

Alabama Statewide Airport Pavement Management Program Update



Walker County-Bevill Field (JFX)

Final Report

February 2022



Submitted to

Alabama Aeronautics Bureau

Submitted by



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Pavement Management – Evaluation – Testing – Design

**ALABAMA STATEWIDE AIRPORT PAVEMENT MANAGEMENT
PROGRAM UPDATE**

Walker County Airport-Bevill Field (JFX)

FINAL REPORT

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Executive Summary

The Aviation Inc. team, which included All About Pavements, Inc., (API) was awarded a contract by the Alabama Department of Transportation’s Aeronautics Bureau (ALDOT) in 2018 to update the existing Alabama Statewide Airport Pavement Management Program (APMP). The scope of this project includes the airside pavement network at Walker County Airport-Bevill Field (JFX).

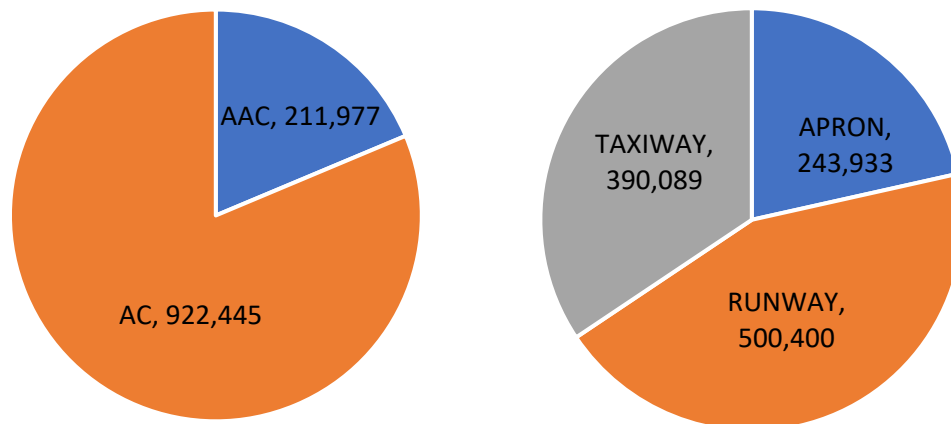
The following APMP tasks were completed to achieve the project objectives at JFX:

- Update the PAVER work history with records review information provided by ALDOT
- Conduct a visual pavement condition survey of the airfield pavements
- Update the PAVER database with inventory and condition data
- Update Maintenance and Rehabilitation (M&R) policies and unit costs
- Develop a 7-Year Pavement Capital Improvement Program (PCIP) with associated cost estimates

ES.1 Pavement Inventory

There are 8 branches and 12 sections within JFX’s pavement network with a total surface area of approximately 1.1 million square feet (sf). Figure ES-1 shows the distribution of the pavement network by surface type and branch use.

Figure ES-1: Pavement Area (sf) by Surface Type and Branch Use.



ES.2 Pavement Condition

Visual pavement inspections were conducted in November 2019 using the Pavement Condition Index (PCI) method as specified in ASTM D5340-12 and FAA AC 150/5380-6C. The PCI is a numerical rating scale from 0 to 100 that provides a measure of the pavement’s functional surface condition. The overall



area-weighted network PCI (AW PCI) for the JFX pavement network is 63, representing a “Fair” condition. The network area-weighted pavement age (AW Age) is 17 years.

Table ES-1 is a listing of the section PCI values and ratings.

Table ES-1: JFX Section PCI Values and Ratings.

Branch ID	Name	Section ID	Surface	Area, sf	PCI	PCI Category
A01	Apron 01	02	AC	35,743	100	Good
A01	Apron 01	01	AAC	208,190	95	Good
RW0927	Runway 09-27	01	AC	481,000	52	Poor
RW0927	Runway 09-27	02	AC	19,400	63	Fair
TC01	Taxiway Connector 01	01	AC	14,693	47	Poor
TC02	Taxiway Connector 02	02	AAC	3,787	100	Good
TC02	Taxiway Connector 02	01	AC	7,206	44	Poor
TC03	Taxiway Connector 03	01	AC	17,848	98	Good
TL01	Taxilane 01	01	AC	42,848	73	Satisfactory
TL02	Taxilane 02	01	AC	87,408	57	Fair
TP01	Taxiway Parallel 01	01	AC	184,806	46	Poor
TP01	Taxiway Parallel 01	02	AC	31,493	70	Fair

ES.3 Pavement Maintenance and Repair Funding Levels

The PAVER database was updated with 2019 condition data, maintenance and repair (M&R) policies, and unit costs; which were then used to evaluate the effect of multiple funding levels on the overall future pavement condition. Figure ES-2 presents the forecasted JFX network PCI values for each funding level.

ES.4 Pavement Capital Improvement Program (PCIP)

The analysis output from the unlimited funding budget scenario was used as a starting point in developing the PCIP. For this scenario, sections were grouped into projects to allow for a logical construction sequence. Table ES-2 summarizes the 7-year PCIP, which has an estimated total cost of approximately \$7.1 million. These recommendations are based on a network-level evaluation. Project-level evaluations should be conducted prior to developing design and bid package documents.

In addition to the major rehabilitation needs that are identified in the PCIP, PAVER was used to develop maintenance activities to repair specific PCI distresses in Year 1. The estimated costs for these maintenance activities are \$5,746 as summarized in Table ES-3.

Figure ES-2: M&R Funding Levels.

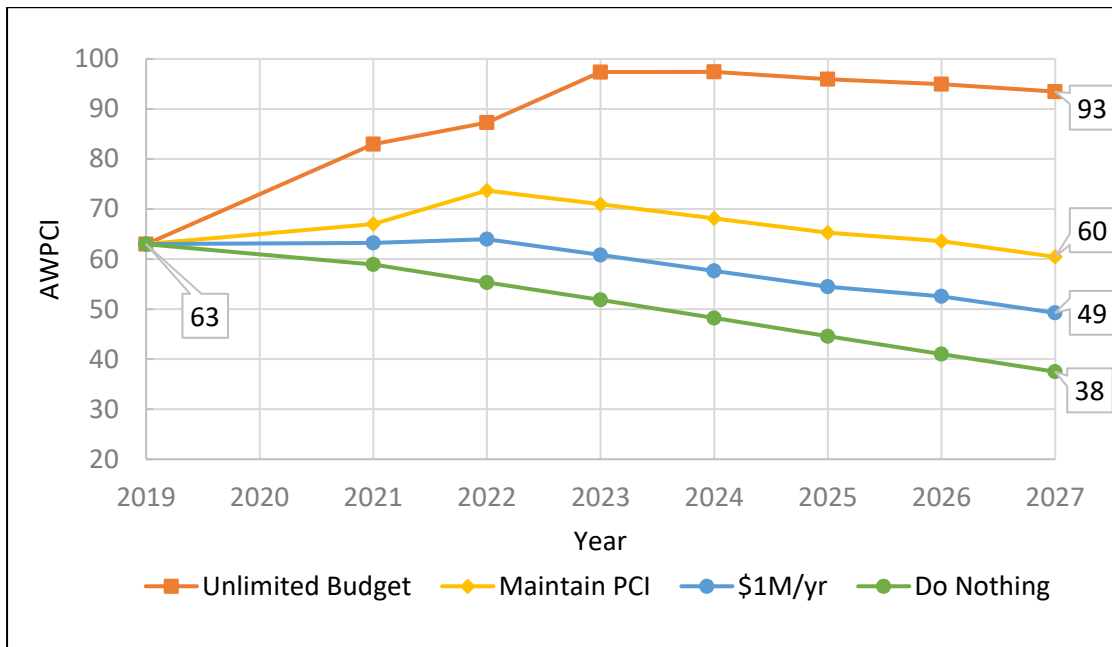


Table ES-2: Summary of Pavement Capital Improvement Program.

Project Year	CIP Project	Total Project Cost	Total Project Area, sf	AWPCI Before	AWPCI After
2021	JFX_21-01_Runway 09-27 Rehabilitation	\$3,149,376	515,093	47	100
2022	JFX_22-01_Apron Preservation	\$187,970	208,190	90	97
	JFX_22-02_Taxilane Rehabilitation	\$744,307	130,256	53	100
2023	JFX_23-01_Taxiway Parallel Reconstruction	\$2,446,529	223,505	39	100
2024	JFX_24-01_TW & Apron Preservation	\$54,960	57,378	90	97
	JFX_24-02_Runway 09-27 Surface Treatment	\$327,821	515,093	96	99
2026	JFX_26-01_Taxiway Parallel Surface Treatment	\$150,908	223,505	96	99
Total		\$7,061,872			

Table ES-3: Summary of Localized Maintenance Plan.

Policy	Work Description	Work Quantity	Work Unit	Work Cost
Preventive	Patching - AC Full-Depth	59	SqFt	\$1,475
	Crack Sealing - AC	1,009	Ft	\$3,985
	Patching - AC Partial-Depth	10	SqFt	\$160
Safety	Crack Sealing - AC	32	Ft	\$127
Total				\$5,746

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1 Introduction

1.1. Overview

The Alabama Department of Transportation's Aeronautics Bureau (ALDOT) is responsible for preserving and enhancing Alabama's air transportation system, which consists of 74 general aviation airports throughout the State. ALDOT implemented an Airport Pavement Management Program (APMP) in 2008 using the PAVER system. ALDOT awarded a project in 2018 to Aviation Inc. (Aviation) to update the System Plan and conduct an Economic Analysis for the Alabama airports. The scope of work also included an update of the APMP for 59 general aviation airports, which was conducted by All About Pavements, Inc., (API), a Aviation team member.

With this update of the APMP, the Alabama airports continue to be eligible for FAA funding for major pavement rehabilitation work under the Airport Improvement Program (AIP) since an APMP meets the pavement maintenance management requirements described in Appendix A of AC 150/5380-6C.

This report discusses the evaluation of the airside pavements at Walker County Airport-Bevill Field (JFX), the current and forecasted pavement condition, and the development of the Pavement Capital Improvement Program (PCIP).

1.2. Work Scope

The goals of the Alabama Statewide Airport Pavement Management Update program are as follows:

- Conduct a visual pavement inspection of the asphalt surfaced pavements for 59 of the 74 general aviation airports in Alabama.
- Based on the visual inspection analysis results, develop a 7-year PCIP for each airport.

The scope of work is as shown below:

- Conduct a Records Review
- Update Pavement Network Definition
- Conduct Pavement Condition Surveys
- Update and customize existing APMP PAVER database
- Develop PCIP and associated project cost estimates
- Prepare Draft and Final Reports
- Develop a web-based viewer for reporting APMP data

As required in the Scope of Work, a detailed pavement condition survey was not conducted for any Portland Cement Concrete (PCC) aprons and PCC taxiways longer than 2,000 ft. Instead, a condition rating of "Good", "Fair", or "Poor" was assigned based on the overall pavement condition.

The deliverable products include a PAVER 7.0 database, individual airport evaluation reports, a statewide summary report, and the web viewer. The JFX report will be one of the 59 individual airport reports that will be available on ALDOT's website.



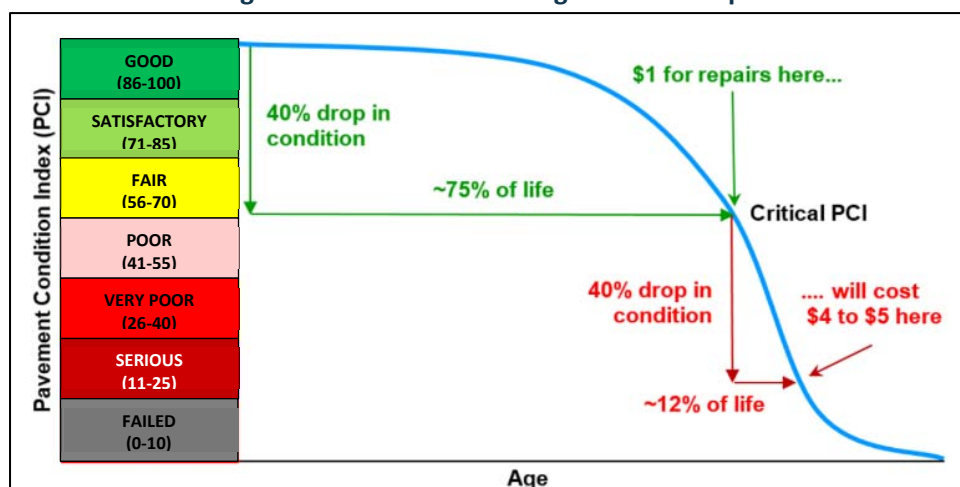
1.3. Pavement Management Concept

An APMP provides an integrated framework for comprehensive evaluation and decision making for managing airfield pavements. The essential components of an effective APMP provide for an objective evaluation of the condition of existing pavements, identification of short-term and long-range major rehabilitation work, necessary improvements in the pavement structural capacity, and the recurring maintenance work that should be completed each year. The APMP will also provide a budget for each of these types of pavement construction.

Historically, most organizations have made maintenance decisions based on past experience, without the benefit of documented data or analysis. This practice does not encourage life cycle cost analysis, nor the evaluation of cost effectiveness of alternate scenarios, and can lead to the inefficient use of funds. With limited allocated funding for Maintenance and Repair (M&R) Program projects, a defined procedure for setting priorities and schedules that will maximize the funds available is more important than ever.

In examining the lifespan of a 20-year pavement, a “Good” to “Fair” condition rating may last only 5 to 15 years. After that point, the rate of deterioration of pavements accelerates sharply as the age of the pavement increases, and within five years, the pavement may deteriorate to the point of failure. In order to extend pavement life, maintenance and repairs need to be scheduled and performed before the pavement surface declines to a “fair” condition. The point at which rehabilitation can be done before the steep decline occurs is called the “critical PCI”, and is generally considered to occur when the Pavement Condition Index (PCI) is between 60 and 70 for general aviation airports. If the work is done before deterioration accelerates, the cost of rehabilitation can be reduced as shown in Figure 1.1.

Figure 1.1: Pavement Management Concept.



2 Airfield Pavement Inventory

2.1. Introduction

JFX is a General Aviation (GA) airport located approximately 5 miles northwest of Jasper. The airport is owned and operated by the Walker County Commission. Figure 2.1 shows an aerial image of the airport.

Figure 2.1: Walker County Airport-Bevill Field.



(Source: Google Earth)

2.2. Pavement Inventory

JFX consists of one runway, a parallel taxiway, two connector taxiways, and an apron. The total pavement area is approximately 1.1 million square feet. Pavement surfaces at JFX include Asphalt Concrete (AC) and Asphalt Overlay on AC (AAC). A complete listing of the pavement sections is included in Appendix A. Runway 02-20 is 5,004 ft. long and 100 ft. wide.

A records search was undertaken to identify any preservation or rehabilitation work that has occurred at JFX since the last APMP update in 2009. The following records that were provided by ALDOT were reviewed, and the PAVER database was updated with work history information:

- Apron Rehabilitation, 2013
- Hangar Access Taxiway Extension, 2018

2.3. Climatic Conditions

Table 3.1 provides a summary of the climatic data for the geographic region that includes JFX. As the table shows, the pavements at JFX are exposed to freeze-thaw cycles in December. The mean air



temperature for January ranges from an average low of 30 degrees °F to an average high of 51 degrees °F. The average annual rainfall at JFX is near 59 inches.

Table 2.1: Average Annual Temperatures and Rainfall for JFX.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
High Temp (°F)	51	56	66	74	80	87	90	90	84	74	64	55
Low Temp (°F)	30	33	40	47	57	65	69	68	62	48	40	33
Precip. (in)	6.2	5.3	6.5	5.1	5.1	4.6	4.9	2.9	4.1	3.6	4.7	5.7

Source: www.intellicast.com

2.4. Pavement Network Definition

A key element in developing an APMP system is defining the pavement network, which is the process of dividing an agency’s pavements into a hierarchical order that facilitates inspection and M&R planning. The JFX network (e.g. all airside pavements) is then divided into branches, which are a readily identifiable part of the pavement system and have distinct functions. For airports, branches typically consist of individual runways, taxiways and aprons. Figure B1A in Appendix B shows the branches at JFX.

Once branches have been defined, pavement evaluation and analysis techniques require the airfield pavement system to be broken up into discrete sections. A pavement “section” is the smallest management unit that is used when considering the application and selection of maintenance and rehabilitation (M&R) treatments, and is defined in Section 2.1.8 of ASTM D 5340-12 as “a contiguous pavement area having uniform construction, maintenance, usage history, and condition. A section should also have the same traffic volume and load intensity.” A complete list of the pavement inventory and the corresponding section designations are included in Appendix A. Figure B1B presents the section layout.

To facilitate the visual survey of the airside pavement, each section is further subdivided into conveniently defined sub-section areas, or sample units. Similar sizing is critical as studies have found that maintaining the size of the sample units to within 40 percent of the established norm may reduce the standard error of the average PCI values. To meet that criteria, ASTM recommends that sample units for asphalt pavements be 5,000 square feet (± 2,000).

Table 2.2 was used as a guideline in developing sampling rates that reflect typical rates that are used for other large pavement networks. In general, this sampling rate will not provide a 95% confidence level with a standard error of 5 PCI points. A higher level of sampling is recommended before a project-level rehabilitation design is developed for a pavement section or facility.

Sample units that include a one-time occurrence of a distress (i.e. a large patch) or an unusual severity or quantity of a distress seen elsewhere, were designated as “additional” sample units as described in the ASTM D5340 PCI procedure. This allows the PCI to be calculated without extrapolating the aberrant



distress throughout the section as a whole. In Appendix B, Figure B1C shows the sample unit layout for JFX.

Table 2.2: PCI Sampling Rate for AC Surfaces.

Total Samples	Samples to Inspect
1	1
2	2
3 – 6	3
7 – 13	4
14 – 39	5
> 39	15 percent, but less than 12

2.5. Inventory Summary

There are 8 branches (facilities) at JFX that include 12 pavement sections and a total area of approximately 1.1 million square feet of paved surfaces, as shown in Table 2.3.

Table 2.3: JFX Pavement Branches.

Branch ID	Branch Name	Branch Use	Area, sf	Number of Sections
A01	Apron 01	APRON	243,933	2
RW0927	Runway 09-27	RUNWAY	500,400	2
TC01	Taxiway Connector 01	TAXIWAY	14,693	1
TC02	Taxiway Connector 02	TAXIWAY	10,993	2
TC03	Taxiway Connector 03	TAXIWAY	17,848	1
TL01	Taxilane 01	TAXIWAY	42,848	1
TL02	Taxilane 02	TAXIWAY	87,408	1
TP01	Taxiway Parallel 01	TAXIWAY	216,299	2
Total			1,134,422	12

Table 2.4 shows the distribution of airfield pavement by age with the area-weighted age being 17 years for all airside pavements at JFX.

Table 2.4: JFX Pavement Age.

Age (Years)	Number of Sections	Percent of Area	Area, sf
0 – 5	2	5%	53,591
6 – 10	2	19%	211,977
11 – 15	1	4%	42,848
16 – 20	3	12%	138,301
> 20	4	61%	687,705



Figure 2.2 shows the distribution by surface type. Figure 2.3 presents the distribution by pavement use (e.g. runway, taxiway, and apron).

Figure 2.2: JFX Pavement Area by Surface Type.

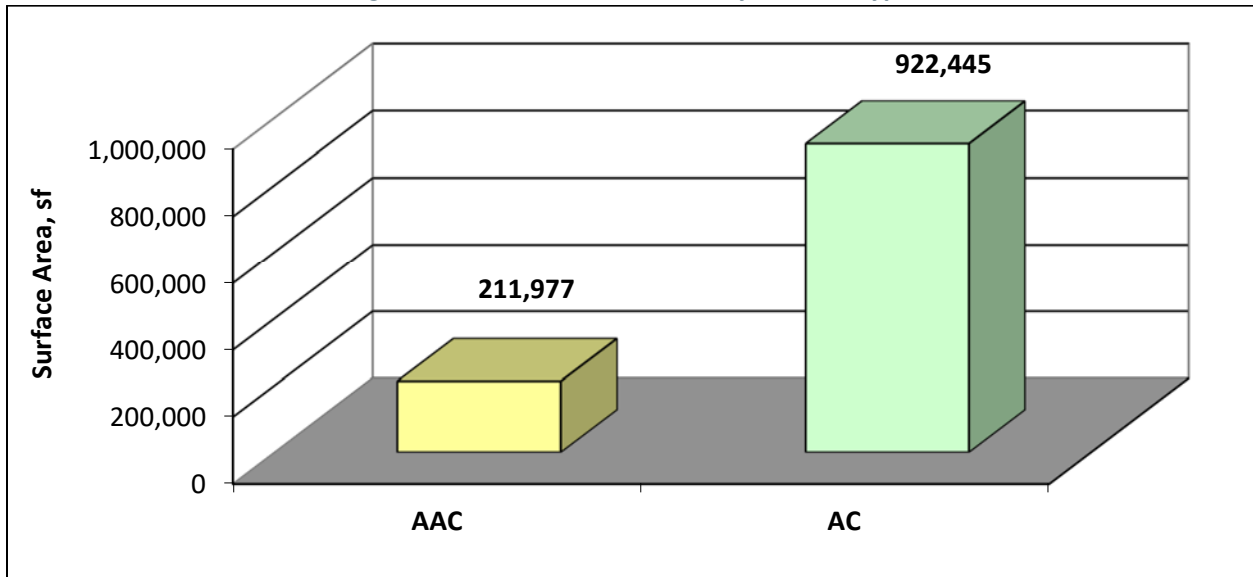
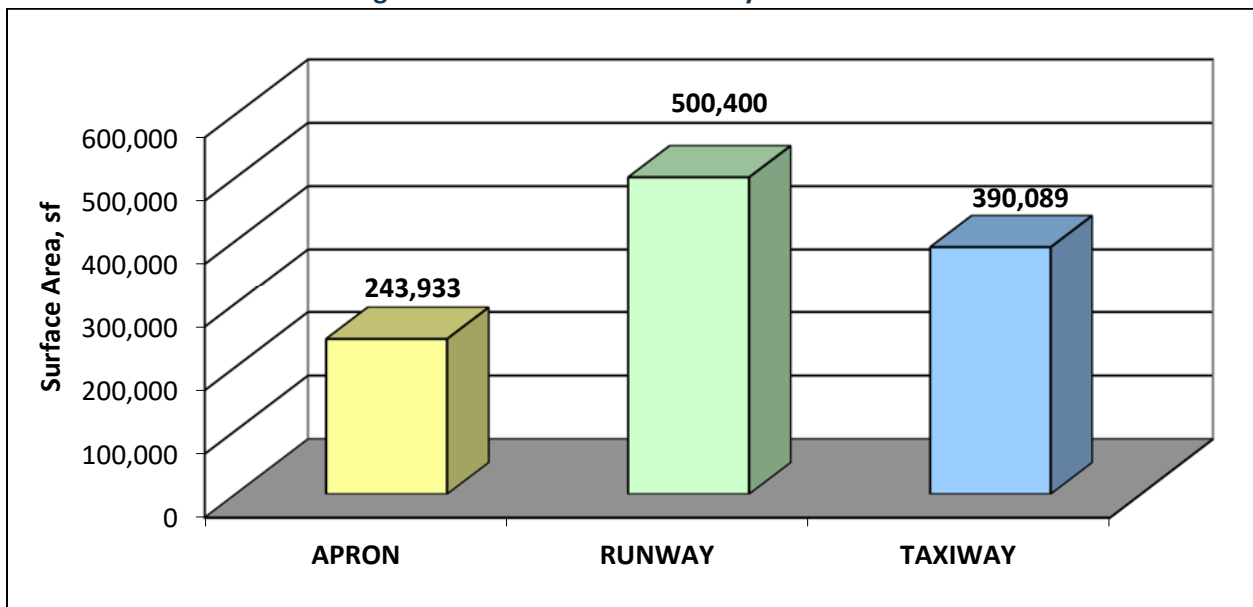


Figure 2.3: JFX Pavement Area by Branch Use.



Maps B1D, B1E, and B1F show the pavement type, branch use, and pavement age, respectively.

3 Pavement Condition

3.1. Introduction

A visual PCI survey of the airside pavements at JFX was conducted in order to assist in the development of a realistic PCIP. The PCI survey measures and records pavement distresses that exist within each of the inspected sample units. This survey was conducted in November 2019 by a two 2-person team. The survey was performed in accordance with the methods described in ASTM D 5340-12 and FAA AC 150/5380-7B, using the sampling rates from Chapter 2 of this API report.

During the pavement survey, Quality Control (QC) and data verification were performed on both the individual distresses and the calculated section PCI values. QC included the following activities;

- Review of distress quantities to identify data entry errors (100% review at the sample unit level). General guidance was used from ASTM D5340-12, section 13, which addresses the precision of distress quantities that are recorded during PCI surveys.
- Duplicate surveys were performed to ensure consistency between each of the inspectors in a 2-person PCI survey team.

3.2. Pavement Condition Rating Methodology

The PCI is a measure of the pavement's functional surface condition. It provides insight into the causes of each distress, and whether the distress is primarily caused by load, climatic conditions, and other material related deficiencies. The PCI is a numerical rating (on a scale of 0 to 100) that is based on the type, severity and quantity of each distress that is found in an inspected sample unit.

The PCI survey results are displayed using seven categories and ratings in accordance with the ASTM, but can also be presented using a simplified 3-category rating system for use in comparing with other distress related indices, as shown in Table 3.1.



Table 3.1: Pavement Condition Index Rating Scale.

	Simplified PCI Color Legend	ASTM PCI Color Legend	PCI Range	PCI Ratings and Definition
GOOD			86-100	<u>GOOD</u> : Pavement has minor or no distresses and should require only routine maintenance.
			71-85	<u>SATISFACTORY</u> : Pavement has scattered low-severity distresses that should require only routine maintenance.
FAIR			56-70	<u>FAIR</u> : Pavement has a combination of generally low- and medium-severity distresses. Near-term maintenance and repair needs may range from routine to major.
POOR			41-55	<u>POOR</u> : Pavement has low-, medium-, and high-severity distresses that probably cause some operational problems. Near-term M&R needs range from routine to major. requirement for
			26-40	<u>VERY POOR</u> : Pavement has predominantly medium- and high-severity distresses that cause considerable maintenance & operational problems. Near-term M&R needs will be major.
			11-25	<u>SERIOUS</u> : Pavement has mainly high-severity distresses that cause operational restrictions; immediate repairs are needed.
			0-10	<u>FAILED</u> : Pavement deterioration has progressed to the point that safe aircraft operations are no longer possible; complete reconstruction is required.

3.3. Distress Types

The ASTM D5340 standard considers 17 distresses, which tend to fall into one of the following four cause categories:

- Load related: AC distresses include alligator cracking, corrugation, depression, polished aggregate, rutting and slippage cracking; PCC distresses include corner breaks, longitudinal cracking, divided slabs, polished aggregate, pumping and joint spalling.
- Climate and durability related: AC distresses include bleeding, block cracking, joint reflection cracking, longitudinal and transverse (L&T) cracking, swelling, raveling, and weathering; PCC distresses include blow-ups, “D” cracking, longitudinal cracking, pop-outs, pumping, scaling, shrinkage cracks, and joint and corner spalling.
- Moisture & Drainage related: AC distresses include alligator cracking, depressions, potholes and swelling; PCC distresses include corner breaks, divided slabs and pumping.
- Other factors: Oil spillage, jet blast erosion, bleeding, patching and concrete slab joint faulting.

As described above, distress may have more than one cause. For example, depressions may be caused by incorrect compaction during construction, or by subgrade softening due to environmental factors. 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 causes of the distress.

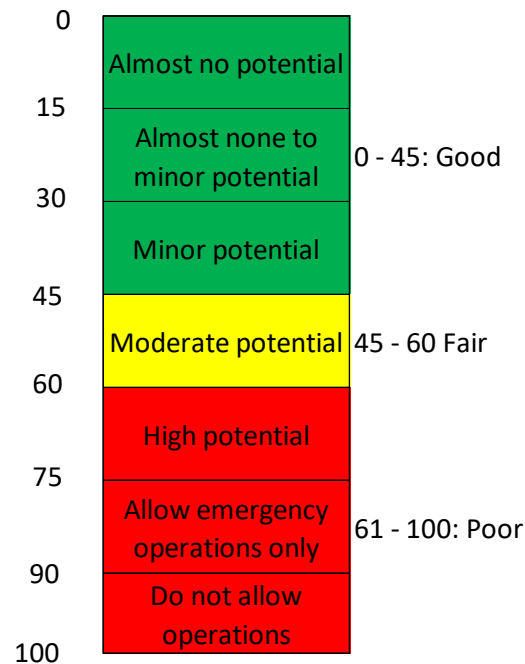
Distress descriptions provided in Appendix C were taken from the “PCI Field Manual,” developed by the U.S. Army Construction Engineering Research Lab (CERL), latest edition. Appendix C provides a detailed explanation of each type of AC and PCC surface distress.

3.4. Additional PCI-based Indices

The distress data used to compute PCI can also be used to calculate additional indices that are helpful in understanding the condition of the pavement and developing PCIP recommendations. One additional index that was computed is the Foreign Object Damage (FOD) potential index.

The FOD index was developed by the US Air Force and is described in detail in the US Army Corp of Engineers Engineering Technical Letter (ETL) 04-09, Pavement Engineering Assessment (EA) Standards. Loose objects on an airfield pavement surface resulting from pavement distresses can be detrimental to aircraft engines, specifically engines that are low to the ground. The objects are ingested into the engines causing costly damage and presenting a safety hazard. Not all pavement distresses create a FOD potential. Therefore, an additional index was identified that uses the results of the PCI distress survey. As shown in Figure 3.1, the scale ranges from 0 to 100 with 0 being no FOD potential. Note that the FOD index uses a simplified three color scale.

Figure 3.1: FOD Potential Rating Scale.





3.5. PCI Survey Results

The airside pavements at JFX include 12 sections with 225 sample units. The sample number of sample units that were surveyed in the field is 60, which is 27 percent of the total samples. Data from the inspected sample units were input into the PAVER database and a resultant PCI for each section was computed.

Figure 3.2 presents the area-weighted PCI by use and the overall airside network.

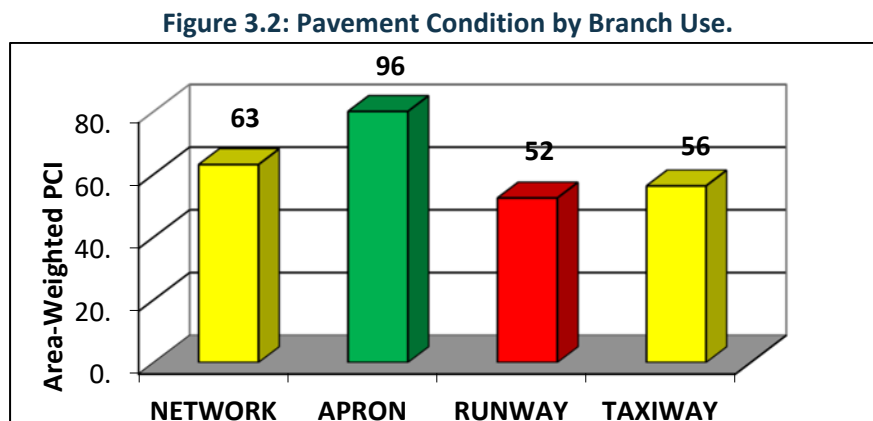


Figure 3.3 shows the distribution of the JFX pavement network by condition. Approximately 61 percent of the network is in “Poor” or worse condition.

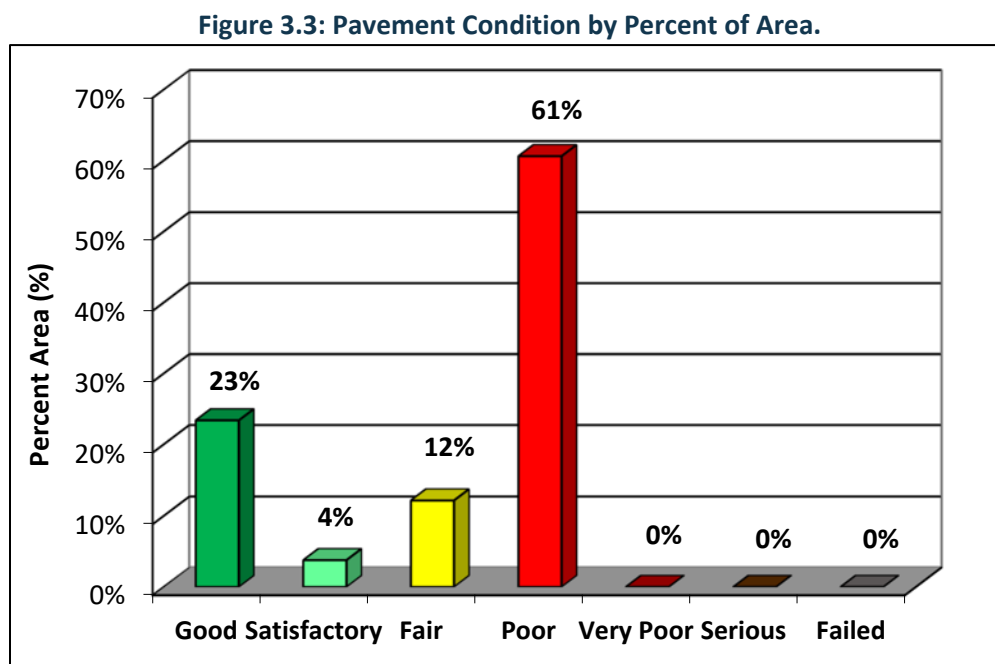


Table 3.2 is a listing of the section PCI.

Table 3.2: Section PCI.

Branch ID	Name	Section ID	Surface	Area, sf	PCI	PCI Category	FOD
A01	Apron 01	02	AC	35,743	100	Good	0
A01	Apron 01	01	AAC	208,190	95	Good	14
RW0927	Runway 09-27	01	AC	481,000	52	Poor	63
RW0927	Runway 09-27	02	AC	19,400	63	Fair	51
TC01	Taxiway Connector 01	01	AC	14,693	47	Poor	68
TC02	Taxiway Connector 02	02	AAC	3,787	100	Good	0
TC02	Taxiway Connector 02	01	AC	7,206	44	Poor	70
TC03	Taxiway Connector 03	01	AC	17,848	98	Good	10
TL01	Taxilane 01	01	AC	42,848	73	Satisfactory	40
TL02	Taxilane 02	01	AC	87,408	57	Fair	58
TP01	Taxiway Parallel 01	01	AC	184,806	46	Poor	69
TP01	Taxiway Parallel 01	02	AC	31,493	70	Fair	43

Figure B2A and B2B in Appendix B are maps of the section PCI in 7- and 3-scale categories, respectively. Figure B2C is a map of the FOD rating. Appendix D contains a detailed report of the PCI values and distress type, quantity, and severity data for each sample unit that was surveyed in a section. Appendix E is a summary report of the extrapolated distress data at the section level.

Appendix F contains current section and branch PCI data and forecasted section PCI values. FOD values by section and branch are also presented. Figure B2D in Appendix B shows the locations of the photos that were taken during the survey. Photos are included in Appendix J.

3.6. PCC Pavements

As stated earlier, the project scope did not include a detailed pavement condition survey for any Portland Cement Concrete (PCC) aprons. For these pavements, a rating of “Good”, “Fair”, or “Poor” was assigned based on the overall pavement condition. Figure 3.4 shows the condition rating for the PCC aprons at JFX.



Figure 3.4: PCC Apron Condition Rating.



4 Pavement Capital Improvement Program

4.1. Introduction

PCI data were collected and entered into the PAVER database. In addition, the database customization included the following components, which are described in detail in this chapter.

1. Performance Modeling
2. Maintenance & Repair (M&R) Triggers (Critical PCI)
3. M&R Policies
4. Unit Costs

Once the database was customized, it was used to run budget analysis scenarios and develop a 7-year PCIP.

4.2. Performance Modeling

To determine long-term M&R needs, a APMP must be able to predict future pavement condition. Future pavement condition is predicted using equation models that are generated from current and historical PCI data. Equation models are developed by grouping pavements based on similar performance characteristics such as region, construction history, surface type, traffic, priority and use. Mathematical techniques such as straight-line extrapolation and regression that include boundary and outlier filters are used to develop models that provide the best fit equation for the pavement condition data. PAVER's Prediction Modeling module was used to develop pavement performance models that are commonly referred to as 'Family Curves'.

Prediction models are used at the section level to compute future conditions based on the typical performance of the pavement sections that are included in each model. Future condition is computed by defining its position relative to the prediction model. The section prediction curve, or equation, is drawn through the current PCI-age point for each specific section. Since the shifted curve will run parallel to the computed prediction model, the predicted condition can be computed for any future age. Figure 4.1 is an illustration of this process.

Prediction models provide an effective way to compute future pavement performance based on past and current conditions, and pavement maintenance and rehabilitation practices. As new PCI inspection surveys are conducted, these models should be updated accordingly. In the case of the Alabama statewide airport pavement network, the best fit family curves were developed for each region by grouping pavements according to branch use (e.g. runway, taxiway) and surface type (e.g. AC, AAC, and APC). The family curves for ALDOT were developed based on branch use and are presented in Figure 4.2.



Figure 4.1: PCI Forecasting.

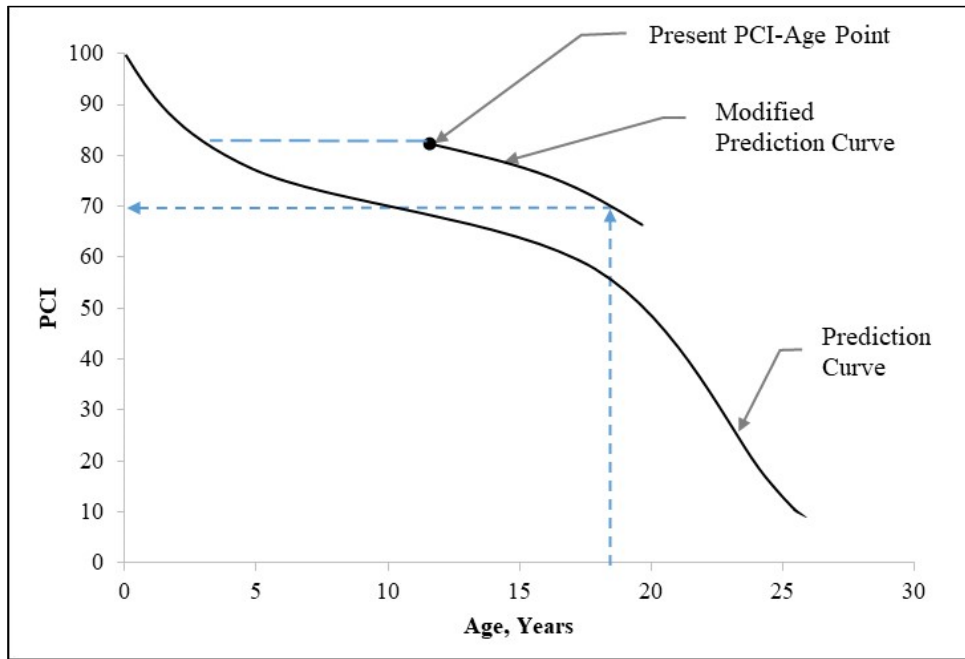
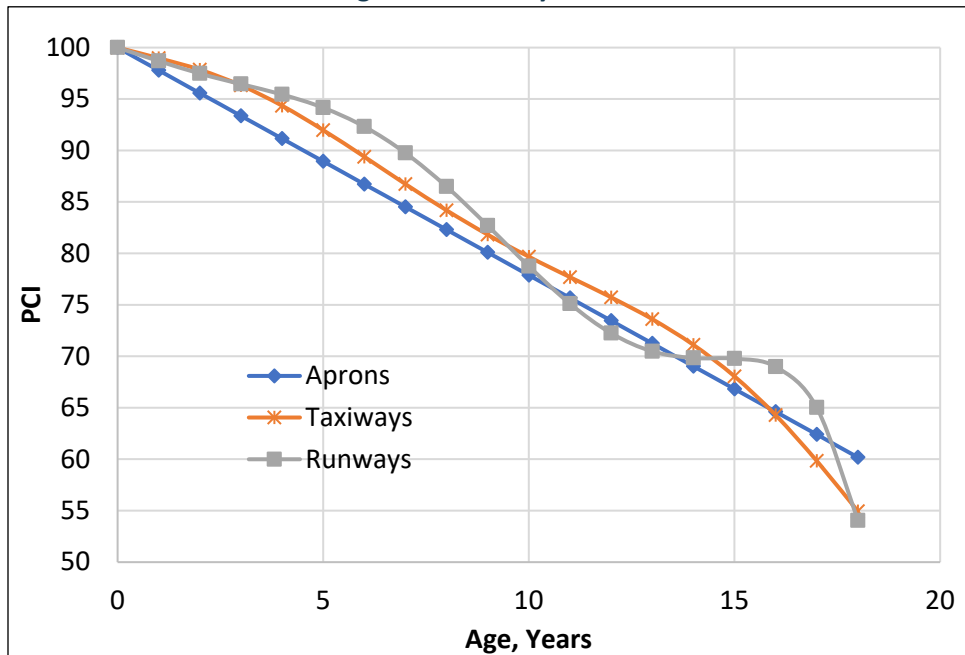


Figure 4.2: Family Curves.



4.3. Critical PCI Values

The Critical PCI value is defined as *“the PCI value at which the rate of PCI loss increases with time, or the cost of applying localized preventive maintenance increases significantly.”* This definition is incorporated into PAVER in defining and measuring the critical PCI values. These values, or M&R triggers, are assigned for each prediction model. As such, the critical PCI values are directly related to the branch use.

These critical PCI levels are selected based on several factors including a review of performance models; experience; other airport triggers; and acknowledge that time is required for funding approval and design. Note that preventive maintenance is recommended, and it should generally be performed above the critical PCI (trigger) values and Major M&R is generally performed below them. The critical PCI (CP) values were set at 70 for runways and taxiways, and 65 for other pavements.

4.4. M&R Policies and Unit Costs

M&R policies refer to the activities that are applied at different condition levels to maintain and repair a pavement section.

Maintenance activities are localized activities which are typically assigned in the first year of the M&R plan based on the observed distresses. Safety (stopgap) maintenance addresses distresses that would affect operational safety if left unrepaired and is applied to pavements below the critical PCI. Preventive maintenance activities are aimed at slowing the rate of deterioration through consistent maintenance of existing pavements and are generally applied to pavements above the critical PCI. Appendix G presents the policies for preventive and safety maintenance.

Repair activities are conducted for larger areas, typically at the section level and are assigned based on the critical PCI. Repair activities broadly consist of three categories: preservation, rehabilitation, and reconstruction. Pavement preservation involves activities like surface treatments that are used to extend pavement service life and to delay more expensive rehabilitation work. These are applied when the pavement is in relatively good condition and does not exhibit any structural distress. Rehabilitation activities are used to repair pavements below or around the critical PCI and typically include mill and overlay. Reconstruction is recommended when the pavement has deteriorated to a level where rehabilitation is no longer cost effective.

Table 4.1 lists the pavement activity types, the individual activities within each type, and their associated 2020 unit costs. A more detailed description of the M&R activities and the development of the M&R unit costs is presented in Appendix H.

In accordance with ALDOT’s focus on preservation, surface treatment is applied to all resurfaced and reconstructed runways, taxiways, and aprons three years after construction work is complete. Taxilanes and T-Hangar pavements are excluded from this requirement. This policy is applicable for projects in the PCIP between 2021 and 2024. For cost estimating, this surface treatment is assumed to have the same cost as the runway surface treatment.



Table 4.1: M&R Activities and Unit Costs.

Activity Type	PCI	Activity	Cost/sf
Maintenance	Note 1	Seal Cracks – AC (\$/lf)	\$3.95
		AC Full-Depth Patching	\$25.05
		AC Partial-Depth Patching	\$16.28
Preservation	75-90	Runway Surface Treatment	\$0.57
		Taxiway and Apron Surface Treatment	\$0.85
Rehabilitation	> CP	2" AC OL ²	\$4.19
	55 - CP	Mill 2" & 2" AC OL	\$4.56
	45 - 55	Mill 2" & 3" AC OL	\$5.79
Reconstruction	0 - 45	AC Reconstruction	\$10.91

¹ Preventive > CP; Safety (Stopgap) < CP

² For sections with structural distress and PCI > CP

4.5. Pavement CIP Development

The PAVER database, updated with condition data and customized with condition performance priorities, policies, and costs; was used to evaluate the effect of multiple funding levels on the overall future pavement condition. This output was further used to develop the PCIP. Figure 4.3 illustrates the process that PAVER uses in the funding analysis.

The following M&R funding levels were used for the JFX pavement network to help establish the 7-Year PCIP. Figure 4.4 presents the network area-weighted average PCI for each of the following funding scenarios at the end of the analysis period:

- Unlimited Funding: Unlimited funding is available for all pavement needs. The PCI increases to 93 by 2027.
- Maintain PCI: Maintain existing PCI of 63.
- Constrained Funding: This scenario constrains the funding to \$1 million each year (total of \$7 million). The PCI decreases to 49 in 2027.
- Do Nothing: Performing no M&R would reduce the network PCI from 63 to 38 by 2027.

Figure 4.3: Budget Analysis Process.

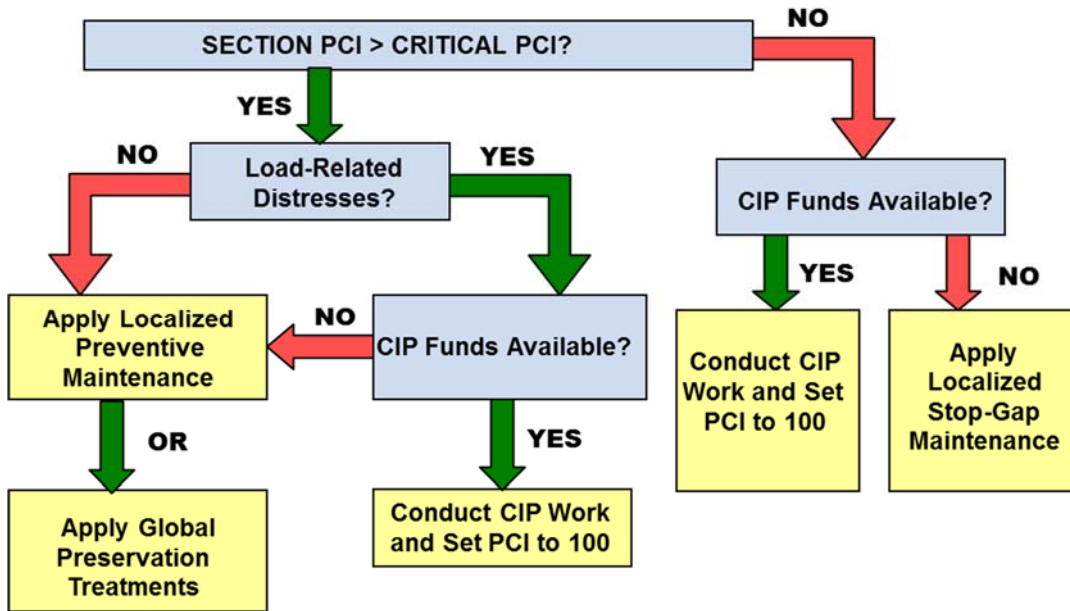


Figure 4.4: M&R Funding Levels.

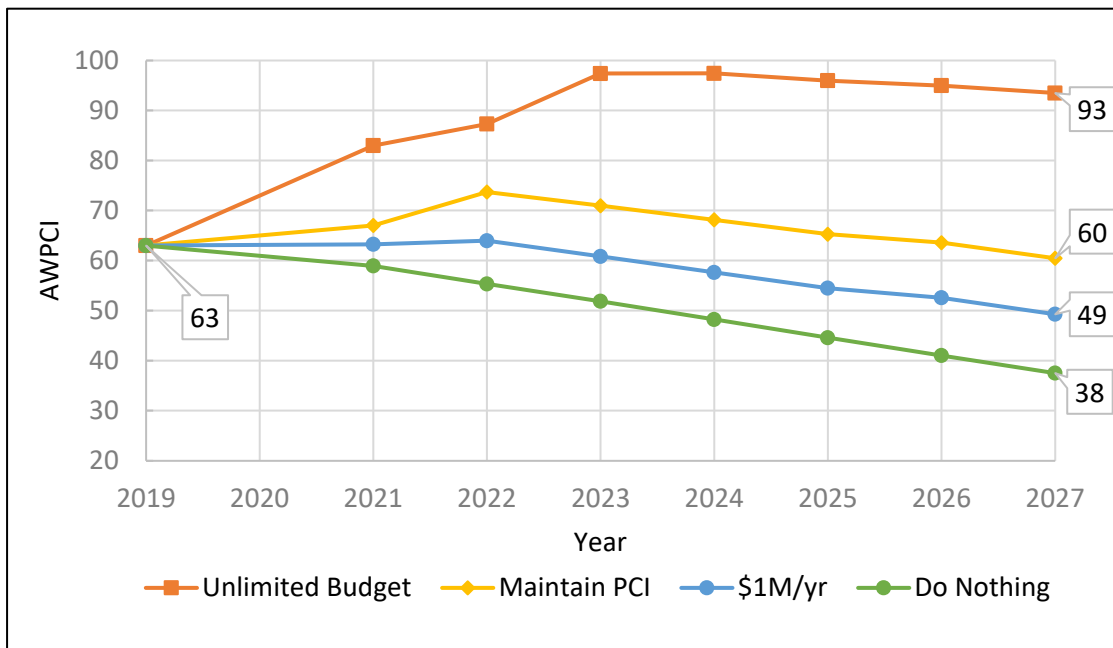


Table 4.2 summarizes the annual funding required for the above analyses. For the unlimited analysis, all pavement needs are funded in the year they are required. Therefore, the unfunded costs are zero. The total funded amount over the 7-year period is approximately \$7.1 million. For the annual funding level of \$1 million per year, funding is prioritized based on the prioritization matrix. When the needs exceed the funding for any year, the remaining sections are transferred to the succeeding year and the amount



for these activities are represented as “unfunded”. The “unfunded” repairs in 2027 for this funding level is approximately \$8.7 million.

Table 4.2: Summary of M&R Funding Level Analyses.

Year	Unlimited	Maintain PCI	Constrained \$1M/year	Do Nothing
2021	\$3,166,000	\$1,162,000	\$688,000	\$0
2022	\$945,000	\$2,097,000	\$674,000	\$0
2023	\$2,449,000	\$39,000	\$59,000	\$0
2024	\$390,000	\$79,000	\$112,000	\$0
2025	\$5,000	\$139,000	\$182,000	\$0
2026	\$159,000	\$360,000	\$407,000	\$0
2027	\$9,000	\$149,000	\$200,000	\$0
Total	\$7,124,000	\$4,025,000	\$2,323,000	\$0
2027 Backlog	-	\$6,266,000	\$8,673,000	\$11,587,000

Map B3A in Appendix B presents the 2027 forecasted PCI by section when the M&R activities recommended in the CIP are not conducted.

4.6. Pavement Capital Improvement Program

The unlimited funding analysis contains rehabilitation activities for sections from the same branch spread out over the seven-year period, which is not always operationally feasible to construct. The analysis output was treated as a starting point in developing the CIP. Sections were often integrated together to account for construction feasibility and other factors, resulting in larger projects which were more realistic. In addition, each project could contain sections whose condition did not trigger rehabilitation but were included to provide a logical plan which would avoid creating “islands” of newer pavement within a particular feature. For example, if the PAVER analysis showed rehabilitation was required for eight out of 10 sections on a runway, the entire runway would be recommended for rehabilitation to provide a continuous new pavement surface.

Table 4.3 shows the projects and the associated costs for the recommended 7-year PCIP. Table 4.4 is a more detailed view of the PCIP. This table lists the individual pavement section, section level M&R work, section repair cost, surface area and the PCI before the M&R is applied. The costs that are presented represent an annual escalation rate of 3% for the unit costs. The total 7-year PCIP cost is approximately \$7.1 million. Map B3B shows the recommended repair types, while Map B3C presents the recommended projects and activities in the PCIP. Appendix I1 presents a summary of the recommended activities and cost by year for each section at JFX.



Chapter 4, Pavement Capital Improvement Program

Table 4.3: Summary of 7-Year PCIP by Project.

Project Year	CIP Project	Total Project Cost	Total Project Area, sf	AWPCI Before	AWPCI After
2021	JFX_21-01_Runway 09-27 Rehabilitation	\$3,149,376	515,093	47	100
2022	JFX_22-01_Apron Preservation	\$187,970	208,190	90	97
	JFX_22-02_Taxilane Rehabilitation	\$744,307	130,256	53	100
2023	JFX_23-01_Taxiway Parallel Reconstruction	\$2,446,529	223,505	39	100
2024	JFX_24-01_TW & Apron Preservation	\$54,960	57,378	90	97
	JFX_24-02_Runway 09-27 Surface Treatment	\$327,821	515,093	96	99
2026	JFX_26-01_Taxiway Parallel Surface Treatment	\$150,908	223,505	96	99
Total		\$7,061,872			

Table 4.4: Summary of 7-Year PCIP by Project and Section.

Branch	Section	Area, sf	PCI Before Rehab	Activity	Activity Type	Cost
JFX_21-01_Runway 09-27 Rehabilitation						\$3,149,376
RW0927	01	481,000	47	Mill 2" & 3" AC OL	Rehabilitation	\$2,868,540
RW0927	02	19,400	54	Mill 2" & 3" AC OL	Rehabilitation	\$115,696
TC01	01	14,693	45	AC Reconstruction	Reconstruction	\$165,140
JFX_22-01_Apron Preservation						\$187,970
A01	01	208,190	90	Taxiway & Apron Surface Treatment	Preservation	\$187,970
JFX_22-02_Taxilane Rehabilitation						\$744,307
TL01	01	42,848	66.55	Mill 2" & 2" AC OL	Rehabilitation	\$207,394
TL02	01	87,408	47.15	Mill 2" & 3" AC OL	Rehabilitation	\$536,913
JFX_23-01_Taxiway Parallel Reconstruction						\$2,446,529
TC02	01	7,206	32.79	AC Reconstruction	Reconstruction	\$85,923
TP01	01	184,806	36.37	AC Reconstruction	Reconstruction	\$2,203,600
TP01	02	31,493	57.18	Mill 2" & 2" AC OL	Rehabilitation	\$157,006
JFX_24-01_TW & Apron Preservation						\$54,960
A01	02	35,743	90.8	Taxiway & Apron Surface Treatment	Preservation	\$34,237
TC02	02	3,787	94	Taxiway & Apron Surface Treatment	Preservation	\$3,627
TC03	01	17,848	89.28	Taxiway & Apron Surface Treatment	Preservation	\$17,096
JFX_24-02_Runway 09-27 Surface Treatment						\$327,821
RW0927	01	481,000	-	Surface Treatment	Preservation	\$306,124
RW0927	02	19,400	-	Surface Treatment	Preservation	\$12,347
TC01	01	14,693	-	Surface Treatment	Preservation	\$9,351
JFX_26-01_Taxiway Parallel Surface Treatment						\$150,908



Branch	Section	Area, sf	PCI Before Rehab	Activity	Activity Type	Cost
TC02	01	7,206	-	Surface Treatment	Preservation	\$4,865
TP01	01	184,806	-	Surface Treatment	Preservation	\$124,779
TP01	02	31,493	-	Surface Treatment	Preservation	\$21,264
Total						\$7,061,872

The FAA, under the Airport Improvement Program (AIP) provides approximately 90 percent of eligible costs for planning and development of public-use airports included in the NPIAS as grants. The remaining 10 percent of costs are shared between ALDOT and the airport sponsor. The following is the distribution of the 7-yr PCIP cost of \$7.1 million for JFX:

- FAA (90%): \$6.3 million
- ALDOT (5%): \$0.4 million
- Airport Sponsor (5%): \$0.4 million

The recommendations within the PCIP are based on a network-level study and should be used for planning purposes only. A detailed project-level assessment should be conducted for each project to determine the appropriate repair activities and develop more accurate cost estimates.

Table 4.5 summarizes the maintenance activities that are recommended for Year 1 (2021). The estimated cost is approximately \$5,746. A complete listing of the maintenance activities by section is presented in Appendix I2. This may be used as a basis for establishing an annual maintenance budget for the JFX pavements.

Table 4.5: Summary of Year-1 Maintenance Plan.

Policy	Work Description	Work Quantity	Work Unit	Work Cost
Preventive	Patching - AC Full-Depth	59	SqFt	\$1,475
	Crack Sealing - AC	1,009	Ft	\$3,985
	Patching - AC Partial-Depth	10	SqFt	\$160
Safety	Crack Sealing - AC	32	Ft	\$127
Total				\$5,746

APPENDIX A

INVENTORY



Appendix A
Pavement Inventory Report
Walker County Airport-Bevill Field (JFX)

Branch ID	Name	Branch Use	Section ID	Rank ¹	Length (ft)	Width (ft)	Area (sf)	LCD ²	Surface ³
A01	Apron 01 Walker County	APRON	01	S	805	300	208,190	6/1/2013	AAC
A01	Apron 01 Walker County	APRON	02	S	293	100	35,743	3/2/2018	AC
RW0927	Runway 09-27 Walker County	RUNWAY	01	P	4,810	100	481,000	11/14/2000	AC
RW0927	Runway 09-27 Walker County	RUNWAY	02	P	194	100	19,400	7/31/2002	AC
TC01	Taxiway Connector 01 Walker County	TAXIWAY	01	S	328	40	14,693	1/20/2000	AC
TC02	Taxiway Connector 02 Walker County	TAXIWAY	01	S	169	40	7,206	9/11/1998	AC
TC02	Taxiway Connector 02 Walker County	TAXIWAY	02	S	61	40	3,787	6/1/2013	AAC
TC03	Taxiway Connector 03 Walker County	TAXIWAY	01	S	233	50	17,848	3/2/2018	AC
TL01	Taxilane 01 Walker County	TAXIWAY	01	T	1,790	20	42,848	7/31/2006	AC
TL02	Taxilane 02 Walker County	TAXIWAY	01	T	945	35	87,408	4/5/2002	AC
TP01	Taxiway Parallel 01 Walker County	TAXIWAY	01	P	4,635	40	184,806	9/14/1999	AC
TP01	Taxiway Parallel 01 Walker County	TAXIWAY	02	P	708	40	31,493	6/15/2005	AC

¹ P = Primary pavement, S = Secondary pavement, T = Tertiary pavement

² LCD = Last construction date. The date of the last major pavement rehabilitation (e.g. AC overlay)

³ AC = Asphalt Cement Concrete, AAC = Asphalt Overlay AC, PCC = Portland cement Concrete, APC = Asphalt Overlay PCC

APPENDIX B

PMP Maps

B1: Inventory Maps

B1A: Branch Identification

B1B: Section Identification

B1C: Sample Unit Layout

B1D: Pavement Type

B1E: Branch Use

B1F: Pavement Age

B2: Surface Condition Maps

B2A: 7-Color PCI

B2B: 3-Color PCI

B2C: FOD Rating

B2D: Survey Photo Locations




B3: Pavement Capital Improvement Plan (PCIP) Maps

B3A: 2027 Forecasted PCI without PCIP









B3B: M&R Needs

B3C: PCIP Recommendations

Legend

-  Section Boundary
-  PCC Aprons
-  Shoulder or Other

Branch Identification

-  Apron 01 Walker County
-  Runway 09-27 Walker County
-  Taxilane 01 Walker County
-  Taxilane 02 Walker County
-  Taxiway Connector 01 Walker County
-  Taxiway Connector 02 Walker County
-  Taxiway Connector 03 Walker County
-  Taxiway Parallel 01 Walker County

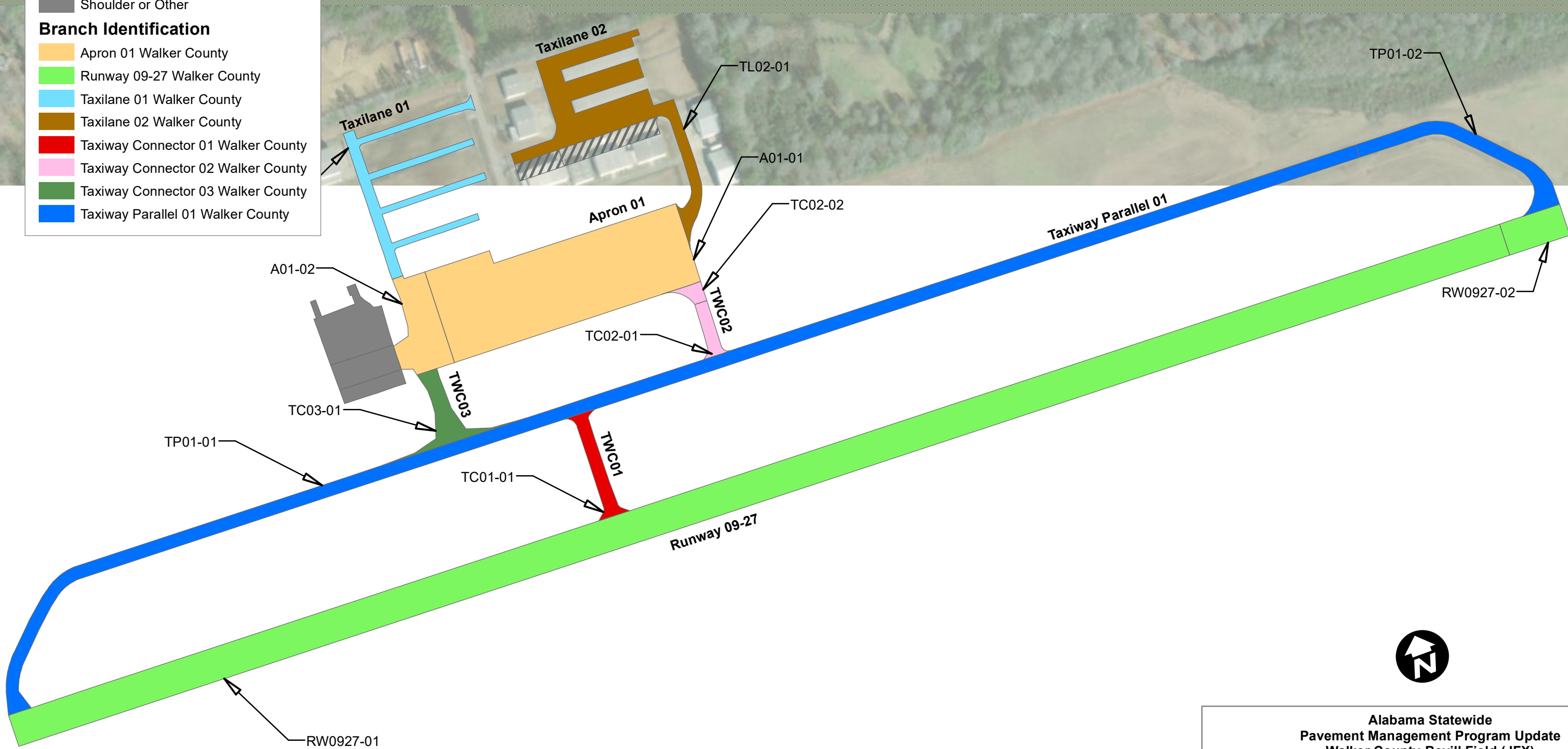





Figure B1A

**Alabama Statewide
Pavement Management Program Update
Walker County-Bevill Field (JFX)
Jasper, AL**

Branch Identification		
ENGINEER KP/MR	DATE May 2021	MAP NUMBER Page 1
REVISED JMA	SCALE 1 in = 300 ft	FINAL

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Legend

-  Section Boundary
-  PCC Aprons
-  Shoulder or Other

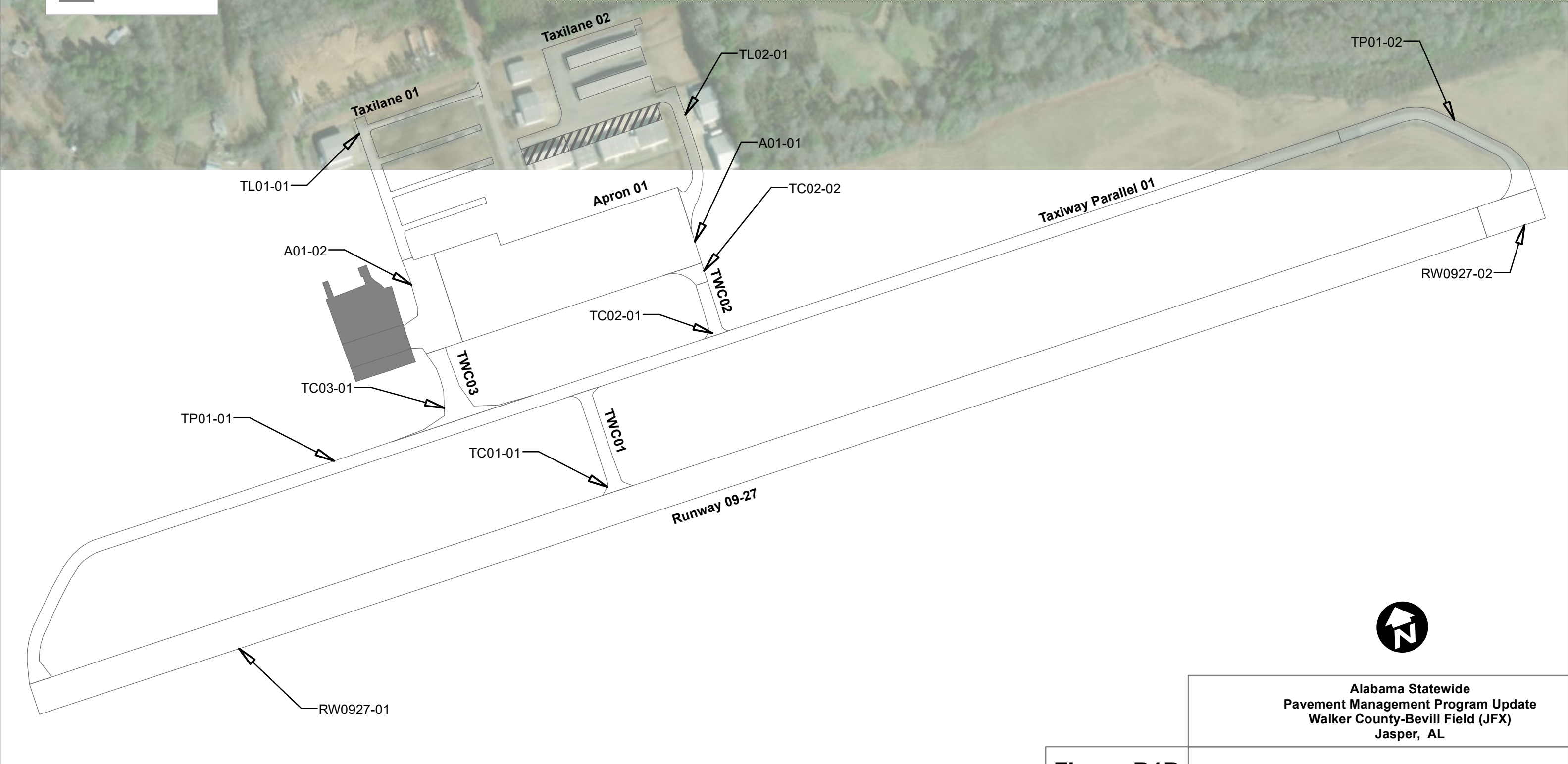


Figure B1B




**Alabama Statewide
Pavement Management Program Update
Walker County-Bevill Field (JFX)
Jasper, AL**

Section Identification



ENGINEER KP/MR	DATE May 2021	MAP NUMBER Page 2
REVISED JMA	SCALE 1 in = 300 ft	FINAL

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Legend

-  Section Boundary
-  PCC Aprons
-  Shoulder or Other

Sample Unit Layout

-  SU Boundary
-  Inspected

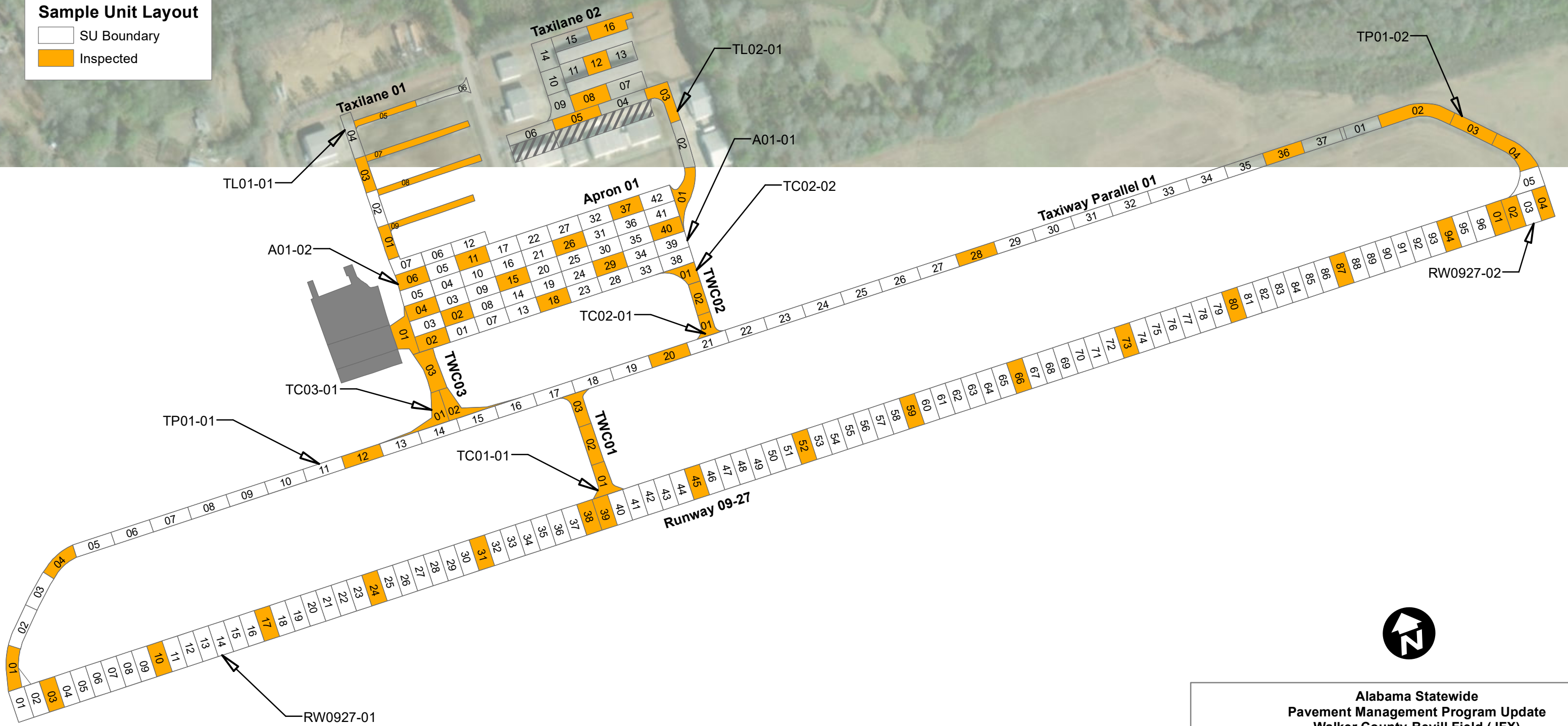





Figure B1C



Alabama Statewide Pavement Management Program Update Walker County-Bevill Field (JFX) Jasper, AL		
Sample Unit Layout		
ENGINEER KP/MR	DATE May 2021	MAP NUMBER Page 3
REVISED JMA	SCALE 1 in = 300 ft	FINAL


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Legend

-  Section Boundary
-  PCC Aprons
-  Shoulder or Other

Pavement Type

-  Asphalt Concrete (AC)
-  Asphalt Overlay Over AC (AAC)

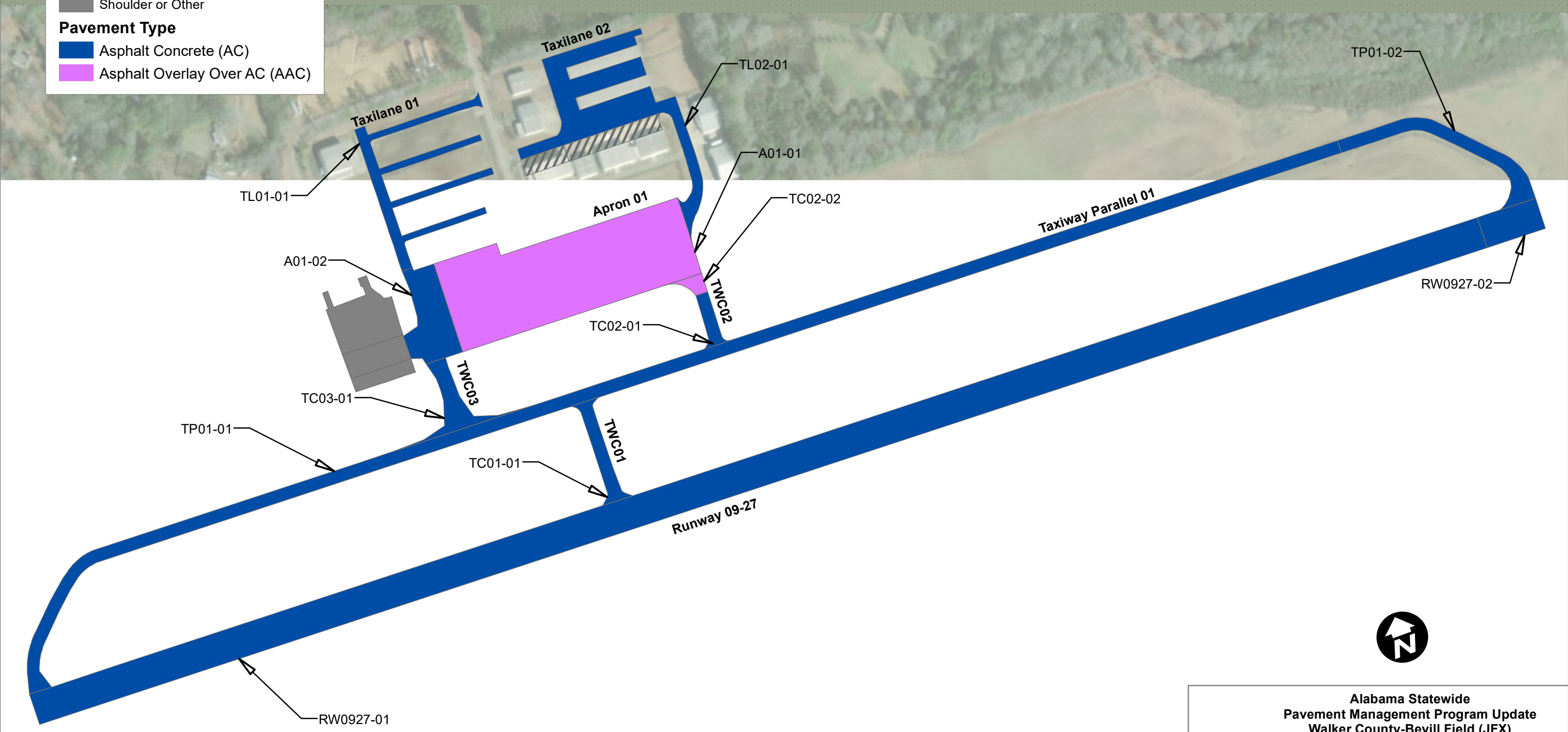





Figure B1D

**Alabama Statewide
Pavement Management Program Update
Walker County-Bevill Field (JFX)
Jasper, AL**




Pavement Type		
ENGINEER KP/MR	DATE May 2021	MAP NUMBER Page 4
REVISED JMA	SCALE 1 in = 300 ft	FINAL

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Legend

-  Section Boundary
-  PCC Aprons
-  Shoulder or Other

Branch Use

-  APRON
-  RUNWAY
-  TAXIWAY

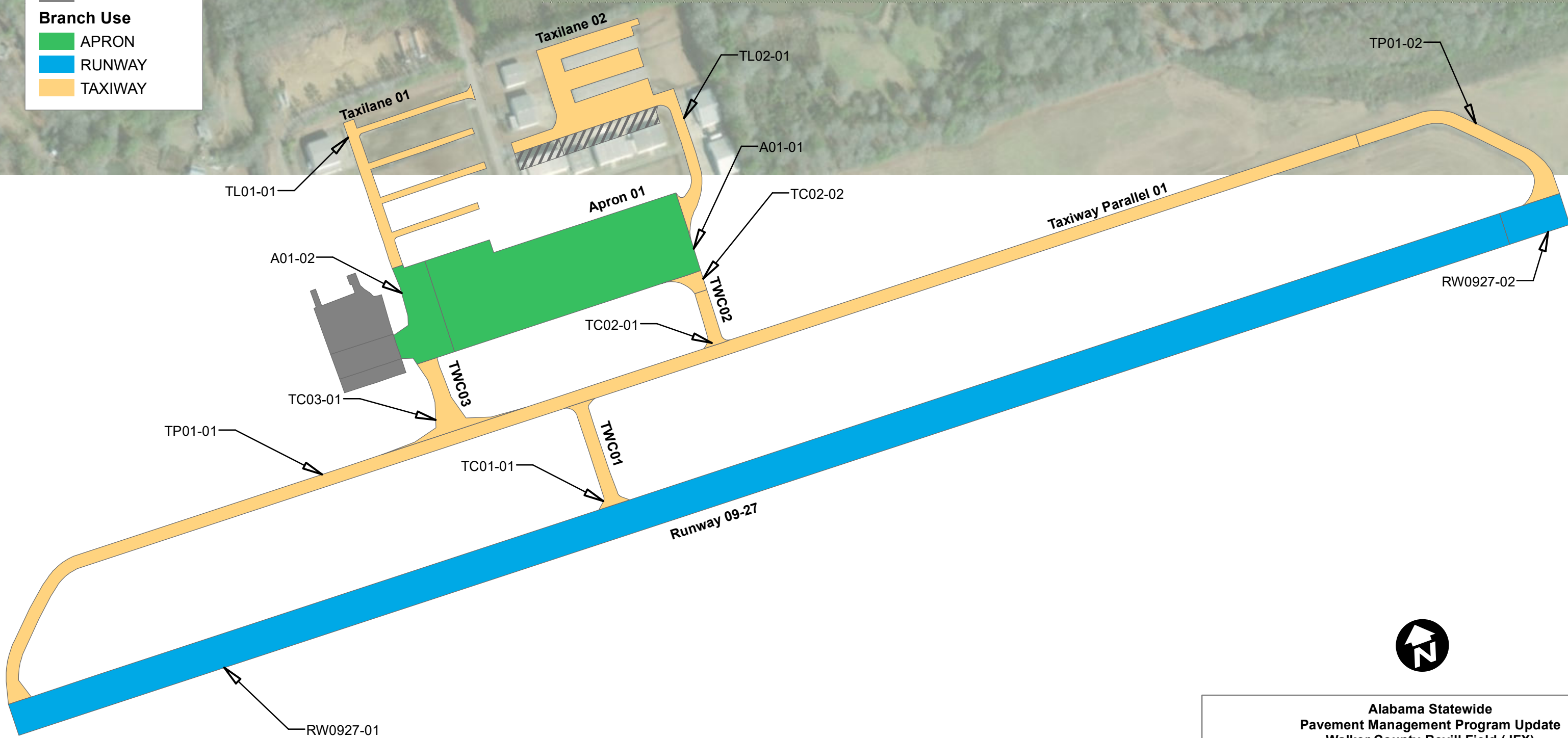





Figure B1E

**Alabama Statewide
Pavement Management Program Update
Walker County-Bevill Field (JFX)
Jasper, AL**






Branch Use		
ENGINEER KP/MR	DATE May 2021	MAP NUMBER Page 5
REVISED JMA	SCALE 1 in = 300 ft	FINAL

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Legend

-  Section Boundary
-  PCC Aprons
-  Shoulder or Other

Pavement Age (Yrs)

-  0 - 10
-  11 - 15
-  16 - 25
-  26 - 50
-  >50

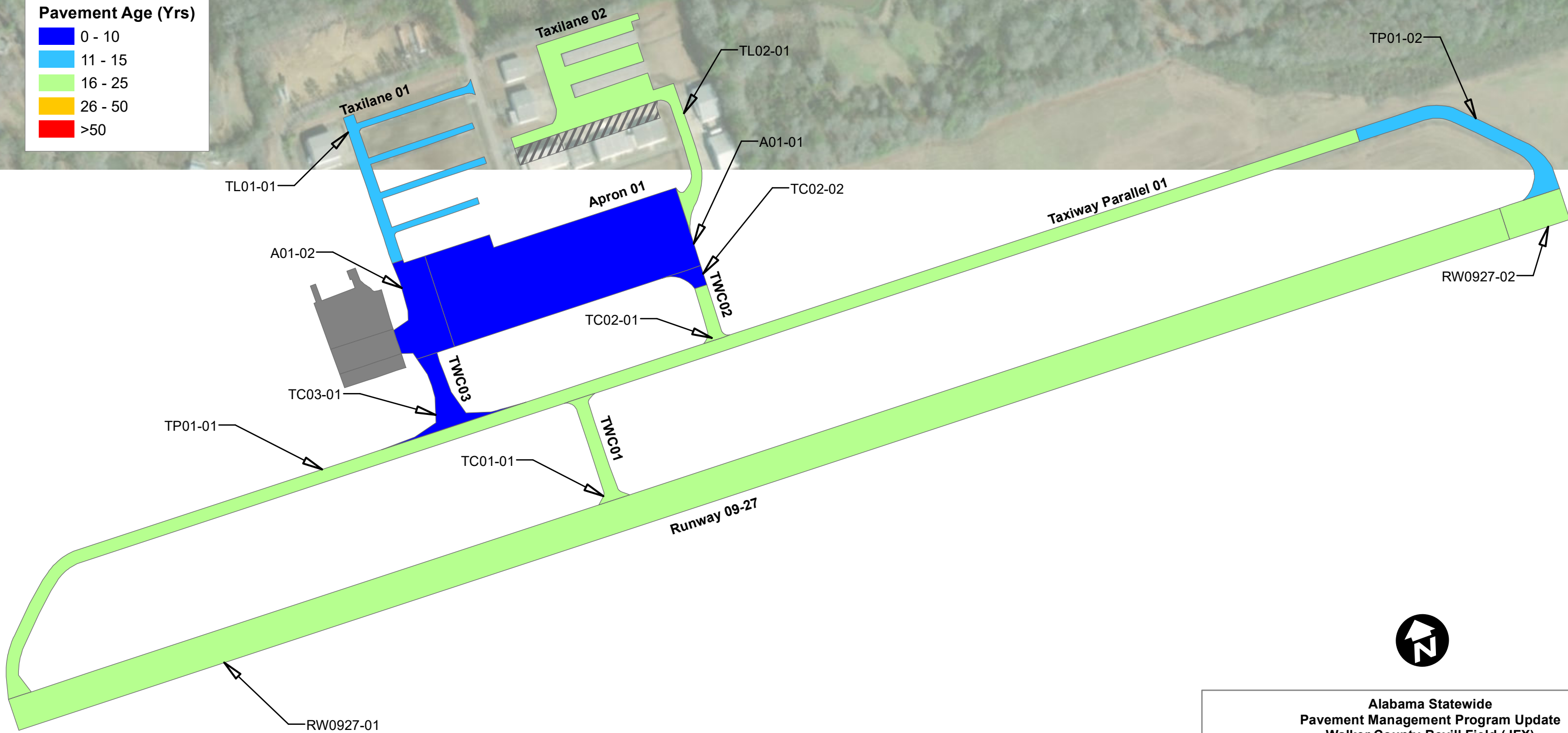





Figure B1F








Alabama Statewide Pavement Management Program Update Walker County-Bevill Field (JFX) Jasper, AL		
Pavement Age		
ENGINEER KP/MR	DATE May 2021	MAP NUMBER Page 6
REVISED JMA	SCALE 1 in = 300 ft	FINAL

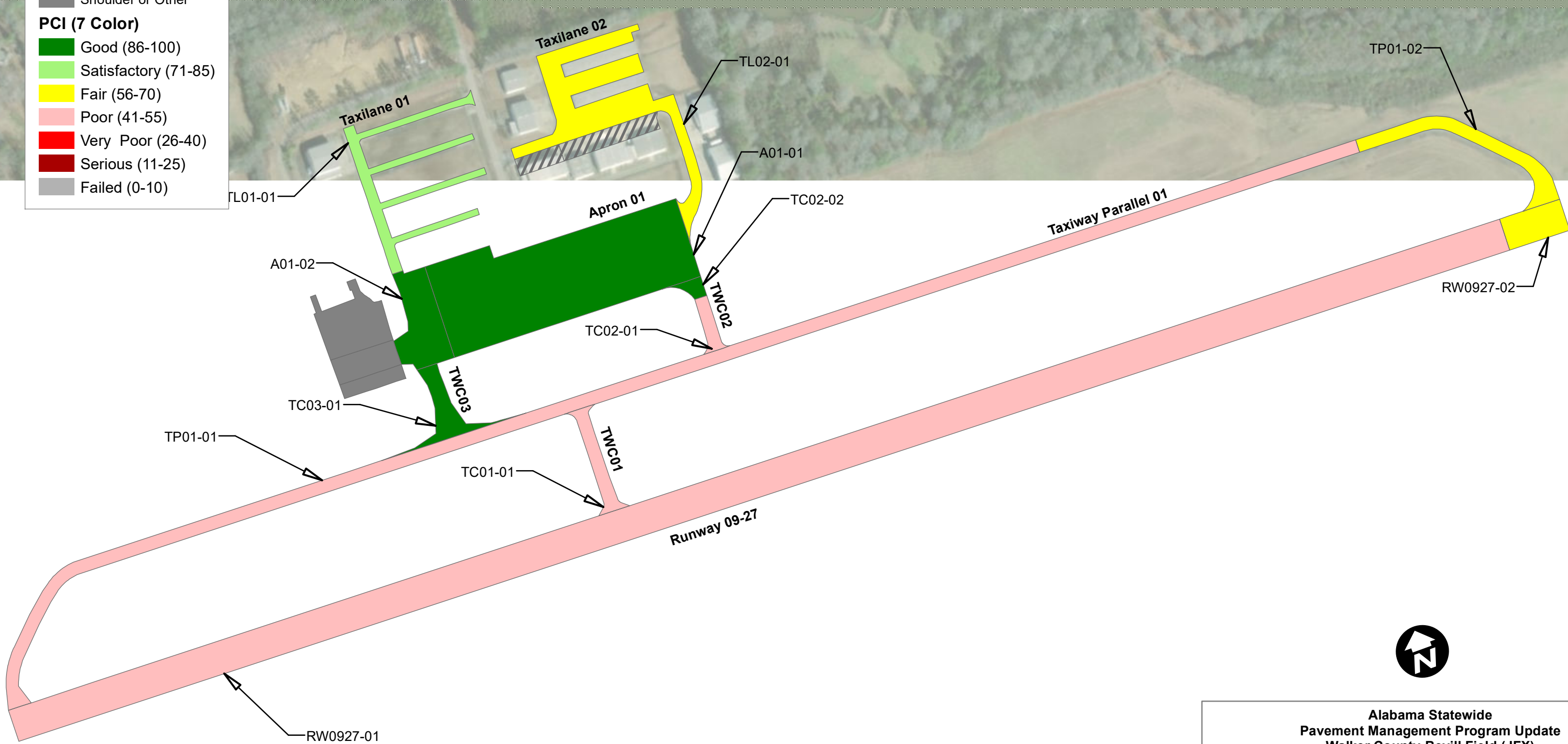
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Legend

-  Section Boundary
-  PCC Aprons
-  Shoulder or Other

PCI (7 Color)


-  Good (86-100)
-  Satisfactory (71-85)
-  Fair (56-70)
-  Poor (41-55)
-  Very Poor (26-40)
-  Serious (11-25)
-  Failed (0-10)






Alabama Statewide
Pavement Management Program Update
Walker County-Bevill Field (JFX)
Jasper, AL

Figure B2A




7-Color PCI

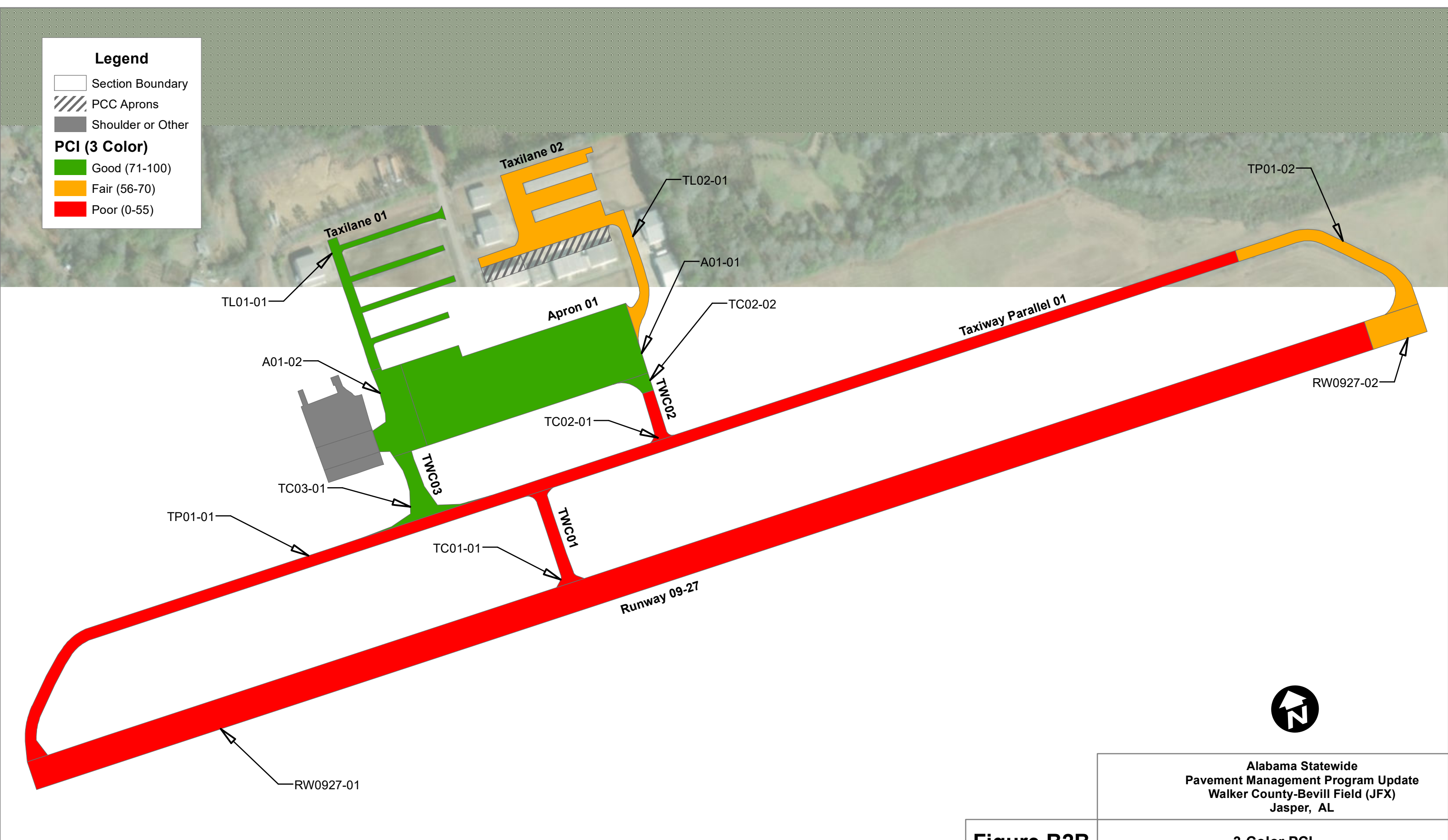
 All About Pavements, Inc. (API) <small>www.allaboutpavements.com Telephone: 217-586-2765 FAX: 217-586-1967</small>	ENGINEER	DATE	MAP NUMBER
	KP/MR	May 2021	Page 7
REVISED	SCALE	FINAL	
JMA	1 in = 300 ft		

Legend

-  Section Boundary
-  PCC Aprons
-  Shoulder or Other

PCI (3 Color)

-  Good (71-100)
-  Fair (56-70)
-  Poor (0-55)



**Alabama Statewide
Pavement Management Program Update
Walker County-Bevill Field (JFX)
Jasper, AL**

Figure B2B

3-Color PCI




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ENGINEER
KP/MR
REVISOR
JMA




DATE
May 2021
SCALE
1 in = 300 ft

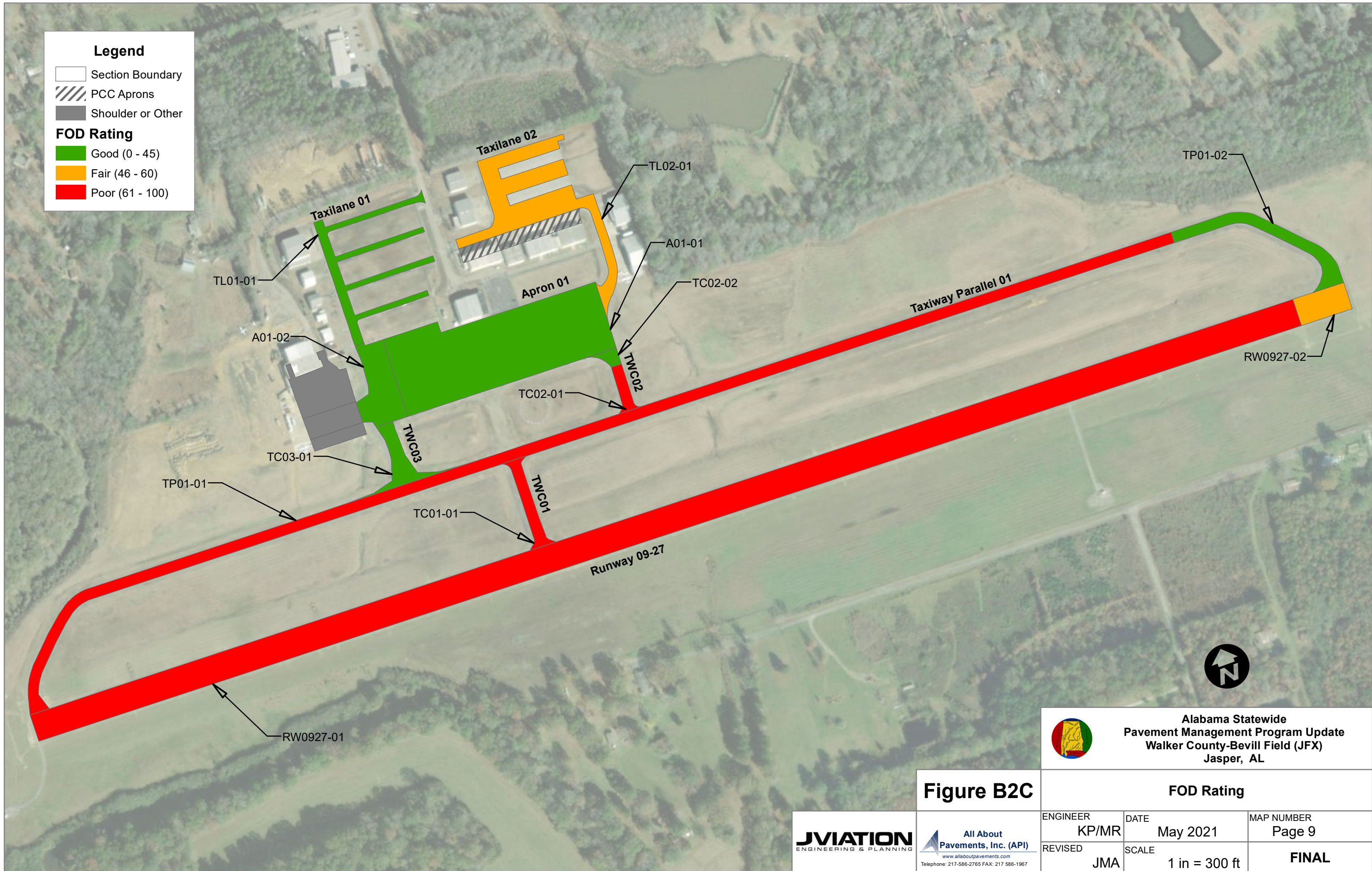
MAP NUMBER
Page 8
FINAL

Legend

-  Section Boundary
-  PCC Aprons
-  Shoulder or Other

FOD Rating

-  Good (0 - 45)
-  Fair (46 - 60)
-  Poor (61 - 100)









**Alabama Statewide
Pavement Management Program Update
Walker County-Bevill Field (JFX)
Jasper, AL**

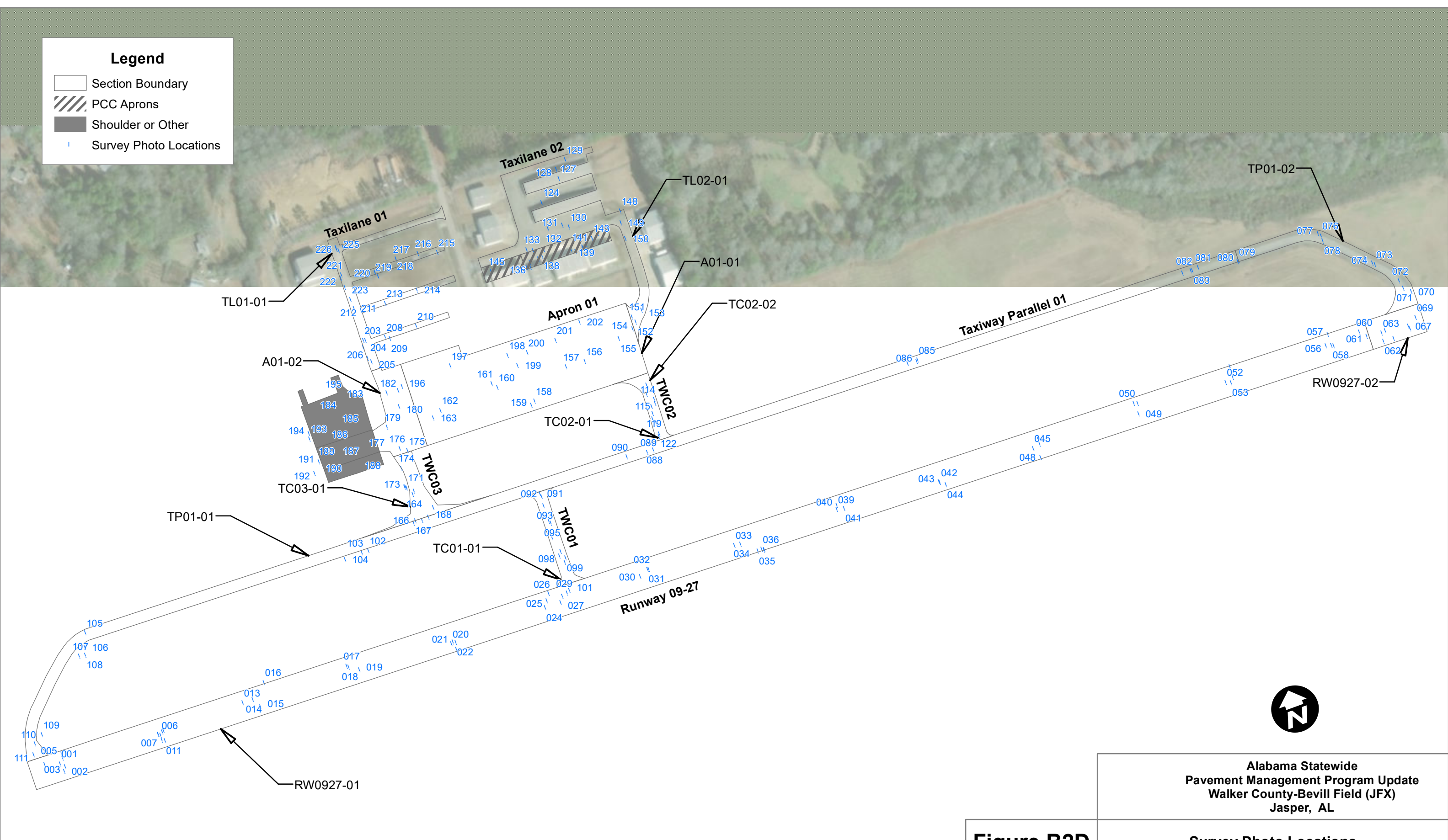
Figure B2C		FOD Rating	
ENGINEER KP/MR	DATE May 2021	MAP NUMBER Page 9	
REVISED JMA	SCALE 1 in = 300 ft	FINAL	


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Legend

-  Section Boundary
-  PCC Aprons
-  Shoulder or Other
-  Survey Photo Locations



**Alabama Statewide
Pavement Management Program Update
Walker County-Bevill Field (JFX)
Jasper, AL**




Figure B2D

Survey Photo Locations








ENGINEER KP/MR	DATE May 2021	MAP NUMBER Page 10
REVISOR JMA	SCALE 1 in = 300 ft	FINAL

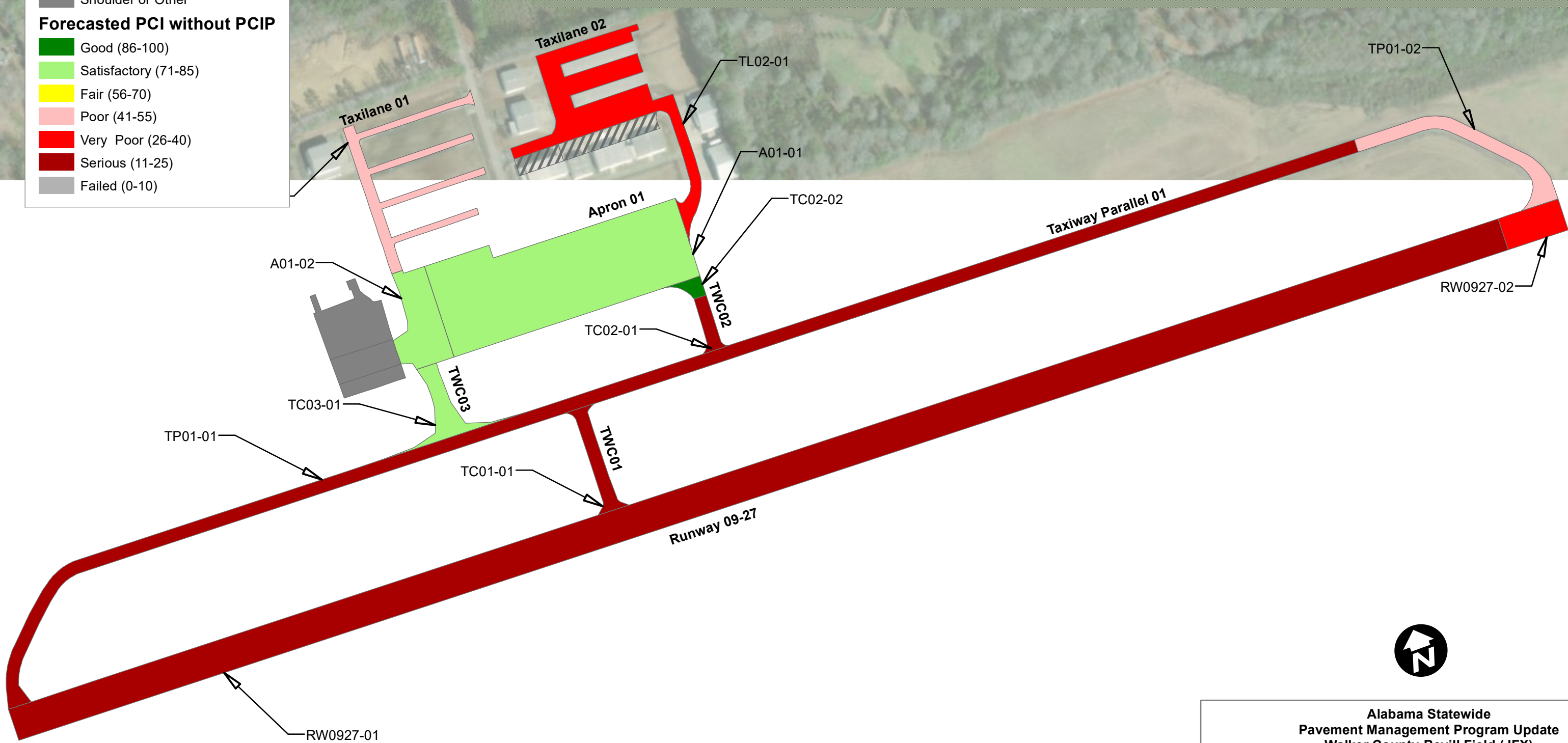
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Legend

-  Section Boundary
-  PCC Aprons
-  Shoulder or Other

Forecasted PCI without PCIP


-  Good (86-100)
-  Satisfactory (71-85)
-  Fair (56-70)
-  Poor (41-55)
-  Very Poor (26-40)
-  Serious (11-25)
-  Failed (0-10)



**Alabama Statewide
Pavement Management Program Update
Walker County-Bevill Field (JFX)
Jasper, AL**




Figure B3A

2027 Forecasted PCI without PCIP




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	REVISED JMA	SCALE 1 in = 300 ft	FINAL

All sections recommended for Rehabilitation or Reconstruction between 2021 and 2024 also receive Surface Treatment in the 3rd year of paving.

Legend

-  Section Boundary
-  PCC Aprons
-  Shoulder or Other

Repair Type

-  Preservation
-  Reconstruction
-  Rehabilitation

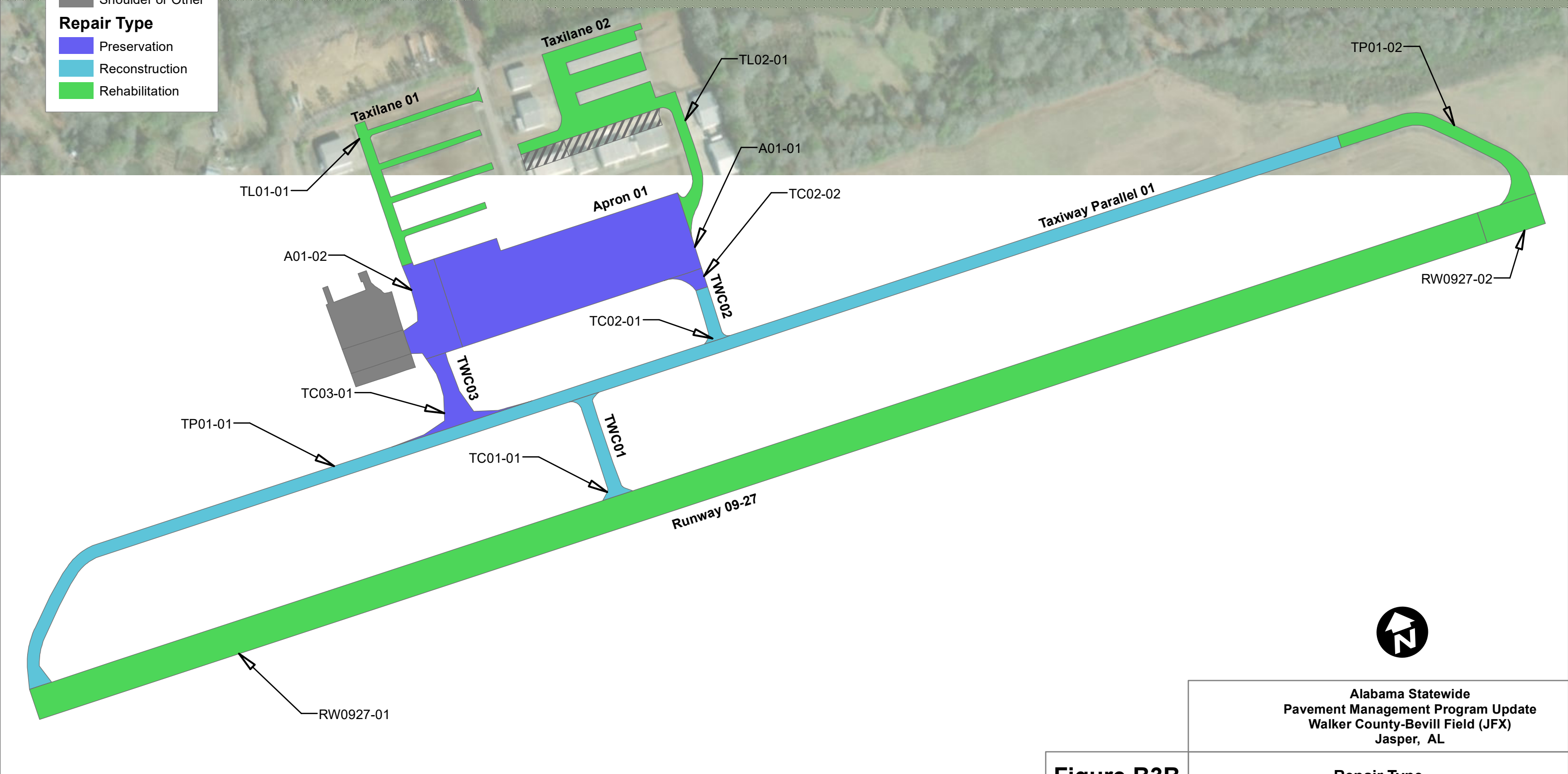


Figure B3B

**Alabama Statewide
Pavement Management Program Update
Walker County-Bevill Field (JFX)
Jasper, AL**

Repair Type		
ENGINEER KP/MR	DATE May 2021	MAP NUMBER Page 12
REVISED JMA	SCALE 1 in = 300 ft	FINAL

**All About
Pavements, Inc. (API)**
www.allaboutpavements.com
Telephone: 217-586-2765 FAX: 217-586-1967

All sections recommended for Mill & AC Overlay or AC Reconstruction between 2021 and 2024 also receive Surface Treatment in the 3rd year of paving

Legend

Project Name

- JFX_21-01_Runway 09-27 Rehabilitation
- JFX_22-01_Apron Preservation
- JFX_22-02_Taxilane Rehabilitation
- JFX_23-01_Taxiway Parallel Reconstruction
- JFX_24-01_TW & Apron Preservation

M&R Activity

- AC Reconstruction
- Mill 2" & 2" AC OL
- Mill 2" & 2" AC OLP
- Taxiway & Apron Surface Treatment

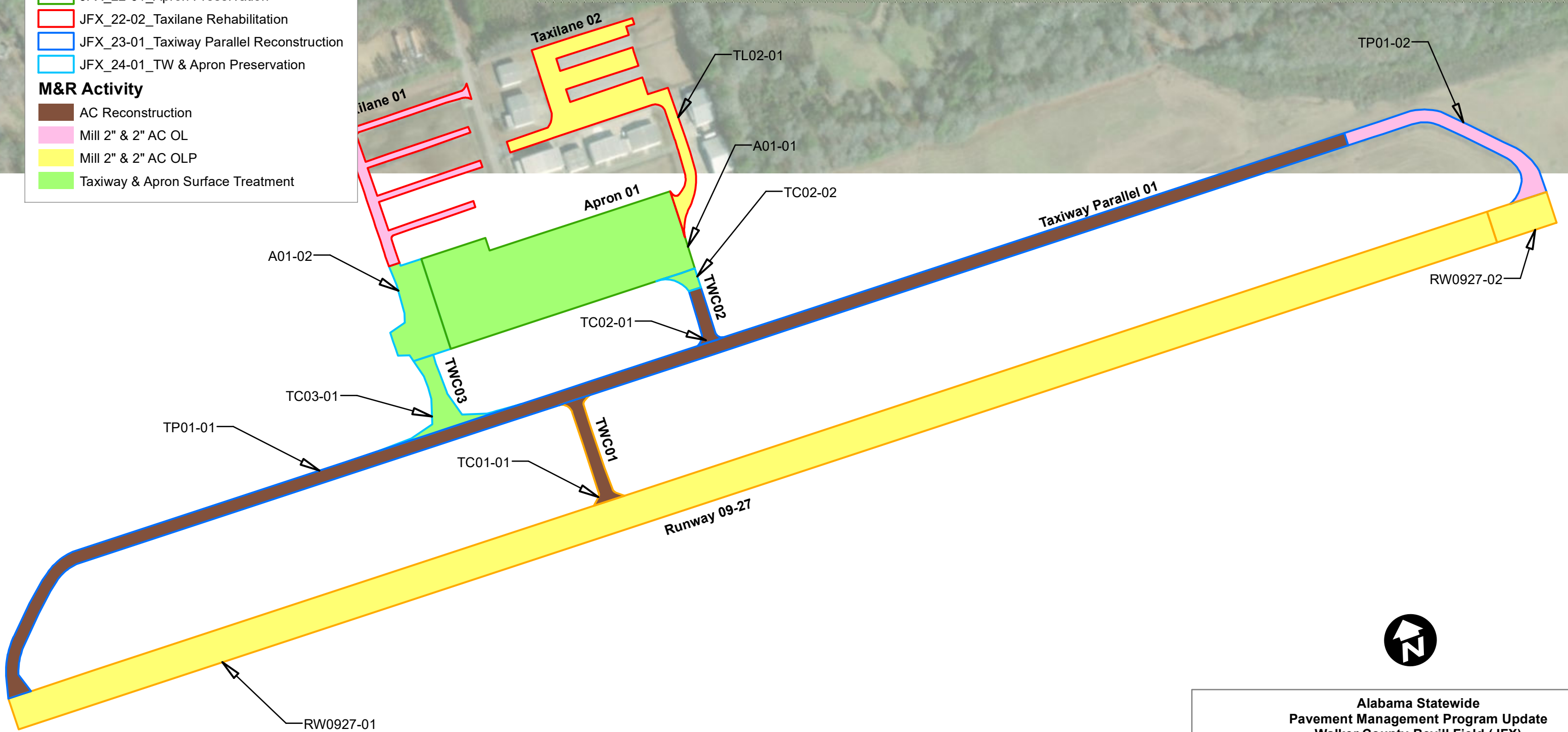


Figure B3C

**Alabama Statewide
Pavement Management Program Update
Walker County-Bevill Field (JFX)
Jasper, AL**

PCIP Recommendations		
ENGINEER KP/MR	DATE May 2021	MAP NUMBER Page 13
REVISED JMA	SCALE 1 in = 300 ft	FINAL

**All About
Pavements, Inc. (API)**
www.allaboutpavements.com
Telephone: 217-586-2765 FAX: 217-586-1967

APPENDIX C

OVERVIEW OF PAVEMENT DISTRESSES



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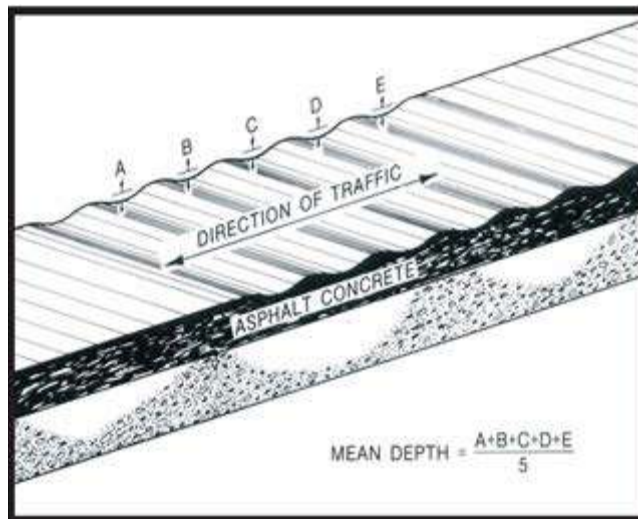
Corrugation

Description

Corrugation is a series of closely spaced ridges and valleys (ripples) occurring at fairly regular intervals, usually less than 5 feet (1.5 meters) along the pavement. The ridges are perpendicular to the traffic direction. Traffic action combined with an unstable pavement surface or base usually causes this type of distress.

Severity Levels

- @** Corrugation is a series of closely spaced ridges and valleys (ripples) occurring at fairly regular intervals, usually less than 5 feet (1.5 meters) along the pavement. The ridges are perpendicular to the traffic direction. Traffic action combined with an unstable pavement surface or base usually causes this type of distress.
- A** Corrugation is a series of closely spaced ridges and valleys (ripples) occurring at fairly regular intervals, usually less than 5 feet (1.5 meters) along the pavement. The ridges are perpendicular to the traffic direction. Traffic action combined with an unstable pavement surface or base usually causes this type of distress.
- <** Corrugation is a series of closely spaced ridges and valleys (ripples) occurring at fairly regular intervals, usually less than 5 feet (1.5 meters) along the pavement. The ridges are perpendicular to the traffic direction. Traffic action combined with an unstable pavement surface or base usually causes this type of distress.



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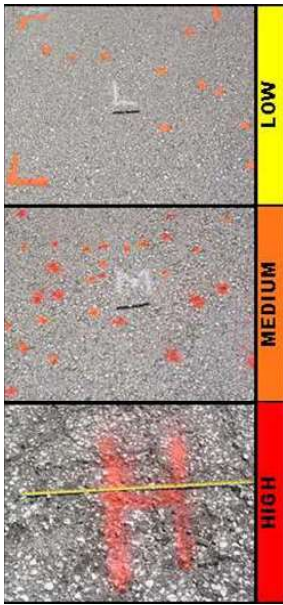
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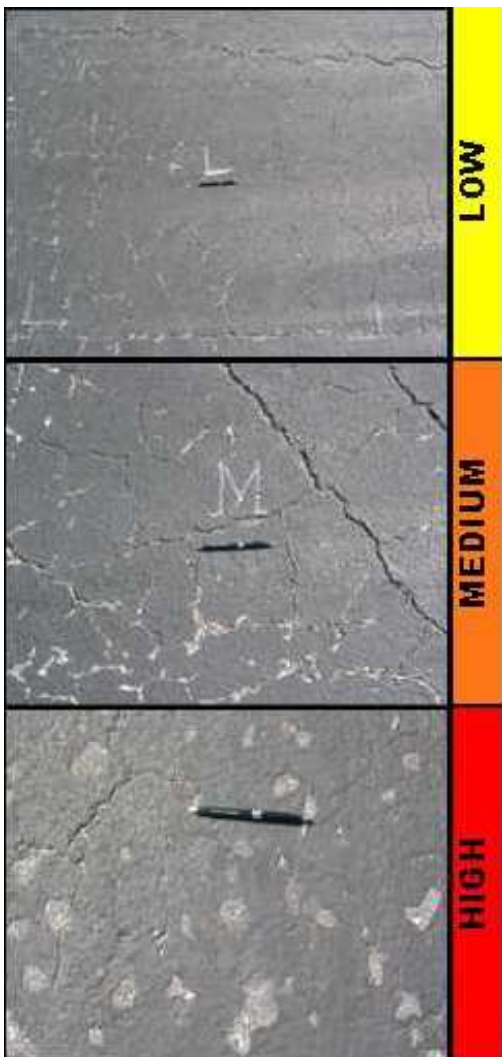
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gaY: CS'ddHJU'

< | \ 'gj YlmiWf|ZlncbYcZhYgWbN|dgY lgh fE:bUgi fYnFX
< fgi fYa YfLNU'gHuj YfLZhYbi a Vf'cZMUGYU|fYUYdUfMwZca|gg|'
< |g'Y(S' fEA|gg| U|[fYUYWg|ng|g'cfYhU'&MWHicZHYUa|bX
gi fYnFXgi fYa YfLNU'-b'| \ 'gj YlmiY Yl|zhYY|g| |b|Wb|h CS'
ddHJU'

BdY h|lgUbK XdYgg|bWbYSS+ 'g fj Ym



Gi ffr GU#7cUHfCjY8YgYA| GYf|ncYg



@

f2H YgUyXlfUlg YghU% dVfHfE-bhYWgCZAUrk\YYdUMB
VWWh \UgXjYcdXzhYgfZWWUgUfY YghU%#]Wfl'aaIk]X'

A

f2H YgUyXlfUlg VlkYb%UX'S dVfHfE-bhYWgCZAUrk\YY
dUMB VWWh \UgXjYcdXzhYWUgUfY%#]Wfl'aaIk]Xcf[fUP'

<

f2H YgUyXlfUlg j Y% dVfHfE-bhYWgCZAUrk hYgfZWWg'
dY]h 'cZ

Dfci g: f|V|b7ci fgYGjY|hi@jYg

@

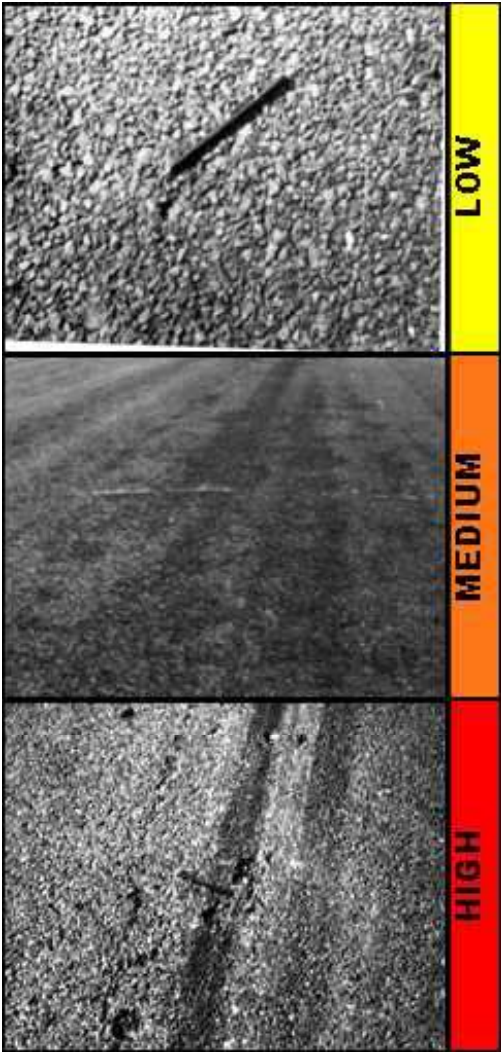
bU%gi UYZdfl#Sgi UYa VffYfYgHuj YgadYhYbia WfcZ
U[fYUYd|Wga|g|h |gV|kYb) Ux&SUX#cfhYbia WfcZa|g|h`
U[fYUYWg|f|g|X|g|h|n|VWX%

A

bU%gi UYZdfl#Sgi UYa VffYfYgHuj YgadYhYbia WfcZ
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<

bU%gi UYZdfl#Sgi UYa VffYfYgHuj YgadYhYbia WfcZ
U[fYUYd|Wga|g|h |g|j|Y|(SUX#cfhYbia WfcZa|g|h` U[fYUYWg|f|g|
|g|f|N|f|h|b% d|V|h|c|Z|h|Y|U|U



%" Fi Hh 157L

5 fi hg Ug fZWXfYgcb]bhYk\Y'dh^\ckYVZ]ba Un]hgUBWgfi lgUY
bc]MUYcbnUfUUbUzk\YbhYk\Y'dhgUYZ`Yk]h kUM" Dj Ya Yh
id]ZiaUicWfUch] hYgNgcZhYfiHFiHh] g]hagZca Uda UbhNzfaU]cb
]bUicZhYdj Ya YhUmfcfg V![fUXZig UnWgXVnWbc]XU]bcf`UMU'
agj Ya YhcZhYa Uf]UgX Yc hZ]WdUg`Q[h]Wbhi Hh] Wb`YXle'a Ucf
gi VifUZ]i fycZhYdj Ya Yh

Gj YfngUgXcbfi hXchL

- ◆ @ck! YghUb']bW]bXch/
- ◆ A Y]a! WkYb' Ux%]bW]bXch/
- ◆ <||\! YWNg%]bW]bXch"

FYUfcdhcg

- ◆ @ck! BcU]cb/
- ◆ A Y]a! dWUbx]fcj YUm
- ◆ <||\! dWUbx]fcj YUm



: ||ifY7!. "57Fi Hh"

%"G|dd|Y7fUW|b| B57L

G|dd|Y7fUW|b| from the direction of traffic. They are produced when braking or turning wheels cause the **dj Ya Yhg fAWc:g|XUXXZfa"H|gi gUncWfkg\YhYYgUck:g|h' g fAWa|| 'cf dcf VbXVWkYbhYg fAWUxb|hUf' cZdj Ya Yhg Vfy'**

Gj Yfng No degrees of severity are defined. It is sufficient to indicate that a slippage **VWY|g'**

FYUFD:MG

- ◆ **Scbch|d|'**
- ◆ **Dff|U'cfZ`Xdh'dUW'**



: ||ifY7%\$ G|dd|Y7fUW|b|"

%"GkY]h] f57L

8Yg]d]b

5'gkY'lgWfUW]h]XVn]bi dkUfXV' [Y]bhYdj Ya YH]g]fZW'5'gkY'aUn
cWf]g]f]dn]ej YUgaU' f]Ucf]g]U]d]h] YZ]f]U]U]k]j]Y'9]h]Y]h]d]N]c]Z]g]k]Y' WbWY
UW]ad]h]Y]X]V]n]j]f]Z]W]W]U]h]'5'gkY'lg]g]U]m]W]g]X]V]n]c]g]U]W]b]h]Y
g]V]f]U]X]c]f]V]n]k]Y]h]'g]c]Z]V]h]U]g]a]U'g]k]Y' WbUg]c]W]f]c]b]h]Y]g]f]Z]W]c]Z]b]g]d]U]h]
c]j]Y]U]h]j]Y]D]7]H]g]U]F]j]h]c]Z]U]V]c]k]! i]d]h]Y]D]7]g]U'

GjY]h]m]@]j]Y]g

GkY'lgWfYnj]lgVYU]X]U]g]U]a]h]c]f]Z]W]c]b]h]Y]d]j]Ya]Y]H]g]f]X]e]i]U]h]m]g]
X]h]f]a]h]X]U]h]Y]b]c]f]a]U]U]Q]W]Z]i]g]h]X]Z]f]h]Y]d]j]Ya]Y]h]g]m]i]b]i]b]X]
@ W]h]g]X]M]U]c]b]'f]d]k]!g]j]Y]h]m]i]k]Y'g]a]U]h]c]h]U]k]U]g]V]c]V]g]j]U]V]Z]V]h]Y]f]
Y]lg]b]W]W]b]V]W]b]f]a]X]V]n]j]h]d]'U]j]X]W]c]j]Y]h]Y]g]m]i]b]U]h]Y]b]c]f]a]U'
U]Q]W]Z]i]g]h]X]Z]f]h]Y]d]j]c]k]j]'c]W]f]Z]h]Y]g]k]Y'lg]d]f]g]h]!

GkY'WbV]c]V]g]j]Y]k]h]c]i]h]Z]V]W]h]U]b]X]U]g]U]g]l]h]Z]W]h]Z]W]c]b]h]Y]
A d]j]Ya]Y]H]g]f]X]e]i]U]h]m]g]X]h]f]a]h]X]U]h]Y]b]c]f]a]U]U]Q]W]Z]i]g]h]X]Z]f]h]Y]d]j]Ya]Y]h]
g]m]i]b]i]b]X]W]h]g]X]M]U]c]b]'

GkY'WbV]f]D]j]n]c]V]g]j]Y]X]U]X]g]j]Y]Y]m]Z]W]U]g]h]Y]d]j]Ya]Y]H]g]f]X]e]i]U]h]m]h]Y]
< h]c]f]a]U]U]Q]W]Z]i]g]h]X]Z]f]h]Y]d]j]Ya]Y]h]g]m]i]b]i]b]X]W]h]g]X]M]U]c]b]'



%"KXhY[h] 157L

8Yg[d]db

H YkY[h] UkUicZhYUg\UH\p\XfUXZ\BYU|[f]UYaUq| Zca hYdj Ya Yh
gfAW

GjY[h]e@jYg

5g\Uhg fAWW[h]bb| l'g'ck'g[h]gcZU[h] k\|Wa UhYUWYUUXVn
V\U\W\B\N\|dg' @cg|hYZ\BYU|[f]UYaUq| |gh|MVYU\Xa UhY
@ UW\dh|XV\Z\N|h' cZhYUg\UH\c" 9N Yg'cZhYUgYU|[f]UYgUY
V[h]bb| l'VY\dg\XfNg\h\B\\$\$ |bW\g'f%aaE' Dj Ya Yha UhY
fYUj Ynbk f\gbk Ug* 'adhg'X!

A @cg'cZ\BYU|[f]UYaUq| |gh|MVYU\X\Yg'cZ\UgYU|[f]UY\jYV\B'
Y\dg\X\i\dlc'% k|X h'Z\hY\ch| Yg'g\X'cZhYUgYU|[f]UY\X\Y\c'hY'cg'
cZ\BYU|[f]UYaUq| "

< 9N Yg'cZ\UgYU|[f]UY\jYV\B'Y\dg\X|f\N\h\B'% k|X h'Z\hY\ch| Yg'
g\X'cZhYUgYU|[f]UY\H\Y\Y|g\W\g\X\U\Y'cg'cZ\BYU|[f]UYaUq|
Y\N|h| l'c'd\h|h|U'c'f'gaY'cg'cZ\UgYU|[f]UY'



%!"6dk!I d!D77L

8YgAd]b

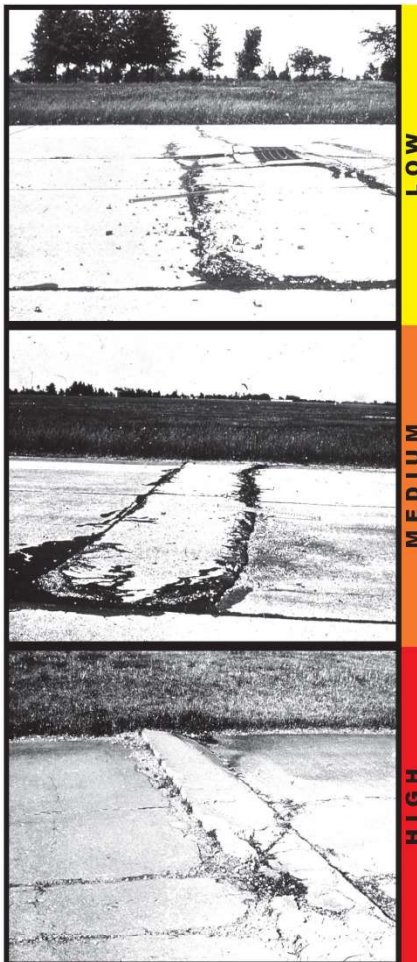
6'dki d'g'Wf]b\dkYhYzi g UnHUUhg YgVWcf'c]HhUhgbdk]Y
Yci [\ lc'dfa]h] d]hgdbVnhYWBWYgUG'H Y]hgZ]W]hk]Xh]gi g Um
W]gXV]h]Z]H]bcZ]W]adYg]VYaUm]Ug]bc hY'c]hg]W]K\Y]Y d]hgdb'
W]bdfY]Y Yci [\ dYg]fZU'cW]n]Xi dk]fX]aj Ya Y]h]Z]hYgU]V]Yg'
fi W]h]f'c'g'UM]h] k]'cWf]bhYj]M]h]cZ]hY'c]h]6'dki d'g'W]Ug'cWf]U
i]]h]m]W]g]U]X]U]b]Y]b'Yg'H]g]h]d]cZ]g]f]g]g]U]a]c]g]U]k]U]g]f]U]f]X
]a]a]Y]U]Y]m]W]U]g]cZ]g]Y]Y]X]a]U]Y]d]h]U]l]c]U]M]Z]H]6'dki d'g'U]Y]b]W]X]X]f'
f]Z]f]W]k\Y]b]W]g]X]g]U]h]g]f]Y]V]h]]Y]U]U]X]Z]f]f]X]d]h]h]"

GjY]h]e]jYg

@ 6i W]h] 'cf'g'UM]h] \Ug]h]f]b]W]X]h]Y]d]j Ya Y]h]b]c]d]M]U]j Y]Z]U]X]d]b]n]U]g]]\h
]a]c]i]h]c]Z]i [\b]g]Y]g]g'

A 6i W]h] 'cf'g'UM]h] \Ug]h]f]b]W]X]h]Y]d]j Ya Y]h]b]c]d]M]U]j Y]Z]i]H]U]g]]b]Z]W]h
]a]c]i]h]c]Z]i [\b]g]Y]g]g'

< 6i W]h] 'cf'g'UM]h] \Ug]h]f]b]W]X]h]Y]d]j Ya Y]h]b]c]d]M]U]j Y'



%" 7cbf6fU_gfD77L

5 WbfVU_lgUWWhUfhgNghY'cHgUUXgUWYghUbcfYiUlc'cbY
\UzhYgUV'Y[h'cbVch'gXgaYlgfXZca hYWbf'zhYgU': cfYUadYZU
gUkjh Xa YgdgcZ& Vri& ZNhuUgUWU'hgUW' hY'ch) ZN'ca`
hYWbf'cb'YgYUX% ZY'cbhYchY'gW'lg'ch'U'gXUXUWbfVU/'hg
UXU'cbUWU' <ck'Y'ZUWWhUfhgNgh+ ZY'cb'YgYUX%SZY'cbhY
chY'lgW'gXUXUWbfVU'" 5 WbfVU_XZ'gZca UWbf'gU'bhU'hY
WUWY'h'g'j VU'nfci [\ hY'hY'gU'h]W'ggk\]YUWbf'gU'fhgN'g
hY'c'HHU'U' Y'@cUXY'U'j'cbWa V'X'k'j'`cg'cZ'g'd'bf'U'X'W'f'j' g'gg'g'
igUmU'g'WbfVU_g'

GjYfng

- ◆ @k! 7UW\lgY'hY'bc'gU'h' 'cfa'bcfgU'h' fbcZ'f'bcVW'X'aU'Y
f'CS'f'd'f'U'f'Z'cb'filled, it has a mean width less than approximately 1 #'
inch (3 millimeters); a filled crack can be of any width, but the filler material
a'igW'j'bg'U'W'f'n'W'X'j'cb'HY'U'U'W'k'Y'b'hYWbfVU_U'X'hY'
'cb'lg'cb'U'W'X'
- ◆ A'X'ia! One of the following conditions exists: (1) filled or non!filled c'fU'W'g'
a'c'X'U'Y'ng'U'X'g'a'Y: CS'd'f'U'f'f'U'cb'filled crack has a mean
width between 1/8 inch (3 millimeters) and 1 inch (25 millimeters); (3) a filled
crack is not spalled or only lightly spalled, but the filler is in unsatisfactory
W'X'j'cb'f'f'HY'U'U'W'k'Y'b'hYWbfVU_U'X'hY'cb'lg'j'\h'n'W'X'
k'j'h'`cg'Y'c'f'a'lg'j'd'f'f'W'g'
- ◆ <f'!\! One of the following conditions exists: (1) filled or non!filled crack is
severely spalled, causing definite FOD potential; (2) a non!filled crack ha'gU'
a'U'bk'X'h [f'U'Y'h'U'U'hd'j'a'U'Y'm'f'W'f'f'f'a]`j'a'Y'g'Z'W'U'f'U'f'Y'
X'a'U'Y'd'f'f'U'f'c'f'f'HY'U'U'W'k'Y'b'hYWbfVU_U'X'hY'cb'lg'g'
g'j'Y'f'n'W'X'

FYU'f'cd'cbg

- ◆ @k! Bc U'W'bc'f'gU'W'W'g'
- ◆ A'X'ia! gU'W'W'g'
- ◆ <f'!\! gU'W'W'g'U'f'h'U'Z'`'
c'f'Y'U'W'h'Y'g'U'



X'h'd'W

: f'ifY7%'D77 7cbf6fU''

%" 7fUWg"@cb|JiXpUZHFUbgYgYUbxS|UcbU'D77L

H YgVWgXj|XhYgU|bc|kc'cfhfYd|WgZUXIfYigUmMgXVhU
WáVhU|bcZcdXfYh|cbZf|h'gYgZUXgfb_UYgYg'@ck'gYf|h
VWgUfYbdhWgXfXaUcfgiVfU'XgYg'AYf|a'cf\\|gYf|hVWgUfY
igUnkcf|h|VWgUfYbdhWgXfXaUcfgiVfU'XgYg'

GjYf|ng

- ◆ @ck!%i|Z'YVWg%#|Wlc%&|Wk|Xk|hbcZi|h|'cf|gU|h|/E
VWg'YghU%&|Wk|Xk|h`ck'gYf|ngU|h|/cf'EZ'YVWg'cZ
Unk|Xk|hZf|f|Zfa|h|bUg|g|Uf|naUbfU|XbcZi|h|'cf
gU|h|/
- ◆ AYf|a!%i|Z'YVWgV|k|Yb%&|c%|Wk|Xk|hbcZi|h|'cf
gU|h|'cf&Z'YVWg'cZUnk|hZi|h|'YghU%#|WcfAYf|a'
gYf|ngU|h|/
- ◆ <|\\!%i|Z'YVWgk|hUk|h|[f|Uf|hU%|W'&i|Z'YVWg'cZ
Unk|h|k|hZi|h|[f|Uf|hU%&|WcfAYf|a'gYf|ngZi|h|/cf'E
Z'YVWg'cZUnk|hZi|h|[f|Uf|hU%&|Wcf|\\|gYf|ngZi|h|"

FYUfcd|cbg

- ◆ @ck!BcU|f|b|cf|gUVWg/
- ◆ AYf|a!gUVWg/
- ◆ <|\\!gUVWgZUf|nU|~Xh'dUWcf|f|UW|hYgU'



: ||ifY7%&'D77HUbgYgY7fUWg'

§' Si fUj]m7fUWgID77L

8YgAdjb

Si fUj]m7fUWg]gWgXVnhYbUj]m7cZhYWBWYk]hgUXXj]fdaYbU' ZWfggWgZYYhukVWg'-hi gUnldNfggUdUMB'cZMwgi bhd' parallel to a joint or linear crack. A dark coloring can usually be seen around the fine XfUj]m7fUWg'H]ghdYcZMwgd' aUnjYbU'mXkXghN]fulbcZhY WBWYk]h]b%c'SZYfSSle*SSa]`jaYgicZhY^chidVW'

GjY]h@Yg

@ ÍSÍ VVWd] \gXjYodXgYFUWg]MVYUaci hZgUVfUk]h`]hYcf bcXghN]fulbcf: CS'dhHjU' cfÍSI VVWd] \gWfYX]bU]a]PX fUcZhYgUzgWg]bcbYcfkcbWgcfUd]`cbY^chZi h]WgUfY a]gh] UXXghN]fulcb\UgWfYX'GaY: CS'dhHjU'

A ÍSÍ VVWd] \gXjYodXgYFUWg]MVYUaci hZgUVfUk]h`]hYcf bcXghN]fulbcf: CS'dhHjU' cfÍSI VVWd] \gWfYX]bU]a]PX fUcZhYgUzgWg]bcbYcfkcbWgcfUd]`cbY^chZi h]WgUfY a]gh] UXXghN]fulcb\UgWfYX'GaY: CS'dhHjU'

< ÍSÍ VVWd] \gXjYodXgYFUWg]MVYUaci hZgUVfUk]h` XghN]fulbcZ: CS'dhHjU'



8% >chhGUSaU YID7LE

>chhGUSaU YlgUmMh\hbk\jWYUvYg] 'cfcVgk UWai 'UYbhY^chh
cfUck'g] hZUhh\hUdhcZkUf" 5Wai 'UdhcZbMadYgVYaUfUglb'
hY'chhY YghYgUZca Ydh\h Uxautng' hbVW]h'zg UM]h'zcf
gU]h'"DJUV'chh' YvdXkchYX'YgZhYgUgd'fWg^chhZca hY
UWai 'UdhcZaUfUgUxUg'cfY YhgkUfZca gM]h' XkbUxgzM]h' hY
Zi bU]bgj ddf]h' hYgV' HdjW'hdngz'chhGUSaU YUfY'%g]dd]h' hY
'chhSUh'&N]h' gdcZ'chhSUh' HkXX]fdkh/(E\UX]h' 'cZHYZ' Y/) E
'cgicZchXkchYgUVX'YgUx* EUwcfUgBwczgSUh]bhY'chh

Gj Yfng

- ◆ @k !]b[YfUn]ccXWb\hchhfi [\cihYgM]b" GUUh'gMzfa]h' kY'k]h' dbnUa]b'cfUa'ci bhcZUn'zhYUj Yhdngz'ZLaU YdYgh
- ◆ A X]a !]b[YfUn]fVb\hchhfi [\cihYgM]b'k]h' dY'cfad'fYcZ Un'zhYUj Yhdngz'ZLaU YdYgh'icWf]h']cUa'XUYX]fY" GUUh]bX]g]a YfUYfUWa YHk]h]b&N]f/
- ◆ <||\ !]b[YfUn]bcfVb\hchhfi [\cihYgM]b'k]h' dY'cfad'fYcZ Un'zhYUj Yhdngz'ZLaU YdYgh'icWf]h']cUg] YX]fY" GUUh] bX]g]a YfUYfUWa YH

FYUfcd]hg

- ◆ @k ! BcU]b/
- ◆ A X]a ! gU'^chh'
- ◆ <||\ ! gU'^chh'



: ||ifY7% 'D7 >chhGUSaU Y'

8& GaU DUWID77L

5' dUWlgUbUk\ YfhYcfll jBU'dj Ya Yh
has been removed and replaced by a filler

aUfjU': cfWbXjcbY U UjcbzdUWj lg'
Xj jXXjhc lkc lndg' gaU fngghU) 'gi UfY
ZNUXUf Yfj Y) 'gi UfYZNL'@uf YdUWg'
UfYXgUfVXjbhYbl hgXjcb'

Gj Yfng:

- ◆ @k ! DUWlgZbUjcbj kY'zkjh'
'jhycfbcXjcfUjcb/
- ◆ A Yjia ! DUW\UgXjcfUfXZbXf
acXfUfYgdU'j WbVYgXbUfcbXhY
YfYg'DUWa UfjU WbVYg'cX'Yz
kjh WbgXfUfYfZfifh jcf: C8'
dNjUf/
- ◆ < j\ ! DUW\UgXjcfUfXZbXhYfVn
gdU'j UfcbXhYdUWcfWUWj'
kjhjbhYdUWZc UgUfYk\ jWkUfUhg
fYUWa Yh

FYUfcdjcbg

- ◆ @k ÈScBchj/
- ◆ A Yjia ! FYUWdUWcfFYUWY
gU'
- ◆ < j\ ÈFYUWdUWcfFYUWYgU'



: jifY7% 'D77 GaU DUW'

&" @Uf YDUWID77L

Patching is the same as defined **ZfUgaU`dUW`
 \ckYVzhYufUcZhYdUWlgacfyhUb) 'gi UfY
 ZNf5 i f]hMhGudUWhUgfydUWkhY
 cf]]bU'dj Ya YHMMgycZdUWa YhcZ
 i bXf] fci bXi f]]ng'HYgj Yf]m'j YgcZLi f]]m
 Wf]fYhYga Yg]hcgYZffYi 'Uf dUW]d."**

Gj Yf]ng

- ◆ @ck ? DUW]gZb]f]cb] kY`zk]h `]h]Ycf
 bcXNf]cfU]cb/
- ◆ A Y]i a ! DUW\UgXNf]cfUWZbXf
 acXfU]YgdU]d] WbVYgYbUfci bXhY
 Y] Yg'DUWa Uf]U WbVYg'cX Y]zk]h`
 W]gXfU]Y]Zf]f]h]bcf: CS'dh]f]U/
- ◆ <] \ ! DUW\UgXNf]cfUWZ]h YfVn
 gdU]d] Ufci bXhYdUWcfW]W]d] k]h]b'
 hYdUWZc Ug]f]k\]WkUffU]g'
 fYdUWa Yh

FYUfcd]cbg

- ◆ @ck È8cBch]d] /
- ◆ A Y]i a ! FYdUWdUWcf]f]dUW]hYgU'
- ◆ <] \ ÈFYdUWdUWcf]f]dUW]hYgU'



:]]ifY7%` 'D77 @Uf YDUW'

&" Dddi lgiD77L

5' dddi hlgUga U' d]WwZdj Ya YhhUMFU_g`cogYZca hYg fAWX Ylc ZYhV
hUk UWcb]bWa VbUcbk]h Y d]h]j YU [fY Uhg' Dddi lgi g UnfU] YZca`
Uddid ja UYn]bWlc(]bWYg]bX]a YfUbxZca %&]bWlc &]bWgXsd"

Gj Yfng

No degrees of severity are defined for popouts. <ckY Yzddi lgaig hVYfNgj Y
VZfYh Yn]fYw hX]g U]g]Yg]YZj YU Yddi hX]ghiaig hVWX
Uddid ja UYn]fYddi lgidf gi UYn]fXj YhYb]fYgUVfU



:]]ifY7%. 'Dddi lg'

&"D adq id77L

8YAdhb

**D adq lghYYMbcZaUhfUvkUfhci [\ `c hgc VWGWi gXVhWZMcb
cZhYgWi bXfdigh `cXg'5ghYkUf'lgYMWZ]hMfYgdffWgcZ] fj YzgWZ
Wncfg'HBXyj lgbUdc fYgj YcgicZdj Ya Yhg ddbfG fAWgUhh Ux
VgYcfj V fUYaUhfU'cbhYdj Ya YhVgYc `c hgc VWGufYy]XbWcZ
d adq "D adq bMf `c hgc bXWgdcf `c hgc UY Ux cgcZg ddbfk \]Wk]"`
`YXlc VWWh i bXfYXUXcXg'**

GjYfm@jYg

BcX] fYgcZgj YfmfYXWbX-hgg ZMhlc]bXUYhUd adq Y]gg'



&" GUVh ID77L

**AUVWVh 'cfVUth fYZfgUbkcf 'cZgUdczZbZcf\UFjBYVWghU
YfXcbnhfi [\ hYiddf g fZWCZhYWBWYHYVWgN6Xc]bMgWU
Uj 'YgZ/8\$X|fyg'AUVWVh 'cfVUth |gigUmWgXVnj YZhg |hY
WBWYUxaUmXk:cGUh 'cZhYgfZWK\|W|ghYVU_XkbcZhYgU
g fZWC UXd of approximately 1/4 to 1/2 in W'GUh 'aUthg VVWgXVn
|adcfWghj VcbUXdcfU|f|UY'5bchYfW|bhXgi fWcZgdYgghY
fU|bVWkYbhYU_UlgfBUC'UX? &E|bga YWa YlgUXWUba |bUglb'
ga YU|f|Uhg'fXVZfa YVnhYVU|bVWkYbhYU_UlgUXU|f|UY
fg |bYd|gcbghUWgYUVU_Xkb|bhYWBWY'**

GjYfng

- ◆ @k! 7Uth 'cfAUVWVh Ylggj Yg|bZVWghUVfUHYg fZW|gb
|ccXWV|cbk|hbc'GUh 'HYVWdUmbaig|WkY X|bXUX
Yg|nfW|bhX
- ◆ AYia ! GUVggVXkj YUdd |aUYn)1 'cf'YgZZhYgfZWK|h'gaY
: CS'dh|U/
- ◆ <||\! GUVggj YfngVXWgh U||\ : CS'dh|U'1 gUmācfYhU
)1 'cZhYgfZW|gUWEX



&": U 'Hb' 1D77L

GHVa Yhcf Zi 'Hh 'lg UxZZfYbWcZYj U'cbUfU'c'hhcf VUWUg gXVnd YjU' cfVhg' 'Hh'cb'

Gj YfHg

Severity levels are defined by the difference in elevation across the fault and the

	Fi bkUng#U jkUng	5dfcbg
@	0% 'bW	% 'E%'bW
A	% 'E%'bW	%'bW
<	2%'bW	2%'bW

FYUfCd'cbg

- ◆ @k! BcU'cb'
- ◆ A Y'a 'E; f'bh Uch hY'cbh
- ◆ <|| 'E; f'bh 'cf'cbh'cXUhgZfYg'fU'cb'



&" G UMFYXGUVFD77L

=hfgNMh VUWgUYVUWghUMFU]hcZifcfacydWgVWU gczj YcUjh' UxwfhDSgi UYg ddbfH Y[\!severity level of this distress type, as defined below, lghZfYXlc UgUg UMFYXgU'ZU`dWgcfVUWgUYWdUjbxkjh bUWbf VUZhYXgUgUgUW[cfhXUgUg YWbfVU"

Gj YfHg

- ◆ **@k! Slab is broken into four or five pieces with the vast majority of the cracks fjh Y,) dWVhZck!gj Yfhn**
- ◆ **AWja !(1) Slab is broken into four or five pieces with over 15 percent of the VUWgZaWja gj Yfhn\ \!gj YfhnVUWg/cfEgUlgVc_Y]hc'gl' cfacydWgkjh'gj Y,) dWVhZhYVUWgZck! /**
- ◆ **<[\! 5hlg Y Y'Zgj Yfhn YgUlgWYXg UMFYXgU'ZU`dWgcfVUWgUYWdUjbxkjh bUWbf Vc_Y]hc'gl' cfacydWgkjh'gj Y%) dWVhZhYVUWgZaWja! cf \ \!gj Yfhn**

FYUfcdhbg

- ◆ **@k EGU'7UWg/**
- ◆ **AWja !: i`Xdh dUWcfYUWYgU'**
- ◆ **<[\!: i`Xdh dUWcfYUWYgU'**



&" Gfb_ qY7fOWfD77L

Gfb_ qY7fOWfD77L
Yn6XUWgghYHfYgUVH Yn6YZfa YXfj hYgUj UxWfj 'cZHY
WbNYUxi gUnk bdi N6Xhfi [\ hYXh 'cZHYgU'

GjYfng

No degrees of severity are defined. It is sufficient to indicate that shrinkage cracks exist.

FYUfcdhbg

- ◆ **8cBchj**



"

' \$' >chhGUgfD77L

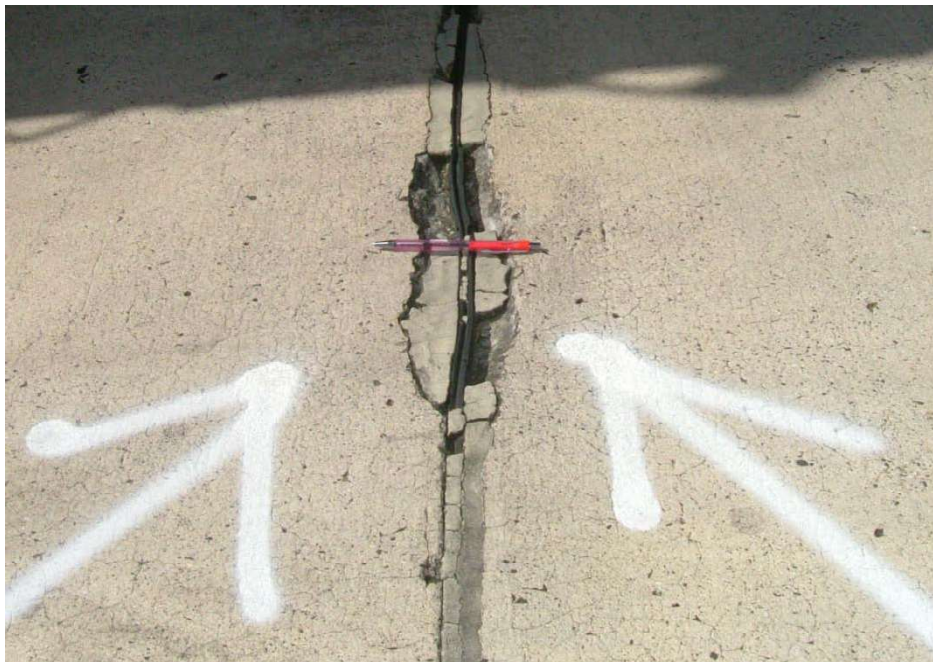
>chhGUh lghYXghN fUbcZhYgUVX Ygkjh b&ZYhZhYgXyZHY'chH'
5'chhGU i gUmXyghN Nhxj YhU nhtci [\ hYgUzV hHhGhY'chHh
UbU 'Y'GUh' h'g l'Zca YWgjj YgYgghY'chHhWU gXVh'f'f'f'f'
cZbMadYgVYaUhfUgcfhZfWcUg' K'U VbXhYhY'chHh gXVh
cj Ykcf_h [EWa VbXkjh hZfWcUgUgUchYVh g'ZgU'h''

Gj Yhng

- ◆ @k! gj Y&ZYhch UxlgVc_Y]hc'acfhUbfYd]WgXVhXVh
'ck'cfa Y]a 'gj YhMhWgkjh ^]hYcfbc: CS'dhH]Uzcf'g&YghU'
&ZYhch UxlgVc_Y]hc'acfhUbfYd]Wgkjh ^]hY: CS'cf]Y
XaU]YdnhU/
- ◆ A Y]a ! gj Y&ZYhch UxlgVc_Y]hc'acfhU' 'd]WgXVhXVh] \h
cfa Y]a Wgcf'ga Y: CS'dhH]U]Y]h]zcf'g&YghU'&ZYhch '
UxlgVc_Y]hc'd]WgcfZU]a YhXkjh'ga YcZhYd]Wg'cg'cfUghz
Wgh WghXVY: CS'cf]YXaU]YdnhU/
- ◆ <]]! gj Y&ZYhch UxlgVc_Y]hc'acfhUbfYd]WgXVhXVh
cfacY]] \ 'gj YhMhWgkjh \]] : CS'dhH]U'

FYUfCd]bg

- ◆ @k! BcU]cb/
- ◆ A Y]a ! dhZfa UdhU]Xh'dUW
- ◆ <]]! dhZfa UdhU]Xh'dUW'



'% 7cbfGdUgD77L

7cbfGdUgD77L 'ghYfjYH'cfVfUxkbcZhYgUkjhJbUdIdJaUYn&ZnZ
hYwbf"5 wbfGdU xZngZca UwbYfVU JbhUhYgU UH 'YgXdkkUX
lcJbhGwHhY'chk\]YhYfU YfHxgjYfU nhci [\ hYgU'

GjYfng

- ◆ @ck! YhY%hYgU'lgMc_Yb]bc'dYcfkcd]WgXbXVnck'gjYfhn
VWgkjh`JhYcfbc: CS'ddHfU/cf&hYgU'lgXbXVnchYaYfja'
gjYfhnVWgkjh`JhYcfbc: CS'ddHfU/
- ◆ AYfja È%hYgU'lgMc_Yb]bc'kcd'afYd]WgXbXVnchYaYfja'
gjYfhnVWgkjh`JhYcfbc: CS'ddHfU/cf&hYgU'lgXbXVnchYaYfja'
YfZUaYfXVWWhUaUhYUWAdh]XVnUzk'
\Uf]bVWgcf' hYgU'\UgXmfUfXle hYdcJhk\Yf'cgYaUf]U'g'
Wigh: CS'ddHfU/
- ◆ <J\ È%hYgU'\UgMc_Yb]bc'kcd'afYd]WgXbXVnchYaYfja'
ZUaYfXVWgkjh`JhYcfbc: CS'ddHfU/cf&hYgU'lgXbXVnchYaYfja'
YfZUaYfXVWWhUaUhYUWAdh]XVnUzk'
\Uf]bVWgcf' hYgU'\UgXmfUfXle hYdcJhk\Yf'cgYaUf]U'g'
Wigh\J\ : CS'ddHfU'

FYUfCdHbg

- ◆ @ck! BcUfcb/
- ◆ AYfja! dffUXh'dUW
- ◆ <J\! dffUXh'dUW



' &'5GF 'ID77L

5GF 'lgWU gXVhWwWw JW'fUWfbVWkYbU_UlgUkXWUfbfUWUj Yg'JWa JbMUG
k\JWZfa U|Y' HY|YUgcfVgkUfZUgh | Y dHgdbk\JWa UnNa UYhY
WbWfYUkXUWfhgV WfYg' 5`_UlgfYacgicZb]HfXVWVnhYcbfUk
Ww YHk]h]bhYdj Ya YH' 5GF 'WUW]h' a UnYUWYUfXVhWwWw JW'dj Ya YH
X]Wg'

JlgU]bXWUfghU5GF'a UnYdYgH]bWXY'

% 7UW]h' cZhYWbWfYdj Ya YHfZb]bUa UfdUMbL

& K\JZVdkb] fUicfchYWcfX|Y'cfgh]h' a UnYdYgH]bWXY
g'fWY

" 5|[fYUyddi]g

(" bWUg]bWbWfYj'c'ia YfU dHgdb]hUa UnYg']bX]gdf]bcZUXWb'cf
]H]fU'g]h WfYgcf'ang]WUYa Ylg'9] UadYg'cZ] dHgdb]bWXYg'cj]h' cZ
UgdUhdj Ya Ylg']\hWb]h]h'zgUVAi]h]z'c]h]a]gU]]ba YHbXU]f]g'bcZ
'c]h]gUgcf Y dHgdb'c]h]h' Yg'

6WU g'5GF 'ga Uf]U'XVhWwWw5GF 'gl' YbMU'ndYgH]h'fci [\c]hYdj Ya YH
g]W]b' 7cf]h UkXWbWfYc]fci fU]]WUng]g]ghYcb]n]W]h]j Ya YhcXc'
Wb]fa hYdYg]bWcZ5GF' HYZ`ck]h' g'c' XWY_Yh]ba]bXk\Yb]Xb]h]h']
hYdYg]bWcZ5GF h'fci [\j]gU]h]g]W]b

%; YbMU'n5GF Xg]Yg]g]fYbdc]Vg]j YX]bhYZ]g]Zk' n]f]g]Uf'W]g]h' W]cb' b'
W]h]g]z]d]g]h]g]f]b U]Y]W]W]h] W]c]W]h]YX]h]c]Z]W]g]h' W]cb]U]X]g]d]f]Y]h
k]h]bhYZ]g]h]f'

& 5GF 'lgXZVh]h]U]XZca 8!7UW]h' VnhYdYg]bWcZUW]h' d'f]b]X]W]U]f]c'
hY'c]h]W 8!7UW]h' d'f]Xca]b]h]m]X]j Ycd]g]U]g]f]Y]g'Z]d]f]U]Y]W]W]g]c'
'c]h]W]g]U]X]b]f]W]W]h] k]h]bhYg]W'

" 5GF 'lgXZVh]h]U]XZca 'A]U]7UW]h] #G]U]h] VnhYdYg]bWcZ]g]U]g]h]g]cZ
Y dHgdb'

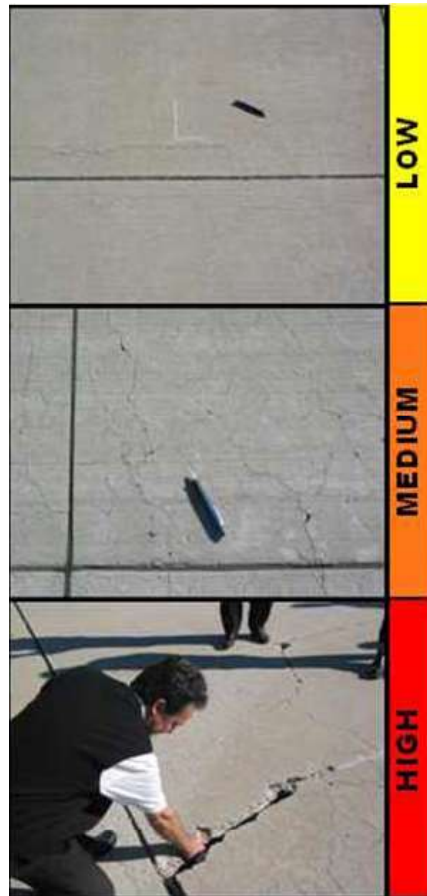
GjYfhi@jYg

@ A|jaUlebc: cf||bCVVNSUaU|YECSE'ddnh|UZca V|Wg'c|hg'5GF' fYUXXddi|g/V|WgU|hYg fZ|WUfYH| \H|FYKa|b|hm'aa'cf'Yg|@|h|Y lebcY|N|B|W|c|Z|a|g|Y|a|Y|H|b|d|j|Y|a|Y|H|c|f|g|f|f|i|b|h| |g|g| V|f|Y|g|c|f|Y|a|Y|g'

Gca Y: CS'ddnh|U/|b|N|G|X|g|k|Y|H| |'c|f|c|h|Y: CS'f|Y|a|g|U|a|Y|c|X|a|U|h|Y f|i|f|Y| A|U|h|Y|Y|N|B|W|c|Z|g|U|a|g|Y|a|Y|H|U|X|c|f|g|a|Y|X|a|U|Y|c|U|X|W|h|g|g| V|f|Y|g|c|f|Y|a|Y|g'

A A|Y|i|a|'5|G|'X|g|N|g|g|N|Z|f|h|U|X|Z|ca '~|c|k|V|h|U|j|H| |c|b|Y|c|f|a|c|f|c|Z|h|Y Z'~|c|k|h|. |b|N|G|X: CS'ddnh|U|Z|b|N|G|X|W|W|h| |c|Z|h|Y|g|U|Z|g|a|Y|Z|U|a|Y|g| U|d|h| V|W|g|c|f|U|W|W|h|f|g|N|b|g|d|Y|g|H|g| fZ|W|d|d|i|g|c|Z|W|N|Y|a|U|h| c|W|Z|d|U|h|b|c|Z|k|N|V|W|g|f|Y|X|a| |b|h|m'|a|a'|c|f|k|N|f|h|U|a|U|h|Y g|V|j|N|X|V|h|H| \H|f|V|W|g'

< C|b|Y|c|f|h|c|Z|h|Y|Z'~|c|k|h| Y|g|h| %|@|c|g|Y|c|f|a|g|g|h| W|N|Y|Z|U|a|Y|g|k|\|W|d|g|\||\|: CS'ddnh|U|Z|&|E|G|U|g|fZ|W|h|H|f|h|U|X|Z|b|U|c|b|g|h|Z|W|h|m|X|f|U|X|U|X|d|j|Y|a|Y|H|f|i|f|g|a|a|Y|U|h|f|U|f'|a|U|h|U|g|c|f|i|f|Y|Y|U|j|g|c| U|X|W|h|g|g| V|f|Y|g|c|f|Y|a|Y|g'



APPENDIX D

DETAILED PAVEMENT CONDITION DATA



FY=hgNMcBfYdch

5@SCH7caVbYSS%8%

; YdUPXSUY

%#88%

DjY%Z%

BVkc. >L

BuY

KU_Y7cihm5]fcb6Y]': jYX

6fUBW 5%

BuY

5dcb\$%KU_Y7cihm

IgY

5DFCB

5fU

&'z' G: h

GMcb S&

cZ & : fca.

GMcb%

H: 9(YcZDjYaYh

@Gj7chg' '#88%

GfUW 57

: Ua]m 5@SCH5dcbg

NcbY

7U]cfm

Fu. G

5fU

)z(' G: h

@Y[h.

&' : h

K]h.

%S: h

GUg

GU@Y[h.

: h

GVK]h.

: h

>]h@Y[h.

: h

Gcd Xf.

GfYHhdY

; fUX \$

@bYg \$

GMcb7caaYlg

Kcf_SUY '#88%

Kcf_HdY 6G7dcb?5[[fUY

7cX 65!5;

=AUcfA/ F. :UgY

Kcf_SUY '#88%

Kcf_HdY Bk7cbgVcb!:]U

7cX BI!B

=AUcfA/ F. HiY

@Gj7chg'SUY %4#88%

HHUcladyg +

GfjYhX (

7cb]hcg D7= %8

=hgNMcB7caaYlg

CladyBi aVf. %

HdY

F

5fU

*' &'88G: h

D7= %8

Clady7caaYlg

Obc8]gNg2

CladyBi aVf. S&

HdY

F

5fU

)8888G: h

D7= %8

Clady7caaYlg

Obc8]gNg2

CladyBi aVf. \$(

HdY

F

5fU

)8888G: h

D7= %8

Clady7caaYlg

Obc8]gNg2

CladyBi aVf. \$

HdY

F

5fU

)8888G: h

D7= %8

Clady7caaYlg

Obc8]gNg2

BYkcf.	>L		BLaY	KU_Y7dihm5)rdh6Y]~: jYX			
GfUW	58%		BLaY	5dib8%KU_Y7dihm	IgX	5DFCB	5fYU
GWfch	\$%	cZ &	: fca.	HUjkUn7chbWf8&		H.	9(YcZDJYaYh
GfUW	557	: Ua]m	5@SCH5dhdg	NdbY		7UH[cfm	FUb. G
5fYU		88Z%\$Geh	@Y[h.	, 9 : h	K]Ph.	'\$\$: h	
GUg		GU@Y[h.	: h	GUVK]Ph.	: h	>ch@Y[h.	: h
Gci Xf.		GfYWHdY		; fUX \$		@bYg \$	
GWfcb7caaYhg							
Kcf_8UY	%#8%-		Kcf_HdY	Bk7djhVcb!h]U		7cXY BI!B	=AUcfA/ F. HiY
Kcf_8UY	*#48%		Kcf_HdY	CjYUm57GhWfU		7cXY C@5G	=AUcfA/ F. HiY
@gh:hg!8UY	%#48%		HRUCladYg	(&		GfjYhX	,
7ch]hcg	D7= -)						
-hgWfcb7caaYhg							
QladYBi aVf.	\$&	HdY	F	5fYU	(+)	\$\$\$Geh	D7= -%
QladY7caaYhg							
(, @/ H7F		@		\$\$\$: h			
QladYBi aVf.	%	HdY	F	5fYU	)	\$\$\$Geh	D7= -+
QladY7caaYhg							
(, @/ H7F		@		,'\$\$: h			
QladYBi aVf.	%	HdY	F	5fYU	)	\$\$\$Geh	D7= -'
QladY7caaYhg							
(, @/ H7F		@		\$\$\$: h			
QladYBi aVf.	%	HdY	F	5fYU	)	\$\$\$Geh	D7= -*
QladY7caaYhg							
(, @/ H7F		@		\$'\$\$: h			
QladYBi aVf.	&	HdY	F	5fYU	)	\$\$\$Geh	D7= -\$
QladY7caaYhg							
(, @/ H7F		@		\$\$\$: h			
QladYBi aVf.	&	HdY	F	5fYU	)	\$\$\$Geh	D7= %\$
QladY7caaYhg							
Oc8]gYg?							
QladYBi aVf.	'+	HdY	F	5fYU	)	\$\$\$Geh	D7= -)
QladY7caaYhg							
(, @/ H7F		@		('\$\$: h			
QladYBi aVf.	(\$	HdY	F	5fYU	)	\$\$\$Geh	D7= %\$
QladY7caaYhg							
Oc8]gYg?							

BYkcf.	>L	BLaY	KU_Y7cihms)rcb6Y]^-:]YX
GFUW	FK\$ &	BLaY	FihkUn\$!& KU_Y7cihms I gY FIEK5M 5fU)SS\$SSGe h
GMqch	\$%	cZ &	: fca. FihkUn\$ 9bX H. FihkUn\$ 9bX @qj7chq! %%(#SS\$
GfAW	57	: Ua]m 5@SCHFKg	NbY 7UH[cfm Fub. D
5fU	(, %SS\$Ge h	@Y[h.	(z%: h K]h. %\$S: h
GUg		GU@Y[h.	: h GUVK]h. : h >ch@Y[h. : h
Gci Xf.		GfYWHdY	; fUX \$ @byg \$
GMqcb7caaYhg			
Kcf_8UY %%%SS		Kcf_HdY Bk7chq]Vcb!-h]U	7cXV BI !-B =gAUcfA/ F. HiY
Kcf_8UY %%(#SS\$		Kcf_HdY Bk7chq]Vcb!-h]U	7cXV BI !-B =gAUcfA/ F. HiY
@qj7chq!8UY %%(#SS%		HRUladYg -*	GfjYhX %
7chq]Vcb D7=)&			
-hg]Vcb7caaYhg			
QladYBi aVf. \$		HdY F	5fU)SS\$SSGe h D7= (*
QladY7caaYhg			
(' 6@C7? 7F		@	SS\$SS Ge h
(, @/ H7F		@	&S\$S : h
(, @CB; -H 8-B5@HF5BGJ9FG) A		A	)+'\$S : h
7F57?-B;			
)+ K95H 9F-B;		@	)SS\$SS Ge h
QladYBi aVf. %		HdY F	5fU)SS\$SSGe h D7= (-
QladY7caaYhg			
(' 6@C7? 7F		@	SS\$SS Ge h
(, @/ H7F		@	%S\$S : h
(, @/ H7F		A	))S\$S : h
)+ K95H 9F-B;		@	)SS\$SS Ge h
QladYBi aVf. %		HdY F	5fU)SS\$SSGe h D7=)(
QladY7caaYhg			
(' 6@C7? 7F		@	&S\$SS Ge h
(, @/ H7F		@	)S\$S : h
(, @/ H7F		A	',+'\$S : h
)+ K95H 9F-B;		@	)SS\$SS Ge h
QladYBi aVf. &		HdY F	5fU)SS\$SSGe h D7= (,
QladY7caaYhg			
(' 6@C7? 7F		@	'*)S\$S Ge h
(' 6@C7? 7F		A	%S\$S Ge h
(, @/ H7F		A	-S\$S : h
(, @/ H7F		<	)'S\$S : h
)+ K95H 9F-B;		@	)SS\$SS Ge h
QladYBi aVf. '%		HdY F	5fU)SS\$SSGe h D7=)+
QladY7caaYhg			
(' 6@C7? 7F		@	&S\$SS Ge h
(, @/ H7F		@	%S\$S : h
(, @/ H7F		A	&S\$S : h
)+ K95H 9F-B;		@	)SS\$SS Ge h
QladYBi aVf. ',		HdY F	5fU)SS\$SSGe h D7=)'
QladY7caaYhg			
(' 6@C7? 7F		@	SS\$SS Ge h
(, @/ H7F		@	%S\$S : h
(, @/ H7F		A	(S'\$S : h
)+ K95H 9F-B;		@	)SS\$SS Ge h
QladYBi aVf. '-		HdY F	5fU)SS\$SSGe h D7=)%
QladY7caaYhg			
(' 6@C7? 7F		@	SS\$SS Ge h

(, @/ H7F @ -, 'SS : h
(, @/ H7F A (+)'SS : h
) + K95H 9F-B; @)SS'SS Gz h

QladYBi aVF. () HndY F 5fYU)SS'SS Gz h D7= ()

QladY7caa Ylg

(' 6@C7? 7F @ %&'SS Gz h
(, @/ H7F @ +)'SS : h
(, @/ H7F A +SS'SS : h
) + K95H 9F-B; @)SS'SS Gz h

QladYBi aVF.)& HndY F 5fYU)SS'SS Gz h D7=),

QladY7caa Ylg

(' 6@C7? 7F @ '+)'SS Gz h
(, @/ H7F @ &'SS : h
(, @/ H7F A %) 'SS : h
) + K95H 9F-B; @)SS'SS Gz h

QladYBi aVF.)- HndY F 5fYU)SS'SS Gz h D7=)'

QladY7caa Ylg

(' 6@C7? 7F @ \$\$\$'SS Gz h
(, @/ H7F @ %-'SS : h
(, @/ H7F A '+)'SS : h
) + K95H 9F-B; @)SS'SS Gz h

QladYBi aVF. ** HndY F 5fYU)SS'SS Gz h D7= *&

QladY7caa Ylg

(' 6@C7? 7F @ &'SS'SS Gz h
(, @/ H7F @ ()'SS : h
(, @CB; H 8-B5@HF5BGJ9FC@ A %) 'SS : h
) + K95H 9F-B; @)SS'SS Gz h

QladYBi aVF. +' HndY F 5fYU)SS'SS Gz h D7= (,

QladY7caa Ylg

(' 6@C7? 7F @ +)'SS Gz h
(, @/ H7F @ ,)'SS : h
(, @/ H7F A)-'SS : h
) + K95H 9F-B; @)SS'SS Gz h

QladYBi aVF. , \$ HndY F 5fYU)SS'SS Gz h D7=)&

QladY7caa Ylg

(, @/ H7F @ %) 'SS : h
(, @/ H7F A *)'SS : h
) + K95H 9F-B; @)SS'SS Gz h

QladYBi aVF. , + HndY F 5fYU)SS'SS Gz h D7=)'

QladY7caa Ylg

(' 6@C7? 7F @ , SS'SS Gz h
(, @/ H7F @ &)'SS : h
(, @/ H7F A ', +'SS : h
) + K95H 9F-B; @)SS'SS Gz h

QladYBi aVF. -(HndY F 5fYU)SS'SS Gz h D7=)&

QladY7caa Ylg

(, @/ H7F @ +)'SS : h
(, @/ H7F A *' SS : h
) + K95H 9F-B; @)SS'SS Gz h

BVkcf. >L BUAY KU_Y7ciblm5)6b6Y]~: JYX
 GfUW FKS & BUAY FikUis!& KU_Y7ciblm IgY FIEK5M 5fU)SS\$Geh
 Gwch \$& cZ & : fca. FikUis: 9bX H. 9(YcZDjYaYh @Gj7cbg! +%SS&
 GfUW 57 : Ua]m 5@SCHFKg NcbY 7Uf[cfm Fub. D
 5fU %Z\$Geh @Y[h. %(:h K]Ph. %\$:h
 GUg GUV@Y[h. :h GUVK]Ph. :h >ch@Y[h. :h
 Gci XE. GfYWHdY ; fUX \$ @Uyg \$
 Gwcb7caaYlg
 Kcf_8UY %%%SS Kcf_HdY Bk7cbg! Vcb! :h]U 7cX BI!B =AUcfA/ F. HiY
 Kcf_8UY +%SS& Kcf_HdY Bk7cbg! Vcb! :h]U 7cX BI!B =AUcfA/ F. HiY
 @Gj7cbg!8UY %4#SS% HRUcladyg (GfjYXK '
 7cb]cbg D7= *'
 -bg]cb7caaYlg
 QladYBiaVE. \$% HdY F 5fU)SS\$Geh D7= *(
 QladY7caaYlg
 (, @/ H7F @ %) '\$\$:h
 (, @/ H7F A &\$ \$\$:h
)+ K95H:9F-B; @)SS\$Geh
 QladYBiaVE. \$& HdY F 5fU)SS\$Geh D7= *&
 QladY7caaYlg
 (, @CB; H:8-B5@H5BGJ9FG' @ %\$\$:h
 7F57?-B;
 (, @/ H7F A &)' \$\$:h
)+ K95H:9F-B; @)SS\$Geh
 QladYBiaVE. \$ HdY F 5fU ((SS\$Geh D7= *'
 QladY7caaYlg
 (, @/ H7F @ -)' \$\$:h
 (, @/ H7F A &\$ \$\$:h
)+ K95H:9F-B; @ \$\$\$ \$Geh

BVkf.	>L	BuY	KU_Y7cibh5)6b6Y]':jYX
GUBW	H7%	BuY	HI]kUn7dbNMfS%KU_Y I gY H5L-K5M 5fU %Z-' G h
GUb	%	cZ %	: fca. FikUn!& H. HI]kUnDUY'S% @g7chg' %SSSS
GfZW	57	: Ua]m 5@SCH57HI]kUg	NbY 7U]cfm FUb. G
5fU	%Z-' G h	@Y[h.	' & : h K]h. (\$: h
GUg		GU@Y[h.	: h GUVK]h. : h >ch@Y[h. : h
Gci Xf.		GfYHhY	; fUY \$ @Ug \$
GUb7caaYlg			
Kcf_8UY %@@%\$		Kcf_HdY Bk7chgUcb! :h]U	7cXY BI !:B =gAUcfA/ F. HiY
Kcf_8UY %SSSS		Kcf_HdY Bk7chgUcb! :h]U	7cXY BI !:B =gAUcfA/ F. HiY
@g7chg'8UY %4#6%		HRUladYg '	GfjYhX '
7cb]dg D7= (+			
-hgUcb7caaYlg			
QadYBi aVf. %		HdY F	5fU)S)'SSG h D7= (&
QadY7caaYlg			
(% 5@@; 5HCF'7F		@	*SS G h
(, @/ H7F		@	%)'SS : h
(, @/ H7F		A	*SSS : h
)& F5J9@B;		A	%SS G h
)+ K95H 9F-B;		@	&S)'SS G h
QadYBi aVf. \$		HdY F	5fU)S)'SSG h D7= (,
QadY7caaYlg			
(% 5@@; 5HCF'7F		@	%SS G h
(, @/ H7F		@	&S) : h
(, @/ H7F		A	(()'SS : h
)+ K95H 9F-B;		@	&SS G h
QadYBi aVf. \$		HdY F	5fU (*)'SSG h D7=)\$
QadY7caaYlg			
(% 5@@; 5HCF'7F		@	'+'SS G h
(, @/ H7F		@	%)'SS : h
(, @/ H7F		A	(+'SS : h
)+ K95H 9F-B;		@	&%'SS G h

BVkf.	>L		BuY	KU_Y7dih5)rd16Y]~: JYX				
GfUW	H7&		BuY	HI]k7chbNMFSSKU_Y I gY H5L-K5M 5fU				%&-' G h
				7cilm				
GU]ch	S&		cZ &	: fca. GU]cb%		H. 5dcb%		@g]7ch] *#48%
GfZW	557		: Ua]m 5@SCH57HI]kug	NbY		7U]cfm		FU. G
5fU		'z, + G h	@Y]h.	*/h	K]h.	(S: h		
GUg			GU@Y]h.	: h	GUVK]h.	: h	>ch]@Y]h.	: h
Gci Xf.			GfYHhY		; fUY \$		@Ug \$	
GU]cb7caa Ylg								
Kcf_8UY	%#%\$		Kcf_HdY	Bk7ch]g V]b! :h]U		7cXY BI !B		=gAUcfA/ F. HiY
Kcf_8UY	*#48%		Kcf_HdY	G]YUa]57GfV]U		7cXY C@5G		=gAUcfA/ F. HiY
@g]h]g]8UY	%#48%		HRU]adYg	%		G]jY]X		%
7cb]h]g	D7= %\$							
-hg]h]g]7caa Ylg								
G]adYBi aVf.	%		HdY	F	5fU	'+, +'SSG h		D7= %\$
G]adY7caa Ylg								
OBcS]g]g]								

BVkf.	>L	BlaY	KU_Y7cibh5)6b6Y]~: jYX
GfUW	H7S&	BlaY	HI]kUn7dbNMfS3KU_Y I g/ H5L-K5M 5fU %&-' G e h 7cibh
GW]ch	S%	cZ &	: fca. DUUYHI]kUn% H. GW]cbS& @G]7cbg! -#%%,
GfUW	57	: Ua]m	5@SCH57HI]kUg NcbY 7U]cfm FUb. G
5fU	+SS G e h	@Y[h.	% :h K]h. (\$:h
GUg	GU@Y[h.	:h	GVK]h. :h >]h@Y[h. :h
Gci Xf.	GfYHhY		; fUY \$ @Ug \$
GW]cb7caaYhg			
Kcf_8UY	%#%\$\$	Kcf_HdY	Bk7cbg]Vcb! :h]U 7cXY BI !:B =gAUcfA/ F. HiY
Kcf_8UY	-#%%,	Kcf_HdY	Bk7cbg]Vcb! :h]U 7cXY BI !:B =gAUcfA/ F. HiY
@G]hg!8UY	%#%\$\$	HUCladYg	& GfjYhX &
7cb]dg	D7= ((
-hg]cb7caaYhg			
QadYBi aVf.	S%	HdY	F 5fU '8)'SS G e h D7= (&
QadY7caaYhg			
(% 5@@; 5HCF 7F		@	*('SS G e h
(, @/ H7F		@	%)SS :h
(, @/ H7F		A	'.'SS :h
)+ K95H 9F-B;		@	%SSSS G e h
)+ K95H 9F-B;		A	%SSSS G e h
QadYBi aVf.	S&	HdY	F 5fU (SSSS G e h D7= ()
QadY7caaYhg			
(% 5@@; 5HCF 7F		@	+\$SS G e h
(, @/ H7F		@	)SS :h
(, @/ H7F		A	*SSSS :h
)+ K95H 9F-B;		@	SSSSSS G e h

BVkf.	>L	BlaY	KU_Y7cibm5)rd6Y]~: JYX
GfUW	HFS	BlaY	HI]kUn7dbNMfS KU_Y I g H5L-K5M 5fU %z(, G h 7cibm
GfUW	57	: Ua]m 5@SCH57HI]kUg NdbY	H. 5dbS% @g7chg! ' #SS%
5fU	%z(, G h	@Y[h.	&' :h KPh.)S:h
GUg	GU@Y[h.	:h	GUVKPh. :h >clh@Y[h. :h
Gci Xf.	GfYHhY		; fUY \$ @Ug \$
GfUW	7caaYlg		
Kcf_8UY '#SS%	Kcf_HdY	Gg7cig! 5[[fUY	7cX 65!5; =gAUcfA/ F. :UgY
Kcf_8UY '#SS%	Kcf_HdY	Bk7chg! Vbb! b]U	7cX BI !B =gAUcfA/ F. HY
@g7chg! 8UY %z(#SS%	HRUladYg '		G fj YKX '
7cb]dg D7= -,			
-hgNW7caaYlg			
GldYBi aVf. S%	HdY	F	5fU)(- 'SSG h D7= %S
GldY7caaYlg			
OBc8]gYg			
GldYBi aVf. S&	HdY	F	5fU))9 'SSG h D7= %S
GldY7caaYlg			
OBc8]gYg			
GldYBi aVf. \$	HdY	F	5fU *, S('SSG h D7= -(
GldY7caaYlg			
() 89F9GCB	@	' &SS G h	
(, @/ H7F	@	)'SS :h	

BYkcf.	>L	BLAY	KU_Y7dihm5)rdh6Y]': JYX				
GfUW	H2%	BLAY	HI]UBYS%KU_Y7dihm	Ig	H5L-K5M	5fU	(&(), Gz h
GMch	%	z %	: fca.	5dcb%	H.	H<U]Ug	@gh7dgh' +#%\$\$\$
GfUW	57	: Ua]m	5@SCH57HI]UBg	NbY	7UH]cfm		Fub. H
5fU	(&(), Gz h	@Y[h.	%- \$: h	K]Ph.	\$\$: h		
GUg	GU@Y[h.	: h	GUVK]Ph.	: h	>ch@Y[h.	: h	
Gci Xf.	GfYWHdY		; fUX \$		@bYg \$		
GMcb7caa Ylg							
Kcf_8UY %\$\$\$	Kcf_HdY Bk7dgh]Vcb' h]U			7cX	BI !-B	=AUcfA/ F. HiY	
Kcf_8UY +#%\$\$\$	Kcf_HdY Bk7dgh]Vcb' h]U			7cX	BI !-B	=AUcfA/ F. HiY	
@gh7dgh'8UY %\$\$\$	HBUcladyg -			GfjYX *			
7dN]hcg D7= +'							
-hg]Vcb7caa Ylg							
QadYBi aVf. \$%	HdY	F	5fU	',,)'\$\$\$Gz h	D7= (&		
QadY7caa Ylg							
(, @/ H7F	@		' \$\$\$: h				
(, @/ H7F	A		)%\$\$\$ : h				
)& F5J9@B;	A		\$\$\$\$ Gz h				
)& F5J9@B;	<		\$\$\$ Gz h				
)+ K95H9F-B;	@		&\$\$\$\$ Gz h				
QadYBi aVf. \$	HdY	F	5fU	' +\$\$\$\$Gz h	D7= ++		
QadY7caa Ylg							
(, @/ H7F	@		&,'\$\$: h				
(, @/ H7F	A		) \$\$\$ : h				
QadYBi aVf. \$)	HdY	F	5fU	' - &'\$\$\$Gz h	D7= *(
QadY7caa Ylg							
(' 6@C7? 7F	@		, \$\$\$ Gz h				
(, @/ H7F	@		%' \$\$\$: h				
(, @/ H7F	A		- \$\$\$: h				
)& F5J9@B;	A		\$\$\$\$ Gz h				
)+ K95H9F-B;	A		& \$\$\$ Gz h				
QadYBi aVf. \$-	HdY	F	5fU	*+ -'\$\$\$Gz h	D7= +(
QadY7caa Ylg							
(, @/ H7F	@		'' \$\$\$: h				
(, @/ H7F	A		%' \$\$\$: h				
)& F5J9@B;	@		\$\$\$\$ Gz h				
)& F5J9@B;	<		*' \$\$\$ Gz h				
QadYBi aVf. \$	HdY	F	5fU	*+\$'\$\$\$Gz h	D7= ,)		
QadY7caa Ylg							
(, @/ H7F	@		\$\$\$: h				
(, @/ H7F	A		(\$\$\$: h				
QadYBi aVf. \$	HdY	F	5fU	)(+\$\$\$Gz h	D7= ,(
QadY7caa Ylg							
(, @/ H7F	@		\$\$\$' \$\$\$: h				
)& F5J9@B;	A		% \$\$\$ Gz h				

BYkcf. >L	BLAY	KU_Y7cibh5)rcb16Y]': JYX
GFUBW HESS	BLAY	HI]UBYS88KU_Y7cibh I g' H5L-K5M 5fYU ,+Z\$ Gc h
GMVch \$%	cZ %	: fca. 5dcb\$% H. H<U]Ug @Uj7cbg' (#-888&
GfZAW 57	: Ua]m 5@SCH57HI]UBg NcbY	7UH]cfm FUb. H
5fYU	,+Z\$ Gc h @Y[h.	-() : h K]Ph. ') : h
GUg	GUV@Y[h.	: h GUVK]Ph. : h >cbh@Y[h. : h
Gci XE.	GfYWHdY	; fUX \$ @Ujg \$
GMVcb7caa Ylg		
Kcf_8UY %@@\$\$	Kcf_HdY Bk7cbg' Vcb' :h]U	7cXY BI !-B =gAUcfA/ F. HiY
Kcf_8UY (#-888&	Kcf_HdY Bk7cbg' Vcb' :h]U	7cXY BI !-B =gAUcfA/ F. HiY
@Uj:hg]'8UY %4-88%	HRUCladYg %	GfjYX *
7cb]cbg D7=)+		
-bg]Vcb7caa Ylg		
QladYBi aVF. \$%	HdY F	5fYU *%-'\$\$Gc h D7= (+
QladY7caa Ylg		
(% 5@@; 5HCF7F	A	*'\$\$ Gc h
(, @/ H7F	@	)'\$\$ : h
(, @/ H7F	A	+) \$\$: h
) + K95H 9F-B;	@	*\$\$'\$\$ Gc h
) + K95H 9F-B;	A	%\$\$ Gc h
QladYBi aVF. \$	HdY F	5fYU), \$'\$\$Gc h D7= **
QladY7caa Ylg		
(, @/ H7F	@	) \$\$ : h
(, @/ H7F	A	' \$\$: h
) + K95H 9F-B;	@	(\$\$ \$ Gc h
QladYBi aVF. \$	HdY F	5fYU)' (\$\$ Gc h D7=) (
QladY7caa Ylg		
(, @/ H7F	@	) \$\$ : h
(, @/ H7F	A	*' +\$\$: h
) + K95H 9F-B;	@	&+ \$\$ Gc h
QladYBi aVF. \$	HdY F	5fYU * &'\$\$Gc h D7=)'
QladY7caa Ylg		
(, @/ H7F	@	)'\$\$ : h
(, @/ H7F	A	,)'\$\$: h
) & F5J9@B;	A	) \$\$ Gc h
QladYBi aVF. %&	HdY F	5fYU () \$\$ \$ Gc h D7=),
QladY7caa Ylg		
(, @/ H7F	@	+, '\$\$: h
(, @/ H7F	A	) \$\$ \$ : h
QladYBi aVF. %	HdY F	5fYU *%('\$\$Gc h D7= * &
QladY7caa Ylg		
(, @/ H7F	@	-)'\$\$: h
(, @/ H7F	A	)- '\$\$ : h

GVkcf. >L	BLAY	KU_Y7cibh5)rcb6Y]~:]YX
GFUBW HD%	BLAY	HI]kUnDUY\$%KU_Y I g H5L-K5M 5fU %&- G e h
GVkch %	cZ & : fca. FikUn\$!&	H. GVkcbS& @Gj7chg! - #(%#-.
GfAW 57	: Ua]m 5@SCH57HI]kUg NcbY	7U]cfm FUb. D
5fU	%(z\$ G e h @Y[h. (z') : h K]h. (\$: h	
GUg	GV@Y[h. : h GUVK]h. : h >clh@Y[h. : h	
Gci Xf.	GfYHhY ; fUY \$	@Ug \$
GVkcb7caaYlg		
Kcf_8UY %&#%\$	Kcf_HdY Bk7chg] Vcb! :h]U	7cX BI !-B =gAUcfA/ F. HfY
Kcf_8UY - #(%#-.	Kcf_HdY Bk7chg] Vcb! :h]U	7cX BI !-B =gAUcfA/ F. HfY
@Gj7chg! 8UY %&#%\$	HUcladYg '+	GfjYhX *
7cb]d]g D7= (*		
-hg]Vcb7caaYlg		
QadYBi aVf. %	HdY F 5fU	)SS\$G e h D7= ',
QadY7caaYlg		
(% 5@@; 5HF 7F	@	%\$G e h
(, @/ H7F	@	)\$ : h
(, @/ H7F	A	+) '\$: h
)\$ D5H<-B;	@	)SS\$ G e h
)+ K95H 9F-B;	@	&SS\$ G e h
)+ K95H 9F-B;	A	%SS\$ G e h
QadYBi aVf. \$	HdY F 5fU	)SS\$G e h D7=)%
QadY7caaYlg		
(% 5@@; 5HF 7F	@	(')\$ G e h
(, @/ H7F	@	%\$: h
(, @/ H7F	A	(*) '\$: h
)+ K95H 9F-B;	@	&SS\$ G e h
QadYBi aVf. %&	HdY F 5fU	)SS\$G e h D7= (,
QadY7caaYlg		
(% 5@@; 5HF 7F	@	*+'\$ G e h
(, @/ H7F	@	-\$: h
(, @CB; HI 8-B5@HF5BGJ9FG' 7F57;-B;	A	)-)'\$ : h
)+ K95H 9F-B;	@	&SS\$ G e h
QadYBi aVf. \$\$	HdY F 5fU	)SS\$G e h D7= ((
QadY7caaYlg		
(% 5@@; 5HF 7F	@	%'\$ G e h
(, @/ H7F	@	%SS\$: h
(, @/ H7F	A	+'\$: h
)+ K95H 9F-B;	@	&SS\$ G e h
QadYBi aVf. &	HdY F 5fU	)SS\$G e h D7= (+
QadY7caaYlg		
(% 5@@; 5HF 7F	@	))'\$ G e h
(, @/ H7F	@	(\$: h
(, @/ H7F	A	*, '\$: h
)+ K95H 9F-B;	@	&SS\$ G e h
QadYBi aVf. !*	HdY F 5fU	)SS\$G e h D7= (+
QadY7caaYlg		
(% 5@@; 5HF 7F	@	)\$ G e h
(, @/ H7F	@	%) '\$: h
(, @/ H7F	A	)+\$ : h
)+ K95H 9F-B;	@	&SS\$ G e h

BYkcf.	>L		BUAY	KU_Y7cibh5)6b6Y]~: JYX			
6fUW	H8%		BUAY	HI]kUnDUY\$%KU_Y	I gY	H5L-K5M	5fU
				7cibh			8%&- Gc h
GV]ch	S&		cZ &	: fca.	GV]cbS%	H. FibkUn\$!&	@G]7cbg! *#)#89
GfZW	57		: Ua]m	5@SCH57HI]kUg	NbY	7U]cfm	FUb. D
5fU		'%-' Gc h	@Y]h.	+\$: h	K]Ph.	(\$: h	
GUg		GV@Y]h.		: h	GVK]Ph.	: h	>clh@Y]h. : h
Gci Xf.		GfY]HhY			; fUY \$	@Ug \$	
GV]cb7caaYhg							
Kcf_8UY	%#%\$\$		Kcf_HdY	Bk7cbg]Ucb! :h]U		7cXY BI !:B	=gAUcfA/ F. HiY
Kcf_8UY	*#)#89		Kcf_HdY	Bk7cbg]Ucb! :h]U		7cXY BI !:B	=gAUcfA/ F. HiY
@G]hgl'8UY	%#)#89%		HUcladYg	)		GfjYhX	'
7cb]hbg	D7=	+\$					
hg]U]cb7caaYhg							
QadYBi aVf.	S&		HdY	F	5fU	-(8888 Gc h	D7= +(
QadY7caaYhg							
(,	@/ H7F		@		'%')88 : h		
(,	@/ H7F		A		88')88 : h		
)+	K95H:9F-B;		@		(88888 Gc h		
QadYBi aVf.	\$		HdY	F	5fU), 8888 Gc h	D7= *+
QadY7caaYhg							
(,	@/ H7F		@		%+'88 : h		
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APPENDIX E
DISTRESS SUMMARY REPORT



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APPENDIX F

INVENTORY

F1: Section Forecasted Pavement Condition Rating

F2: Branch PCI Rating

F3: Branch FOD Rating



Appendix F1
Forecasted Section PCI
Walker County Airport-Bevill Field (JFX)

Branch ID	Section ID	Forecasted PCI						
		2021	2022	2023	2024	2025	2026	2027
A01	01	92	90	88	86	84	81	79
A01	02	97	95	93	91	89	86	84
RW0927	01	47	43	39	34	30	26	21
RW0927	02	54	50	46	42	37	33	29
TC01	01	45	41	38	34	31	27	23
TC02	01	40	36	33	29	26	22	19
TC02	02	99	98	96	94	92	89	86
TC03	01	96	94	92	89	87	84	82
TL01	01	70	67	62	58	53	48	45
TL02	01	51	47	45	42	38	35	31
TP01	01	43	40	36	33	29	26	22
TP01	02	66	62	57	52	48	45	43

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APPENDIX G

SAFETY AND PREVENTIVE MAINTENANCE POLICIES



Appendix G1
Localized Safety (Stopgap) Repair Policy

Distress	Distress Severity	Description	Code	Work Type	Work Unit
41	High	ALLIGATOR CR	PA-FD	Patching - AC Full-Depth	SqFt
43	High	BLOCK CR	CS-AC	Crack Sealing - AC	Ft
45	High	DEPRESSION	PA-FD	Patching - AC Full-Depth	SqFt
47	High	JT REF. CR	CS-AC	Crack Sealing - AC	Ft
48	High	L & T CR	CS-AC	Crack Sealing - AC	Ft
50	High	PATCHING	PA-FD	Patching - AC Full-Depth	SqFt
53	High	RUTTING	PA-FD	Patching - AC Full-Depth	SqFt
54	High	SHOVING	PA-PD	Patching - AC Partial-Depth	SqFt
55	NA	SLIPPAGE CR	PA-PD	Patching - AC Partial-Depth	SqFt
56	High	SWELLING	PA-FD	Patching - AC Full-Depth	SqFt
61	High	BLOW-UP	SL-PC	Slab Replacement - PCC	SqFt
61	Medium	BLOW-UP	PA-PF	Patching - PCC Full Depth	SqFt
62	High	CORNER BREAK	PA-PF	Patching - PCC Full Depth	SqFt
63	High	LINEAR CR	PA-PF	Patching - PCC Full Depth	SqFt
63	Medium	LINEAR CR	CS-PC	Crack Sealing - PCC	Ft
64	High	DURABIL. CR	SL-PC	Slab Replacement - PCC	SqFt
64	Medium	DURABIL. CR	PA-PF	Patching - PCC Full Depth	SqFt
66	High	SMALL PATCH	PA-PP	Patching - PCC Partial Depth	SqFt
67	High	LARGE PATCH	PA-PF	Patching - PCC Full Depth	SqFt
70	High	SCALING	SL-PC	Slab Replacement - PCC	SqFt
71	High	FAULTING	GR-PP	Grinding (Localized)	Ft
72	High	SHAT. SLAB	SL-PC	Slab Replacement - PCC	SqFt
74	High	JOINT SPALL	PA-PP	Patching - PCC Partial Depth	SqFt
75	High	CORNER SPALL	PA-PP	Patching - PCC Partial Depth	SqFt
76	High	ASR	SL-PC	Slab Replacement - PCC	SqFt

**Appendix G2
Localized Revertive Repair Policy**

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**Appendix G2
Localized Preventive Repair Policy**

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APPENDIX H

M&R UNIT COSTS

H1: M&R Unit Costs

H2: Component Costs for Repair

H3: Airport Category

Maintenance and Repair (M&R) Unit Costs

The M&R costs developed for the ALDOT PMP include costs for maintenance, preservation, and repair activities and are described below.

Unit Costs Source Data

The source for the M&R costs data is RSMMeans, which has data for 14 locations throughout Alabama, as identified by the yellow highlighted boxes in Figure 1. The cost data is presented in terms of individual line items like asphalt wearing course, aggregate base etc., which were consolidated to develop the activity costs described below.

The cost data show a distinct difference in costs between locations north and south of Birmingham, especially for the higher value items like the asphalt layers. Therefore, the unit costs were developed accordingly for the airports north and south of Birmingham, as identified in Figure 1. Appendix H2 presents the component costs used in developing the M&R costs.

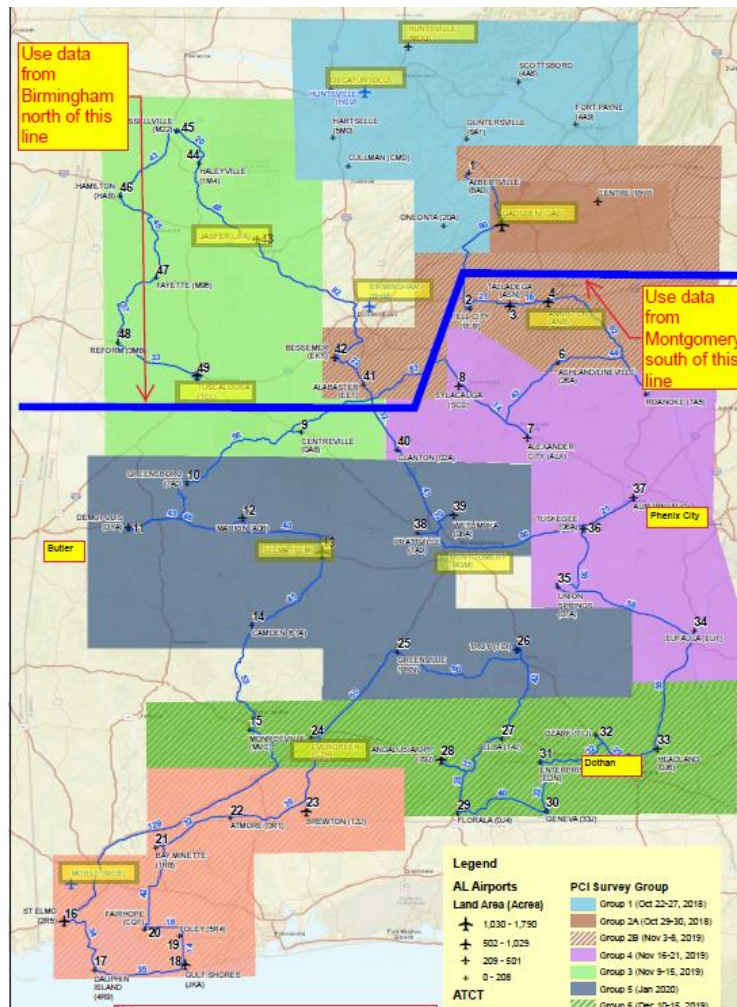


Figure 1: RSMMeans Unit Costs Locations.

Maintenance & Repair (M&R) Activities

Maintenance activities are localized activities which are typically assigned in the first year of the M&R plan based on the observed distresses.

Repair activities are further subdivided into preservation, rehabilitation, and reconstruction. Repair activities are conducted for larger areas, typically at the section level and are assigned based on the Critical Pavement Condition Index, denoted as CP in Table 1. The CP is based on the section’s rank or importance within the overall network and typically ranges from 55 to 70. The CP was set at 70 for the ALDOT runway pavements and 65 for the other pavements.

Table 1: Repair Activities.

Activity Type	PCI	Activity
Preservation	> CP	Runway Surface Treatment
		Taxiway and Apron Surface Treatment
Rehabilitation	> CP	2" AC OL ¹
	55 - CP	Mill 2" & 2" AC OL
	45 - 55	Mill 2" & 3" AC OL
Reconstruction	0 - 45	Reconstruct with AC

¹For Sections with Structural Distress and PCI greater than Critical PCI

The depths for the milling and overlay (AC OL) in Table 1 were established by creating a balance between removal of surficial distress and providing additional pavement structural capacity. All overlay options include full-depth patching to repair localized distresses.

From the FAA 5010 records, the Alabama airport network includes a wide range of allowable aircraft loads. The airports were divided into three categories of allowable aircraft loads based on requirements for minimum pavement thickness and the use of a P-401 surface layer. The categories are based on the aircraft maximum gross takeoff weight (MGTOW) and include: less than 12,500 lbs, 12,500 to 30,000 lbs, and 30,000 to 100,000 lbs. Appendix H3 presents the category for each airport.

For any sections requiring reconstruction, the pavement sections were established primarily in accordance with the requirements in Table 3 of the FAA’s Advisory Circular 150/5320-6F. The pavement sections used for developing the cost estimates are:

- ≤ 12,500 lbs 4" P-403 (State HMA Mix) + 6" P-209 Base
- 12,500 – 30,000 lbs 4" P-403 (State HMA Mix) + 8" P-209 Base
- 30,000 – 100,000 lbs 5" P-401 + 10" P-209 Base

It is important to note that while the FAA requires a stabilized base for those pavements that support aircraft operations with MGTOWs that are greater than 100,000 lbs, the number of such operations is minimal for those airports shown in Appendix H3. As a result, the cost of a stabilized base is excluded in the development of the unit costs for ALDOT’s PMP update. However, based on the Engineer’s future design and aircraft fleet mix development, project-level construction work could include the use of a stabilized base at that time.

M&R Unit Costs

Paving projects typically include additional project costs like mobilization, design, construction administration and inspections, and drainage improvements. A summary of non-direct pavement construction line items has been included in the unit costs in Tables 5 and 6 as described below. These non-direct items are expressed as a percentage of the total component costs for each activity.

These non-direct pavement construction items were developed from API’s extensive experience with APMP project cost estimation. These percentages may vary for Alabama airport construction projects; however, since the direct pavement scope of work is estimated in a network-level evaluation, these conservative estimates serve as a good starting point for the development of realistic total project costs and annual APMP budgets for ALDOT. For repair activities such as Mill & Overlay, which typically do not include significant drainage work, the corresponding multiplier was reduced by 50 percent. The non-direct cost factors are presented in Table 2.

Table 2: Cost Factors.

Factor	Function of	Estimate		
		Preservation	Rehabilitation	Reconstruction
Mobilization	All costs, less design	10%	10%	10%
Drainage Improvements	Paving costs	-	4%	8%
Contingency	All costs, less mobilization and design	10%	20%	20%
Design & CM	All costs, less mobilization and design	15%	20%	20%

The M&R unit costs for maintenance, preservation, and repair activities were developed from the RSMMeans cost data and are presented in the following section.

Maintenance

The maintenance activities include crack seal, and full and partial-depth patching. The unit costs are presented in Table 3.

Table 3: Unit Costs for Maintenance.

Activity	Unit Cost	Unit
Seal Cracks - AC	\$3.95	lf
AC Full-Depth Patching	\$25.05	sf
AC Partial-Dept Patching	\$16.28	sf
Seal Cracks – PCC	\$6.00	lf
PCC Full-Depth Patching	\$35.00	sf
PCC Partial-Depth Patching	\$175.00	sf
Jt. Seal	\$8.00	lf
Slab Replacement	\$20.00	sf

Preservation

The unit costs for the surface treatments are presented in Table 4. They include sealing of cracks and application of pavement markings.

Table 4: Unit Costs for Preservation Activities.

Activity	Unit Cost	Unit
Runway Surface Treatment	\$0.57	sf
Taxiway and Apron Surface Treatment	\$0.88	sf

Rehabilitation and Reconstruction

As discussed previously, repair activities are also divided into rehabilitation and reconstruction. The unit costs for airport repair for the Northern Region (Birmingham Area) and Southern Region (Montgomery Area) are shown in Tables 5 and 6, respectively.

Table 5: Unit Costs for Repair Activities, Northern Region.

Activity Type	Activity	MGTOW, thousand lbs		
		≤ 12.5	12.5-30	30-100
Rehabilitation	2" AC OL	\$3.78		\$4.19
	Mill 2" & 2" AC OL	\$4.15		\$4.56
	Mill 2" & 3" AC OL	\$5.18		\$5.79
Reconstruction	AC Reconstruction	\$8.40	\$9.10	\$10.91

Table 6: Unit Costs for Repair Activities, Southern Region.

Activity Type	Activity	MGTOW, thousand lbs		
		≤ 12.5	12.5-30	30-100
Rehabilitation	2" AC OL	\$3.54		\$3.91
	Mill 2" & 2" AC OL	\$3.90		\$4.27
	Mill 2" & 3" AC OL	\$4.82		\$5.37
Reconstruction	AC Reconstruction	\$7.63	\$8.25	\$9.87

Appendix H2
Component Costs for Repair

Activity Type	Unit	Birmingham (Northern)	Montgomery (Southern)	Comments
Milling 1" to 3"	SY	\$2.08	\$2.01	
Pavement Demolition	SY	\$6.34	\$6.12	
Haulage - For Demolition & AC	CY	\$6.08	\$5.87	
Haulage for 12" Thick Demolition	SY	\$2.03	\$1.96	
Haulage for 2" Thick AC Paving	SY	\$0.34	\$0.33	
Haulage for 3" Thick AC Paving	SY	\$0.51	\$0.49	
Haulage for 4" Thick AC Paving	SY	\$0.68	\$0.65	
AC Wearing Course	Ton	\$97.42	\$86.90	
AC Binder Course	Ton	\$87.80	\$78.17	
P401 - For airports with >60 kip aircraft	Ton	\$116.90	\$104.28	Assumed P401 cost to be 20% greater than AC Wearing Course
6" Aggregate Base (P208)	SY	\$10.17	\$9.12	
8" Aggregate Base (P208)	SY	\$13.29	\$11.89	
6" P209 Aggregate Base	SY	\$12.20	\$10.94	Assumed P209 cost to be 20% greater than P208
8" P209 Aggregate Base	SY	\$15.95	\$14.27	Assumed P209 cost to be 20% greater than P208
10" P209 Aggregate Base	SY	\$19.94	\$17.84	Direct multiplier for 10" from 8"
4" P154 Aggregate Base	SY	\$5.42	\$4.86	Assumed P154 cost to be 20% lower than P208
6" P154 Aggregate Base	SY	\$8.14	\$7.30	Assumed P154 cost to be 20% lower than P208
Pavement Markings	sf	\$1.48	\$1.39	

**Appendix H3
Airport Category**

Region	City	FAA ID	Max Gross Weight (Thousand lbs)			Max GW	Category
			S	D	2D		
Birmingham	Reform	3M8	12.5	-	-	12.5	<= 12,500
	Fayette	M95	15.0	-	-	15.0	12,500-30,000
	Hamilton	HAB	15.0	-	-	15.0	12,500-30,000
	Scottsboro	4A6	15.0	-	-	15.0	12,500-30,000
	Alabaster	EET	16.0	-	-	16.0	12,500-30,000
	Centre-Piedmont	PYP	16.0	-	-	16.0	12,500-30,000
	Fort Payne	4A9	16.0	-	-	16.0	12,500-30,000
	Haleyville	1M4	20.0	-	-	20.0	12,500-30,000
	Hartselle	5M0	20.0	-	-	20.0	12,500-30,000
	Guntersville	8A1	24.0	-	-	24.0	12,500-30,000
	Cullman	CMD	30.0	-	-	30.0	12,500-30,000
	Russellville	M22	30.0	-	-	30.0	12,500-30,000
	Jasper	JFX	50.0	-	-	50.0	> 30,000
	Oneonta	20A	20.0	35.0	55.0	55.0	> 30,000
	Bessemer	EKY	60.0	60.0	-	60.0	> 30,000
	Albertville	8A0	60.0	90.0	130.0	130.0	> 30,000
	Madison	MDQ	60.0	75.0	140.0	140.0	> 30,000
	Decatur	DCU	75.0	125.0	150.0	150.0	> 30,000
	Tuscaloosa	TCL	61.0	87.0	168.0	168.0	> 30,000
	Gadsden	GAD	90.0	115.0	195.0	195.0	> 30,000
Montgomery	Floralia	0J4	-	-	-	-	<= 12,500
	Elba	14J	4.0	-	-	4.0	<= 12,500
	Headland	0J6	12.0	-	-	12.0	<= 12,500
	Roanoke	7A5	12.0	-	-	12.0	<= 12,500
	Greenville	PRN	15.0	-	-	15.0	12,500-30,000
	Union Springs	07A	15.0	-	-	15.0	12,500-30,000
	Wetumpka	08A	15.0	-	-	15.0	12,500-30,000
	Atmore	0R1	16.0	-	-	16.0	12,500-30,000
	Clanton	02A	16.0	-	-	16.0	12,500-30,000
	Eufaula	EUF	16.0	-	-	16.0	12,500-30,000
	Geneva	33J	16.0	-	-	16.0	12,500-30,000
	Greensboro	7A0	16.0	-	-	16.0	12,500-30,000
	Centreville	0A8	18.0	-	-	18.0	12,500-30,000
	Ashland-Lineville	26A	20.0	-	-	20.0	12,500-30,000
	Sylacauga	SCD	20.0	-	-	20.0	12,500-30,000
	St. Elmo	2R5	23.0	-	-	23.0	12,500-30,000
	Ozark	71J	-	25.0	-	25.0	12,500-30,000
	Camden	61A	27.0	-	-	27.0	12,500-30,000
	Bay Minette	1R8	28.0	-	-	28.0	12,500-30,000
	Foley	5R4	28.0	-	-	28.0	12,500-30,000
Tuskegee	06A	28.5	-	-	28.5	12,500-30,000	

**Appendix H3
Airport Category**

Region	City	FAA ID	Max Gross Weight (Thousand lbs)			Max GW	Category
			S	D	2D		
Montgomery	Alexander City	ALX	30.0	-	-	30.0	12,500-30,000
	Dauphin Island	4R9	30.0	-	-	30.0	12,500-30,000
	Pell City	PLR	30.0	-	-	30.0	12,500-30,000
	Prattville	1A9	30.0	-	-	30.0	12,500-30,000
	Enterprise	EDN	-	-	-	-	> 30,000
	Evergreen	GZH	30.0	50.0	-	50.0	> 30,000
	Marion	A08	30.0	50.0	-	50.0	> 30,000
	Selma	SEM	33.0	54.0	-	54.0	> 30,000
	Fairhope	CQF	36.0	58.0	-	58.0	> 30,000
	Brewton	12J	40.0	60.0	-	60.0	> 30,000
	Demopolis	DYA	30.0	38.0	60.0	60.0	> 30,000
	Monroeville	MVC	70.0	-	-	70.0	> 30,000
	Auburn-Opelika	AUO	45.0	75.0	-	75.0	> 30,000
	Talladega	ASN	30.0	65.0	95.0	95.0	> 30,000
	Gulf Shores	JKA	80.0	100.0	-	100.0	> 30,000
	Troy	TOI	24.0	80.0	140.0	140.0	> 30,000
	Anniston	ANB	28.0	43.5	260.0	260.0	> 30,000
Andalusia-OPP	79J	98.0	160.0	275.0	275.0	> 30,000	

APPENDIX I

PAVEMENT CAPITAL IMPROVEMENT PROGRAM

I1: PCIP Summary

I2: Year 1 Maintenance Plan



Appendix I1
PCIP Summary
Walker County Airport-Bevill Field (JFX)

Branch & Section	2021	2022	2023	2024	2025	2026	2027
A01-01	Preventive \$1628.55 Before:92.35 After:92.35	Preventive + Required Project Global MR \$189469.55 Before:90.14 After:96.77	Preventive \$1156.62 Before:94.56 After:94.56	Preventive \$1628.55 Before:92.35 After:92.35	Preventive \$2098.55 Before:90.14 After:90.14	Preventive \$2568.55 Before:87.93 After:87.93	Preventive \$3038.55 Before:85.72 After:85.72
A01-02	Preventive \$96.96 Before:97.35 After:97.35	Preventive \$177.65 Before:95.14 After:95.14	Preventive \$258.35 Before:92.93 After:92.93	Preventive + Required Project Global MR \$34652.32 Before:90.72 After:97.35	Preventive \$177.99 Before:95.13 After:95.13	Preventive \$258.68 Before:92.92 After:92.92	Preventive \$339.37 Before:90.71 After:90.71
RW0927-01	Required Project Major Below Critical \$2871570 Before:46.88 After:100	Preventive \$639.01 Before:98.7 After:98.7	Preventive \$1237.81 Before:97.48 After:97.48	Preventive + Required Project Global MR \$309582.77 Before:96.45 After:98.7	Preventive \$1237.81 Before:97.48 After:97.48	Preventive \$1742.77 Before:96.45 After:96.45	Preventive \$2234.32 Before:95.45 After:95.45
RW0927-02	Required Project Major Below Critical \$115818 Before:54.17 After:100	Preventive \$25.77 Before:98.7 After:98.7	Preventive \$49.92 Before:97.48 After:97.48	Preventive + Required Project Global MR \$12486.29 Before:96.45 After:98.7	Preventive \$49.92 Before:97.48 After:97.48	Preventive \$70.29 Before:96.45 After:96.45	Preventive \$90.12 Before:95.45 After:95.45

Appendix I1
PCIP Summary
Walker County Airport-Bevill Field (JFX)

Branch & Section	2021	2022	2023	2024	2025	2026	2027
TC01-01	Required Project Major Below Critical \$165149.32 Before:44.56 After:100	Preventive \$15.29 Before:98.98 After:98.98	Preventive \$32.35 Before:97.85 After:97.85	Preventive + Required Project Global MR \$9458.67 Before:96.33 After:98.98	Preventive \$32.35 Before:97.85 After:97.85	Preventive \$55.01 Before:96.34 After:96.34	Preventive \$84.63 Before:94.36 After:94.36
TC02-01	StopGap \$318.53 Before:39.75 After:39.75	StopGap \$753.41 Before:36.2 After:36.2	Required Project Major Below Critical \$85895.52 Before:32.66 After:100	Preventive \$7.5 Before:98.98 After:98.98	Preventive \$15.87 Before:97.85 After:97.85	Preventive + Required Project Global MR \$4927.13 Before:96.33 After:98.98	Preventive \$15.87 Before:97.85 After:97.85
TC02-02	Preventive \$4.75 Before:98.77 After:98.77	Preventive \$9.36 Before:97.58 After:97.58	Preventive \$15.55 Before:95.98 After:95.98	Preventive + Required Project Global MR \$3659.09 Before:93.91 After:98.77	Preventive \$9.36 Before:97.58 After:97.58	Preventive \$15.59 Before:95.97 After:95.97	Preventive \$23.57 Before:93.91 After:93.91
TC03-01	Preventive \$69.48 Before:96.19 After:96.19	Preventive \$106.29 Before:94.17 After:94.17	Preventive \$149.9 Before:91.78 After:91.78	Preventive + Required Project Global MR \$17331.4 Before:89.18 After:96.19	Preventive \$106.29 Before:94.17 After:94.17	Preventive \$149.9 Before:91.78 After:91.78	Preventive \$197.48 Before:89.17 After:89.17
TL01-01	Preventive \$1321.2 Before:69.78 After:69.78	Required Project Major Above Critical \$207384.32 Before:66.4 After:100	Preventive \$44.58 Before:98.98 After:98.98	Preventive \$94.34 Before:97.85 After:97.85	Preventive \$160.82 Before:96.33 After:96.33	Preventive \$247.6 Before:94.35 After:94.35	Preventive \$350.7 Before:91.99 After:91.99

Appendix I1
PCIP Summary
Walker County Airport-Bevill Field (JFX)

Branch & Section	2021	2022	2023	2024	2025	2026	2027
TL02-01	StopGap \$2507.6 Before:51.12 After:51.12	Required Project Major Below Critical \$537559.2 Before:47.03 After:100	Preventive \$90.95 Before:98.98 After:98.98	Preventive \$192.46 Before:97.85 After:97.85	Preventive \$328.07 Before:96.33 After:96.33	Preventive \$505.09 Before:94.35 After:94.35	Preventive \$715.41 Before:91.99 After:91.99
TP01-01	StopGap \$6756.02 Before:43.32 After:43.32	StopGap \$8074.6 Before:39.78 After:39.78	Required Project Major Below Critical \$2202887.52 Before:36.23 After:100	Preventive \$192.29 Before:98.98 After:98.98	Preventive \$406.91 Before:97.85 After:97.85	Preventive + Required Project Global MR \$126361.71 Before:96.33 After:98.98	Preventive \$406.91 Before:97.85 After:97.85
TP01-02	StopGap \$453.21 Before:65.92 After:65.92	StopGap \$587.5 Before:61.75 After:61.75	Required Project Major Below Critical \$157150.07 Before:56.99 After:100	Preventive \$32.77 Before:98.98 After:98.98	Preventive \$69.34 Before:97.85 After:97.85	Preventive + Required Project Global MR \$21533.44 Before:96.33 After:98.98	Preventive \$69.34 Before:97.85 After:97.85

Appendix I2
Localized Maintenance Plan
Walker County Airport-Bevill Field (JFX)

Branch ID	Section ID	Policy	Distress Code	Description	Severity	Distress Qty	Distress Unit	Percent Distress	Work Description	Work Qty	Work Unit	Unit Cost	Work Cost
A01	01	Preventive	48	L & T CR	Low	2,341	Ft	1.12	No Localized M & R	0		\$0.00	\$0
RW0927	01	Safety	43	BLOCK CR	Low	177,649	SqFt	36.93	No Localized M & R	0		\$0.00	\$0
RW0927	01	Safety	43	BLOCK CR	Medium	641	SqFt	0.13	No Localized M & R	0		\$0.00	\$0
RW0927	01	Safety	48	L & T CR	High	32	Ft	0.01	Crack Sealing - AC	32	Ft	\$3.95	\$127
RW0927	01	Safety	48	L & T CR	Low	9,953	Ft	2.07	No Localized M & R	0		\$0.00	\$0
RW0927	01	Safety	48	L & T CR	Medium	40,333	Ft	8.39	No Localized M & R	0		\$0.00	\$0
RW0927	01	Safety	57	WEATHERING	Low	481,000	SqFt	100	No Localized M & R	0		\$0.00	\$0
RW0927	02	Safety	48	L & T CR	Low	593	Ft	3.06	No Localized M & R	0		\$0.00	\$0
RW0927	02	Safety	48	L & T CR	Medium	1,085	Ft	5.59	No Localized M & R	0		\$0.00	\$0
RW0927	02	Safety	57	WEATHERING	Low	16,436	SqFt	84.72	No Localized M & R	0		\$0.00	\$0
TC01	01	Safety	41	ALLIGATOR CR	Low	217	SqFt	1.48	No Localized M & R	0		\$0.00	\$0
TC01	01	Safety	48	L & T CR	Low	490	Ft	3.33	No Localized M & R	0		\$0.00	\$0
TC01	01	Safety	48	L & T CR	Medium	1,515	Ft	10.31	No Localized M & R	0		\$0.00	\$0
TC01	01	Safety	52	RAVELING	Medium	120	SqFt	0.82	No Localized M & R	0		\$0.00	\$0
TC01	01	Safety	57	WEATHERING	Low	7,346	SqFt	50	No Localized M & R	0		\$0.00	\$0
TC02	01	Safety	41	ALLIGATOR CR	Low	134	SqFt	1.86	No Localized M & R	0		\$0.00	\$0
TC02	01	Safety	48	L & T CR	Low	201	Ft	2.79	No Localized M & R	0		\$0.00	\$0
TC02	01	Safety	48	L & T CR	Medium	993	Ft	13.78	No Localized M & R	0		\$0.00	\$0
TC02	01	Safety	57	WEATHERING	Low	3,602	SqFt	49.99	No Localized M & R	0		\$0.00	\$0
TC02	01	Safety	57	WEATHERING	Medium	100	SqFt	1.39	No Localized M & R	0		\$0.00	\$0
TC03	01	Preventive	45	DEPRESSION	Low	32	SqFt	0.18	Patching - AC Full-Depth	59	SqFt	\$25.05	\$1,475
TC03	01	Preventive	48	L & T CR	Low	5	Ft	0.03	No Localized M & R	0		\$0.00	\$0
TL01	01	Preventive	43	BLOCK CR	Low	112	SqFt	0.26	No Localized M & R	0		\$0.00	\$0
TL01	01	Preventive	48	L & T CR	Low	1,710	Ft	3.99	No Localized M & R	0		\$0.00	\$0
TL01	01	Preventive	48	L & T CR	Medium	1,009	Ft	2.35	Crack Sealing - AC	1,009	Ft	\$3.95	\$3,985
TL01	01	Preventive	52	RAVELING	High	10	SqFt	0.02	Patching - AC Partial-Dep	10	SqFt	\$16.28	\$160
TL01	01	Preventive	52	RAVELING	Low	28	SqFt	0.07	No Localized M & R	0		\$0.00	\$0
TL01	01	Preventive	52	RAVELING	Medium	183	SqFt	0.43	No Localized M & R	0		\$0.00	\$0
TL01	01	Preventive	57	WEATHERING	Low	3,372	SqFt	7.87	No Localized M & R	0		\$0.00	\$0

Appendix I2
Localized Maintenance Plan
Walker County Airport-Bevill Field (JFX)

Branch ID	Section ID	Policy	Distress Code	Description	Severity	Distress Qty	Distress Unit	Percent Distress	Work Description	Work Qty	Work Unit	Unit Cost	Work Cost
TL01	01	Preventive	57	WEATHERING	Medium	351	SqFt	0.82	No Localized M & R	0		\$0.00	\$0
TL02	01	Safety	41	ALLIGATOR CR	Medium	15	SqFt	0.02	No Localized M & R	0		\$0.00	\$0
TL02	01	Safety	48	L & T CR	Low	875	Ft	1	No Localized M & R	0		\$0.00	\$0
TL02	01	Safety	48	L & T CR	Medium	9,316	Ft	10.66	No Localized M & R	0		\$0.00	\$0
TL02	01	Safety	52	RAVELING	Medium	128	SqFt	0.15	No Localized M & R	0		\$0.00	\$0
TL02	01	Safety	57	WEATHERING	Low	32,413	SqFt	37.08	No Localized M & R	0		\$0.00	\$0
TL02	01	Safety	57	WEATHERING	Medium	332	SqFt	0.38	No Localized M & R	0		\$0.00	\$0
TP01	01	Safety	41	ALLIGATOR CR	Low	2,113	SqFt	1.14	No Localized M & R	0		\$0.00	\$0
TP01	01	Safety	48	L & T CR	Low	3,604	Ft	1.95	No Localized M & R	0		\$0.00	\$0
TP01	01	Safety	48	L & T CR	Medium	23,255	Ft	12.58	No Localized M & R	0		\$0.00	\$0
TP01	01	Safety	50	PATCHING	Low	3,080	SqFt	1.67	No Localized M & R	0		\$0.00	\$0
TP01	01	Safety	57	WEATHERING	Low	92,403	SqFt	50	No Localized M & R	0		\$0.00	\$0
TP01	01	Safety	57	WEATHERING	Medium	616	SqFt	0.33	No Localized M & R	0		\$0.00	\$0
TP01	02	Safety	48	L & T CR	Low	926	Ft	2.94	No Localized M & R	0		\$0.00	\$0
TP01	02	Safety	48	L & T CR	Medium	995	Ft	3.16	No Localized M & R	0		\$0.00	\$0
TP01	02	Safety	57	WEATHERING	Low	14,733	SqFt	46.78	No Localized M & R	0		\$0.00	\$0