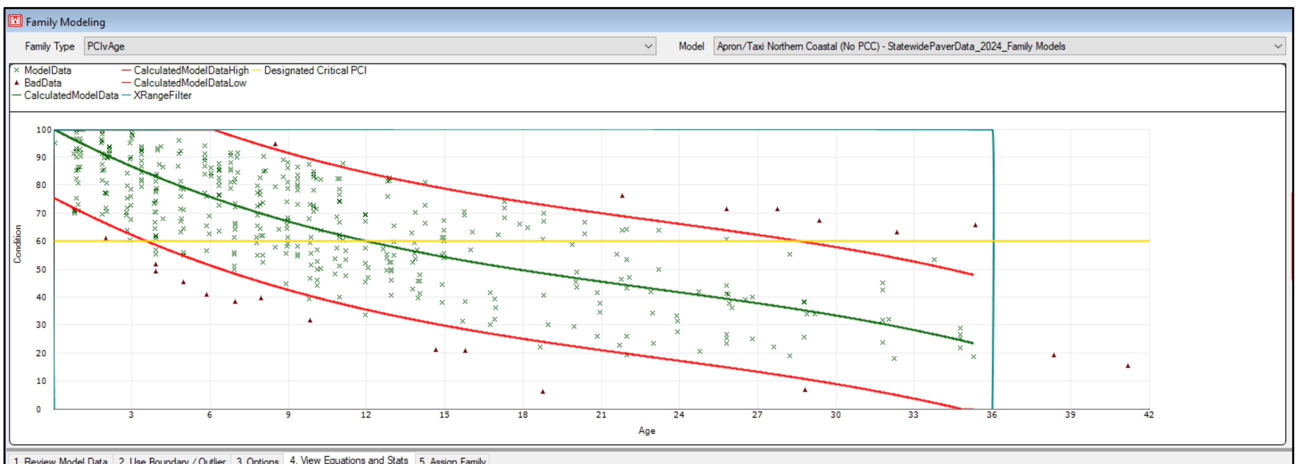
Northern Coastal



1 * (100 - 10.5894861221313 X^1 + 1.32160758972168 X^2 - 0.0757919177412987 X^3 + 0.00137243943754584 X^4) PCI Pts

Coeff of correlation	0.809
Approximate R^2	0.655
Standard deviation of error	11.395 PCI Pts
Absolute Mean of error	8.912 PCI Pts
Arithmetic Mean of error	0.142 PCI Pts
Total Points	214 (186 Valid, 28 Invalid)
Extrapolation Slope	-4.73 PCI Points per Year

Figure 10—Northern Coastal Runway Model

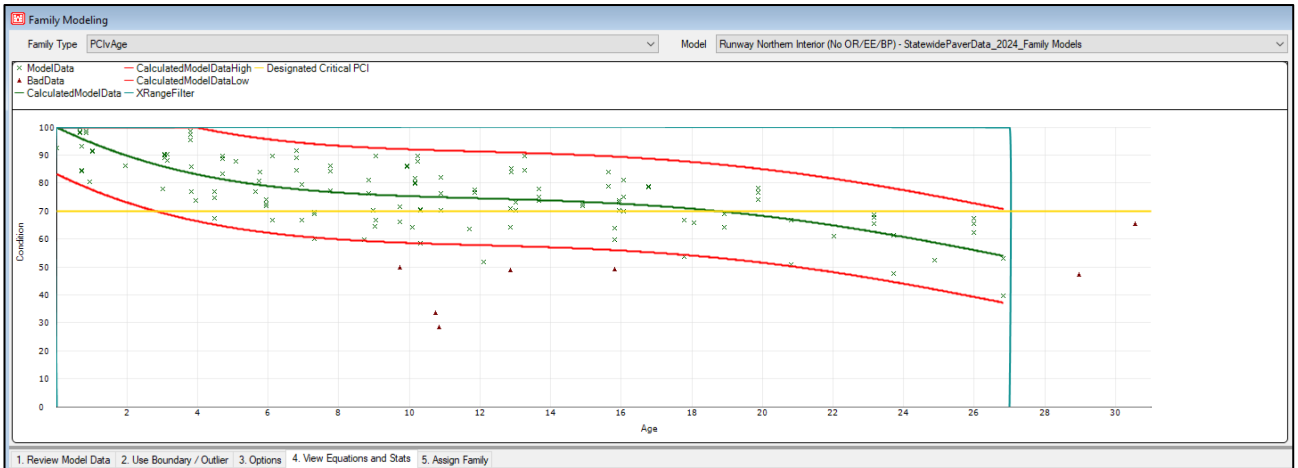


1 * (100 - 4.89080905914307 X^1 + 0.15653695166111 X^2 - 0.00225158128887415 X^3) PCI Pts

Coeff of correlation	0.799
Approximate R^2	0.638
Standard deviation of error	12.496 PCI Pts
Absolute Mean of error	10.293 PCI Pts
Arithmetic Mean of error	-0.9 PCI Pts
Total Points	447 (426 Valid, 21 Invalid)
Extrapolation Slope	-2.03 PCI Points per Year

Figure 11—Northern Coastal Apron and Taxiway Model

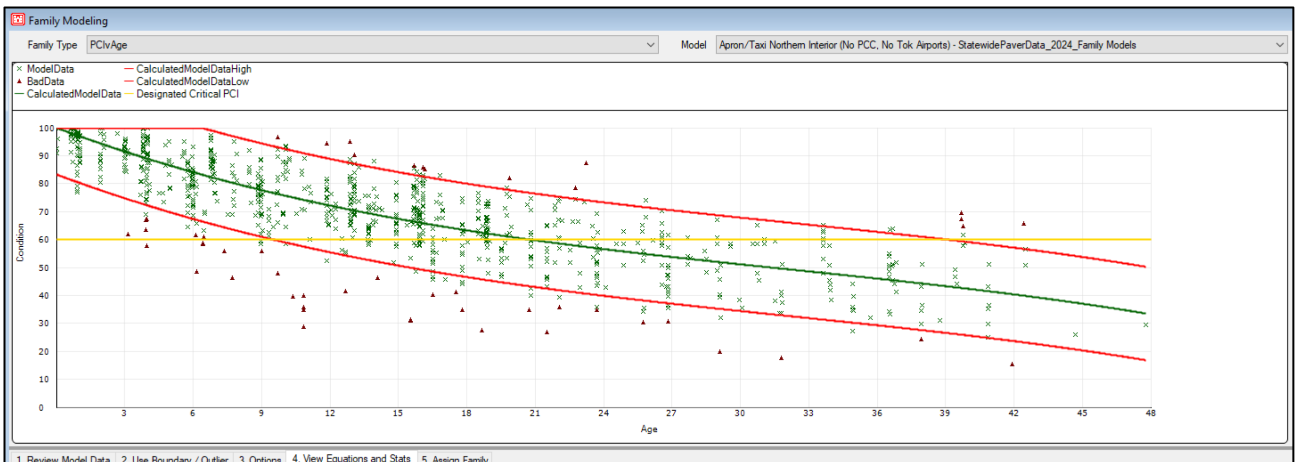
Northern Interior



1 * (100 - 6.16180229187012 X^1 + 0.566703915596008 X^2 - 0.0226209256798029 X^3 + 0.000285959948087111 X^4) PCI Pts

Coeff of correlation	0.739
Approximate R^2	0.545
Standard deviation of error	8.539 PCI Pts
Absolute Mean of error	6.898 PCI Pts
Arithmetic Mean of error	-0.296 PCI Pts
Total Points	138 (131 Valid, 7 Invalid)
Extrapolation Slope	-2.39 PCI Points per Year

Figure 12—Northern Interior Runway Model



1 * (100 - 3.03352904319763 X^1 + 0.0677804872393608 X^2 - 0.00069918273948133 X^3) PCI Pts

Coeff of correlation	0.869
Approximate R^2	0.755
Standard deviation of error	8.528 PCI Pts
Absolute Mean of error	6.786 PCI Pts
Arithmetic Mean of error	-0.31 PCI Pts
Total Points	921 (870 Valid, 51 Invalid)
Extrapolation Slope	-1.25 PCI Points per Year

Figure 13—Northern Interior Apron and Taxiway Model

Southcoast Low Deterioration

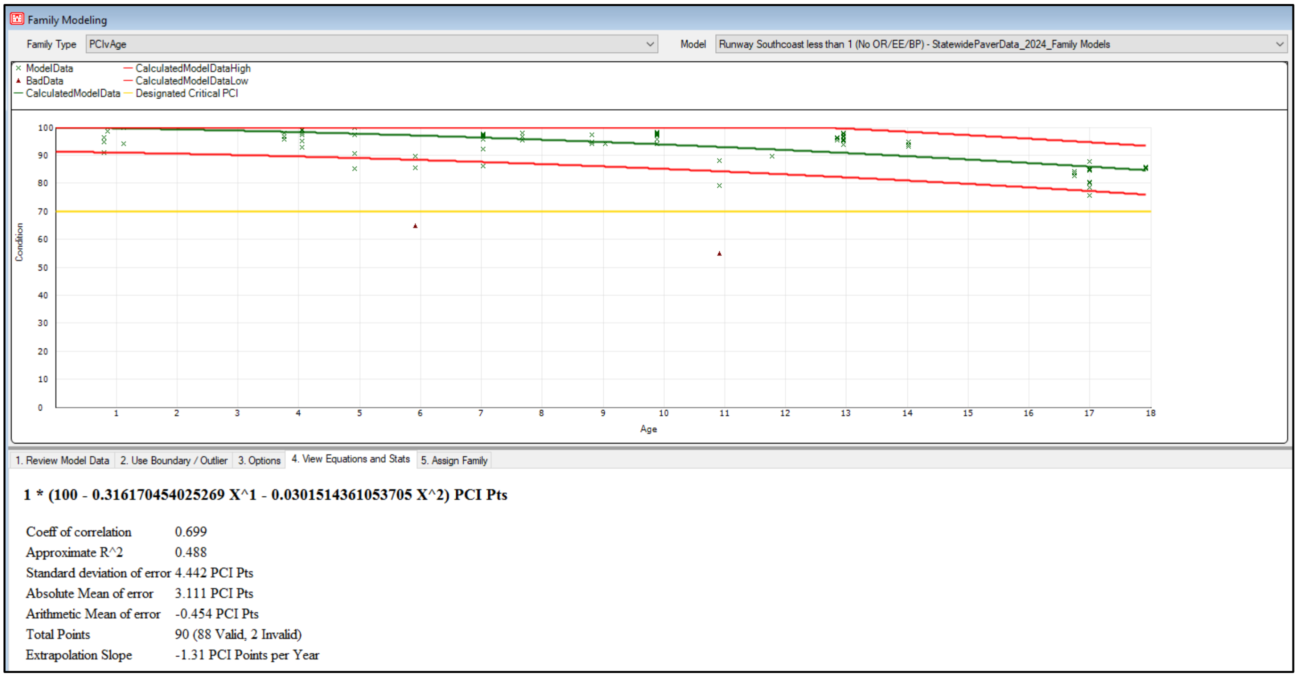


Figure 14—Southcoast Low Deterioration Runway Model

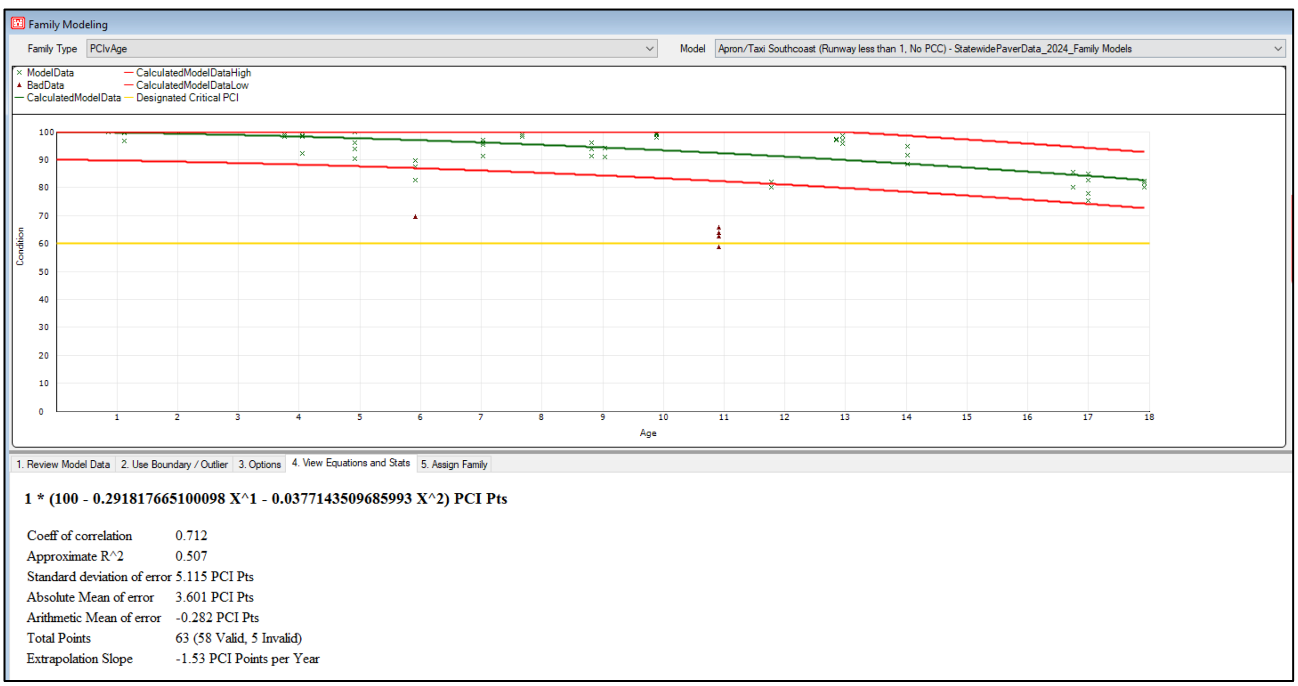
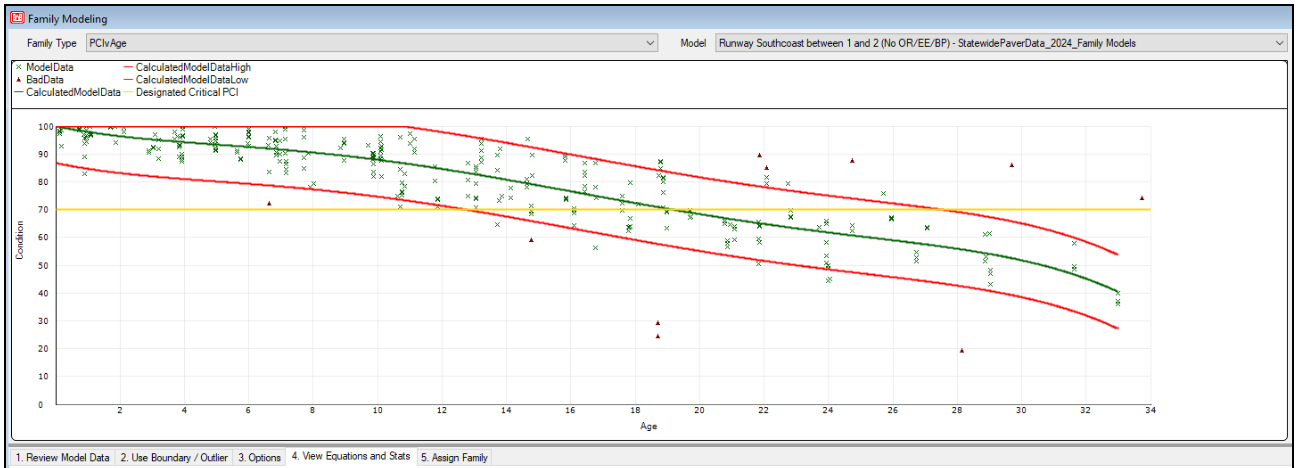


Figure 15—Southcoast Low Deterioration Apron and Taxiway Model

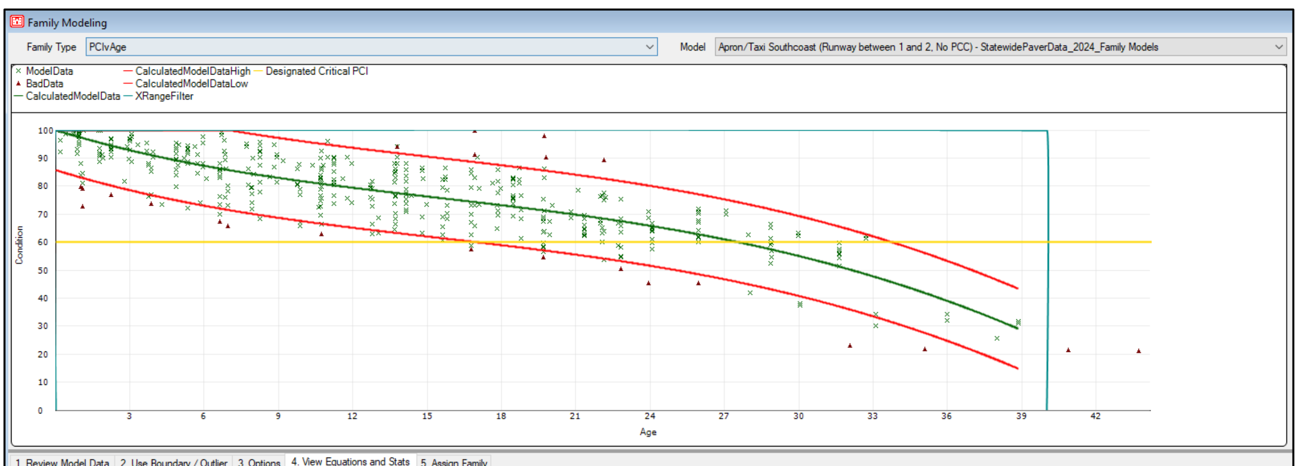
Southcoast Moderate Deterioration



1 * (100 - 2.43933343887329 X^1 + 0.378779113292694 X^2 - 0.0380992516875267 X^3 + 0.00143558683339506 X^4 - 1.85233002412133E-05 X^5) PCI Pts

Coeff of correlation	0.896
Approximate R^2	0.802
Standard deviation of error	6.765 PCI Pts
Absolute Mean of error	5.218 PCI Pts
Arithmetic Mean of error	-0.101 PCI Pts
Total Points	318 (307 Valid, 11 Invalid)
Extrapolation Slope	-3.78 PCI Points per Year

Figure 16—Southcoast Moderate Deterioration Runway Model



1 * (100 - 2.73104119300842 X^1 + 0.118734151124954 X^2 - 0.00303993793204427 X^3 + 1.50234236571123E-05 X^4) PCI Pts

Coeff of correlation	0.861
Approximate R^2	0.741
Standard deviation of error	7.28 PCI Pts
Absolute Mean of error	5.752 PCI Pts
Arithmetic Mean of error	-0.178 PCI Pts
Total Points	438 (413 Valid, 25 Invalid)
Extrapolation Slope	-3.46 PCI Points per Year

Figure 17—Southcoast Moderate Deterioration Apron and Taxiway Model

Southcoast High Deterioration

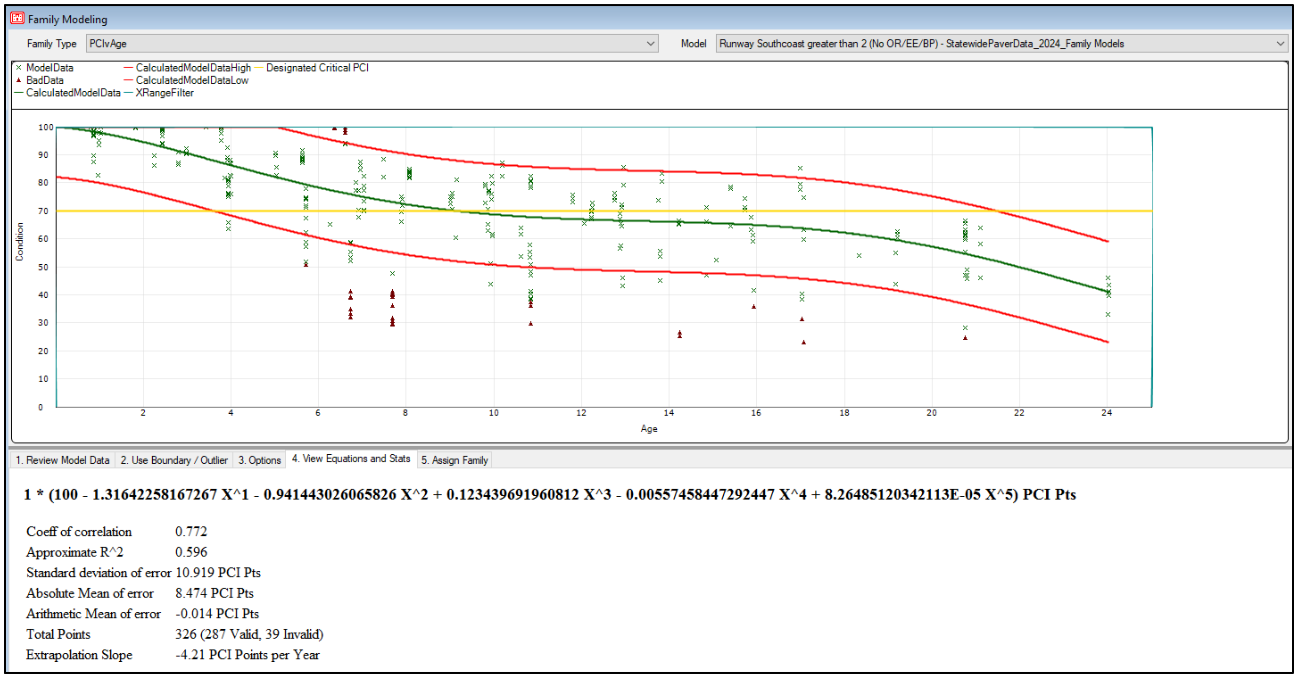


Figure 18—Southcoast High Deterioration Runway Model

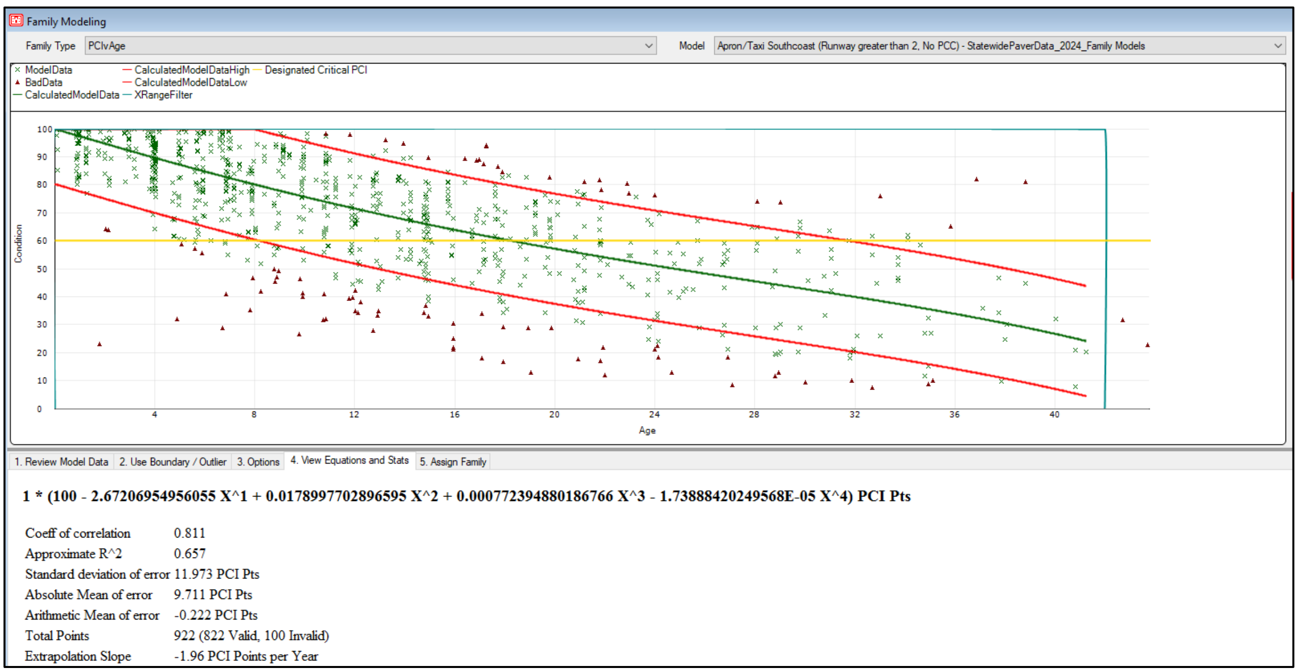


Figure 19—Southcoast High Deterioration Apron and Taxiway Model

All Concrete

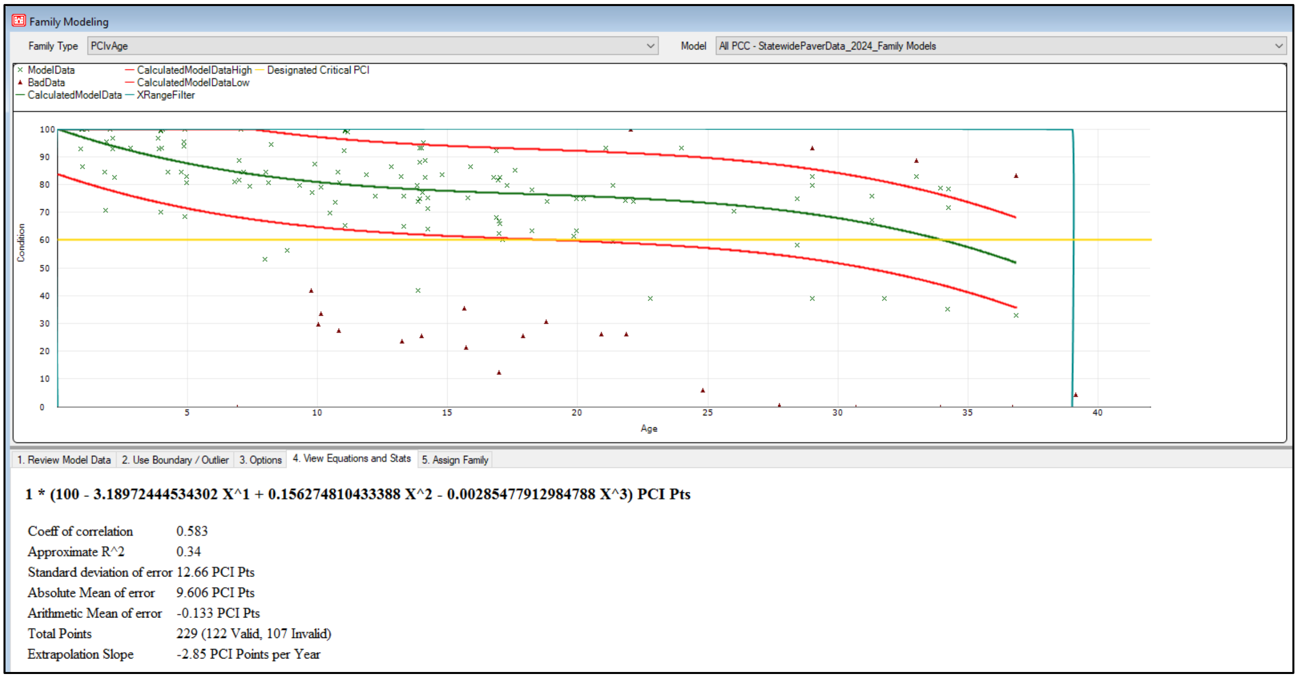


Figure 20—Concrete Model

SUMMARY

A reliable pavement performance model is crucial for effective pavement management, forming a robust foundation for timely and informed maintenance and rehabilitation decisions. Pavement performance deterioration is a dynamic process influenced by various factors, including traffic load, weather conditions, and material properties. Because of this complexity, regular inspections are essential to capture the evolving state of the pavement and ensure that performance data is consistently updated. By doing so, we can accurately predict future pavement conditions and optimize maintenance strategies. We are pleased to announce the completion of our pavement prediction models, which are specifically designed for the Alaska PMP. These models will enhance our ability to manage and maintain Alaska's airport network more efficiently.

♦ ♦ ♦

Appendix C
Alaska Airport
Pavement Management Program
2024 Unit Cost Analysis Report

April 2025

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

This report refines the pavement treatment unit costs for use in the Alaska Airport Pavement Management Program (PMP). Unit costs are used within the PAVER software to predict annual pavement maintenance and repair (M&R) budgets for paved airports within Alaska.

This report was initially drafted in 2024 to assist in developing statewide M&R budget recommendations for Alaska DOT&PF managed paved airports. The report has been updated and refined in 2025. Specifically, we have reviewed and revised our analysis of heating fuel costs for indexing pavement M&R costs at the airports that are widely dispersed throughout Alaska. In addition, we introduced the Consumer Price Index (CPI) as a new method of analysis in estimating the escalation of unit costs in future years.

Derivation of appropriate pavement M&R unit costs is not trivial. First, pavement unit costs were derived from a sample of actual construction projects completed by Alaska Department of Transportation and Public Facilities (Alaska DOT&PF) during the period 2005 to 2023. We carefully reviewed the projects, assigned them to a category of work, removed any costs unrelated to pavement M&R (i.e. fencing, access roads, building, generators, etc.), and computed a unit cost for the pavement treatment based on the pavement area constructed. We then developed a method of standardizing pavement M&R costs around the state to a single location—Anchorage—by use of published heating fuel prices. Lastly, we ensured that unit costs were adjusted to a standard year of analysis—2023.

Through this process, we developed unit costs for a variety of pavement M&R treatments in four categories: Pavement Preservation and Corrective Maintenance, Rehabilitation, Reconstruction and Permafrost Reconstruction and Repair.

With additional airports surveyed in summer 2024 and PCI data loaded into PAVER software, the unit cost data needs to be updated. Recent airport improvement project costs validate the previously developed M&R treatment unit costs, but future unit cost predictions must be evaluated using:

- Anchorage Consumer Price Index (CPI)
- Alaska Asphalt Price Index (API)
- Division of Community and Regional Affairs (DCRA) Heating Fuel Cost

BACKGROUND

The recommendations shown in Figure 1 are based on maintaining the airports at the Legislative standards[1]. Note that a series of preservation treatments can extend the pavement life more economically than waiting until more major preservation treatments are required.

Guideline for Determination of Action to be Taken for a Given PCI Rating		
Runways	**Taxiways/Aprons**	**Action**
100 - 70	100 - 60	Preventative Maintenance
69 - 40	59 - 40	Corrective Maintenance/Rehabilitate
39 - 0	39 - 0	Reconstruct

Figure 1—Alaska Maintenance Definitions of Recommendations

Alaska DOT&PF uses the PCI to set policies to determine the type of pavement treatment to be applied but is constrained by budgets that are available. The PAVER software is used to generate optimal solutions for airport pavement management decisions.

Pavement preservation treatments are applied to the surface of the existing pavement and include crack sealing, asphalt patching of localized distresses, seal coats to control weathering or raveling, etc. These treatments do not affect other operating systems at an airport such as lighting. They take a short lead time to implement, have relatively low unit costs, and may not raise the PCI but will retard the pavement deterioration to extend the useful life.

Pavement rehabilitation is the cost-effective repair which may strengthen the pavements structural layers. Rehabilitation is triggered when the pavement PCI falls into the range of 40 to 69. As a result of rehabilitation, the PAVER software resets the pavement PCI to 100, however, the condition after rehabilitation is dependent on the quality of construction and the overlaid surface. Rehabilitation activities generally provide a long-term benefit to the pavement in contrast to the short-term benefit provided by surface treatments. Rehabilitation improves performance methods and materials to extend the useful life of the pavement. Consequently, the unit costs of rehabilitation activities are much higher than those of preservation treatments. Also, and take a longer lead time for Alaska DOT&PF to accomplish this work.

Pavement reconstruction is required when the PCI is below 40, but reconstruction may be economical when PCI values range from 40-54 and requires rebuilding the entire pavement (structural section). A long lead time is required to design and reconstruct a pavement section as all the related components are affected such as utilities, right of way, environmental issues, maintaining airport functionality during construction. Thus, a very high unit cost is generated. Again, PAVER resets the PCI to 100 for Reconstruction, but it depends on the quality of the construction and materials.

[1] Pavement Management and Preservation Airport Pavement Condition Reporting, Official Alaska State Website, accessed on January 20, 2024: https://dot.alaska.gov/stwddes/asset_mgmt/airport_pave.shtml

LITERATURE REVIEW

We conducted a review of relevant literature on the topic of pavement preservation treatments. In particular there are two specific studies that appear relevant to the development of unit costs for airport M&R in Alaska:

1. Airport Cooperative Research Program Synthesis 22, ***"Common Airport Pavement Maintenance Practices,"*** was published in 2011 and provides a review of the effectiveness of surface treatments in airport applications.
2. An Alaska DOT&PF Research funded a 2012 report that establishes unit costs, service life and treatment timing for pavement preservation treatments in Alaska. Report No. FHWA-AK-RD-12-14, ***"Develop Guidelines for Pavement Preservation Treatments and for Building a Pavement Preservation Program Platform for Alaska"***, was authored by R. Gary Hicks, DingXin Cheng, Hannele Zubeck, Jenny Liu, and Tony Mullins.

The following summary statements describe essential findings from the Alaska DOT&PF funded report, which appears to be highly relevant to pavement preservation on Alaska airports.

- A wide range of surface treatments and other preservation treatments have been used successfully in cold climates.
- Unit costs for many treatments are presented, but the costs are for the lower 48.
- Five preservation treatments have been used in the State of Alaska, including:
  1. Thin HMA overlays
  2. Chip seals
  3. Slurry seal and Microsurfacing
  4. Crack sealing
  5. Saw cut and seal joints

While the preservation treatments listed above have been used in the State of Alaska, chip seals, slurry seals, and microsurfacing are not commonly used on airport projects. The timing between the treatments and the service life do not necessarily match. Current policy and available funding affect the spacing between the treatments in addition to the actual pavement surface condition. Typical treatment timing, as reported by Hicks et. al. is presented in Figure 2.

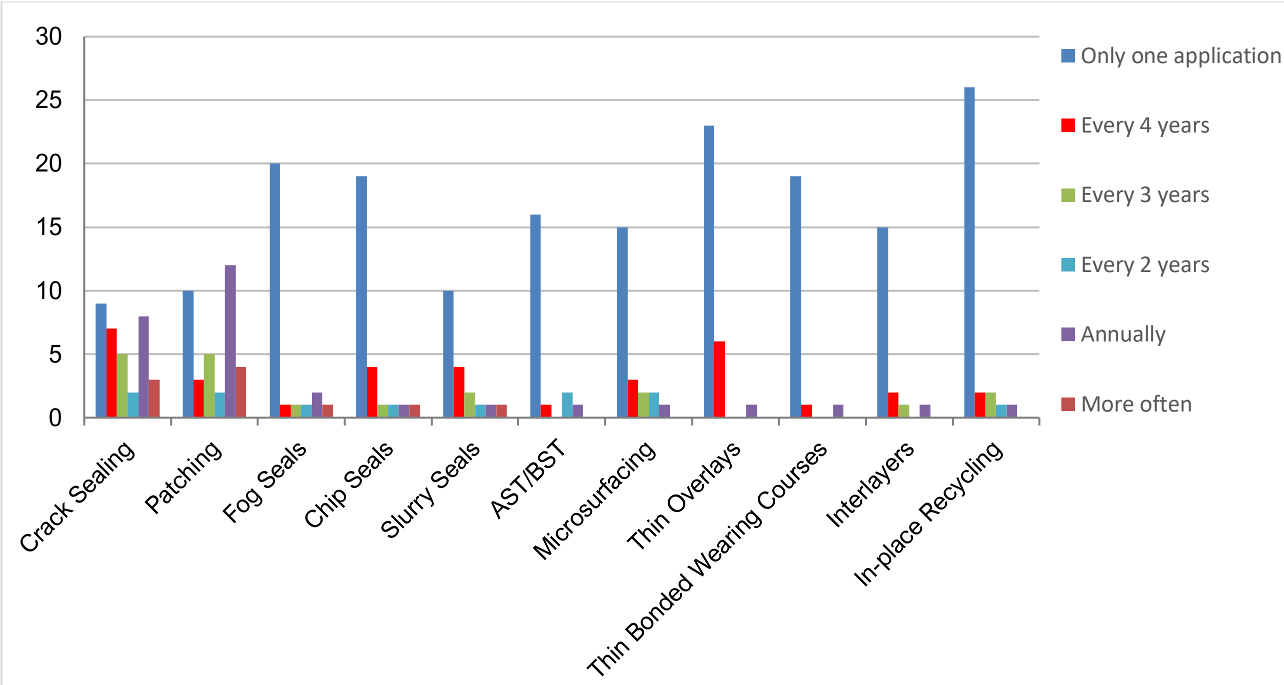


Figure 2—Typical Treatment Timing

The average service life of the various surface treatments as assessed by Hicks et. al. is presented in Figure 3.

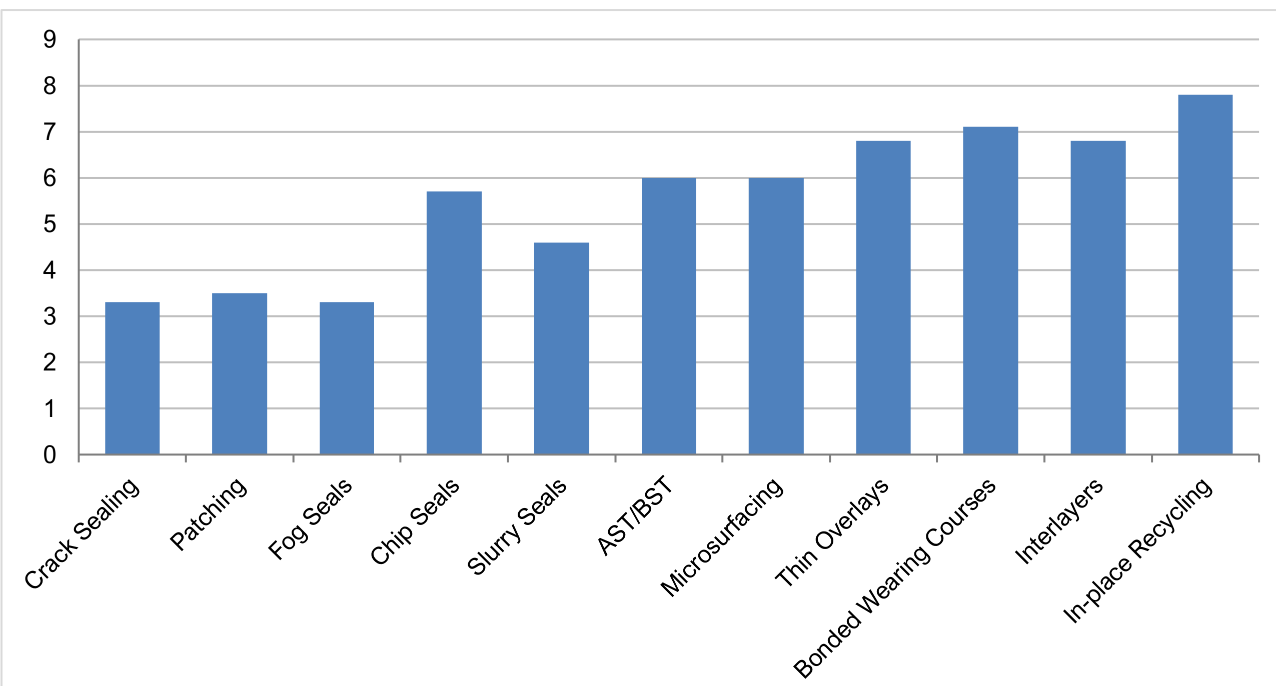


Figure 3—Average Treatment Service Life

Hicks et. al. developed summaries of treatment costs which are shown in Table 1 and Table 2.

Table 1—Summary of Treatment Costs (2010)

	Crack Sealing	Patching	Fog Seals	Chip Seals	Slurry Seals	AST/BST	Microsurfacing	Thin Overlays	Bonded Wearing Courses	Interlayers	In-place Recycling
USA											
Maine	7,500/ mile		17,000/ mile				91,800/ mile	150,000/mile			500,000/ mile
Michigan	4,500/ mile		0.50/yd^2	1.51/yd^2 (single chip seal)			3.50/yd^2 (two course)	60/ton	5.5/yd^2		
Minnesota	2,500/mile			26,000/ mile			37,000/ mile	60,000/ mile	65,000/ mile		400,000/ mile
New Hampshire	0.90/ lb			2.15/yd^2			3.00/yd^2	2.70/yd^2	6.0/yd^2	10.0/yd^2	6.0/yd^2
New York	5,000/lane mile		10,000/ lane mile	20,000/ lane mile	15,000/ lane mile		40,000/ lane mile	50,000/ lane mile	50,000/ lane mile		120,000/ lane mile
Wisconsin (Dane County)	5,000/lane mile	8,000/ lane mile	varies	13,000/ lane mile	varies		28,000/ lane mile	40,000/ lane mile			
Canada											
Entire Country	2-4 /m	30-40 /m^2	11 /m^2	10 /m^2	11 /m2	16 /m^2	7 /m^2	20 /m^2	45 /m^2		50 /m^2
British Colombia	10 /m	20/m^2		10/m^2	120,000/ lane km	100,000/ lane km	10/m	20/m^2		10/m^2	$120,000/ lane km
Northern Canada		300/km				50,000/km	75,000/km	225,000/ km		250,000/km	
Nordic Countries											
Denmark	3.40/m	37.00/m	1.80/m^2	5.80/m^2		5.60/m^2			24.80/m^2	3.40/m	37.00/m
Sweden	37/m^2	22/m^2	2.3/m^2	2.4/m^2	2.4/m^2	2.0/m^2		9.0/m^2	9.8/m^2 (incl. surface planing)	13/m^2	6.8/m^2
Finland											3.0/m^2
China											
Northeast	2/m^2	2/m^2	1/m^2	2/m^2	1.5/m^2	1/m^2	4/m^2	7/m^2		8/m^2	

Table 2—Summary of Treatment Unit Costs (2010)

Treatment	Relative Cost ($ to $$$$)	Estimated Unit Cost
Crack filling	$	$0.10 to $1.20/ft
Crack sealing	$	$0.75 to $1.50/ft
Slurry seal	$$	$0.75 to $1.00/yd^2
Microsurfacing (single-course)	$$	$1.50 to $3.00/yd^2
Chip seal (single-course)	$$(conventional)	$1.50 to $2.00/yd^2 (conventional)
Chip seal (single-course)	$$$ (polymer modified)	$2.00 to $4.00/yd^2 (polymer modified)
Ultra-thin bonded wearing course	$$$	$4.00 to $6.00/yd^2
Thin HMA overlay (dense-graded)	$$$	$3.00 to $6.00/yd^2
Cold milling and thin HMA overlay	$$$	$5.00 to $10.00/yd^2
Ultra-thin HMA overlay	$$	$2.00 to $3.00/yd^2
Hot in-place recycling (excluding thin HMA overlay for surface recycle and remixing types)	$$/$$$	$2.00 to $7.00/yd^2
Cold in-place recycling (excluding thin HMA overlay)	$$	$1.25 to $3.00/yd^2
Profile milling	$	$0.35 to $0.75/yd^2
Ultra-thin whitetopping	$$$$	$15.00 to $25.00/yd^2
Note: $ = low cost; $$ = moderate cost; $$$ = high cost; $$$$ = very high cost.		

ALASKA DOT&PF STAFF INTERVIEWS

A questionnaire was sent to the Alaska DOT&PF Headquarters and Regions in the winter of 2022-2023, requesting information and cost data on the preservation treatments used by Maintenance and Operations (M&O) offices on airport pavements. Responses indicate that typically only crack sealing and localized pavement patching are performed by M&O staff when material and equipment are available. Furthermore, unit cost information is not available from the State accounting system since only the total cost of a maintenance activity is reported without the associated number of linear feet or square feet treated. Preservation treatments (other than crack sealing and patching) are funded through the Federal Aviation Administration (FAA) Airport Improvement Program (AIP) and the work is typically performed through contract. Pavement inspection personnel met with airport managers during pavement condition inspection (PCI) surveys in 2023 and 2024, but no additional information was provided that would modify our initial findings.

Table 3 summarizes the responses to the M&O questionnaire sent to Alaska DOT&PF staff regarding pavement maintenance, rehabilitation, and reconstruction (M&R) activities.

Table 3—Summary of Responses to M&O Questionnaire

PAVER Network ID	Part 139 (Y/N)	On Road Network (Y/N)	Crack Seal Freq (Yr)	Seal Equip Onsite (Y/N/M)	Treatment Candidate (Y/N)	Crack Seal (Y/N)	Cold Patch (Y/N)	HMA Patch (Y/N)	Seal Coat (Y/N)	HMA Overlay (Y/N)	Mill & Fill (Y/N)	Mill, Stabilize Base, Pave (Y/N)	Reconstruct, Rebuild Str Section (Y/N)
Adak	Y	N	none	Y	Y	Y	Y	N	Y	Y	Y	N	N
Akutan	N	N	5	N	Y	Y	Y	N	Y	Y	Y	N	N
Aniak	N	N	3	Y	N	Y	Y	N	Y	Y	Y	Y	Y
Atka	N	N	none	N	Y	Y	Y	N	Y	Y	Y	Y	N
Barrow	Y	N	1	Y	N	Y	Y	N	Y	Y	Y	Y	Y
Bethel	Y	N	1	Y	N	Y	Y	N	Y	Y	Y	Y	Y
Birchwood	N	Y	5	M	Y	Y	Y	Y	Y	Y	Y	Y	N
Clear	N	Y	5	N	Y	Y	Y	N	Y	Y	Y	N	N
Cold Bay	Y	N	none	N	Y	Y	Y	N	Y	Y	Y	Y	N
Cordova	Y	N	1	Y	Y	Y	Y	N	Y	Y	Y	Y	N
Deadhorse	Y	Y	1	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Dillingham	Y	N	1	Y	Y	Y	Y	N	Y	Y	Y	N	N
Fairbanks	Y	Y	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Galena	N	N	3	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Gambell	N	N	5	M	N	Y	Y	N	Y	Y	Y	Y	Y
Gulkana	N	Y	3	N	N	Y	Y	N	Y	Y	Y	Y	Y
Gustavus	Y	Y	none	N	Y	Y	Y	N	Y	Y	Y	Y	N
Haines	N	Y	none	N	N	Y	Y	N	Y	Y	Y	Y	N
Healy R.	N	Y	3	N	Y	Y	Y	N	Y	Y	Y	Y	N
Homer	Y	Y	1	M	N	Y	Y	Y	Y	Y	Y	Y	N
Hoonah	N	N	none	N	Y	Y	Y	N	Y	Y	Y	Y	N
Iliamna	N	N	Bi-annual	Y	Y	Y	Y	N	Y	Y	Y	Y	N
Juneau	Y	Y	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
Kake	N	N	none	N	N	Y	Y	N	Y	Y	Y	Y	N
Kenai	Y	Y	3	N	Y	Y	Y	Y	Y	Y	Y	Y	N
Ketchikan	Y	Y	3	N	Y	Y	Y	N	Y	Y	Y	Y	N
KingSalmon	Y	N	annual	Y	Y	Y	Y	N	Y	Y	Y	Y	N
Klawock	N	N	none	N	N	Y	Y	N	Y	Y	Y	Y	N
Kodiak	Y	Y	none	N	Y	Y	Y	Y	Y	Y	Y	N	N
Kotzebue	Y	N	1	Y	N	Y	Y	N	Y	Y	Y	Y	
McGrath	N	N	3	Y	N	Y	Y	N	Y	Y	Y	N	N
Merrill	N	Y	3	N	Y	Y	Y	N	Y	Y	Y	Y	
Nenana	N	Y	3	N	Y	Y	Y	N	Y	Y	Y	N	N
Nome	Y	Y	1	Y	Y	Y	Y	N	Y	Y	Y	Y	
Northway	N	Y	3	N	Y	Y	Y	N	Y	Y	Y	N	N
Palmer	N	Y	3	N	Y	Y	Y	Y	Y	Y	Y	Y	N
Petersburg	Y	N	none	N	Y	Y	Y	N	Y	Y	Y	Y	

Table 2—Summary of Responses to M&O Questionnaire (continued)

PAVER Network ID	Part 139 (Y/N)	On Road Network (Y/N)	Crack Seal Freq (Yr)	Seal Equip Onsite (Y/N/M)	Treatment Candidate (Y/N)	Crack Seal (Y/N)	Cold Patch (Y/N)	HMA Patch (Y/N)	Seal Coat (Y/N)	HMA Overlay (Y/N)	Mill & Fill (Y/N)	Mill, Stabilize Base, Pave (Y/N)	Reconstruct, Rebuild Str Section (Y/N)
Sand Point	Y	N	none	N	Y	Y	Y	N	Y	Y	Y	Y	N
Seward	N	Y	5	M	Y	Y	Y	N	Y	Y	Y	Y	Y
Shishmaref	N	N	5	Y	N	Y	Y	N	Y	Y	Y	Y	N
Sitka	Y	N	none	N	N	Y	Y	N	Y	Y	Y	Y	
Skagway	N	Y	none	N	Y	Y	Y	N	Y	Y	Y	Y	N
Soldotna	N	Y	3	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
StGeorge	N	N	none	N	Y	Y	Y	N	Y	Y	Y	N	N
StPaul	N	N	none	N	Y	Y	Y	N	Y	Y	Y	N	N
Talkeetna	N	Y	5	M	Y	Y	Y	N	Y	Y	Y	Y	Y
Tok	N	Y	5	N	Y	Y	Y	N	Y	Y	Y	N	N
Unalakleet	N	N	5	Y	Y	Y	Y	N	Y	Y	Y	N	N
Unalaska	Y	N	1	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Valdez	Y	Y	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Wasilla	N	Y	3	N	Y	Y	Y	Y	Y	Y	Y	N	N
Wrangell	Y	N	none	M	Y	Y	Y	N	Y	Y	Y	Y	Y
Yakutat	Y	N	none	M	Y	Y	Y	N	Y	Y	Y	Y	Y

AIRPORT PAVEMENT PRESERVATION TREATMENTS

The following airport pavement treatments have been used in Alaska and were selected to develop unit cost data for use in the Alaska Airport PMP.

Pavement Preservation and Corrective Maintenance

- Crack Sealing/Joint Sealing
- Patching
- Grinding
- Slab Replacement

Global Surface Treatments

- Surface Seal
    - Emulsified Asphalt Seal Coat (P-608)
    - Rapid Cure Seal Coat (P-608-R)
    - Sand Seal (P-633)

Rehabilitation

- Minor Rehabilitation – AC
    - HMA Overlay
    - Mill and HMA Overlay
- Major Rehabilitation
    - Base Reclamation and HMA Overlay
    - Mill and Base Stabilization and HMA Overlay
    - Partial Depth Reconstruction

Reconstruction

- Complete Reconstruction
    - Reconstruct with Subgrade Conditioning
    - Reconstruct with Subgrade Recompaction and Repairs

EVALUATION OF ALASKA DOT&PF PROJECT COSTS

Alaska DOT&PF provided a list of 55 recent airport contracts including project cost data. The project information included enough information to understand the Alaska DOT&PF design and construction costs, the Contractor's price to perform the work, the type of pavement treatment, and the area of pavement treated.

Total Project Cost vs Pavement Treatment Cost

Based on our review and understanding of project costs, the Total Pavement Project Cost reported in each of the 55 contract packages is made up of two components: 1) Design Cost and 2) Construction Cost. The Construction Cost is further broken into those costs borne directly by Alaska DOT&PF and those costs performed by the Contractor and reflected in the Contract Price. To further complicate matters, the Construction Cost typically includes both the costs to perform the pavement treatment as well as costs to perform work unrelated to treatment of the pavement. These unrelated costs may include buildings, generators, security fence improvements, access roads, etc. To understand the actual treatment unit costs, one must analyze each project to understand the components of the contract and separate out the overhead costs and the costs to perform work unrelated to the pavement. The process can be summarized by the following two equations:

Equation No. 1: $TP = DC + AK\_P + CP\_P$

Equation No. 2: $CC = (AK\_P + AK\_NP) + (CP\_P + CP\_NP)$

where,

TP	=	Total Pavement Project Cost
CC	=	Total Construction Cost
CP	=	Contractor's Price = CP_P + CP_NP
CP_P	=	Contractor's Price—Pavement Related
CP_NP	=	Contractor's Price—Not Pavement Related
DC	=	Design Costs
AK	=	Alaska DOT&PF Construction Costs = AK_P + AK_NP
AK_P	=	Alaska DOT&PF Construction Costs—Pavement Related
AK_NP	=	Alaska DOT&PF Construction Costs—Not Pavement Related

Using these equations, we analyzed the costs of the 55 projects to solve for the Total Pavement Project Cost (TP). Once this cost was known, it was a straightforward matter to divide TP by the area of the pavement that was treated to find the unit cost of the pavement treatment. The following is an example of how this procedure was used to compute the unit cost of pavement rehabilitation treatment conducted as part of the 2009 Petersburg Airport Runway Safety Improvements.

Example—Pavement Treatment Unit Cost

Project No. 3-02-0219-013, #69360, **Runway Safety Improvements** was a 2009 project at Petersburg airport consisting of the following work scope: base reclamation, regrading, and HMA overlay. The following details of the project are of interest:

Area	=	932,240 sf
CP	=	$ 9,781,787
CP_NP	=	$ 739,800
AK_NP	=	$ 0
CC	=	$ 12,584,336
DC	=	$ 226,805
CP_P	=	$ 9,781,787 - $ 739,800 = $ 9,041,987
AK_P	=	CC – CP
	=	$ 12,584,336 – $ 9,781,787 = $ 2,802,549
TP	=	DC + AK_P + CP_P
	=	$ 226,805 + $ 2,802,549 + $ 9,041,987 = $ 12,071,341
Unit Cost	=	TP / Area
	=	$ 12,071,341 / 932,240 sf = **$12.95 / sf**

Standardize Costs for Geographic Location and Time

Two of the inherent difficulties in estimating pavement construction costs are the geographic variability of these costs throughout Alaska coupled with variability over time. To effectively use the unit cost data derived from the 55 reviewed construction project records, we standardized unit costs to the 2023 cost of construction in Anchorage by the following method.

To standardize costs for geography, we elected to create an index based on heating fuel as a proxy. The benefits of this method are as follows. First, the State of Alaska monitors and publishes the average cost of heating fuel in 100 communities throughout the state, so a ready source of data if available. Second, heating fuel is essentially the same as diesel fuel. Third, the price of diesel fuel is a major cost driver for construction projects.

Heating fuel costs are conducted and published by the Division of Community and Regional Affairs (DCRA) at https://gis.data.alaska.gov/search?tags=heating%2520fuel%2520prices . As discussed on the DCRA website, heating fuel is shipped throughout the state by truck, barge and even by air, depending on access to each community, and the price of heating fuel is highly dependent upon the cost of transporting the fuel to each community.

DCRA classifies fuel prices by region, listed as follows and shown in Figure 4:

- Southeast (SE)
- Southwest (SW)
- Gulf Coast (GC)
- Interior (INT)
- Western (W)
- Northwest (NW)
- Northern Slope (NS)
- South Central (SC)

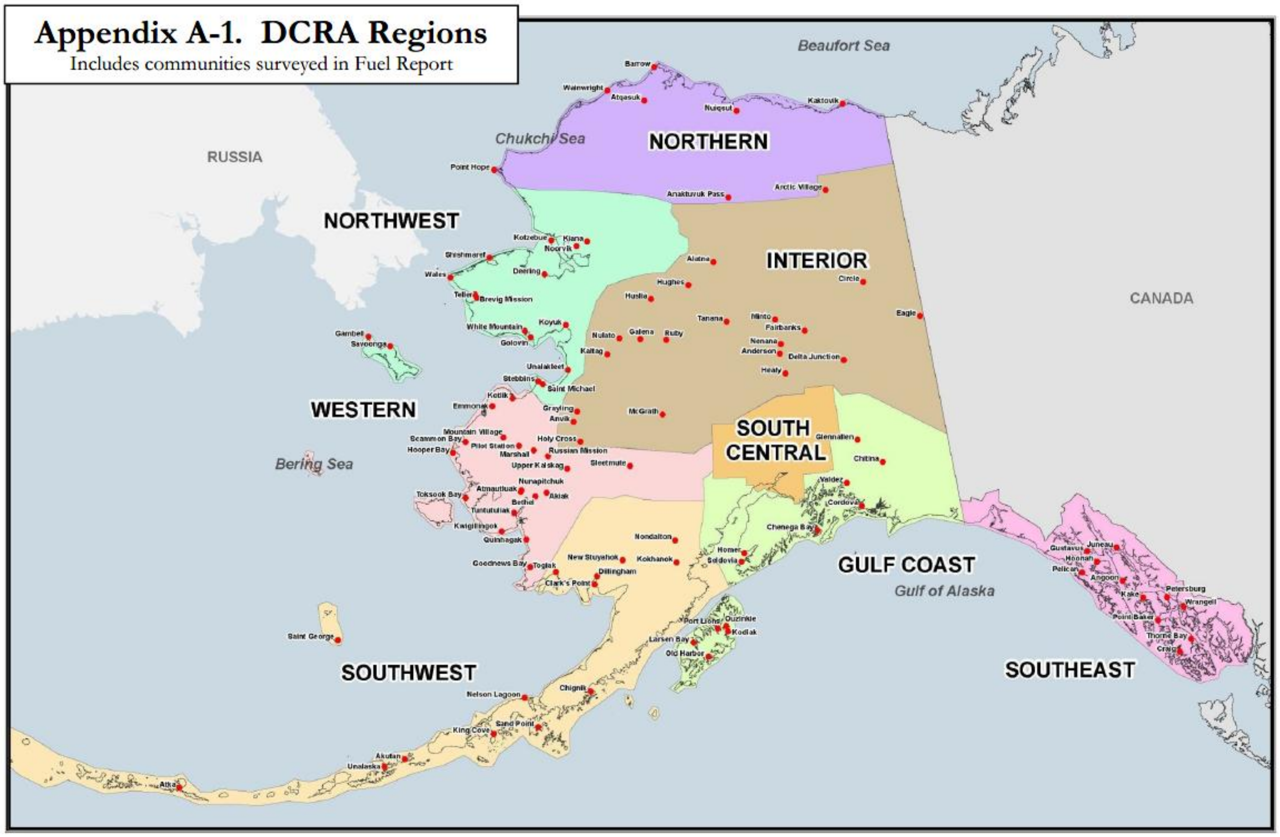


Figure 4—DCRA Regions

Note: Because national fuel surveys in 2005 included Southcentral Alaska only, the DCRA fuel survey was intentionally designed to report on fuel prices in unreported regions of Alaska. For this reason, the DCRA survey does not report on prices in the Anchorage/Mat-Su region (South Central).

DCRA also tracks the price of gasoline and publishes a comparison of the average prices of a gallon of regular gasoline in Anchorage along with the national average price in the US.

From these two sources of information, we computed the average heating fuel price for each of the seven DCRA regions during the period 2005 to 2024 as shown in Table 4.

Table 4—Regional Heating Fuel Cost by Year ($)

Year	Southeast	Southwest	Gulf Coast	Interior	Western	Northwest	Northern
2024	5.25	6.84	5.26	7.01	7.76	6.53	7.45
2023	5.35	6.75	5.42	6.78	7.47	6.56	9.00
2022	4.73	5.49	4.90	5.84	6.57	5.44	6.92
2021	3.65	4.21	3.44	4.92	5.17	4.55	6.54
2020	3.67	4.90	3.42	5.07	5.18	4.95	6.54
2019	3.97	5.08	3.91	5.19	5.53	4.85	6.54
2018	3.76	4.16	3.76	5.13	5.31	4.50	6.54
2017	3.29	3.93	3.39	4.77	5.12	4.78	6.75
2016	3.29	4.34	3.37	4.99	5.64	5.14	6.73
2015	4.19	5.07	4.21	5.45	6.41	6.18	7.53
2014	4.60	5.75	4.85	5.39	6.54	6.23	7.53
2013	4.72	5.83	4.92	5.53	6.63	5.98	7.16
2012	4.66	5.92	4.81	5.23	6.59	6.16	6.68
2011	4.53	5.30	4.60	5.15	5.61	5.79	6.67
2010	3.64	4.71	3.92	4.86	4.96	5.58	6.34
2009	3.62	5.26	3.76	5.17	6.76	7.12	6.35
2008	5.30	5.78	5.00	5.71	6.34	6.12	5.68
2007	3.64	4.17	3.35	4.36	4.84	4.53	4.80
2006	3.31	3.98	2.96	3.98	4.72	4.40	4.46
2005	3.24	3.58	2.99	3.47	3.79	3.61	3.93

The regional heating fuel costs presented in Table 4 were used to standardize pavement costs for any project in Alaska during the period 2005 to 2024 to the cost of a current pavement treatment in Anchorage.

The calculation steps to standardize pavement treatment unit costs is as follows:

1. Compute the unit cost ($/sf) in the year of construction.
2. Factor up the unit cost from the year of construction to 2023 using the ratio of heating fuel prices.
3. To standardize the unit cost to Anchorage, multiply by the ratio of the 2023 heating fuel price in the Gulf Coast Region to the region of the project.

Example—Standardize 2009 Petersburg Pavement Treatment Unit Costs

As an example, we applied this methodology to the 2009 Petersburg project, which is in the Southcoast Region.

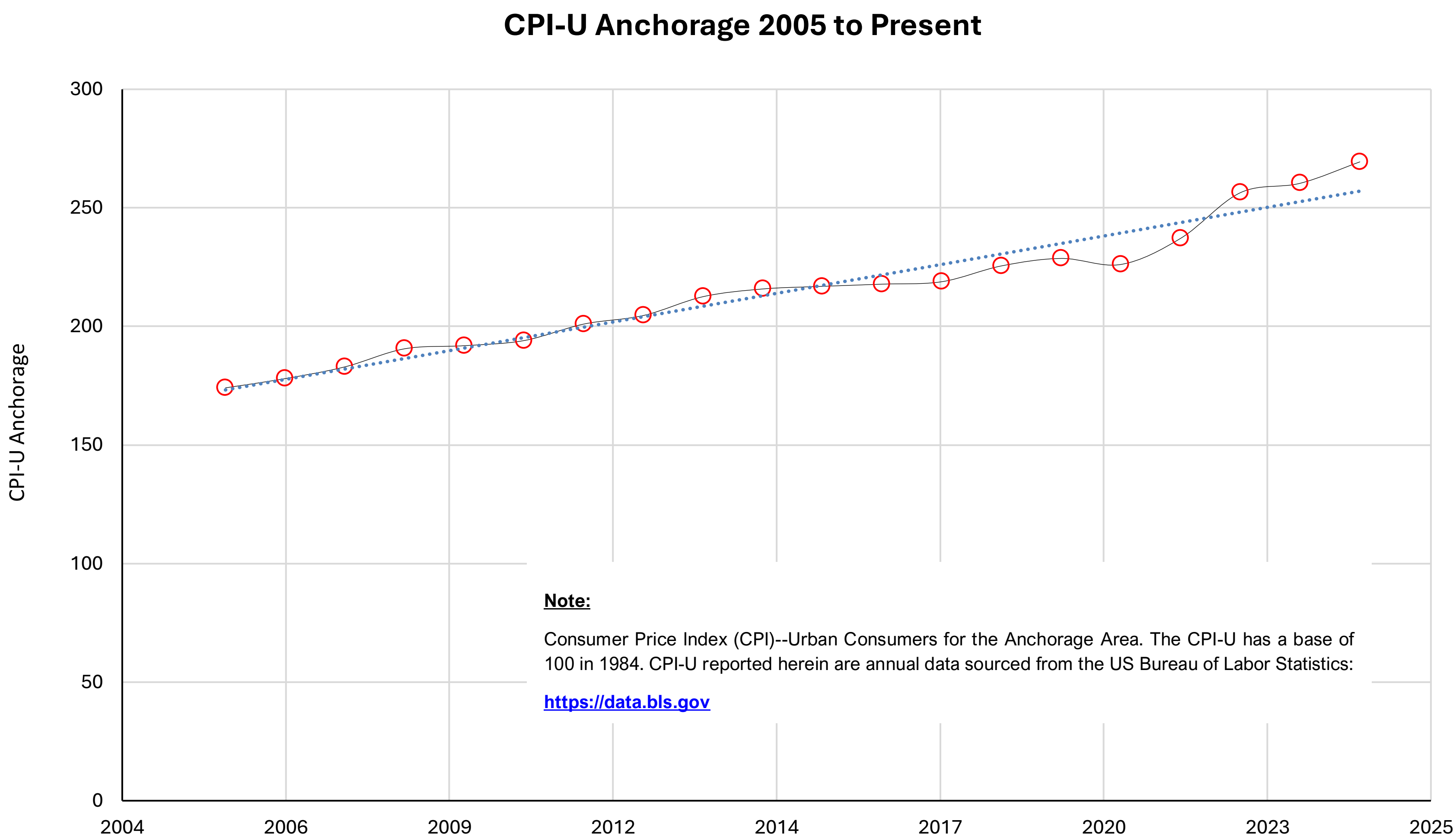
Step 1 **Establish Unit Cost for Year of Construction in Region of Construction**	Petersburg Airport Base Reclamation	Unit Cost
		2009 Petersburg
		$12.95 / sf

Step 2 **Bring Cost Forward to 2023**	Southcoast Heating Fuel Cost			Unit Cost
	2009	2023	Factor	2023 Petersburg
	$2.96/gal	$5.46/gal	1.845	$23.89 / sf

Step 3 **Standardize Cost to Anchorage (Gulf Coast)**	2023 Heating Fuel Costs			Unit Cost
	Southcoast Region	Gulf Coast Region	Factor	2023 Anchorage
	$5.46/gal	$4.71/gal	0.863	$20.61 / sf

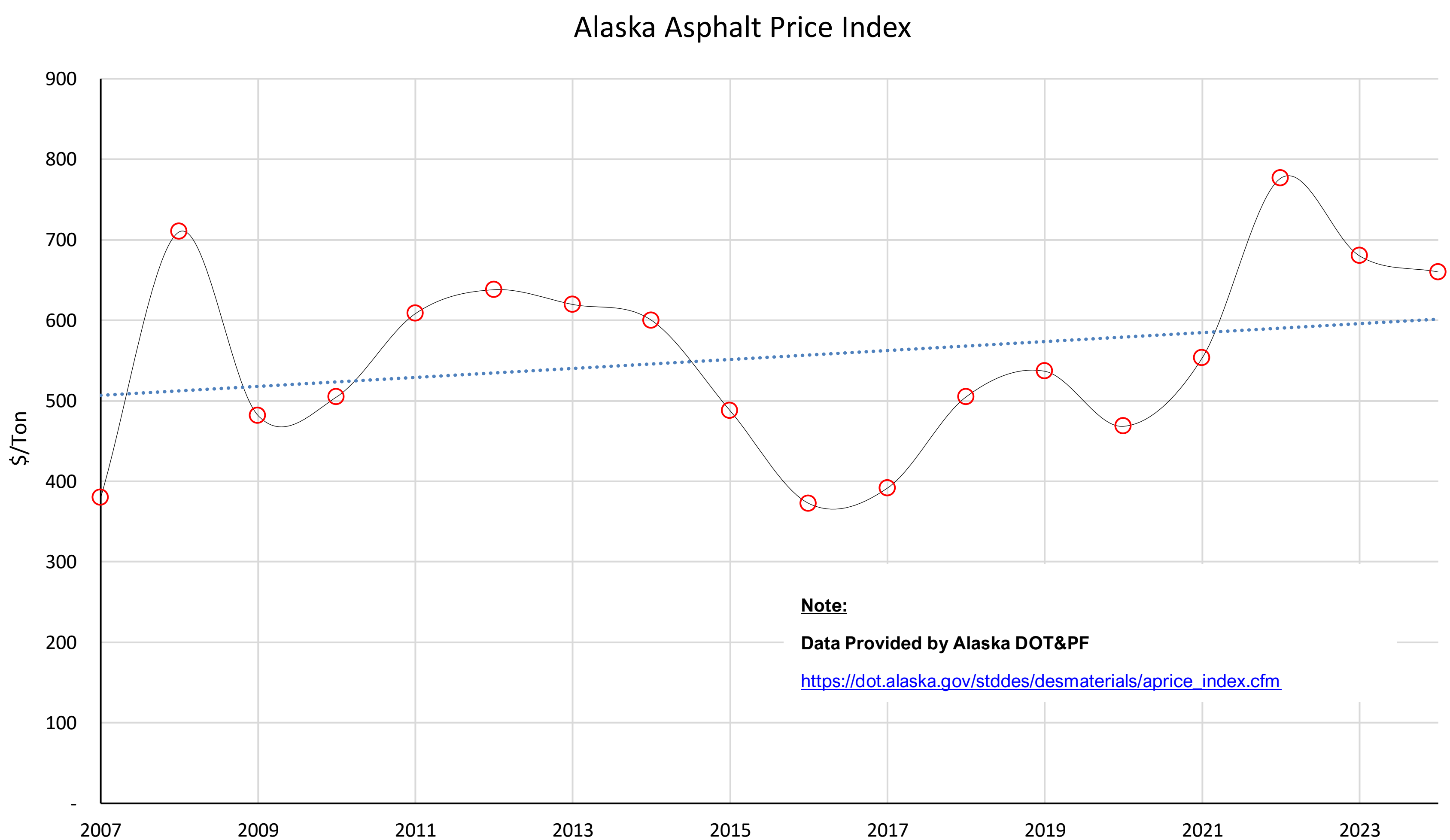
PROJECT COST INFLATION FACTORS

Consumer Price Index Anchorage Area 2005 to Present



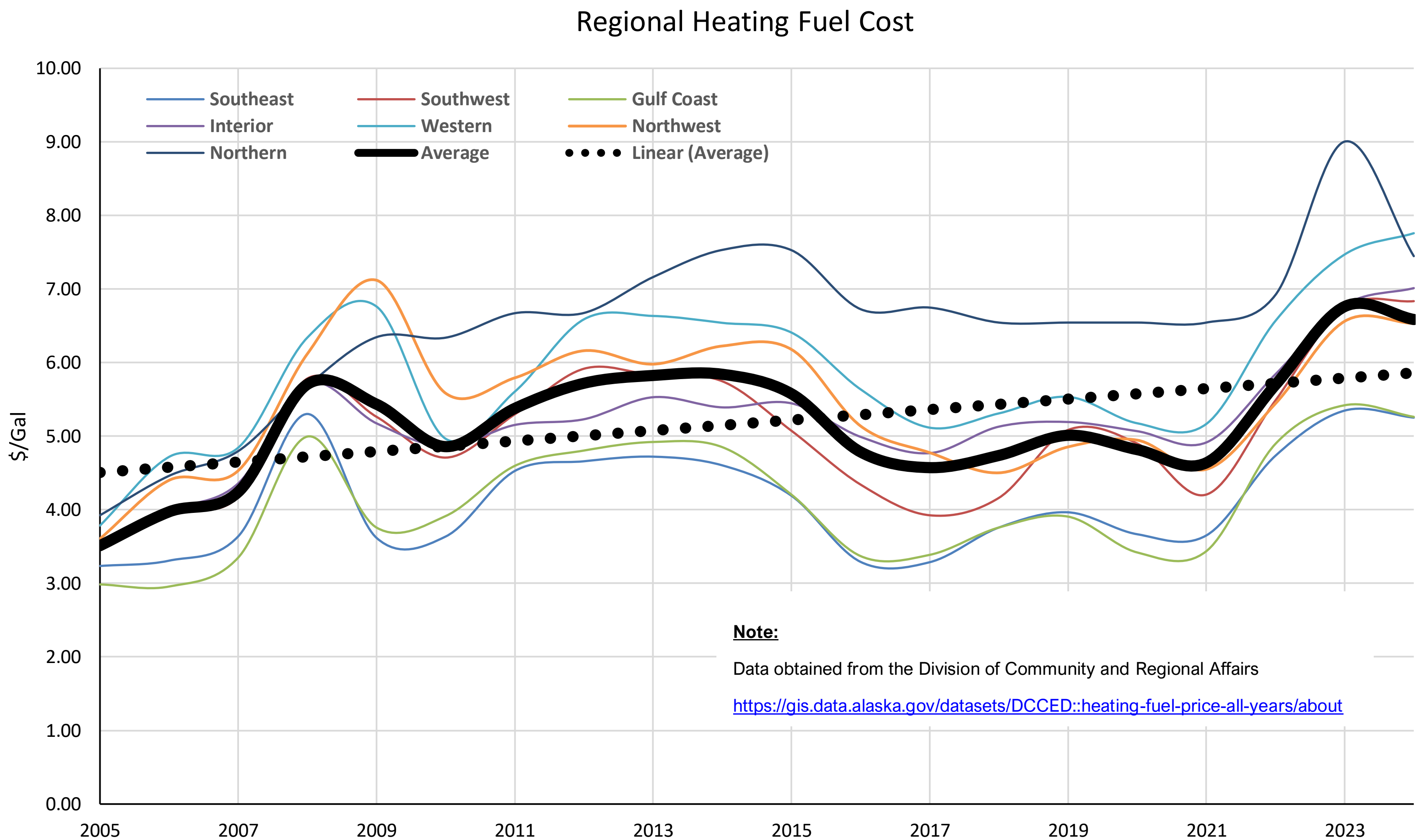
- From 2005 to 2024, CPI-U Anchorage has increased an average of 2.54% per year based on the trendline shown.

Alaska Asphalt Price Index 2007 to Present



- Alaska API varies considerably. The trendline indicates an average annual increase of 1.09%.

Alaska Regional Heating Fuel Costs 2005 to Present



- Fuel prices vary considerably and a linear trendline indicates an annual average increase of 1.57%.

Alaska Flexible Pavement Design Manual

Chapter 8, Life Cycle Cost Analysis, Section 8.4 LCCA Using AKFPD, step 5 notes the following:

> *"The analysis period must be 35 years and the discount rate must be 3%. These values may be changed by directive from the Chief Engineer."*

This discount rate is used to convert future costs to present worth in a life cycle cost analysis, this also can be used to develop future costs from the present costs as an inflation factor.

Summary of Project Cost Inflation Factors

The project team considered four different methods of assessing how inflation affects the unit cost of pavement preservation treatments in Alaska. The following is a summary of four inflation factors discussed above.

Table 5—Summary of Project Cost Inflation Factors

Source of Information	Average rate of change per year of the trendline
Consumer Price Index	2.54%
Asphalt Price Index	1.09%
Average Heating Fuel Cost	1.57%
Flexible Pavement Design Manual	3.00%

From Table 5 it is clear that the four methods of estimating the inflationary effect on project costs produce rates ranging from a low of 1.09% to a high of 3%. While CPI is a broad index that reflects the totality of cost increases in the market, Heating Fuel Cost and Asphalt Price Index are more narrow indices that attempt to capture cost increases for specific materials. Neither of the three indices is perfect for our purpose and we are faced with a decision as to which factor is best for the Alaska DOT&PF to use for projecting pavement preservation treatment costs into the future. In consideration of the above sources to develop future cost data, and in discussion with the Alaska DOT&PF Project Manager, the project team established a 3.0% inflation factor for use in developing budgets for 5-year and 10-year models for this year's report.

STANDARDIZED 2024 PAVEMENT M&R CONSTRUCTION COSTS

Table 6 through Table 8 list unit costs within the PAVER database that are used to develop M&R plans. Localized M&R funds are allocated to each airport as part of AIP funding and are not tracked on a per-line-item basis. This approach makes it difficult to determine the unit costs for localized work, as the funds are dispersed in a more general manner. To address this challenge, the project team proposed comparing similar roadway localized costs to establish a more accurate baseline.

Alaska DOT&PF staff were able to obtain unit costs for the work types listed below and upon review it is apparent that unit costs for roadway work conducted in Anchorage is approximately double the default unit costs for comparable roadway work types in PAVER. Consequently, we have applied a multiplier of 2 to all PAVER airfield default unit costs for localized work as shown in Table 6.

Although some of the work types listed may not always be utilized in Alaska, the full suite of work types are used to develop cost by condition curves for the distress maintenance policies that are presently applied. This ensures that cost estimates remain consistent and reflective of actual maintenance practices in place.

Table 6—Anchorage Localized M&R Work Unit Costs

Localized Work Type	Cost	Units
Crack Sealing - AC	$5.15	ft
Grinding (Localized)	$9.89	ft
Joint Seal (Localized)	$5.15	ft
Patching - AC Deep	$14.42	sf
Patching - AC Shallow	$6.69	sf
Crack Sealing - PCC	$5.15	ft
Patching - PCC Full Depth	$51.50	sf
Patching - PCC Partial Depth	$13.39	sf
Slab Replacement - PCC	$37.08	sf

Table 7—Anchorage Global M&R Work Unit Costs

Global Work Type	Cost ($/sf)
Emulsified Asphalt Seal Coat (P-608)	$1.24
Rapid Cure Seal Coat (P-608-R)	$1.24
Sand Seal (P-633)	$1.24

Table 8—Anchorage Major M&R Work Unit Costs

Rehabilitation Work Type	Cost ($/sf)
Minor Rehabilitation - AC	$11.58
Major Rehabilitation - AC	$18.32
Complete Reconstruction - AC	$38.32
Minor Rehabilitation - PCC	$28.94
Major Rehabilitation - PCC	$39.27
Complete Reconstruction - PCC	$81.42

MODIFIED FUEL FACTORS

We observed several outlier airports when comparing the heating fuel price for individual airport locations in the seven DCRA regional groups. For example, Fairbanks and McGrath are both within the DCRA Interior Region, but the per gallon fuel price is $4.18 in Fairbanks and $8.22 in McGrath (nearly double). Based on this observation, we modified the regional groupings slightly to better account for these outliers.

The area-weighted combined fuel factor was calculated by dividing the area-weighted average heating fuel cost for a group by the Anchorage heating fuel cost. The modified fuel factors shown in Table 9 and Figure 5.

Table 9—Modified Fuel Factor Groups

Modified Fuel Factor Group	Number of Airports	Modified Fuel Factor
Anchorage	4	1.00
Central Interior	14	1.13
Southcoast	18	1.30
Northwest	4	1.55
Western / Northern	10	1.94
Southcoast Island	4	2.28

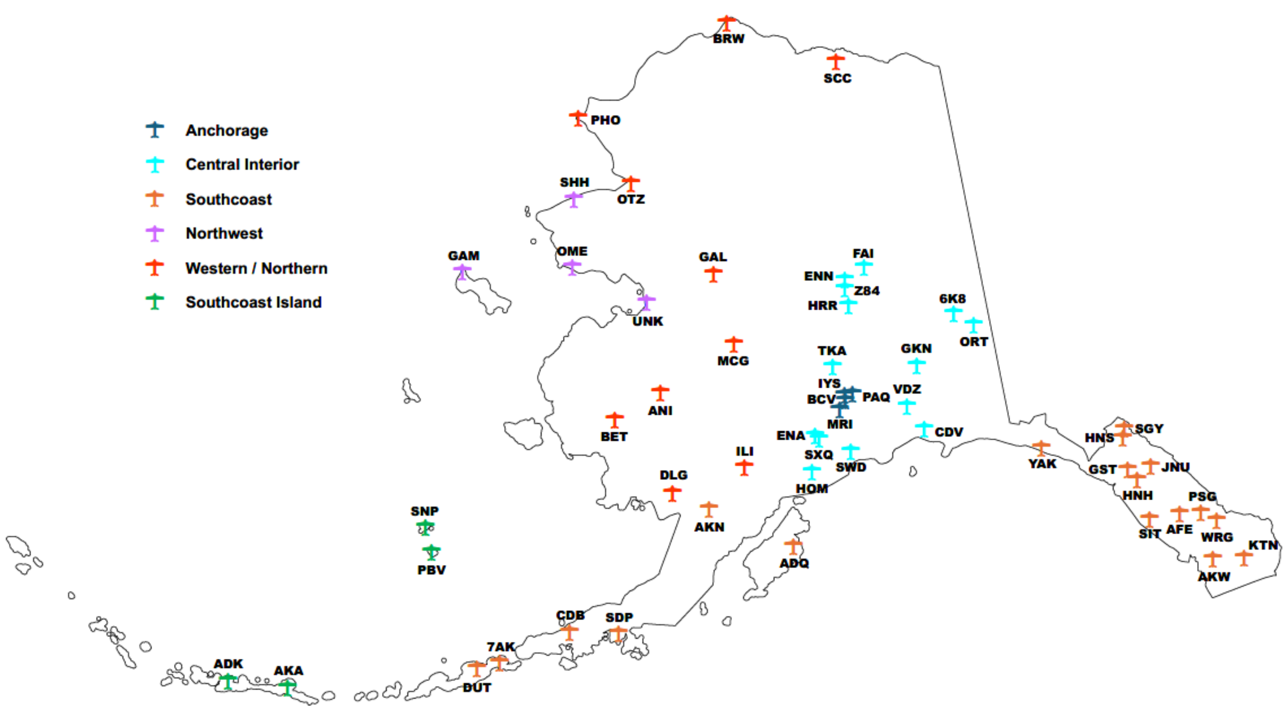


Figure 5—Airport Location Relative to Modified Fuel Factor Groups

Table 10 shows the fuel price and modified fuel factor for each airport relative to its assigned modified fuel factor group.

Table 10—Airport Assignments to Modified Fuel Factor Groups for Unit Cost Analysis

PAVER Network ID	Fuel Price ($/gal)	Fuel Factor	Modified Fuel Factor	Modified Fuel Factor Group
Birchwood	$3.82	1.00	1.00	Anchorage
Merrill	$3.82	1.00		
Palmer	$3.82	1.00		
Wasilla	$3.82	1.00		
Clear	$4.13	1.08	1.13	Central Interior
Cordova	$4.80	1.26		
Fairbanks	$4.18	1.09		
Gulkana	$3.90	1.02		
Healy R.	$4.27	1.12		
Homer	$4.46	1.17		
Kenai	$4.46	1.17		
Nenana	$4.15	1.09		
Northway	$4.33	1.13		
Seward	$4.46	1.17		
Soldotna	$4.46	1.17		
Talkeetna	$4.46	1.17		
Tok	$4.33	1.13		
Valdez	$4.08	1.07		
Akutan	$4.60	1.20	1.30	Southcoast
Cold Bay	$4.72	1.23		
Gustavus	$4.81	1.26		
Haines	$4.81	1.26		
Hoonah	$5.19	1.36		
Juneau	$4.99	1.30		
Kake	$6.16	1.61		
Ketchikan	$5.06	1.32		
King Salmon	$5.00	1.31		
Klawock	$5.01	1.31		
Kodiak	$4.72	1.24		
Petersburg	$5.18	1.35		
Sitka	$5.08	1.33		
Skagway	$4.81	1.26		
Unalaska	$5.82	1.52		
Wrangell	$5.23	1.37		
Yakutat	$4.81	1.26		
Sand Point	$5.07	1.33		
Nome	$5.89	1.54	1.55	Northwest
Unalakleet	$5.89	1.54		
Gambell	$6.80	1.78		
Shishmaref	$5.02	1.31		
Dillingham	$6.69	1.75	1.94	Western / Northern
Iliamna	$7.54	1.97		
Galena	$8.17	2.14		
McGrath	$8.22	2.15		
Aniak	$7.50	1.96		
Bethel	$6.95	1.82		
Point Hope	$7.60	1.99		
Kotzebue	$7.94	2.08		
Deadhorse	$7.50	1.96		
Barrow	$7.03	1.84		
Adak	$7.95	2.08	2.28	Southcoast Island
Atka	$7.95	2.08		
Saint George	$10.30	2.70		
Saint Paul	$10.30	2.70		

SUMMARY

This report documents the development of pavement treatment unit costs for use in the Airport Pavement Management Program. Unit costs are used within the PAVER database to predict annual pavement maintenance and repair budgets for paved airports within Alaska.

Derivation of appropriate pavement M&R unit costs is not trivial. First, pavement unit costs were derived from a sample of actual construction projects completed by Alaska DOT&PF during the period 2005 to 2024. We carefully reviewed the projects, assigned work categories, removed costs unrelated to pavement M&R, and computed a unit cost for the pavement treatment based on the area treated. We then developed a method of standardizing pavement M&R costs around the state to a single location—Anchorage—by use of published heating fuel prices. Lastly, we ensured that unit costs were adjusted to a standard year of analysis—2024. Upon further analysis, we developed modified fuel factor groups to better account for outlier airports.

Through this process, unit costs for a range of pavement M&R treatments were developed for three categories: Localized Pavement Preservation and Corrective Maintenance Global Surface Treatments , and Major Rehabilitation or Reconstruction. These unit costs are used for a variety of purposes in PAVER including the analysis of alternative M&R budget scenarios.

♦ ♦ ♦

Appendix D
Alaska Airport
Pavement Management Program
2024 Pavement Classification Ratings

April 2025

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

The Aircraft Classification Rating - Pavement Classification Rating (ACR-PCR) method for reporting pavement strength was developed by the International Civil Aviation Organization (ICAO). The purpose of the ACR-PCR method is to provide aviation authorities around the globe with a unified and straightforward method of reporting and evaluating pavement strength.

In the ACR-PCR method, one compares the relative loading effect of an aircraft (Aircraft Classification Rating or ACR) to the relative strength of the pavement for unrestricted operations (Pavement Classification Rating or PCR). ACRs and PCRs are computed for a specific combination of pavement type, aircraft tire pressure, and subgrade soil strength. ACRs and PCRs may be computed for two types of pavements, four tire pressure categories, four subgrade strength categories, and two evaluation types, as shown in Table 1.

Table 1—PCR Codes [1]

Pavement Category	Code	Notes
Rigid	R	Portland Cement Concrete
Flexible	F	Asphalt Concrete

Tire Pressure Category	Code	Tire Pressure Range
Unlimited	W	No pressure limit
High	X	Pressure limited to 254 psi
Medium	Y	Pressure limited to 181 psi
Low	Z	Pressure limited to 73 psi

Subgrade Strength Category	Code	Elastic Modulus (E) (psi)	Represents E (psi)
High	A	29,008	E > 21,756
Medium	B	17,405	14,504 < E < 21,756
Low	C	11,603	8,702 < E < 14,504
Ultra Low	D	7,252	E < 8,702

Evaluation Category	Code	Notes
Technical Study	T	Computation used to determine PCR
Using Aircraft	U	Maximum ACR from among current fleet

[1] Federal Aviation Administration (2022), *Standardized Method of Reporting Airport Pavement Strength – PCR*, Advisory Circular 150/5335-5D, US Department of Transportation, Washington, DC, April 29, 2022.

Aircraft manufacturers typically publish ACRs for aircraft at a range of aircraft weights. Airport authorities then must compute a PCR for the public-use airport pavements. As a member of ICAO, the FAA is obligated to report runway pavement strength using the ACR-PCR system and has developed a method for computing PCR to be used by airport authorities in the United States.

Furthermore, the FAA has tied US airports' future eligibility for AIP funding to the requirement to assign and publish PCRs for paved runways. This requirement appears in a letter from the FAA Office of Safety and Standards to Airport Sponsors, dated April 29, 2022, based on the following statement:

> *"Effective with the publication of AC 150/5335-5D, the FAA requires all public use paved runways at all 14 CFR Part 139 certificated airports to be assigned gross weight and PCR data by September 30, 2024. Furthermore, the FAA requires that all airports assign gross weight and PCR data to airport pavements as part of projects funded with federal grant monies that* ***include pavement management****, rehabilitation or reconstruction."* [2] ***(bold emphasis added)***

To fulfill this requirement, PCRs are being computed for each airport in the Alaska Airport PMP. Generally, PCRs have been computed at the same time PCI inspections were performed. Runway PCRs are published in individual airport reports beginning in 2023 through 2024.

METHODOLOGY

FAA Advisory Circular 150/5335-5D, Standardized Method of Reporting, Airport Pavement Strength – PCR, establishes the methodologies for computed PCRs for FAA-funded airport pavements. For technical evaluations of PCR, the FAA method is embodied within FAARFIELD, which is the FAA software that conducts both airport pavement thickness design and pavement strength reporting using the ACR/PCR.

Computation of the runway pavement PCR follows a stepwise process, as follows:

1. The pavement must be divided into individual sections of the same age, pavement type, and structural section.
2. For each pavement section on the runway, the following inputs are required:
    a. Pavement surface type and thickness.
    b. Base layer material type and thickness (and whether stabilized or not).
    c. Subbase layer material type and thickness (and whether stabilized or not).
    d. Subgrade soil type and strength or stiffness.
3. Develop an aircraft fleet mix for the airport.
4. Compute PCR for each runway section using FAARFIELD.
5. Typically, the lowest section PCR is selected to be published for the runway.

[2] Federal Aviation Administration (2022). Letter to Airport Sponsors, Office of Airport Safety and Standards, AAS-110, US Department of Transportation, Washington DC, April 29, 2022.

PHYSICAL PROPERTY DATA

For this study, we established the physical property data (thickness, type, and strength properties) of each runway pavement section based upon a desktop review of available Alaska DOT&PF as-built construction records and other reports. Careful review of as-built construction plans, geologic studies, geotechnical engineering project reports, and related documents allowed the development of an understanding of the current runway structure. This required our engineers to consider how the airport was constructed over time, including strengthening, lengthening, widening, and otherwise reconfiguring the airport pavement system over a period of several decades. Based on our review of the available documents, we established a physical property data (PPD) table to summarize our understanding of the pavement sections for the airport runway. The following is the PPD established for Gustavus Airport which is presented as an example of the PPD tables developed for this project.

Table 2—Gustavus Airport Physical Property Data Table

		Pavement		Base		Subbase		Subgrade	
Branch ID	**Section ID**	**Thick (in)**	**Type**	**Thick (in)**	**Type**	**Thick (in)**	**Type**	**Type**	**CBR**
Runway 11/29 6100	6100-01	4.5	P-401	6	P-209	-	-	SP-SM	10
	6100-03	4.5	P-401	6	P-209	-	-	SP-SM	10
	6100-05	4.5	P-401	6	P-209	-	-	SP-SM	10
	6100-06	3	P-401	8	P-209	-	-	SP-SM	10
	6100-07	2	P-401	8	P-209	-	-	SP-SM	10
Runway 2/20 6200	6200-01	4	P-401	10	P-209	5	P-154	SP-SM	10
	6200-02	4	P-401	6	P-209	9	P-154	SP-SM	10
	6200-03	4	P-401	6	P-209	9	P-154	SP-SM	10

The data from the PPD was then entered into the FAARFIELD software. We entered each unique runway section into FAARFIELD separately. In the case that more than one section shared the same section as reported in the PPD, we only entered one section. For the Gustavus Airport PPD shown above, a total of five sections were entered into FAARFIELD, three sections for RW 11/29 and two sections for RW 2/20.

AIRCRAFT FLEET MIX

The aircraft fleet mix for each airport was established based on review of the previous five years of data from two separate sources. The primary source was a report produced from an analysis of FAA Aviation System Performance Metrics (ASPM) records for the period 2016 to 2022, with the data grouped by airport calendar year. This data included a list of each aircraft that filed a flight plan with the FAA to travel to or from one of the airports of interest in the Alaska Airport PMP. The second source was produced from the Traffic Flow Management System Counts (TFMSC), which is affiliated with FAA ASPM system but includes only DoD aircraft. Due to the proximity of two large air bases in Alaska, there are frequent training missions to Alaska public use airports by military aircraft. Using the data from these two sources, we established a fleet mix for each airport and entered that fleet mix into FAARFIELD.

A FAARFIELD screenshot is presented in Figure 1 to demonstrate how the PPD and aircraft fleet mix data were entered into FAARFIELD.

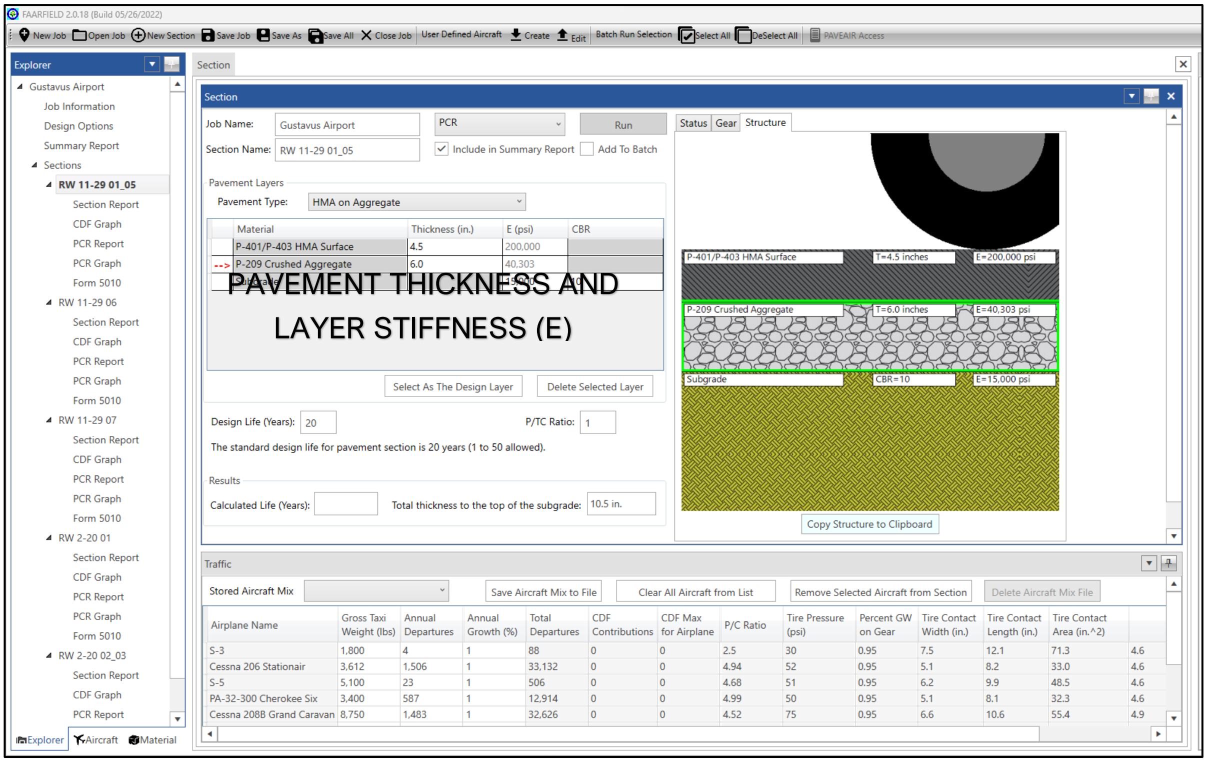


Figure 1—FAARFIELD Screenshot Showing PCR Input Data for Gustavus Airport

FAARFIELD OUTPUT

We ran FAARFIELD to compute the PCR for each runway at the airports under consideration during the study year. FAARFIELD computes the PCR and identifies the controlling aircraft for the PCR. We computed PCRs for 22 runways evaluated in 2023 and 10 runways in 2024, which are presented in Table 3 and Table 4.

Table 3—Runway PCRs Computed for Alaska Airports in 2023

Airport	Runway	PCR	Airport	Runway	PCR
Adak	5/23	2482/F/B/W/T	Klawock	2/20	575/F/B/X/T
Atka	16/34	509/F/C/X/T	Kodiak	1/19	1424/F/C/W/T
Cold Bay	8/26	1137/F/B/W/T	Kodiak	8/26	1301/F/C/W/T
Cold Bay	15/33	1023/F/B/W/T	Kodiak	11/29	739/F/C/W/T
Deadhorse	6/24	403/F/A/X/T	McGrath	16/34	991/F/C/W/T
Dillingham	1/19	738/F/C/W/T	Petersburg	5/23	418/F/B/X/T
Gustavus	11/29	418/F/B/X/T	Sand Point	13/31	1018/F/A/W/T
Gustavus	2/20	237/F/B/X/T	Sitka	11/29	461/F/B/X/T
Iliamna	8/26	334/F/C/W/T	St George	11/29	520/F/C/W/T
Iliamna	18/36	334/F/C/W/T	St Paul	18/36	878/F/C/W/T
Ketchikan	11/29	635/F/B/X/T	Wrangell	10/28	384/F/A/X/T

Table 4—Runway PCRs Computed for Alaska Airports in 2024

Airport	Runway	PCR	Airport	Runway	PCR
Aniak	11/29	882/F/B/X/T	King Salmon	18/36	1170/F/B/X/T
Bethel	1L/19R	530/F/C/X/T	Kotzebue	9/27	710/F/B/X/T
Bethel	1R/19L	360/F/C/X/T	Point Hope	3/21	527/F/B/X/T
Gambell	16/34	221/F/C/X/T	Shishmaref	5/23	239/F/C/X/T
King Salmon	12/30	550/F/B/X/T	Wasilla	4/22	129/F/D/X/U

The runway PCRs presented in Table 3 and Table 4 were computed based on the methodology detailed in FAA AC 150/5335-5D. In some cases, PCRs were adjusted based on engineering judgement or the needs of the Alaska DOT&PF. For this reason, the PCRs in the above tables may not be the same as those published in the individual airport reports for these airports. Moreover, where a difference in the PCR exists between this document and the individual airport reports, the PCR reported in the individual airport report shall take precedence.

LIMITATIONS

The preferred method for establishing the PPD for runway sections is to conduct a program of pavement coring and testing to measure layer thickness and estimate layer strength. Rather than perform field testing as described above, we conducted a desktop review of the available construction records. In the case of conflicting or missing data, we completed the PPD based on conservative assumptions and estimates. In addition, for airports with pavement base, subbase, or subgrade layers constructed of frost-susceptible materials, we conservatively reduced the reported strength of the layer to that during the thaw-weakened condition. For these reasons, the PCRs presented in Table 3 are conservatively low in some cases.

In one or two cases, when we compared the computed PCRs to the ACRs of using aircraft on a runway, and the runway did not exhibit any load-related damage, it became clear that the conservative assumptions and estimates used in our calculations had resulted in a PCR that did not represent the actual runway strength. In these cases, we reverted to the ACR of the using aircraft as the PCR. The one or two cases where this occurred are noted in the individual airport reports.

SUMMARY

Runway PCRs were computed in conformance with the guidance in FAA AC 150/5335-5D and have been published for airports inspected in 2022 and 2023. The PCRs are published in the individual airport reports for each airport.

♦ ♦ ♦

Appendix E
Alaska Airport
Pavement Management Program
2024 PAVER Work Plan Details

April 2025

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

We recommend that Alaska DOT&PF target a PCI of 70 for the Alaska airport pavement system. M&R activities planned and programmed by the Department in past years, and funded by the FAA through the AIP program, have resulted in a relatively high average PCI of 72 across a system of 54 airports in Alaska. This is a remarkable achievement and Alaska DOT&PF should take stock of the relatively high condition of its airport pavement system.

With an average PCI of 72, the pavement system's condition is approaching the critical PCI of 70. Although the PCI is still above this critical threshold, the pavement system will benefit more from a sustained program of pavement preservation rather than major repair work. The pavement preservation approach takes advantage of lower-cost technologies, such as seal coats, to preserve and protect a structurally sound pavement in a relatively high state of condition. Since pavement preservation treatments cost only a fraction of the price of major work, such as mill/overlay, the preservation approach is to apply these treatments “early and often.” Routine, regular application of seal coats, in concert with crack sealing and patching, is a widely accepted strategy of preserving the high condition of a pavement network at a reasonable cost.

For this reason, we strongly recommend that Alaska DOT&PF adopt Budget Scenario 4—Target PCI 70. At an annual cost of $123M, the Maintain Current PCI budget is approximately 13 percent higher than the current annual budget of $109.25M for pavement M&R. This is a modest increase in annual cost, but at the same time represents a very cost-effective alternative to some of the other scenarios. In addition, Budget Scenario 4—Target PCI 70 will reduce backlog growth by approximately $80M over the five-year period as compared to Budget Scenario 5—Maintain Current Budget.

However, in the event that Alaska DOT&PF continues with their $109.25M annual budget into the five-year period from 2025 to 2029, we are providing the PAVER recommended M&R details for Budget Scenario No. 5—Maintain Current Budget. The following tables and figures summarize how the PMP recommends allocating funds given the current annual budget.

MAINTAIN CURRENT BUDGET WORK PLAN DETAILS

Summary of Budget Scenario 5 - Maintain Current Budget

Alaska DOT&PF expends approximately **$109.25M** per year for pavement M&R. Funding sources for this budget include federal AIP funds in addition to state funds. At this level of investment, the PCI at the end of the five-year analysis period will be **70**. The total amount funded over the five-year analysis period is **$546M** and would result in a backlog of **$1.58B.** An overall summary of this budget is shown in Table 1. Table 2 and 3 depict the total funded per airport by M&R work type and by year, respectively. Tables 4 through 8 display the major M&R per section for each year.

Table 1 - Budget Scenario 5 - Maintain Current Budget ($M)

Date of Plan	Funded M&R Work Type				Total Funded	Total Unfunded	Total Funded and Unfunded	PCI	
	Localized Stopgap	Localized Preventive	Global	Major				Before Work	After Work
2025	$10.14	$9.07	$0.03	$90.00	$109	$1,060	$1,170	72	73
2026	$12.23	$9.83	$5.99	$81.15	$109	$1,124	$1,233	71	73
2027	$14.95	$8.87	$1.02	$84.39	$109	$1,256	$1,365	71	72
2028	$18.02	$8.05	$0.79	$82.36	$109	$1,349	$1,458	70	71
2029	$22.42	$7.77	$0.54	$78.51	$109	$1,584	$1,693	69	70
Total	**$78**	**$44**	**$8**	**$416**	**$546**	**-**	**$2,130**	**72**	**70**

Figure 1 displays the impact on the PCI over time with respect to the total funded and unfunded M&R.

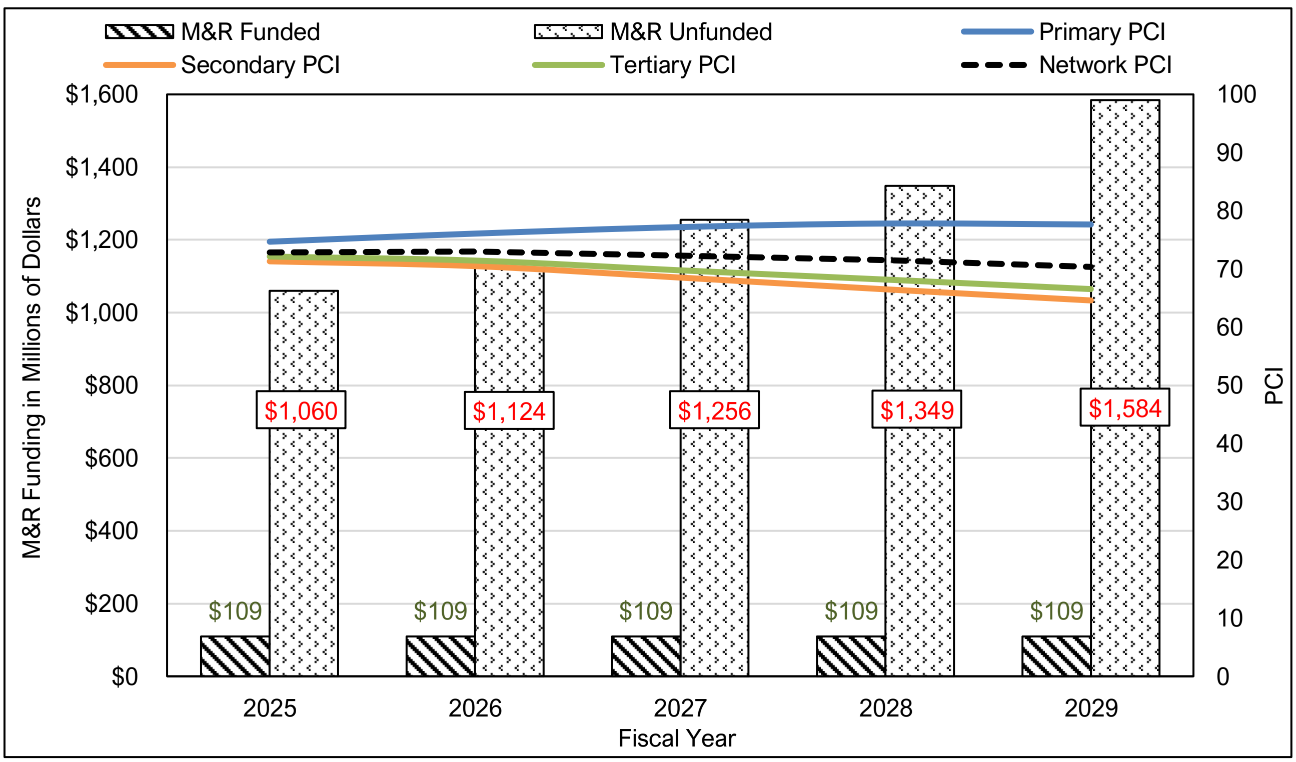


Figure 1 - Budget Scenario 5—Maintain Current Budget

Table 2 - Total Funded per Airport by M&R Work Type (2025 through 2029)

Network ID	Funding by M&R Work Type				Total
	Localized Stopgap	Localized Preventive	Global	Major	
Adak	$12,643,896	$227,775	$0	$0	$12,871,672
Akutan	$0	$88,126	$34,627	$0	$122,753
Aniak	$38,306	$1,869,890	$135,706	$0	$2,043,902
Atka	$170,112	$70,019	$35,123	$0	$275,254
Barrow	$950,359	$3,037,886	$107,823	$29,655,673	$33,751,741
Bethel	$1,541,975	$5,399,426	$444,121	$15,870,203	$23,255,725
Birchwood	$679,285	$204,012	$169,550	$0	$1,052,846
Clear	$533,911	$48,422	$0	$0	$582,333
Cold Bay	$305,513	$501,225	$232,200	$0	$1,038,938
Cordova	$168,367	$216,271	$158,129	$28,553,911	$29,096,678
Deadhorse	$164,688	$3,423,717	$60,355	$26,176,149	$29,824,910
Dillingham	$17,475	$3,031,812	$289,182	$24,875,876	$28,214,345
Fairbanks	$729,833	$2,410,898	$223,808	$42,138,173	$45,502,712
Galena	$931,618	$3,908,694	$361,721	$0	$5,202,033
Gambell	$67,018	$104,905	$36,448	$0	$208,372
Gulkana	$1,397	$290,177	$110,443	$0	$402,017
Gustavus	$0	$244,225	$6,412	$0	$250,637
Haines	$479,507	$81,559	$149,982	$0	$711,047
Healy R.	$744,756	$0	$0	$0	$744,756
Homer	$0	$191,731	$134,390	$0	$326,120
Hoonah	$572,081	$44,923	$0	$0	$617,004
Iliamna	$1,808,223	$337,585	$0	$0	$2,145,808
Juneau	$983,730	$660,890	$548,429	$26,969,071	$29,162,121
Kake	$51,890	$85,462	$707	$0	$138,059
Kenai	$1,496,554	$1,063,302	$648,389	$0	$3,208,245
Ketchikan	$623,323	$263,183	$341,271	$30,751,792	$31,979,569
KingSalmon	$655,102	$703,276	$82,540	$0	$1,440,918
Klawock	$114,921	$272,041	$0	$0	$386,961
Kodiak	$83,115	$587,039	$74,130	$121,657,633	$122,401,917
Kotzebue	$61,650	$3,131,941	$320,584	$8,667,589	$12,181,764
McGrath	$793,401	$2,346,169	$176,609	$0	$3,316,179
Merrill	$262,542	$871,489	$735,869	$139,711	$2,009,610
Nenana	$342,903	$13,878	$0	$0	$356,781
Nome	$635,277	$1,098,611	$151,074	$5,551,235	$7,436,198
Northway	$1,608,601	$0	$0	$0	$1,608,601
Palmer	$665,922	$842,690	$360,374	$0	$1,868,985
Petersburg	$107,379	$122,948	$84,071	$18,719,389	$19,033,788
Point Hope	$0	$781,906	$0	$0	$781,906
Sand Point	$2,511	$417,029	$185,401	$0	$604,941
Seward	$677,661	$139,517	$14,755	$0	$831,933
Shishmaref	$394,676	$22,474	$16,572	$0	$433,721
Sitka	$538,612	$497,561	$259,353	$0	$1,295,526
Skagway	$305,200	$258,983	$0	$0	$564,182
Soldotna	$317,603	$478,324	$675,424	$0	$1,471,351
StGeorge	$0	$493,535	$59,278	$0	$552,813
StPaul	$1,229,225	$641,968	$94,888	$0	$1,966,081
Talkeetna	$6,524	$212,971	$170,111	$0	$389,606
Tok	$774,157	$38,483	$43,043	$0	$855,683
Unalakleet	$1,358,680	$51,124	$0	$0	$1,409,803
Unalaska	$13,877,234	$104,761	$5,617	$0	$13,987,612
Valdez	$826,837	$513,728	$325,650	$0	$1,666,216
Wasilla	$150,858	$482,252	$152,780	$0	$785,890
Wrangell	$93,711	$222,088	$129,601	$21,757,714	$22,203,113
Yakutat	$26,172,686	$442,113	$29,851	$14,934,918	$41,579,568
Total:	**$77,760,803**	**$43,595,014**	**$8,376,390**	**$416,419,037**	**$546,151,244**

Table 3 - Total Funded per Airport by Year (2025 through 2029)

Network ID	Funding by Year					Total
	2025	2026	2027	2028	2029	
Adak	$1,671,201	$2,054,486	$2,499,736	$3,018,772	$3,627,476	$12,871,672
Akutan	$13,780	$50,739	$16,775	$19,358	$22,101	$122,753
Aniak	$431,226	$744,512	$340,817	$257,916	$269,431	$2,043,902
Atka	$39,186	$81,857	$46,038	$51,541	$56,632	$275,254
Barrow	$991,923	$1,037,738	$899,617	$655,362	$30,167,101	$33,751,741
Bethel	$1,033,333	$1,936,858	$1,724,628	$1,396,604	$17,164,303	$23,255,725
Birchwood	$135,525	$170,684	$187,956	$340,258	$218,423	$1,052,846
Clear	$81,905	$97,518	$114,615	$133,073	$155,222	$582,333
Cold Bay	$146,237	$323,555	$161,955	$221,973	$185,218	$1,038,938
Cordova	$88,561	$1,112,528	$12,020,080	$15,810,952	$64,557	$29,096,678
Deadhorse	$635,870	$25,603,919	$1,514,882	$1,012,942	$1,057,297	$29,824,910
Dillingham	$915,324	$855,710	$16,650,087	$9,261,324	$531,901	$28,214,345
Fairbanks	$615,292	$10,955,527	$2,689,024	$21,564,459	$9,678,409	$45,502,712
Galena	$996,870	$1,238,582	$986,911	$1,030,735	$948,936	$5,202,033
Gambell	$47,076	$67,576	$33,693	$27,135	$32,892	$208,372
Gulkana	$51,627	$167,054	$55,773	$61,511	$66,052	$402,017
Gustavus	$29,940	$38,524	$47,509	$58,199	$76,464	$250,637
Haines	$76,559	$225,563	$103,517	$141,774	$163,634	$711,047
Healy R.	$113,692	$129,119	$145,482	$166,545	$189,919	$744,756
Homer	$17,367	$164,254	$36,307	$47,945	$60,247	$326,120
Hoonah	$73,961	$93,380	$116,730	$148,063	$184,870	$617,004
Iliamna	$262,189	$326,356	$422,440	$491,954	$642,869	$2,145,808
Juneau	$312,364	$8,409,824	$16,010,924	$3,941,148	$487,861	$29,162,121
Kake	$28,137	$20,871	$24,800	$29,262	$34,988	$138,059
Kenai	$399,232	$1,110,884	$493,916	$563,987	$640,225	$3,208,245
Ketchikan	$162,615	$8,265,407	$10,645,082	$12,683,742	$222,722	$31,979,569
KingSalmon	$229,989	$342,834	$260,263	$288,180	$319,652	$1,440,918
Klawock	$61,522	$71,058	$74,128	$84,584	$95,669	$386,961
Kodiak	$90,173,859	$287,909	$27,386,788	$4,438,421	$114,939	$122,401,917
Kotzebue	$817,272	$918,226	$994,403	$791,032	$8,660,831	$12,181,764
McGrath	$601,408	$854,666	$864,044	$475,658	$520,403	$3,316,179
Merrill	$195,900	$738,146	$275,404	$336,210	$463,949	$2,009,610
Nenana	$58,763	$60,964	$69,280	$78,316	$89,458	$356,781
Nome	$232,058	$912,729	$368,449	$414,418	$5,508,544	$7,436,198
Northway	$234,143	$272,835	$318,310	$366,320	$416,993	$1,608,601
Palmer	$256,647	$553,734	$402,599	$308,314	$347,692	$1,868,985
Petersburg	$67,275	$18,832,061	$31,707	$44,031	$58,714	$19,033,788
Point Hope	$9,091	$134,003	$240,146	$206,906	$191,760	$781,906
Sand Point	$71,500	$265,735	$80,511	$88,387	$98,807	$604,941
Seward	$128,434	$158,963	$160,419	$180,689	$203,428	$831,933
Shishmaref	$53,271	$83,297	$79,666	$98,215	$119,272	$433,721
Sitka	$182,040	$436,425	$199,984	$225,307	$251,770	$1,295,526
Skagway	$111,735	$125,590	$108,378	$108,460	$110,019	$564,182
Soldotna	$124,461	$541,158	$183,687	$274,982	$347,064	$1,471,351
StGeorge	$79,591	$148,714	$95,909	$107,965	$120,634	$552,813
StPaul	$248,504	$402,743	$361,573	$429,725	$523,536	$1,966,081
Talkeetna	$40,013	$216,128	$44,214	$50,219	$39,032	$389,606
Tok	$123,979	$185,658	$158,941	$180,900	$206,206	$855,683
Unalakleet	$184,689	$187,006	$248,649	$337,898	$451,561	$1,409,803
Unalaska	$2,497,467	$2,667,838	$2,802,269	$2,934,436	$3,085,602	$13,987,612
Valdez	$205,651	$563,557	$256,327	$302,510	$338,171	$1,666,216
Wasilla	$107,288	$194,107	$125,803	$135,631	$223,060	$785,890
Wrangell	$105,223	$10,061,443	$67,138	$11,922,191	$47,119	$22,203,113
Yakutat	$2,676,651	$3,712,523	$4,984,574	$10,870,068	$19,335,753	$41,579,568
Total:	**$109,249,419**	**$109,213,074**	**$109,232,857**	**$109,216,508**	**$109,239,387**	**$546,151,244**

Table 4 - 2025 Major M&R by Section

Alaska DOT&PF Region	Network ID	Branch ID	Branch Use	Section ID	Section Rank	Area (Sqft)	PCI Before Work	Major M&R Cost
Southcoast	Kodiak	0300	Taxiway	0300-01	Primary	168,504	56.89	$10,134,766
Southcoast	Kodiak	0300	Taxiway	0300-02	Primary	30,262	80.80	$1,820,125
Southcoast	Kodiak	0400	Taxiway	0400-01	Primary	297,693	55.37	$17,904,910
Southcoast	Kodiak	0500	Taxiway	0500-01	Primary	90,069	50.32	$5,417,250
Southcoast	Kodiak	0500	Taxiway	0500-01A	Primary	24,367	83.29	$1,465,567
Southcoast	Kodiak	0500	Taxiway	0500-02	Primary	32,276	55.47	$1,941,258
Southcoast	Kodiak	0600	Taxiway	0600-03	Primary	24,365	82.71	$1,465,446
Southcoast	Kodiak	6200	Runway	6200-01	Primary	186,750	56.81	$11,232,182
Southcoast	Kodiak	6200	Runway	6200-02	Primary	186,750	43.65	$11,232,182
Southcoast	Kodiak	6200	Runway	6200-03	Primary	210,000	62.38	$12,630,566
Southcoast	Kodiak	6200	Runway	6200-04	Primary	18,962	66.85	$1,140,480
Southcoast	Kodiak	6200	Runway	6200-05	Primary	19,059	57.49	$1,146,314
Southcoast	Kodiak	6200	Runway	6200-06	Primary	19,813	68.02	$1,191,664
Southcoast	Kodiak	6200	Runway	6200-07	Primary	187,500	79.03	$11,277,291
							2025 Total	**$90,000,000**

Table 5 - 2026 Major M&R by Section

Alaska DOT&PF Region	Network ID	Branch ID	Branch Use	Section I D	Section Rank	Area (Sqft)	PCI Before Work	Major M&R Cost
Central	Merrill	0400	Taxiway	0400-01a	Secondary	6,951	58.35	$139,711
Northern	Cordova	6100	Runway	6100-05	Primary	36,742	57.35	$862,754
Northern	Deadhorse	6100	Runway	6100-01	Primary	325,000	69.79	$7,742,859
Northern	Deadhorse	6100	Runway	6100-02	Primary	325,000	66.05	$9,354,135
Northern	Deadhorse	6100	Runway	6100-03	Primary	325,000	69.01	$8,078,900
Northern	Fairbanks	0120	Taxiway	0120-HS	Primary	2,975	58.89	$152,224
Northern	Fairbanks	0150	Taxiway	0150-02	Primary	8,309	59.89	$178,804
Northern	Fairbanks	0700	Taxiway	0700-02	Primary	35,769	59.80	$772,210
Northern	Fairbanks	6100	Runway	6100-03	Primary	590,000	67.73	$9,127,793
Northern	Nome	0500	Taxiway	0500-01	Primary	11,558	59.29	$348,569
Northern	Nome	0500	Taxiway	0500-03	Primary	3,667	52.12	$138,430
Southcoast	Juneau	6100	Runway	6100-1B	Primary	442,850	67.66	$7,908,059
Southcoast	Ketchikan	6100	Runway	6100-01	Primary	375,000	64.47	$7,758,551
Southcoast	Petersburg	6100	Runway	6100-01	Primary	300,000	65.36	$5,969,781
Southcoast	Petersburg	6100	Runway	6100-01W	Primary	20,000	65.89	$388,574
Southcoast	Petersburg	6100	Runway	6100-03	Primary	300,000	66.61	$5,636,834
Southcoast	Petersburg	6100	Runway	6100-03W	Primary	20,000	66.53	$377,210
Southcoast	Petersburg	6100	Runway	6100-05	Primary	300,000	65.36	$5,969,781
Southcoast	Petersburg	6100	Runway	6100-05W	Primary	20,000	66.53	$377,210
Southcoast	Wrangell	6100	Runway	6100-01	Primary	300,000	69.12	$4,968,276
Southcoast	Wrangell	6100	Runway	6100-05	Primary	300,000	69.37	$4,901,687
							2026 Total	**$81,152,351**

Table 6 - 2027 Major M&R by Section

Alaska DOT&PF Region	Network ID	Branch ID	Branch Use	Section ID	Section Rank	Area (Sqft)	PCI Before Work	Major M&R Cost
Central	Dillingham	6100	Runway	6100-01	Primary	320,000	69.24	$8,092,756
Central	Dillingham	6100	Runway	6100-02	Primary	320,000	69.53	$7,966,049
Northern	Cordova	6100	Runway	6100-01	Primary	281,250	62.18	$5,722,050
Northern	Cordova	6100	Runway	6100-03	Primary	281,250	60.00	$6,209,249
Northern	Deadhorse	1000	Taxiway	1000-01	Primary	25,078	58.55	$1,000,255
Northern	Fairbanks	0100	Taxiway	0100-04	Primary	29,850	59.06	$681,334
Northern	Fairbanks	0130	Taxiway	0130-01	Primary	20,192	59.50	$453,818
Northern	Fairbanks	0200	Taxiway	0200-03	Primary	35,301	59.15	$803,227
Southcoast	Juneau	0510	Taxiway	0510-04	Primary	13,600	55.69	$399,016
Southcoast	Juneau	6100	Runway	6100-1A	Primary	442,850	69.21	$7,517,573
Southcoast	Juneau	6100	Runway	6100-1C	Primary	442,850	68.60	$7,764,614
Southcoast	Ketchikan	6100	Runway	6100-03	Primary	375,000	57.22	$10,477,591
Southcoast	Kodiak	6100	Runway	6100-01	Primary	375,500	69.72	$6,199,148
Southcoast	Kodiak	6100	Runway	6100-02	Primary	375,500	68.95	$6,463,559
Southcoast	Kodiak	6100	Runway	6100-03	Primary	375,500	68.69	$6,552,841
Southcoast	Kodiak	6300	Runway	6300-02	Primary	243,750	69.59	$4,053,059
Southcoast	Kodiak	6300	Runway	6300-03	Primary	243,750	69.68	$4,032,996
							2027 Total	**$84,389,135**

Table 7 - 2028 Major M&R by Section

Alaska DOT&PF Region	Network ID	Branch ID	Branch Use	Section ID	Section Rank	Area (Sqft)	PCI Before Work	Major M&R Cost
Central	Dillingham	6100	Runway	6100-03	Primary	320,000	68.17	$8,817,070
Northern	Cordova	6100	Runway	6100-02	Primary	562,500	53.56	$15,759,857
Northern	Fairbanks	0120	Taxiway	0120-01	Primary	149,900	59.76	$3,438,158
Northern	Fairbanks	0150	Taxiway	0150-01	Primary	17,798	59.93	$405,741
Northern	Fairbanks	0600	Taxiway	0600-02	Primary	50,387	55.60	$1,327,478
Northern	Fairbanks	0800	Taxiway	0800-02	Primary	42,172	55.35	$1,119,689
Northern	Fairbanks	1300	Taxiway	1300-02	Primary	35,491	56.29	$914,964
Northern	Fairbanks	1400	Taxiway	1400-02	Primary	36,350	55.53	$959,750
Northern	Fairbanks	1400	Taxiway	1400-03	Primary	30,692	58.93	$724,839
Northern	Fairbanks	1600	Taxiway	1600-03	Primary	128,757	57.91	$3,148,430
Northern	Fairbanks	6100	Runway	6100-05	Primary	590,000	69.29	$8,930,377
Northern	Kotzebue	6100	Runway	6100-06	Primary	8,750	68.48	$237,277
Northern	Kotzebue	6100	Runway	6100-07	Primary	8,750	69.14	$229,155
Southcoast	Juneau	0210	Taxiway	0210-02	Tertiary	1,978	56.56	$58,153
Southcoast	Juneau	0300	Taxiway	0300-01	Primary	92,494	55.32	$2,827,368
Southcoast	Juneau	0600	Taxiway	0600-01	Primary	12,163	53.54	$392,193
Southcoast	Ketchikan	6100	Runway	6100-05	Primary	375,000	52.34	$12,515,650
Southcoast	Kodiak	6300	Runway	6300-01	Primary	243,750	68.80	$4,356,031
Southcoast	Wrangell	0100	Taxiway	0100-01	Primary	13,960	59.44	$372,556
Southcoast	Wrangell	0100	Taxiway	0100-02	Primary	34,078	59.27	$914,909
Southcoast	Wrangell	6100	Runway	6100-03	Primary	300,000	50.26	$10,600,287
Southcoast	Yakutat	6100	Runway	6100-09	Primary	241,000	69.90	$4,057,178
Southcoast	Yakutat	6200	Runway	6200-08	Secondary	13,750	67.88	$257,640
							2028 Total	**$82,364,752**

Table 8 - 2029 Major M&R by Section

Alaska DOT&PF Region	Network ID	Branch ID	Branch Use	Section ID	Section Rank	Area (Sqft)	PCI Before Work	Major M&R Cost
Central	Bethel	6100	Runway	6100-01	Primary	418,700	69.58	$11,027,516
Central	Bethel	6100	Runway	6100-04	Primary	31,000	69.99	$798,052
Central	Bethel	6100	Runway	6100-05	Primary	31,000	69.91	$801,645
Central	Bethel	6100	Runway	6100-06	Primary	31,000	69.74	$809,278
Central	Bethel	6100	Runway	6100-11	Primary	26,250	69.58	$691,360
Central	Bethel	6100	Runway	6100-12	Primary	31,250	69.79	$813,542
Central	Bethel	6100	Runway	6100-15	Primary	35,500	69.70	$928,811
Northern	Barrow	6100	Runway	6100-01	Primary	295,000	69.04	$8,000,317
Northern	Barrow	6100	Runway	6100-03	Primary	295,000	69.02	$8,008,861
Northern	Barrow	6100	Runway	6100-05	Primary	295,000	69.06	$7,991,769
Northern	Barrow	6100	Runway	6100-06	Primary	28,184	69.59	$741,888
Northern	Barrow	6100	Runway	6100-08	Primary	90,000	68.93	$2,455,115
Northern	Barrow	6100	Runway	6100-09	Primary	90,000	68.91	$2,457,722
Northern	Fairbanks	6100	Runway	6100-01	Primary	590,000	69.69	$8,999,337
Northern	Kotzebue	6100	Runway	6100-02	Primary	295,000	68.57	$8,201,156
Northern	Nome	6200	Runway	6200-05	Primary	240,716	69.58	$5,064,236
Southcoast	Juneau	0210	Taxiway	0210-01	Tertiary	3,178	54.66	$102,095
Southcoast	Yakutat	6100	Runway	6100-01	Primary	54,600	68.54	$1,018,796
Southcoast	Yakutat	6100	Runway	6100-07	Primary	241,000	69.28	$4,323,860
Southcoast	Yakutat	6100	Runway	6100-08	Primary	241,000	69.06	$4,375,300
Southcoast	Yakutat	6100	Runway	6100-12	Primary	51,000	69.54	$902,143
							2029 Total	**$78,512,799**

SUMMARY

Maintenance and Rehabilitation (M&R) plans were generated using the PAVER software which utilizes basic inventory data combined with inspection information, maintenance policies, maintenance costs, and predictions about future pavement conditions. Alaska DOT&PF staff will need to consider the geographic location of each individual airport along with any mobilization factors when developing future projects.

♦ ♦ ♦