

Alabama Statewide Airport Pavement Management Program Update



Enterprise Municipal Airport (EDN)

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

Enterprise Municipal Airport, Enterprise (EDN)

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 (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 Enterprise Municipal Airport (EDN).

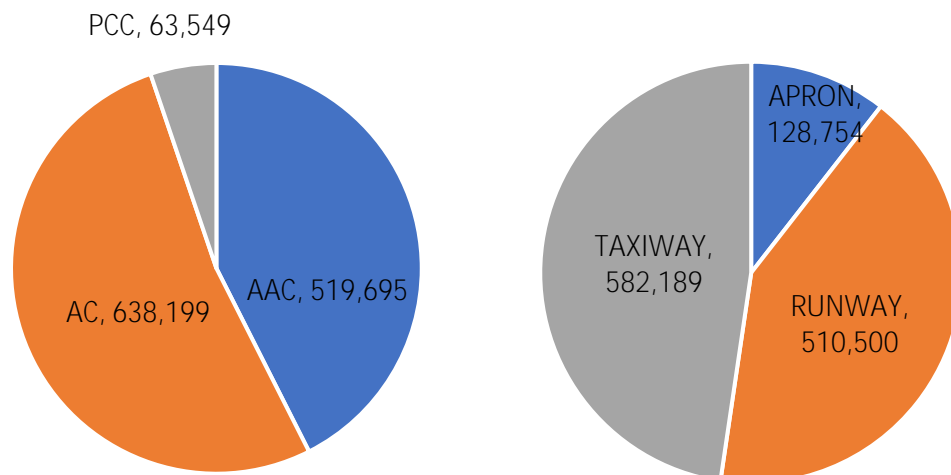
The following APMP tasks were completed to achieve the project objectives at EDN:

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

ES.1 Pavement Inventory

There are 11 branches and 15 sections within EDN with a total pavement area of approximately 1.22 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 of pavement functional surface condition. The overall

area-weighted network PCI (AW PCI) for the EDN pavement network is 82 Satisfactory condition. The network area-weighted pavement age (AW Age) is greater than 20 years.

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

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

Branch ID	Name	Section ID	Surface	Area, sf	PCI	PCI Category
A01	Apron 01	01	AAC	65,205	100	Good
A01	Apron 01	02	PCC	63,549	100	Good
R0523	Runway 05-23	01	AC	165,000	89	Good
R0523	Runway 05-23	02	AAC	285,000	82	Satisfactory
R0523	Runway 05-23	03	AC	60,500	89	Good
TA	Taxiway A	01	AAC	164,755	98	Good
TA1	Taxiway A1	01	AC	4,164	91	Good
TA1	Taxiway A1	02	AAC	4,735	99	Good
TA2	Taxiway A2	01	AC	15,365	70	Fair
TA3	Taxiway A3	01	AC	20,037	97	Good
TA4	Taxiway A4	01	AC	15,724	90	Good
TC01	Taxiway Connector 01	01	AC	9,945	82	Satisfactory
TC02	Taxiway Connector 02	01	AC	7,847	100	Good
THANG01	Taxiway Hangar 01	01	AC	255,301	62	Fair
TL01	Taxilane 01	01	AC	84,316	87	Good

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 EDN 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 \$2.1 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 \$28,225 as summarized in Table ES-3.

Figure ES-2: M&R Funding Levels.

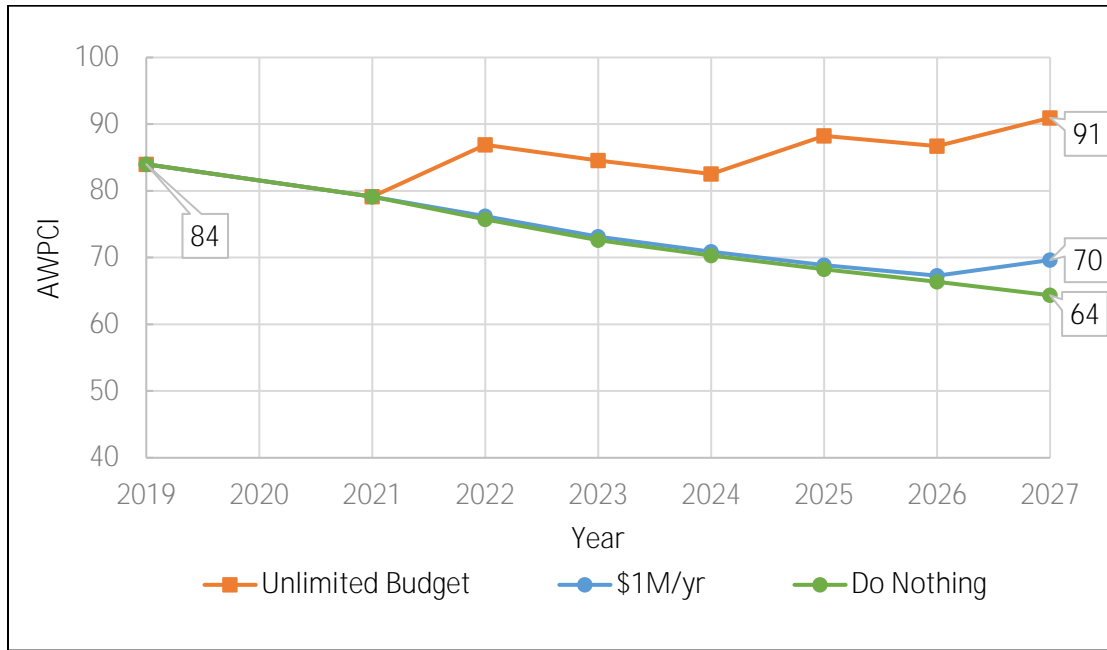


Table ES-2: Summary of Pavement Capital Improvement Program.

Project Year	CIP Project	Total Project Cost	Total Project Area, sf	AWPCI Before	AWPCI After
2021	EDN_21-01_Runway 05-23 Preservation	\$345,794	565,790	80	87
	EDN_21-02_Taxilane Preservation	\$82,627	94,261	83	90
2022	EDN_22-01_Apron 01 Surface Treatment	\$43,824	73,052	98	98
2023	EDN_23-01_Taxiway A Preservation	\$157,620	169,490	91	97
	EDN_23-02_Taxiway Hangar Rehabilitation	\$1,497,082	255,301	46	100
Total		\$2,126,947			

Table ES-3: Summary of Localized Maintenance Plan.

Policy	Work Description	Work Quantity	Work Unit	Work Cost
Preventive	Crack Sealing - AC	2,914	Ft	\$11,511
	Patching - AC Full-Depth	613	SqFt	\$15,364
Safety	Crack Sealing - AC	342	Ft	\$1,350
Total				\$28,225

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1 Introduction

1.1. Overview

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 Enterprise Municipal Airport (EDN), 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:

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

The scope of work is as shown below:

- Ø Conduct a Records Review
- Ø Update Pavement Network Definition
- Ø Conduct Pavement Condition Surveys
- Ø Update and customize existing APMP PAVER database
- Ø Develop PCIP and associated project cost estimates
- Ø Prepare Draft and Final Reports
- Ø 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

The deliverable products include a PAVER 7.0 database, individual airport evaluation reports, a statewide summary report, and the web viewer. The EDN report will be one of the 59 individual airport reports that will be

1.3. Pavement Management Concept

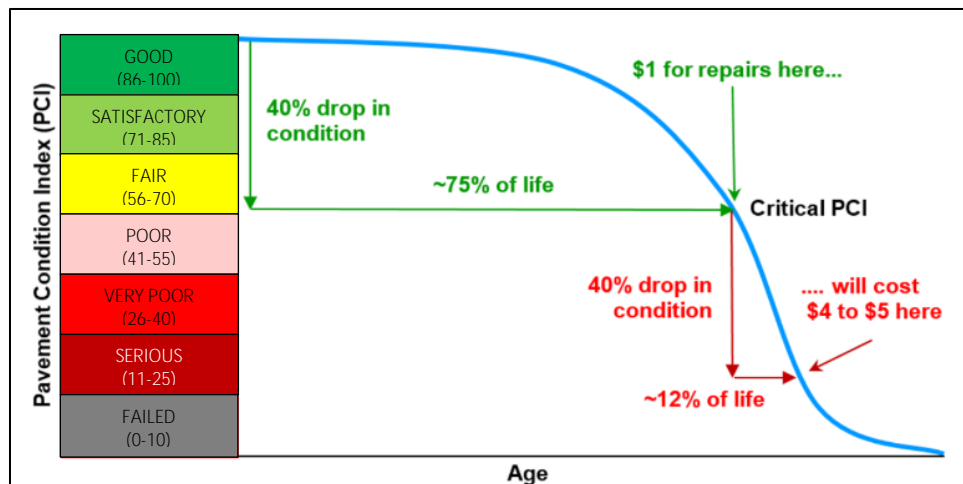
An APMP provides an integrated framework for comprehensive evaluation and decision making for managing airfield pavements. The essential components of an effective APMP provide for an objective evaluation of the condition of existing pavements, identification of short-term and long-range major rehabilitation 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 20-15 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

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

EDN is a General Aviation (GA) airport located approximately 3 miles west of Enterprise. The airport was activated in July 1955 and is owned and operated by the Town of Enterprise. Figure 2.1 shows an aerial image of the airport.

Figure 2.1: Enterprise Municipal Airport.



(Source: Google Earth)

2.2. Pavement Inventory

EDN consists of one runway, a parallel taxiway, two connector taxiways, and an apron. The total pavement area is approximately 1.23 million square feet. Pavement surfaces at EDN include Asphalt Concrete (AC), Asphalt Overlay on AC (AAC), and Portland Cement Concrete (PCC). A complete listing of the pavement sections is included in Appendix A. Runway 05-23 is 5,080 ft. long and 100 ft. wide.

A records search was undertaken to identify any preservation or rehabilitation work that has occurred at EDN 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:

- Ø Runway 05-23 Rehabilitation, 2011
- Ø Taxiway Rehabilitation, 2018
- Ø Apron Reconstruction, 2019

2.3. Climatic Conditions

Table 3.1 provides a summary of the climatic data for the geographic region that includes EDN. As the table shows, the pavements at EDN are not exposed to any freeze-thaw cycles. The mean air temperature for January ranges from an average low of 39 degrees °F to an average high of 58 degrees °F. The average annual rainfall at EDN is near 57 inches.

Table 2.1: Average Annual Temperatures and Rainfall for EDN.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
High Temp (°F)	58	63	70	76	83	88	90	89	86	78	69	61
Low Temp (°F)	39	42	48	54	62	69	71	71	67	56	48	41
Precip. (in)	6.1	5.1	6.3	4.0	4.7	4.8	6.2	3.8	3.9	2.8	4.4	4.7

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

The EDN 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 EDN.

Once branches have been defined, pavement evaluation and analysis techniques require the airfield 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 ($\pm 2,000$).

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 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 EDN.

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 11 branches (facilities) at EDN that include 15 pavement sections and a total area of approximately 1.22 million square feet of paved surfaces, as shown in Table 2.3.

Table 2.3: EDN Pavement Branches.

Branch ID	Branch Name	Branch Use	Area, sf	Number of Sections
A01	Apron 01	APRON	128,754	2
R0523	Runway 05-23	RUNWAY	510,500	3
TA	Taxiway A	TAXIWAY	164,755	1
TA1	Taxiway A1	TAXIWAY	8,899	2
TA2	Taxiway A2	TAXIWAY	15,365	1
TA3	Taxiway A3	TAXIWAY	20,037	1
TA4	Taxiway A4	TAXIWAY	15,724	1
TC01	Taxiway Connector 01	TAXIWAY	9,945	1
TC02	Taxiway Connector 02	TAXIWAY	7,847	1
THANG01	Taxiway Hangar 01	TAXIWAY	255,301	1
TL01	Taxilane 01	TAXIWAY	84,316	1
Total			1,221,443	15

Table 2.4 shows the distribution of airfield pavement by age with the area-weighted age being greater than 20 years for all airside pavements at EDN.

Table 2.4: EDN Pavement Age.

Age (Years)	Number of Sections	Percent of Area	Area, sf
0 5	5	25	306,091
6 10	6	45	545,753
11 15	0	0	0
16 20	0	0	0
> 20	4	30	369,599

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: EDN Pavement Area by Surface Type.

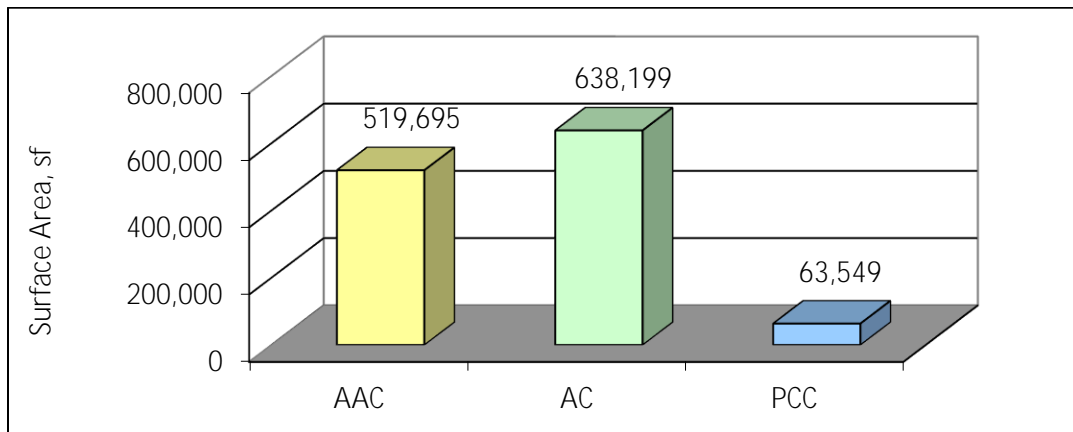
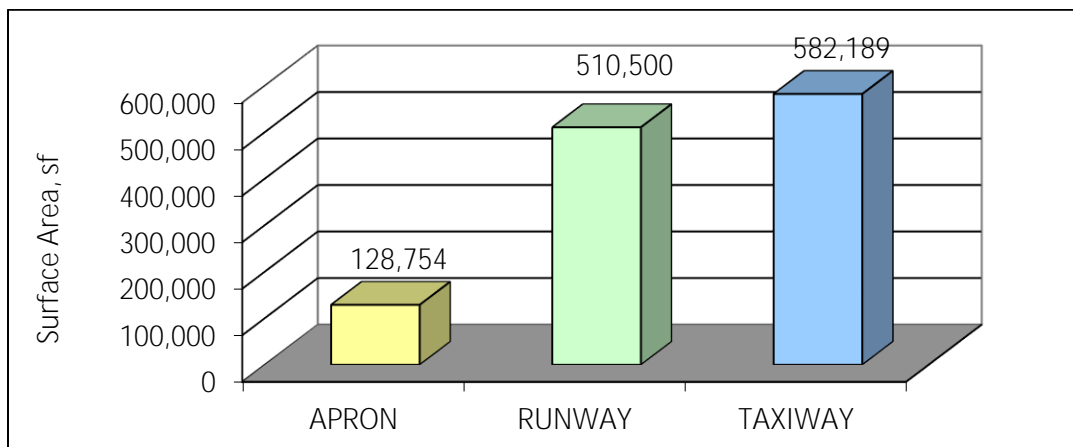


Figure 2.3: EDN Pavement Area by Branch Use.



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 EDN 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 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;

- Ø 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.
- Ø 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

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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	[Green]	[Green]	86-100	<u>GOOD</u> : Pavement has minor or no distresses and should require only routine maintenance.
		[Light Green]	71-85	<u>SATISFACTORY</u> : Pavement has scattered low-severity distresses that should require only routine maintenance.
FAIR	[Yellow]	[Yellow]	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	[Red]	[Light Pink]	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
		[Red]	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.
		[Dark Red]	11-25	<u>SERIOUS</u> : Pavement has mainly high-severity distresses that cause operational restrictions; immediate repairs are needed.
		[Grey]	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:

- Ø 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.
- Ø 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-outs, pumping, scaling, shrinkage cracks, and joint and corner spalling.
- Ø Moisture & Drainage related: AC distresses include alligator cracking, depressions, potholes and swelling; PCC distresses include corner breaks, divided slabs and pumping.
- Ø 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.

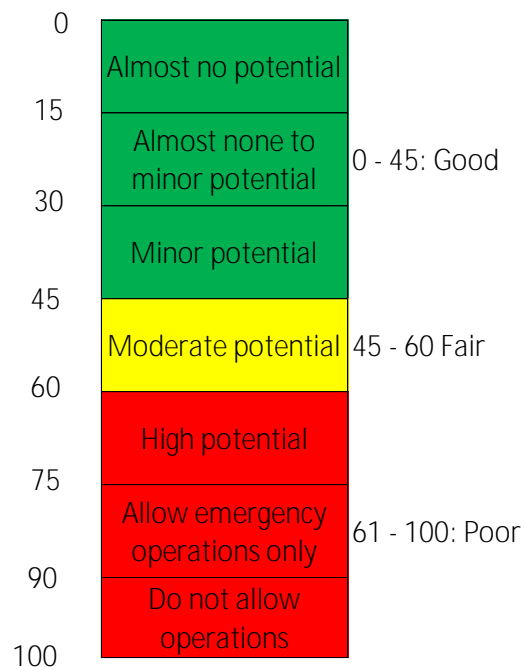
Distress descriptions provided in Appendix C were taken from the U.S. Army Construction Engineering Research Lab (CERL), latest edition. Appendix C provides a detailed explanation of each type of AC and PCC surface distress.

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 EDN include 15 sections with 230 sample units. The sample number of sample units that were surveyed in the field is 65, which is 28 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 3.2: Pavement Condition by Branch Use.



Figure 3.3 shows the distribution of the EDN pavement network by condition. None of the pavement

Figure 3.3: Pavement Condition by Percent of Area.

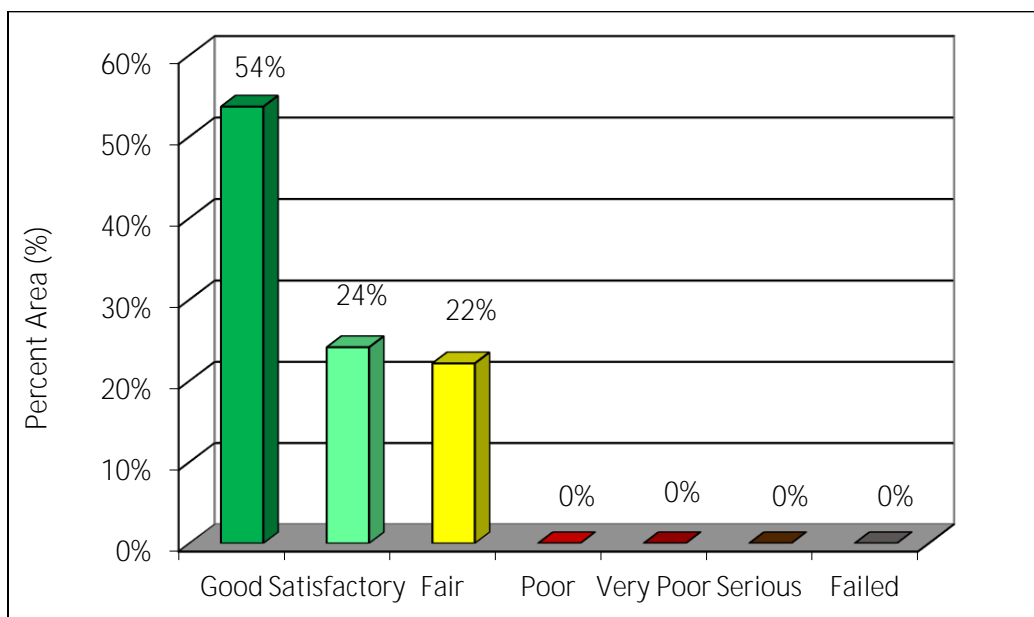


Table 3.2 is a listing of the section PCI.

Table 3.2: Section PCI.

Branch ID	Name	Section ID	Surface	Area, sf	PCI	PCI Category	FOD
A01	Apron 01	01	AC	65,205	100	Good	0
A01	Apron 01	02	PCC	63,549	100	Good	0
R0523	Runway 05-23	01	AC	165,000	89	Good	21
R0523	Runway 05-23	02	AAC	285,000	82	Satisfactory	29
R0523	Runway 05-23	03	AC	60,500	89	Good	21
TA	Taxiway A	01	AAC	164,755	98	Good	11
TA1	Taxiway A1	01	AC	4,164	91	Good	19
TA1	Taxiway A1	02	AAC	4,735	99	Good	10
TA2	Taxiway A2	02	AC	4,347	60	Fair	54
TA3	Taxiway A3	01	AC	20,037	97	Good	12
TA4	Taxiway A4	01	AC	15,724	90	Good	20
TC01	Taxiway Connector 01	01	AC	9,945	82	Satisfactory	29
TC02	Taxiway Connector 02	01	AC	7,847	100	Good	0
THANG01	Taxiway Hangar 01	01	AC	255,301	62	Fair	48
TL01	Taxilane 01	01	AC	84,316	87	Good	22

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 h # # h## 7 8 7 h assigned based on the overall pavement condition. There are no PCC aprons at EDN.

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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. The equation used to develop pavement performance models that

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.

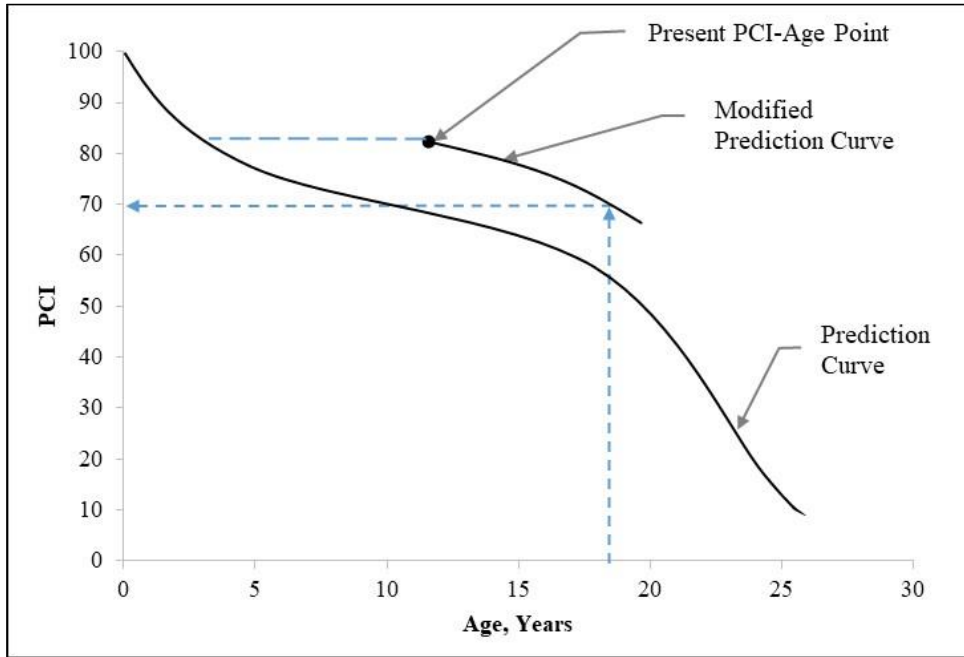
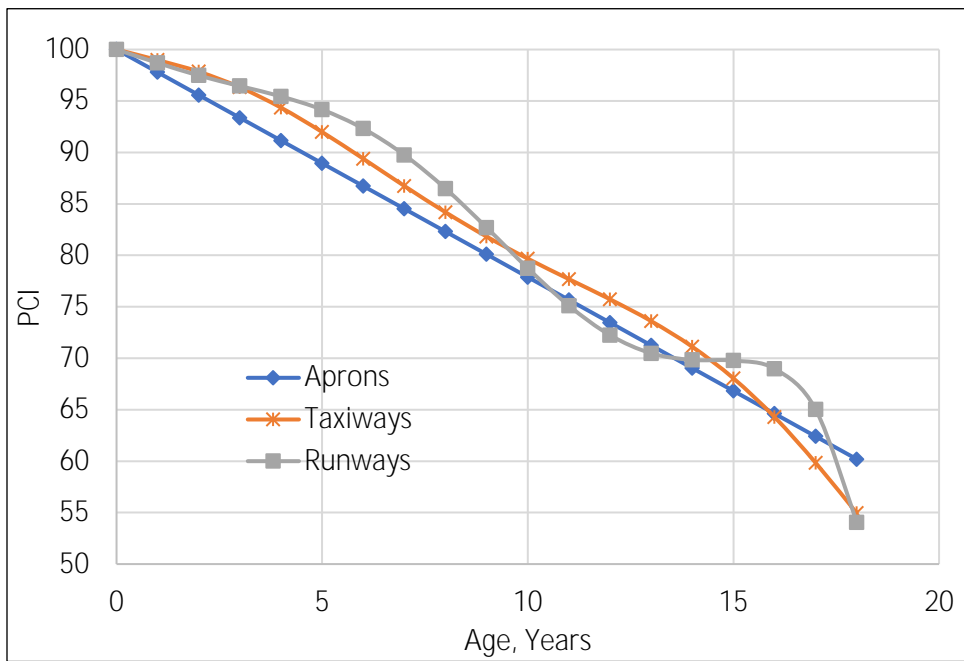


Figure 4.2: Family Curves.



4.3. Critical PCI Values

the PCI value at which the rate of PCI loss increases with time, or the cost of applying localized preventive maintenance increases significantly 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.

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	\$3.91
	55 - CP	Mill 2" & 2" AC OL	\$4.27
	45 - 55	Mill 2" & 2" AC OLP (With Pre-Overlay Repairs)	\$5.37
Reconstruction	0 - 45	AC Reconstruction	\$9.87

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 EDN 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:

- Ø Unlimited Funding: Unlimited funding is available for all pavement needs. The PCI increases to 91 by 2027.
- Ø Maintain PCI: PAVER cannot iterate to this scenario.
- Ø Constrained Funding: This scenario constrains the funding to \$1 million each year (total of \$7 million). The PCI decreases to 70 in 2027.
- Ø Do Nothing: Performing no M&R would reduce the network PCI from 84 to 64 by 2027.

Figure 4.3: Budget Analysis Process.

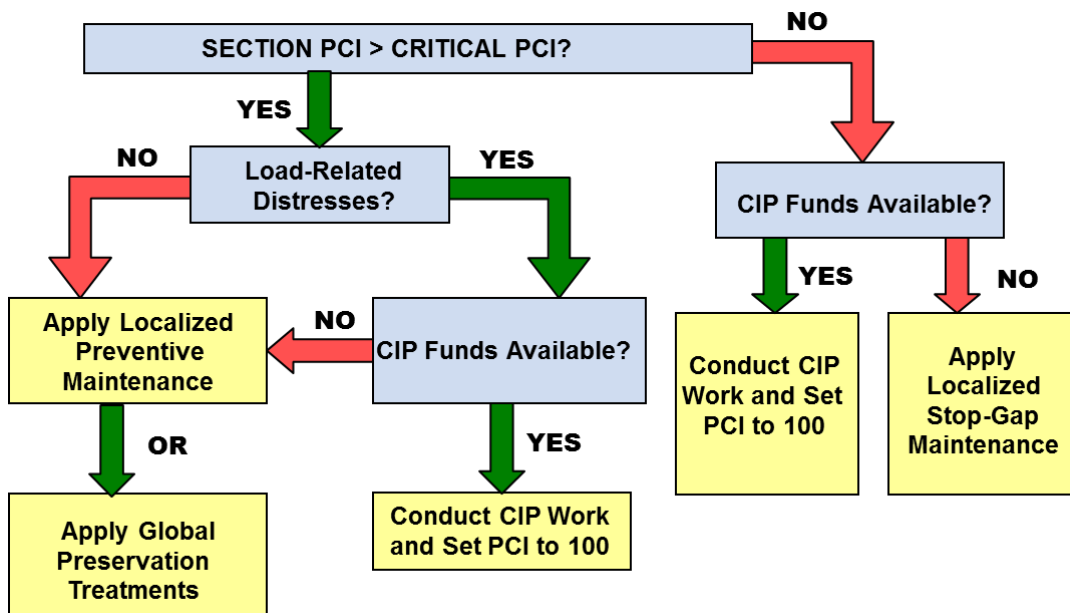


Figure 4.4: M&R Funding Levels.

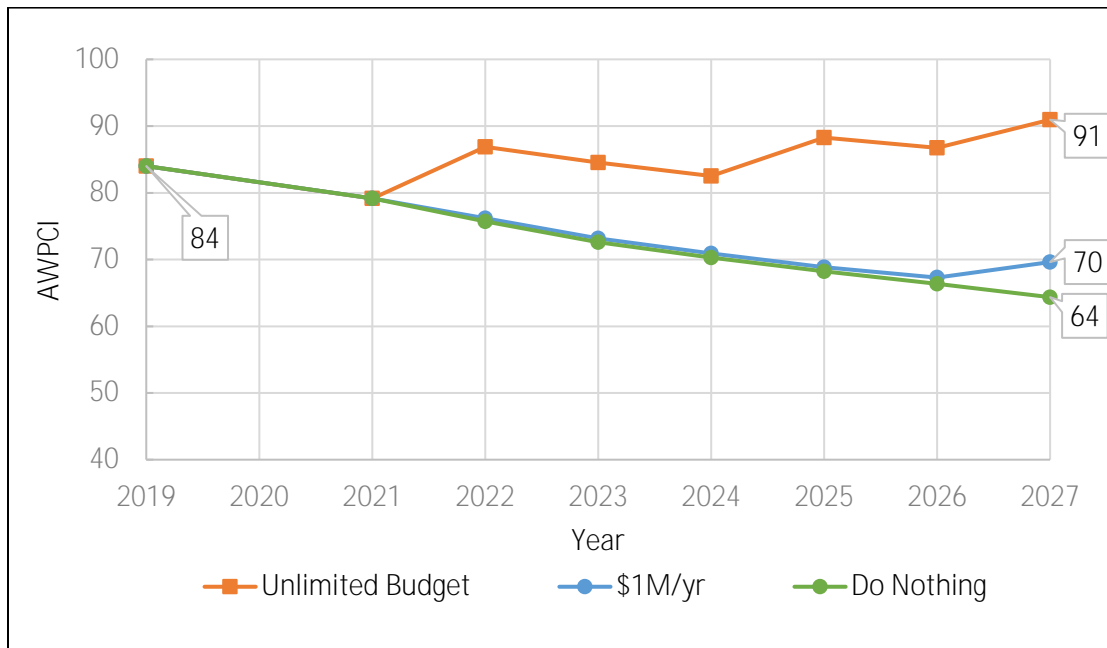


Table 4.2 summarizes the annual funding required for the above analyses. For the unlimited analysis, all pavement needs are funded in the year they are required. Therefore, the unfunded costs are zero. The total funded amount over the 7-year period is approximately \$4.1 million. For the annual funding 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

The 2027 for this funding level are approximately \$4.8 million.

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

Year	Unlimited	Constrained \$1M/year	Do Nothing
2021	\$19,000	\$19,000	\$0
2022	\$1,451,000	\$91,000	\$0
2023	\$19,097	\$28,000	\$0
2024	\$22,000	\$31,000	\$0
2025	\$1,385,000	\$29,000	\$0
2026	\$67,117	\$87,566	\$0
2027	\$1,162,373	\$893,424	\$0
Total	\$4,125,000	\$1,178,000	\$0
2027 Backlog	-	\$4,770,000	\$5,877,000

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 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 \$2.1 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 EDN.

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	EDN_21-01_Runway 05-23 Preservation	\$345,794	565,790	80	87
	EDN_21-02_Taxilane Preservation	\$82,627	94,261	83	90
2022	EDN_22-01_Apron 01 Surface Treatment	\$43,824	73,052	98	98
2023	EDN_23-01_Taxiway A Preservation	\$157,620	169,490	91	97
	EDN_23-02_Taxiway Hangar Rehabilitation	\$1,497,082	255,301	46	100
Total		\$2,126,947			

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

Branch	Section	Area, sf	PCI Before Rehab	Activity	Activity Type	Cost
EDN_21-01_Runway 05-23 Preservation						\$345,794
R0523	01	165,000	85	Runway Surface Treatment	Preservation	\$96,100
R0523	02	285,000	77	Runway Surface Treatment	Preservation	\$165,991
R0523	03	60,500	85	Runway Surface Treatment	Preservation	\$35,237
TA1	01	4,164	88	Taxiway & Apron Surface Treatment	Preservation	\$3,650
TA2	01	15,365	66	Taxiway & Apron Surface Treatment	Preservation	\$13,469
TA3	01	20,037	95	Taxiway & Apron Surface Treatment	Preservation	\$17,564
TA4	01	15,724	87	Taxiway & Apron Surface Treatment	Preservation	\$13,783
EDN_21-02_Taxilane Preservation						\$82,627
TC01	01	9,945	80	Taxiway & Apron Surface Treatment	Preservation	\$8,718
TL01	01	84,316	84	Taxiway & Apron Surface Treatment	Preservation	\$73,910
EDN_22-01_Apron 01 Surface Rehabilitation						\$43,824
A01	01	65,205	95	Taxiway & Apron Surface Treatment	Preservation	\$39,116
TA2	02	4,347	98	Taxiway & Apron Surface Treatment	Preservation	\$4,707
EDN_23-01_Taxiway A Preservation						\$157,620
TA	01	164,755	92	Taxiway & Apron Surface Treatment	Preservation	\$153,216
TA1	02	4,735	94	Taxiway & Apron Surface Treatment	Preservation	\$4,403
EDN_23-02_Taxiway Hangar Rehabilitation						\$1,497,082
THANG01	01	255,301	47	Mill 2" & 2" AC OLP	Rehabilitation	\$1,497,082
Total						\$2,126,947

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 \$2.1 million for EDN:

- Ø FAA (90%): \$1.9 million
- Ø ALDOT (5%): \$0.1 million

Ø Airport Sponsor (5%): \$0.1 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 \$28,225. 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 EDN pavements.

Table 4.5: Summary of Year-1 Maintenance Plan.

Policy	Work Description	Work Quantity	Work Unit	Work Cost
Preventive	Crack Sealing - AC	2,914	Ft	\$11,511
	Patching - AC Full-Depth	613	SqFt	\$15,364
Safety	Crack Sealing - AC	342	Ft	\$1,350
Total				\$28,225

APPENDIX A

INVENTORY



Appendix A
Pavement Inventory Report
Enterprise Municipal Airport (EDN)

Branch ID	Name	Branch Use	Section ID	Rank ¹	Length (ft)	Width (ft)	Area (sf)	LCD ²	Surface ³
A01	Apron 01 Enterprise	APRON	01	S	315	207	65,205	12/1/2019	AAC
A01	Apron 01 Enterprise	APRON	02	S	307	207	63,549	1/2/2020	PCC
R0523	Runway 05-23 Enterprise	RUNWAY	01	P	1,650	100	165,000	6/2/2011	AC
R0523	Runway 05-23 Enterprise	RUNWAY	02	P	2,850	100	285,000	6/2/2011	AAC
R0523	Runway 05-23 Enterprise	RUNWAY	03	P	605	100	60,500	6/2/2011	AC
TA	Taxiway A Enterprise	TAXIWAY	01	P	4,844	35	164,755	6/1/2018	AAC
TA1	Taxiway A1 Enterprise	TAXIWAY	01	S	83	45	4,164	6/1/2011	AC
TA1	Taxiway A1 Enterprise	TAXIWAY	02	S	146	35	4,735	6/1/2018	AAC
TA2	Taxiway A2 Enterprise	TAXIWAY	01	S	235	35	15,365	6/2/2011	AC
TA3	Taxiway A3 Enterprise	TAXIWAY	01	S	233	25	20,037	1/1/1955	AC
TA4	Taxiway A4 Enterprise	TAXIWAY	01	S	366	35	15,724	6/1/2011	AC
TC01	Taxiway Connector 01 Enterprise	TAXIWAY	01	S	317	29	9,945	1/1/1955	AC
TC02	Taxiway Connector 02 Enterprise	TAXIWAY	01	S	85	57	7,847	6/1/2019	AC
THANG01	Taxiway Hangar 01 Enterprise	TAXIWAY	01	T	849	547	255,301	1/1/1955	AC
TL01	Taxilane 01 Enterprise	TAXIWAY	01	T	1,242	50	84,316	1/1/1955	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

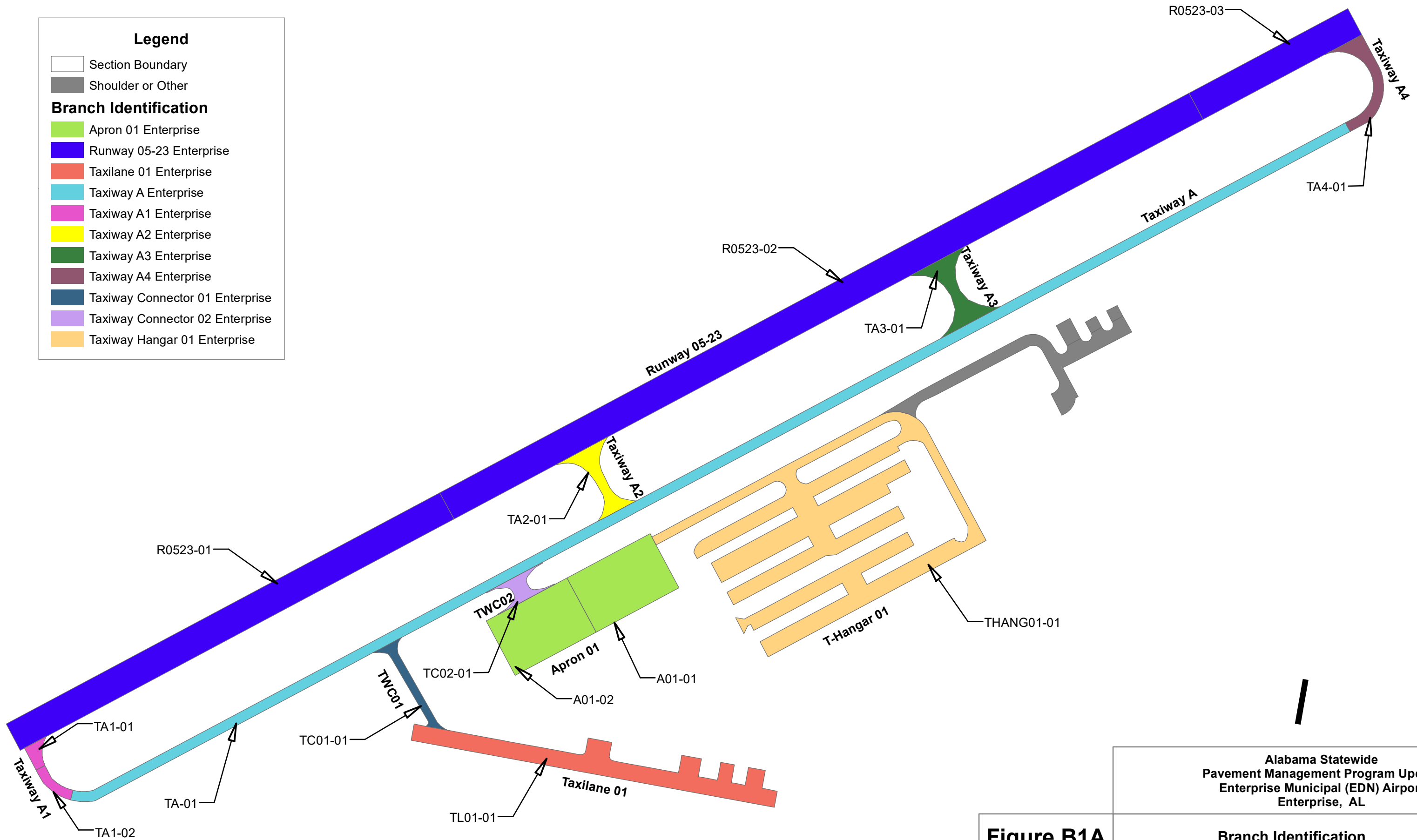
B3C: PCIP Recommendations

Legend

- Section Boundary
- Shoulder or Other

Branch Identification

- Apron 01 Enterprise
- Runway 05-23 Enterprise
- Taxilane 01 Enterprise
- Taxiway A Enterprise
- Taxiway A1 Enterprise
- Taxiway A2 Enterprise
- Taxiway A3 Enterprise
- Taxiway A4 Enterprise
- Taxiway Connector 01 Enterprise
- Taxiway Connector 02 Enterprise
- Taxiway Hangar 01 Enterprise



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 Enterprise, AL

Figure B1A

Branch Identification

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	KP/MR	July 2021	Page 1
REVISED	SCALE	FINAL	
JMA	1 in = 300 ft		

Legend

- Section Boundary
- Shoulder or Other

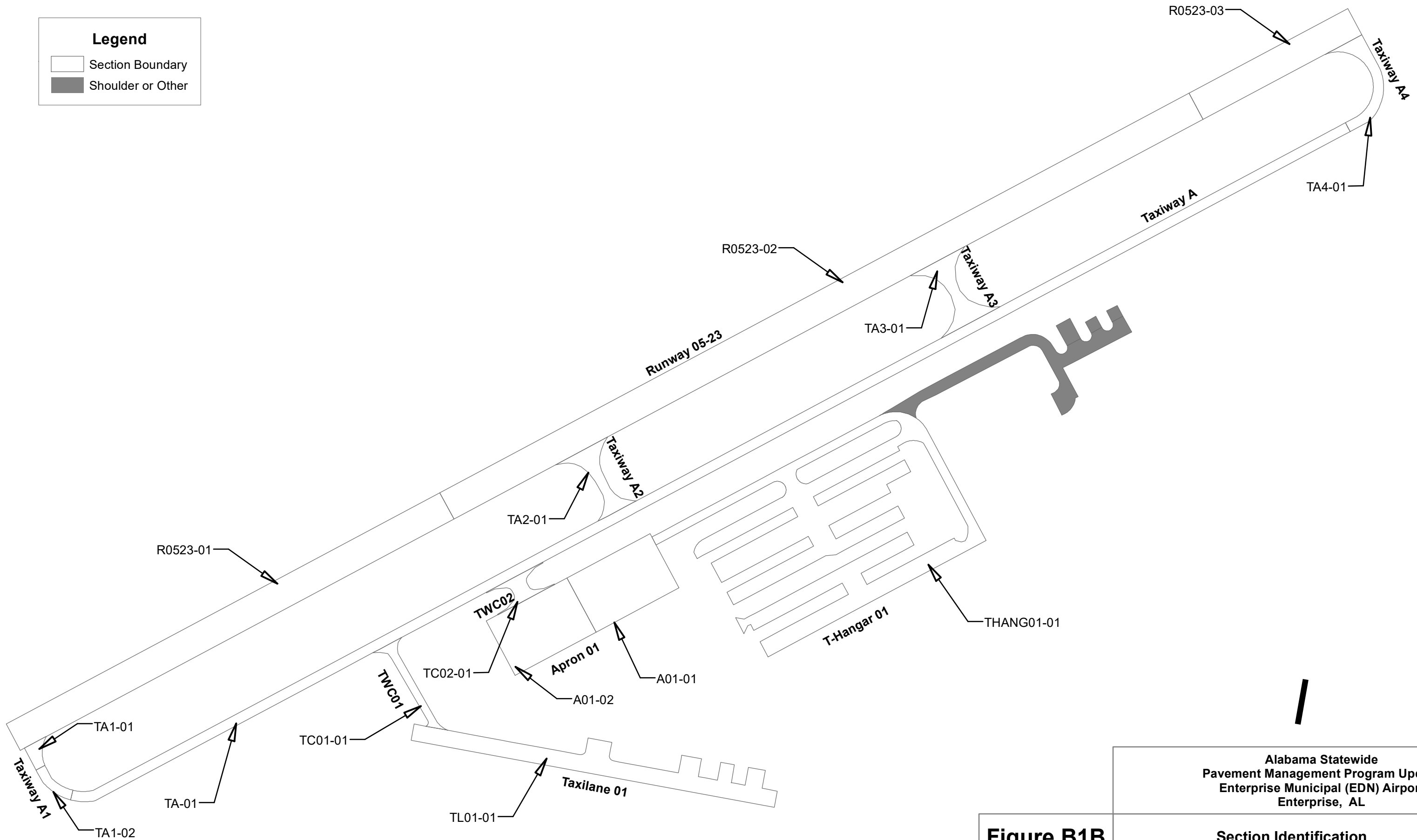


Figure B1B



Alabama Statewide
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Enterprise, AL

Section Identification

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

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Legend

-  Section Boundary
-  Shoulder or Other

Sample Unit Layout



-  SU Boundary
-  Inspected



Figure B1C

Alabama Statewide Pavement Management Program Update Enterprise Municipal (EDN) Airport Enterprise, AL		
Sample Unit Layout		
ENGINEER KP/MR	DATE July 2021	MAP NUMBER Page 3
REVISED JMA	SCALE 1 in = 300 ft	FINAL

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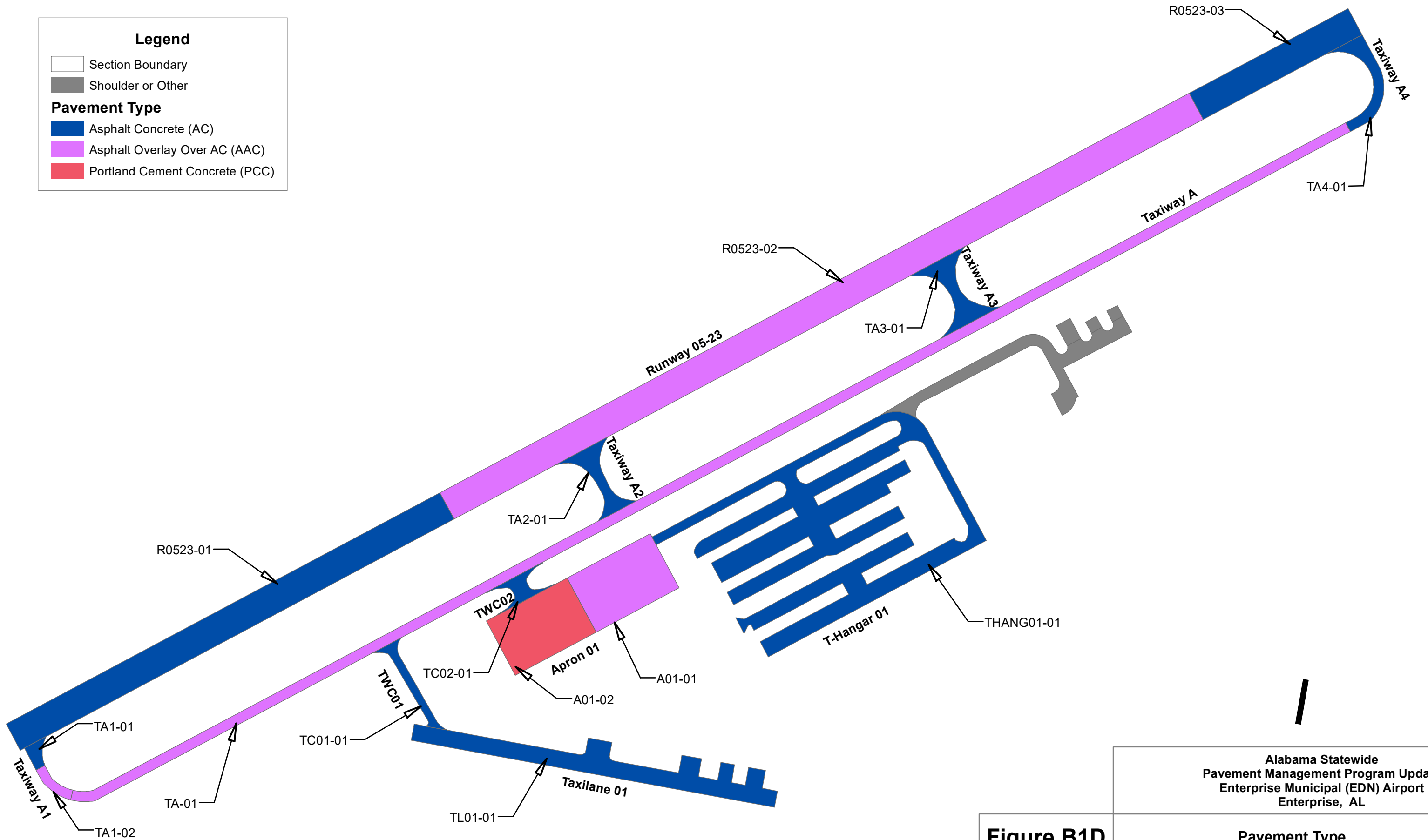
Legend

Section Boundary

Shoulder or Other

Pavement Type

- Asphalt Concrete (AC)
- Asphalt Overlay Over AC (AAC)
- Portland Cement Concrete (PCC)



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Figure B1D

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

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Legend

- Section Boundary
- Shoulder or Other
- Branch Use**
- APRON
- RUNWAY
- TAXIWAY

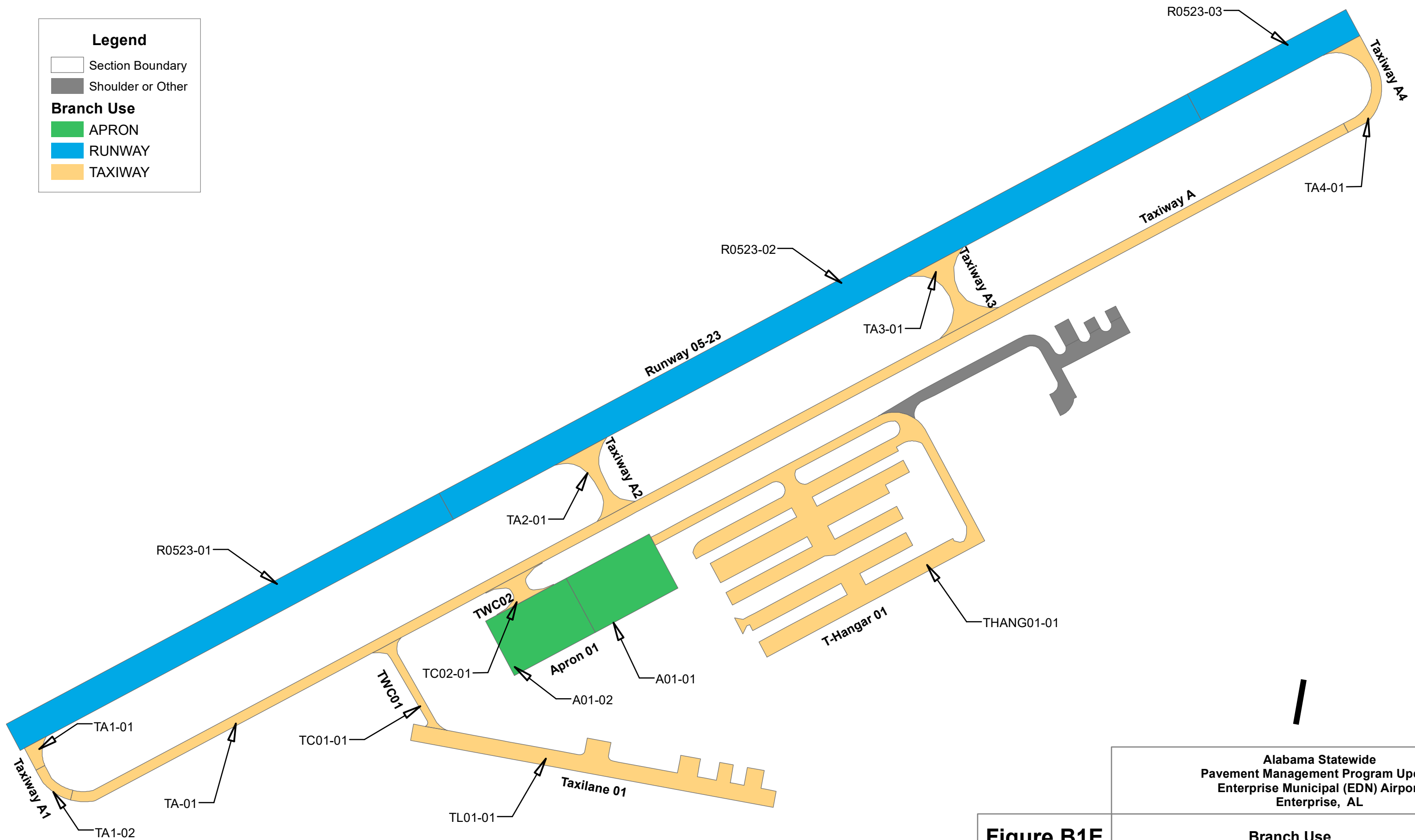


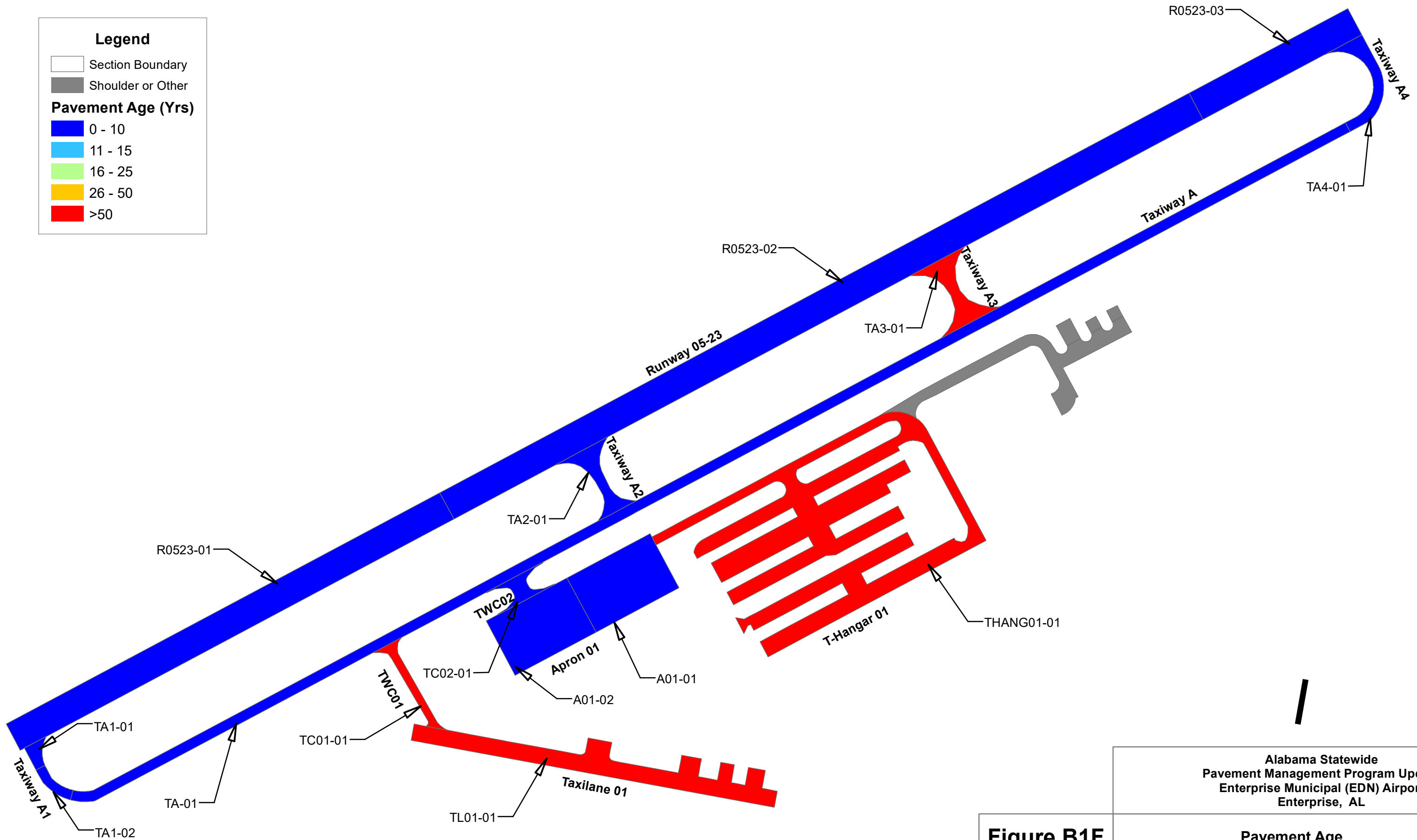
Figure B1E

Alabama Statewide Pavement Management Program Update Enterprise Municipal (EDN) Airport Enterprise, AL		
Branch Use		
ENGINEER KP/MR	DATE July 2021	MAP NUMBER Page 5
REVISED JMA	SCALE 1 in = 300 ft	FINAL

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Legend

- Section Boundary
- Shoulder or Other
- Pavement Age (Yrs)**
- 0 - 10
- 11 - 15
- 16 - 25
- 26 - 50
- >50



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Enterprise, AL

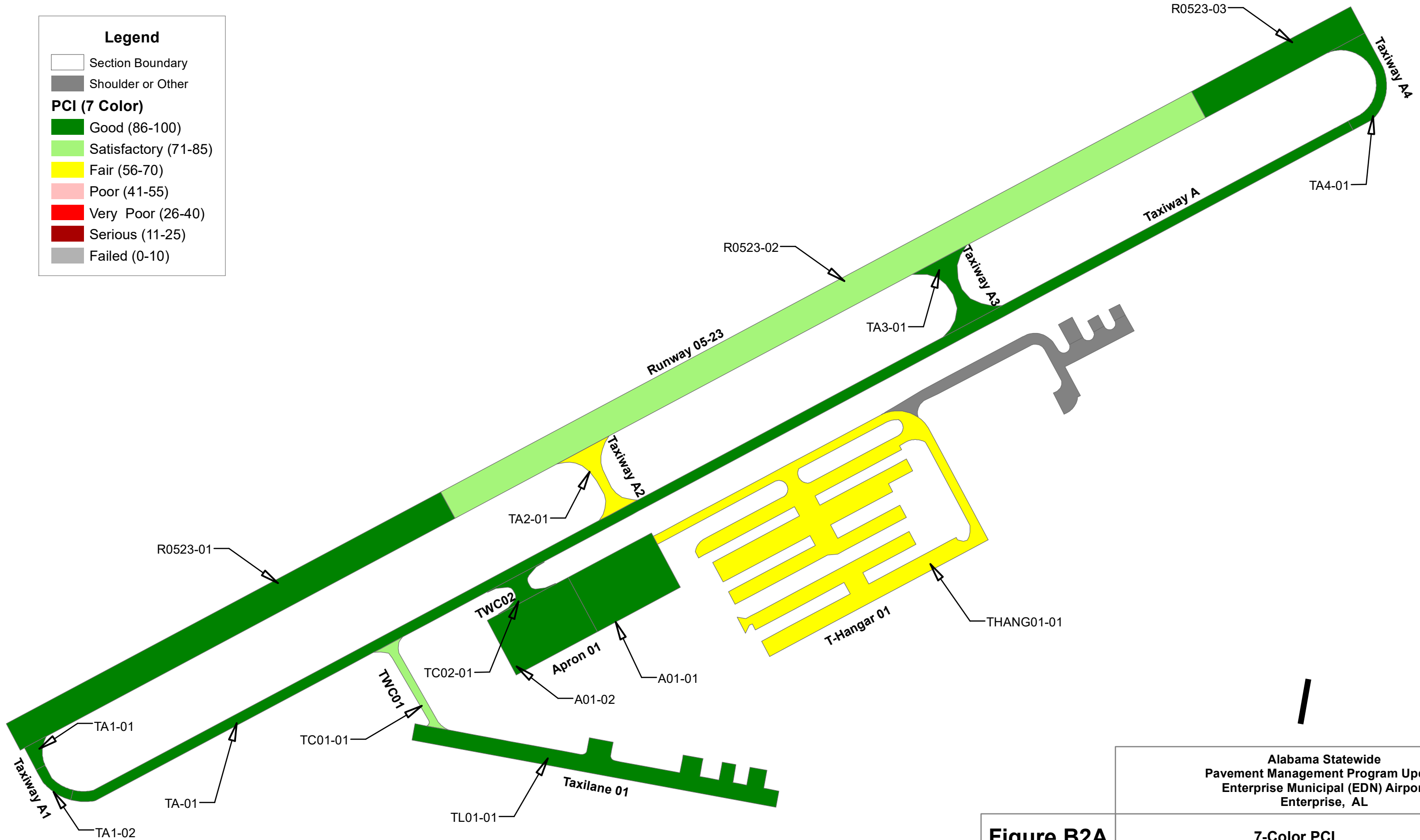
Figure B1F

Pavement Age

All About Pavements, Inc. (API) <small>www.allaboutpavements.com Telephone: 217-586-2765 FAX: 217-586-1967</small>	ENGINEER	DATE	MAP NUMBER
	KP/MR	July 2021	Page 6
	REVISED	SCALE	
	JMA	1 in = 300 ft	FINAL

Legend

- Section Boundary
- 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)



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Figure B2A

7-Color PCI

	ENGINEER KP/MR	DATE July 2021	MAP NUMBER Page 7
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Legend

- Section Boundary
- Shoulder or Other
- PCI (3 Color)**
- Good (71-100)
- Fair (56-70)
- Poor (0-55)

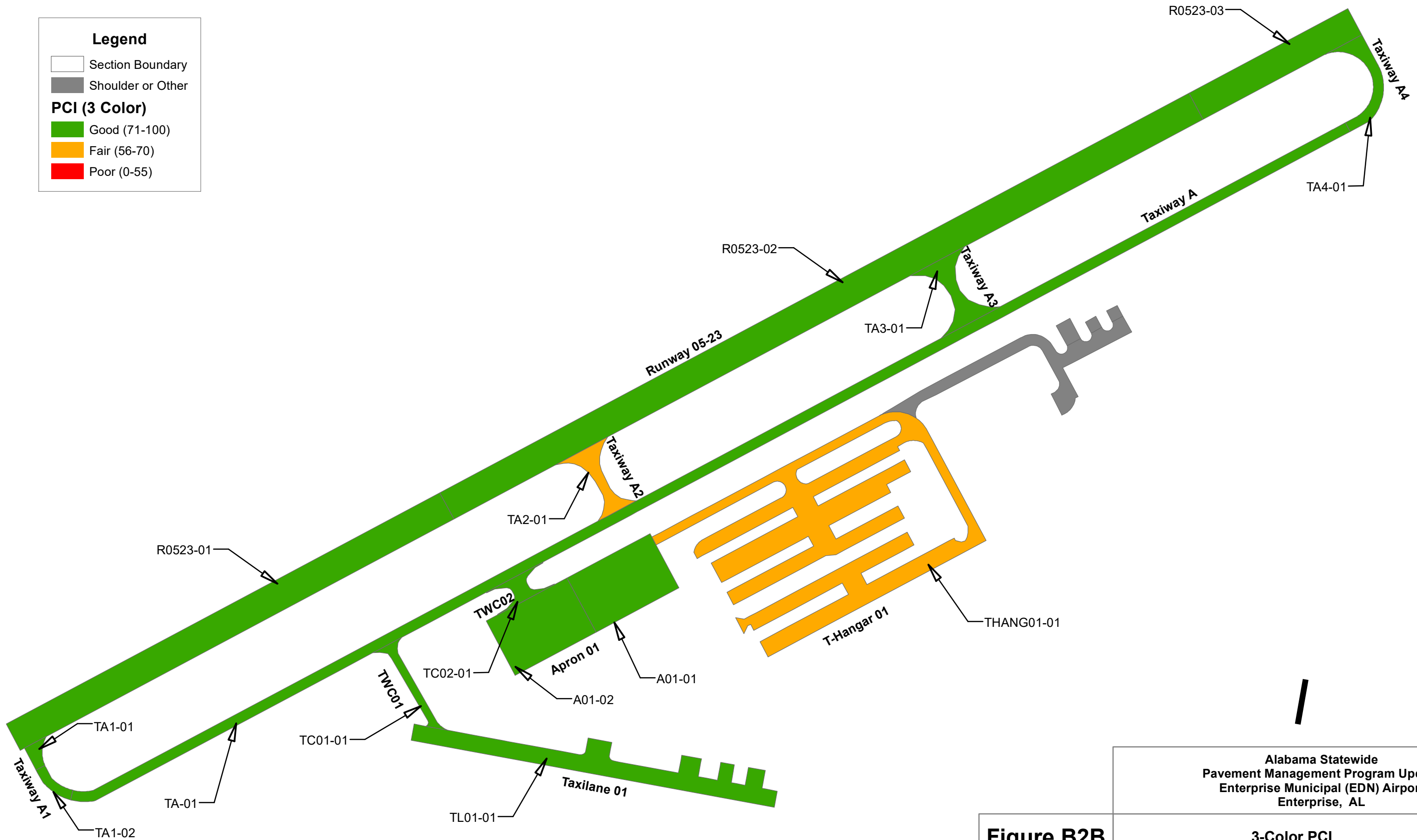


Figure B2B

Alabama Statewide Pavement Management Program Update Enterprise Municipal (EDN) Airport Enterprise, AL		
3-Color PCI		
ENGINEER KP/MR	DATE July 2021	MAP NUMBER Page 8
REVISED JMA	SCALE 1 in = 300 ft	FINAL

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Legend

- Section Boundary
- Shoulder or Other
- Survey Photo Locations

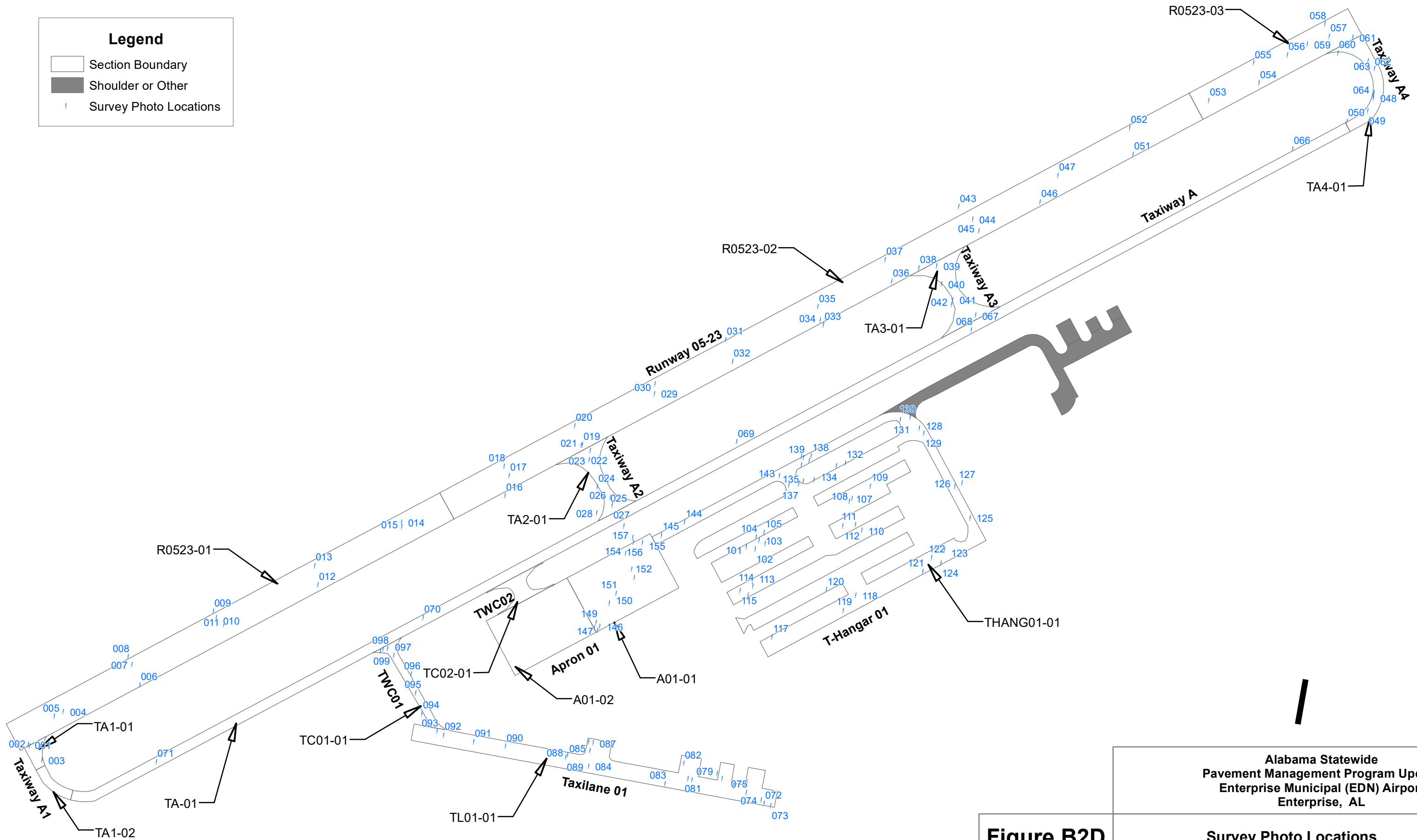


Figure B2D

Alabama Statewide Pavement Management Program Update Enterprise Municipal (EDN) Airport Enterprise, AL		
Survey Photo Locations		
ENGINEER KP/MR	DATE July 2021	MAP NUMBER Page 10
REVISED JMA	SCALE 1 in = 300 ft	FINAL

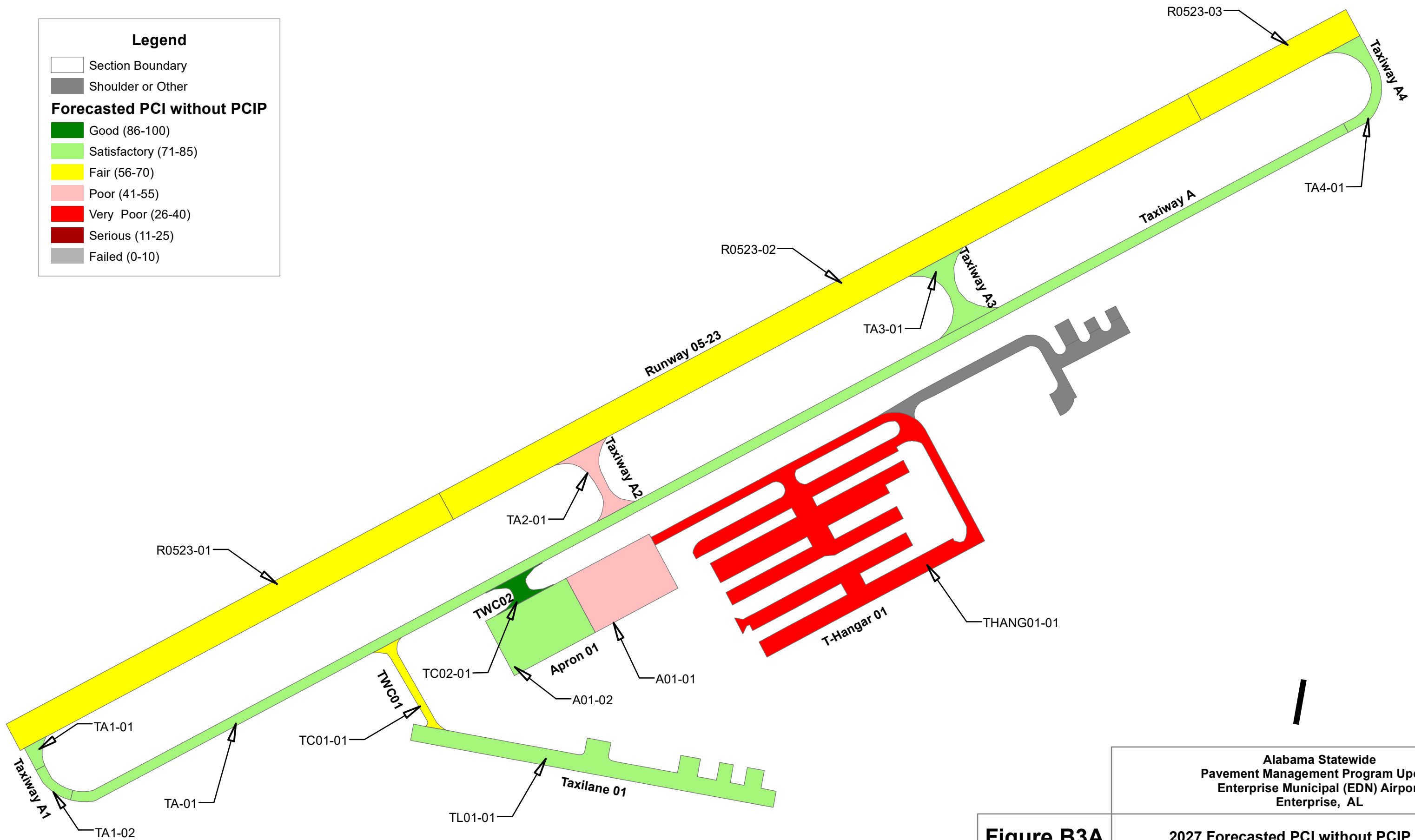
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Legend

- Section Boundary
- 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)



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Figure B3A 2027 Forecasted PCI without PCIP

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	KP/MR	July 2021	Page 11
REVISOR	SCALE	FINAL	
JMA	1 in = 300 ft		

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

Legend

- Section Boundary
- Shoulder or Other

Repair Type

- No Activity
- Preservation
- Rehabilitation

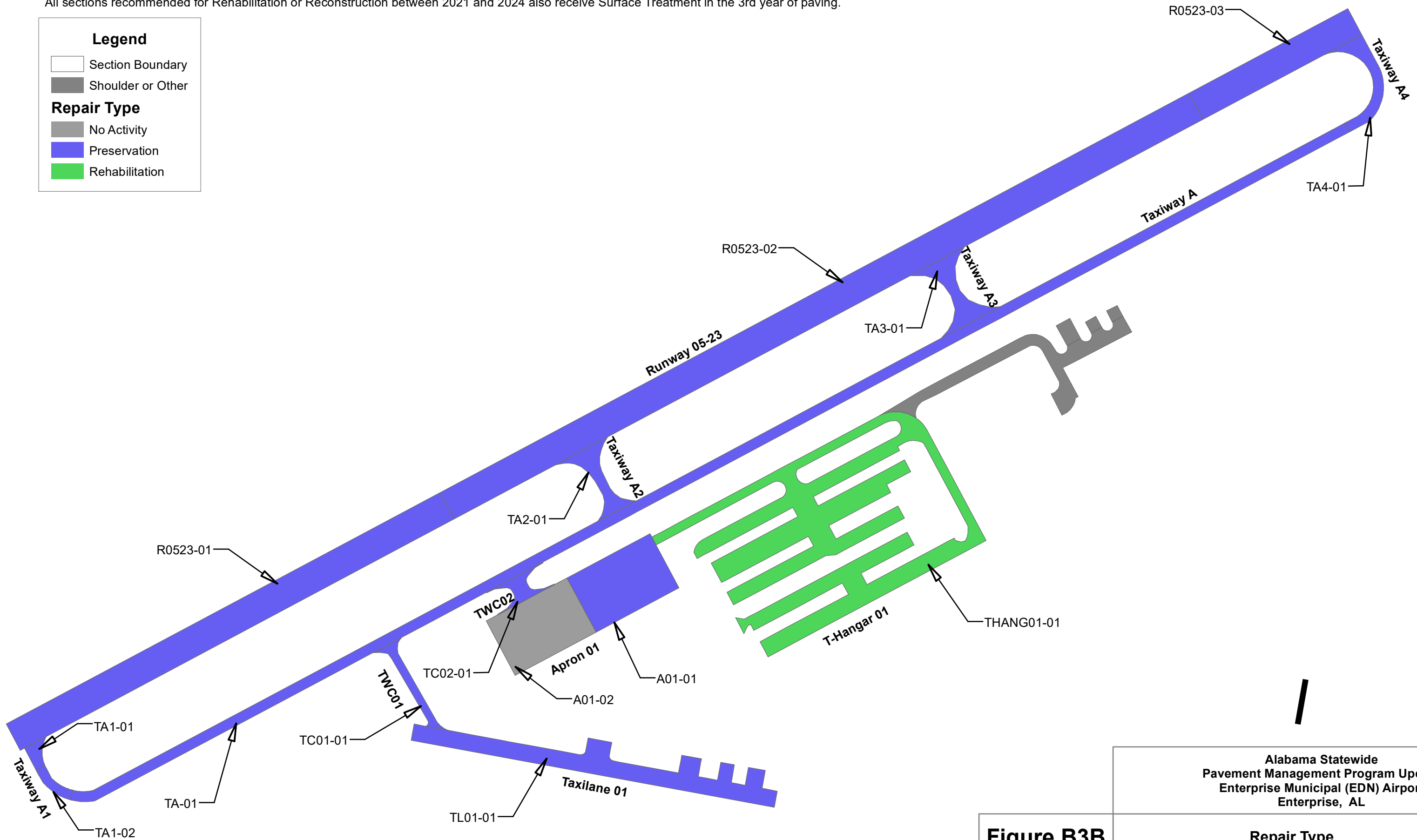


Figure B3B

Alabama Statewide Pavement Management Program Update Enterprise Municipal (EDN) Airport Enterprise, AL		
Repair Type		
ENGINEER KP/MR	DATE July 2021	MAP NUMBER Page 12
REVISED JMA	SCALE 1 in = 300 ft	FINAL

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

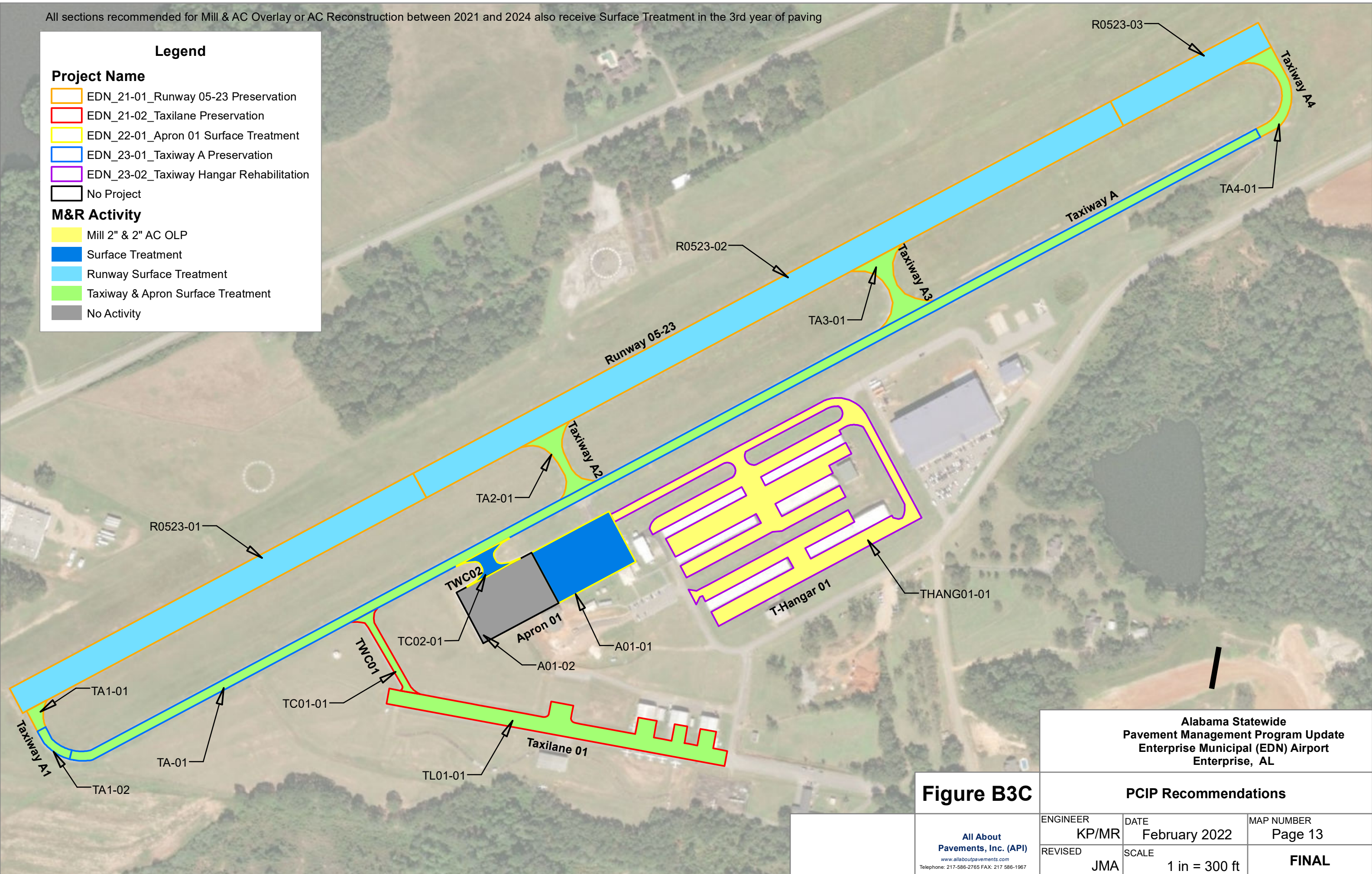
Legend

Project Name

- EDN_21-01_Runway 05-23 Preservation
- EDN_21-02_Taxilane Preservation
- EDN_22-01_Apron 01 Surface Treatment
- EDN_23-01_Taxiway A Preservation
- EDN_23-02_Taxiway Hangar Rehabilitation
- No Project

M&R Activity

- Mill 2" & 2" AC OLP
- Surface Treatment
- Runway Surface Treatment
- Taxiway & Apron Surface Treatment
- No Activity



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Figure B3C

PCIP Recommendations		
ENGINEER KP/MR	DATE February 2022	MAP NUMBER Page 13
REVISED JMA	SCALE 1 in = 300 ft	FINAL

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APPENDIX C

OVERVIEW OF PAVEMENT DISTRESSES



% 5~|| Ucf7fUWb| f57L

5~|| UcfVUWb| lgUg|YgcZ|HfVbBb| VUWgUgXvZ|| iYZ|ifYcZHY
Ug|UHfUWYg|fWk\YfYhg|Yg|Yg|Ug|Ug|g\|| \Ygi bWk\Y~cUg'HY
VUWgdcd|UfYc|hYg|fW|b|U|n|g|Ug|Ygc|Z|f|U|Y|VUWg'5ZfYUW
HfZ|WcU|h| hYVUWgVbWZ|fa| |'a|Ung|XZg|Uf|U| |'X|d|Wg|h|U|Y|Ycd
Ud|U|b|n|g|a|V| |W|W|b|k| |Y|c|f|h|Y|g| |b|c|Z|U| || Ucf"HYd|Wg|U|Y|Y|g|h|U|&
Z|Y|h| |'c|h|Y|c| |Y|g|X"5~|| UcfVUWb| |c|W|g|c|b|n| |b|U|f|g|h|U|f|Y|g|V|U|X|c|'
f|Y|U|W|X|HfZ|WcU| |Z|g|W|g|k\Y' |d|h|g|Z|U|X|g|W|g|X|Y|X|U|a|U|c|f|g| |V|U|X|g|Y|g|'

Gj Yf|ng

- ◆ @k! aUWi dcZ|bz\Uf' | YUWg|i|b| |'d|f|U|Y|c| X|W|c|h|Y|k| |h| b|b|Y
c|f|c|b|n|U|Z|k| |H|f|V|b|B|b| |VUWg'HYVUWg|U|f|b|c|g|U|Y|X'
- ◆ A Y|a !: i|f|h|Y|X|Y|Y|c|d|a|Y| |c|Z| | |H|U| || UcfVUWb| | |b|c|Ud|U|b|n|b|c|f
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U|Y|g|U|f|Y|m|Y|X| |b|d|U|W| |c|X|U| | |f| |U|Y| |h|c|W|W|k|Y|b|d|W|g|/
- ◆ <|| \! \Ug|d| |f|g|X|g| |h|U|h|Y|d|W|g|U|f|Y|k|Y| X|b|X|U|X|g|U|Y|X|U|h|Y|X|Y|g|'
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FYU|fcd|cbg

- ◆ @k! BcU|b|c|g|f|W|g|U|c|f|g|Y|U|h|Z|f~ck|g|j|Y| |h|n|g|Y|g|/
- ◆ A Y|a ! d|f|U|c|Z| ~X|h|d|U|W|g|Y|U|h|c|f|W|b|g| |W|
- ◆ <|| \! d|f|U|c|Z| ~X|h|d|U|W|g|Y|U|h|c|f|W|b|g| |W|



& 6 YXh| B57L

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YhNg| Yhci [\ lc fXWg|XNg|UW'**

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|de hYUf|gUZNXk|h VYXh| zfa c| YhYVWga UMjU/dUW'**



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lgW|gXa U|bn|ng|fb U|YcZhYUg|U|H|WVYU|X|g|bd|c|U|K|g|c|V|W|X|H|Y
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Gj Yf|ng

- ◆ @ck! X|b|X|V|n|W|V|g|h|U|f|Y|U|a|c|g|i| |h|n|g|U|Y|Z|V|h|g|h| b|c|Z|f|N| |b|c|V|N|E
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d|h|H|U|'

FYUfD|Wg

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c|j|Y|U|h|
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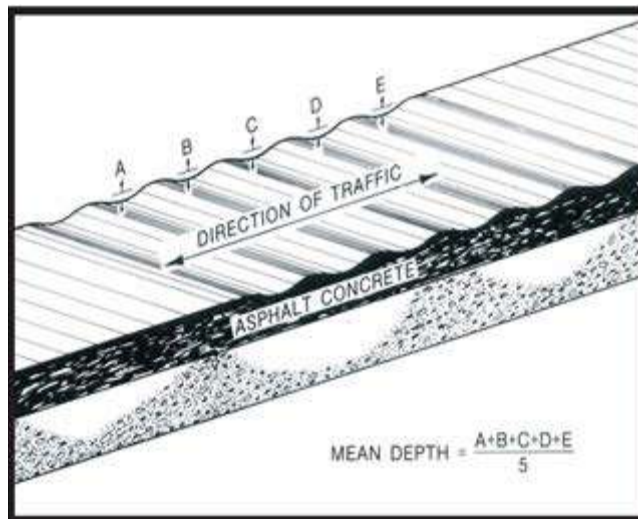
Corrugation

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.



)" SYFYgdcbf57L

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- ◆ A Wj a ! GUckzdUfU'cfZ' Xch dUW
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GjYf|n|@jYg

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Ylgg'

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- ◆ Scbch]h' /
- ◆ DffU'cfZ' Xh' dUW'



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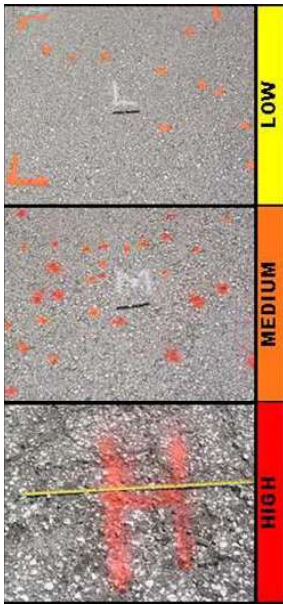
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a YfLNUWgHluj YUfZhYbi a VfCZMUGYU|fYUYdUfMwga]ggh 'g
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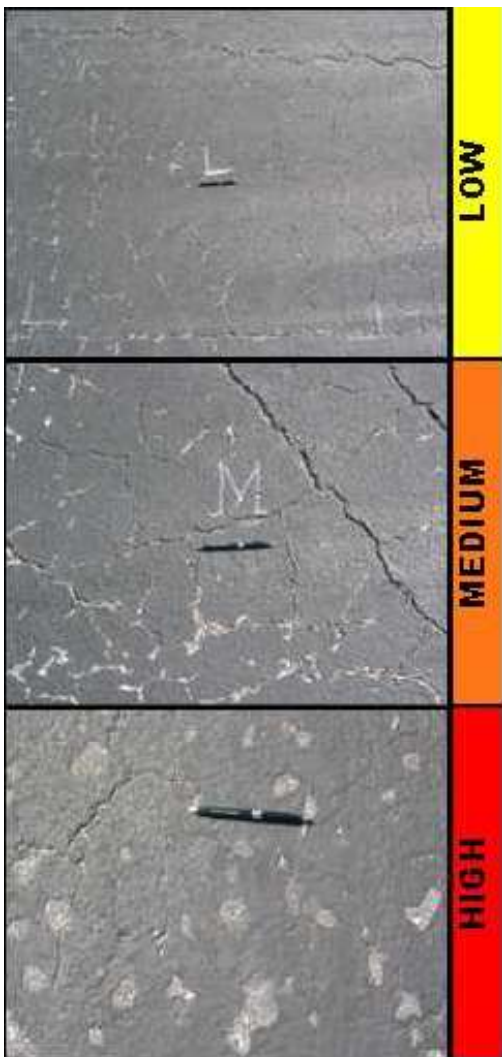
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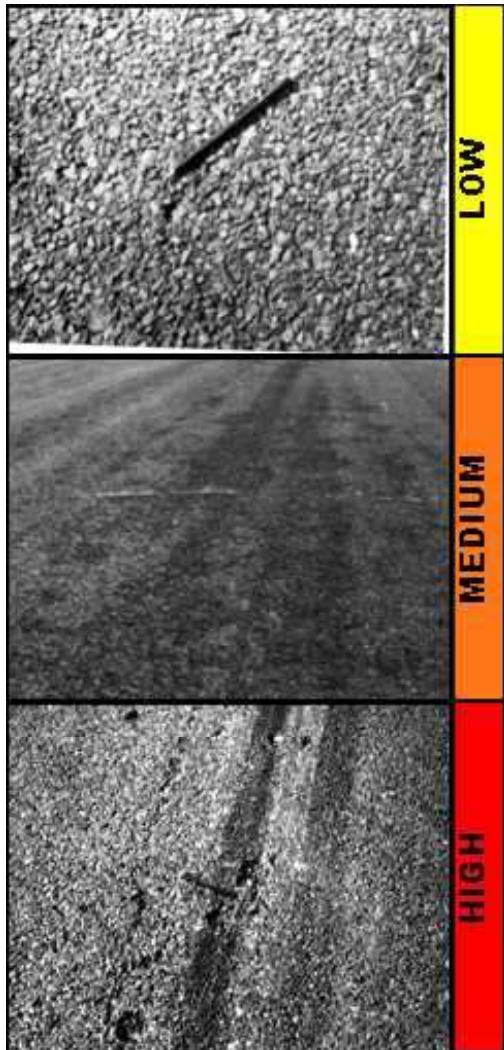
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U[[f]UYWg]g]g]f]f]h]ub%ai hçYg]h] VWX%`

A ÷bU%gi UYZdfl#Sgi UYa VffYfYgHUIj YgãdYhYbi aWfçZ
U[[f]UYd]Wgãlgg]]gVlkYb&UX(SUX#chYbi aWfçZalg]`
U[[f]UYWg]g]g]f]f]h]ub%ai hçYg]h] VWX&`çVW]hçZhYUfU`

< ÷bU%gi UYZdfl#Sgi UYa VffYfYgHUIj YgãdYhYbi aWfçZ
U[[f]UYd]Wgãlgg]]g]Yf(SUX#chYbi aWfçZalg]` U[[f]UYWg]g]
g]f]f]h]ub%ai hçYg]h] VWX&`çVW]hçZhYUfU`



%" 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] hYgXgczHyfiHFiHh] g]hagZca Uda UbhXZfaU]cb
]bUicZhYdj Ya YhUmfcfg V![fUXZig UnWgXVhWgc]XU]bcf`UMU'
agj Ya YhcZhYa Uf]UgXylehZ]WdUg`Q[h]Wb]hi Hh] Wb`YXle'a Ucf
gi VifUZ]i fycZhYdj Ya Yh

Gj YfingUgXcbfi hXchL

- ◆ @ck! YghUb']bW]bXch/
- ◆ A Y]ia! WkYb' Ux%]bW]bXch/
- ◆ <]]\! YWxg%]bW]bXch"

FYUfcdhcg

- ◆ @ck! BcU]cb/
- ◆ A Y]ia! dWU]bXf]cj YUth
- ◆ <]]\! dWU]bXf]cj YUth



:]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|g|g|U|ncW|fg| \Yb|Y|g|U|ck|g|N|h' g|f|W|a|| 'cf|dc|f|V|b|X|W|k|Y|b|Y|g|f|W|U|X|b|h|U|f|c|Z|d|j|Y|Y|hg|f|W|f|Y'**

G|Y|f|N|g No degrees of severity are defined. It is sufficient to indicate that a slippage **W|W|Y|g|g'**

F|Y|U|f|D|'M|g

- ◆ **S|c|b|c|h|d|/'**
- ◆ **D|f|U|'c|Z|'X|h|'d|U|W'**



: ||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' fU]cf]g]U]d]h] YZ]f]U]X]U]k]j]Y'9]h]Y]h]n]c]z]k]Y' WbWY
UW]a]d]h]Y]X]V]n]g]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]
g]Y]f]U]h]j]Y]D]7]H]g]U]F]g] h]c]Z]U]V]c]k]! i]d]h]Y]D]7]g]U'

GjY]h]n]@]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]g]h]X]Z]f]h]Y]d]j]Ya]Y]h]g]W]b]i]b]X]
@ W]h]g]X]U]h]b]'f]d]k]!g]j]Y]h]n]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]g]j]h]U]j]X]W]g]Y]h]Y]g]W]b]U]h]Y]b]c]f]a]U'
U]Q]W]Z]g]h]X]Z]f]h]Y]d]j]k]h]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]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]g]h]X]Z]f]h]Y]d]j]Ya]Y]h]
g]W]b]i]b]X]W]h]g]X]U]h]b]'

GkY'WbV]f]D]f]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]g]h]X]Z]f]h]Y]d]j]Ya]Y]h]g]W]b]i]b]X]W]h]g]X]U]h]b]'



%"KXhY[h] 157L

8Yg[d]db

H YkY[h] UkUhcZhYUg[UH]bXfUxZbYU[fY UYa Uq] Zca hYdj Ya Yh
g fAW

GjY[h]e@jYg

5gkUhj fAWW[h]b[h] le'g'ck'g[h]gcZU[h] k\jWa UhYUWYUUXVn
V\auUWbY[h]dg' @cg[h]YZbYU[fY UYa Uq] l'gd[MVYU]Xa UhY
@ UW\dhYXVnZ[h] cZhYUg[UH]c" 9N Yg'cZhYUgYU[fY UYgUY
V[h]b[h] le VYIdgXfNg[h]U\$) jWYgcf%aaE' Dj Ya Yha UhY
fYUj Ynbk f[h]bk Ug* 'adhg'X!

A @cg'cZbYU[fY UYa Uq] l'gd[MVYU]Xx Yg'cZUgYU[fY UY\j YVb'
YIdgXi dlc%# k]X hZHY ch Yg'gX'cZhYUgYU[fY UYX Yc hYcg'
cZbYU[fY UYa Uq] "

< 9N Yg'cZUgYU[fY UY\j YVb' YIdgX[fY UYhU]b%# k]X hZHY ch Yg'
gX'cZhYUgYU[fY UYH YY]gWgX[VY]cg'cZbYU[fY UYa Uq]
Y[h] le'cd[h]U'cf ga Ycg'cZUgYU[fY UY'



%!"6dk!I d!D77L

8YgAd]b

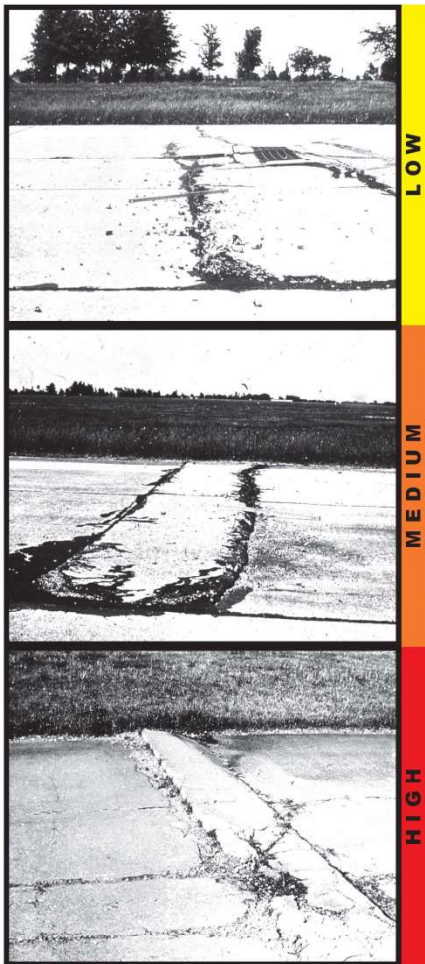
6'dki dg'cWf]b\dkYhYzi gUmHUmhg YgVWcf'c]HhUhgbdk]Y
Yci [\ lc'dfa]h] d]hgdbVnhYWBWYgUg'H Y]hgZ]W]hk]Xh]gi gUm
W]gXV]h]Z]H]U]bc]Z]W]adYg]VYaUm]Ug]bc'hY'c]hg]W]K\Y]Y d]hgdb'
W]bdfY]Y Yci [\ d]Yg]fZU'cW]n]X]i dk]fX]ag Ya Y]h]Z]hYgU]V]Yg'
f]i W]h]f'c]g'UM]h] k]'cWf]b]hY]]M]h]ic]Z]hY'c]h]6'dki dg'W]bUg'cWf]U]h
i]h]h]m]V]g]U]X]U]b]Y]b]Yg'H]g]h]d]c]Z]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]c]Z]g]Y]Y]X]a]U]Y]d]h]h]U]l]c]U]M]Z]H]6'dki dg'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]Y]c]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]c]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]i
]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'



%" 7fUWg"@cb|JiXpUZHFUbg YgYUbxS|U|cbU'fD77L

H YgVWUgXj|XhYgU|bc|kc'cfhfYd|WgZUxifYi gUmWgXVhU
WáVhU|bcZcdXfYh|cbZf|h' gYgZUxg|fb_UYgYgYg"@ck'gY|fhn
VWgUfYbdhWgXfXaUcf|giVfUxgYgYg'A Yfi a'cf||\gY|fhnVWgUfY
igUnkcf|h|VWgUxifVWgXfXaUcf|giVfUxgYgYg'

GjYfng

- ◆ @ck!%i hZ`YXVWg%#|bWlc%&|bWk|Xk|h bcZi |h|'cf|gU|h|/E
VWgYghU%&|bWk|Xk|h`ck'gY|fngU|h|/cf'EZ`YXVWgcz
Unk|Xk|h ZfYcfZfa|h| |bUg|gUfinaUbfUx|bcZi |h|'cf
gU|h|/
- ◆ A Yfi a !%i hZ`YXVWgVhYb%&|c%|bWk|Xk|h bcZi |h|'cf
gU|h|'cf&Z`YXVWgczUnk|h Zi |h|`YghU%#|bWcf a Yfi a'
gY|fngU|h|/
- ◆ <||\!%i hZ`YXVWgk|h Uk|h |fYfYhU%|bW&|i hZ`YXVWgcz
Unk|h k|h Zi |h| |fYfYhU%&|bWcf a Yfi a'gY|fhnZi |h|/cf'E
Z`YXVWgczUnk|h Zi |h| |fYfYhU%&|bWcf||\gY|fhnZi |h|"

FYUfcd|cbg

- ◆ @ck!BcU|b'cf|gUVWg/
- ◆ A Yfi a !gUVWg/
- ◆ <||\!gUVWgZUfhnUz`Xh'dUWcfYfUWhYgU'



: ||ifY7%&'D77HUb|YgY7fUWg'

§' Si fUj]m7fUWgID77L

8YgAdjb

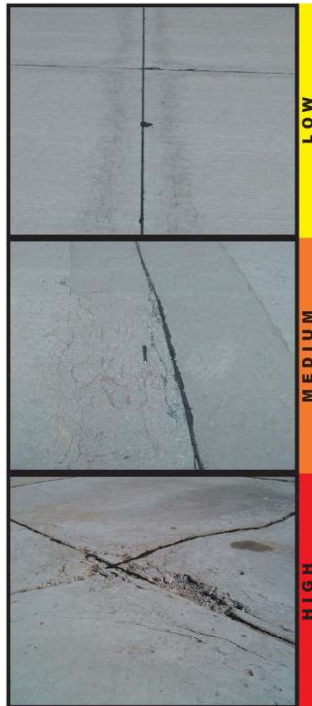
Si fUj]m7fUWg]gWgXVnhYbUj]m7cZhYWBWYk]hgUXXj]fdaYbU' ZWfjgWUgZYVhUkVWg'-fi gUnldNfgUdUMb'cZMwgi bhd' parallel to a joint or linear crack. A dark coloring can usually be seen around the fine XfUj]m7fUWg'H]ghd'cZMwgd' aUnjYbU'mUXk'XghN]fulbcZhY WBWYk]h]b'c'§ZYfSSle*SSa]`jaYgicZhY^cbidVW'

GjY]m7Yg

@ ÍSÍ VWVh] \gWjYodXgY fUWg]MUYUaci hZgUVfUk]h`]hYcf bcXghN]fulbcf: CS'dhHjU' cfÍSI VWVh] \gWfYX]bU]a]fX fUcZhYgUzgWg]bcbYcfk'WbYgcfUd]`cb'cbZi h]WgUfY a]gh] UXXghN]fulcb\UgWfYX'GaY: CS'dhHjU'

A ÍSÍ VWVh] \gWjYodXgY fUWg]MUYUaci hZgUVfUk]h`]hYcf bcXghN]fulbcf: CS'dhHjU' cfÍSI VWVh] \gWfYX]bU]a]fX fUcZhYgUzgWg]bcbYcfk'WbYgcfUd]`cb'cbZi h]WgUfY a]gh] UXXghN]fulcb\UgWfYX'GaY: CS'dhHjU'

< ÍSÍ VWVh] \gWjYodXgY fUWg]MUYUaci hZgUVfUk]h`]hYcf bcXghN]fulbcf: CS'dhHjU'



88! GaU DUWID77L

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

aUfJU': cfWbXllcbY U UjcbzdUWll lg'
Xj jXXllc lkc lndg' gaU fngghU) 'gei UfY
ZNLUXUf Yfj Y) 'gei UfYZNL'@uf YdUWg'
UfYXgUfVXj bhYbl hgXllcb'

Gj Yllng

- ◆ @k! DUWlgZblcbll kY'zkjh'
'llhYcfbcXllcfUjcb/
- ◆ A Yjia ! DUW\lgXllcfUWZUBXf
acXllUfYgdU' ll WbVYgXbUfcbXhY
Y' Y'gDUWa UfJU WbVYg'cX' YZ
kjh WbgXllUfY'Z'fifh jcf: C8'
dnlhU/
- ◆ < ll \ ! DUW\lgXllcfUWZ'YhYVn
gdU' ll UfcbXhYdUWcfWllll'
kjh bhYdUWZc UgU'k\ jWkUfUllg'
fYUWa Yh

FYUfcdllcbg

- ◆ @k ÈScBchll /
- ◆ A Yjia ! FYUWdUWcf fYUWWhY
gU'
- ◆ < ll \ ÈFYUWdUWcf fYUWWhYgU'



: llifY7% 'D77 GaU DUW'

&" @Uf YDUWID77L

Patching is the same as defined **ZfUgaU`dUW`
**ckYVzhYufUcZhYdUWlgacfyhUb) 'gi UfY
ZNF5 i f]hMhlgUdUWhUgfydUWkhY
cf]]bU'dj Ya YHMMgycZdUWa YhcZ
i bXf fci bXi f]]ng'HYgj Yf]mY YgcZLi f]]m
WfYhYga YghcgYZffYi 'Uf dUW]d."****

Gj Yf]ng

- ◆ **@ck ? DUWlgZb]]cb] kY`zk]h `]hYcf
bcXNFcfU]cb/**
- ◆ **A Y]i a ! DUW\UgXNFcfUWZbXf
acXfUYgdU]d VbVYgYbUfci bXhY
Y] Yg'DUWa Uf]U VbVYg'cX Y]zk]h`
WbgXfUYVZf]f]]bcf: CS'dh]]U/**
- ◆ **<] \ ! DUW\UgXNFcfUWZ]hYVn
gdU]d Ufci bXhYdUWcfVW]d k]h]b'
hYdUWZc Ug]]k\]WkUffU]g
fydUWa Yh**

FYUfcd]cbg

- ◆ **@ck E8cBch]d /**
- ◆ **A Y]i a ! FYdUWdUWcf fydUWhYgU'**
- ◆ **<] \ E'FYdUWdUWcf fydUWhYgU'**



:]]ifY7% `D77 @Uf YDUW'

&" Dddi lgiD77L

5' dddi HgUga U' dJWcZdj Ya YHhUMFU_g`ccgYZca hYg fZWX Ylc ZYH
hUk UWcbJbWa VbUcbkjh Y ddbj YU [fY UHg' Dddi lgi g UnfUj YZca`
Udd ja UYnfbWlc(JbWYgbXLa YfUkZca %&JbWlc &JbWgXsd"

Gj YHNg

No degrees of severity are defined for popouts. <ckY Yzddi lgaig HYYHNgj Y
VZfYh YnfYw hXUg UYgJYg' YZj YU Yddi hXghiaig H VWX
Udd ja UYnfbYddi lgidf gi UYnfbXg YhYHfYgUVfU



: ||ifY7%. 'Dddi lgi'

&" GUVh ID77L

**AUVWVh 'cfVUth fYZfgUbkcf 'cZgUdczZbZcf\UFjBYWVghU
YfXcbnhfi [\ hYidhf g fZWCZhYWBWYHYWVgN6Xc]bMgWU
Uj 'YgZ/8\$X|fyg'AUVWVh 'cfVUth |gigUmWgXVnj YZhg |hY
WBWYUxAltXk:cGUh 'cZhYgfZWK\|W|ghYVU_XkbcZhYgU
g fZWC Uxh of approximately 1/4 to 1/2 in W'GUh 'aUthg VVWgXVn
|adcfWghj VcbUXbcfU|f|UY'5bchYfW|bhXgi fWcZgdYgghY
fU|bVWkYbhYU_U|g|BUC'UX? &E|bga YW YlgUXWUba |bUglb'
ga YU|f|Uhg'fXVZfa YVnhYVU|bVWkYbhYU_U|g|UXU|f|UY
fg |bYd|g|ghUWgYUVU_Xkb|bhYWBWY'**

GjYfHg

- ◆ @k! 7Uth 'cfAUVWVh Y|ggj Yg|bZVWgUVfUHYg fZW|gb'
|ccXWV|cbk|h bc'GUh 'HYWVdUmbaig|WkY X|bXUX
Yg|nfW|bhX
- ◆ AYia! GUVggVXkj YUhd |aUfM)1 'cf'YgZZhYgfZWK|h'gaY
:CS'dh|U/
- ◆ <||\! GUVggj YfngVYXW|gh U||\ :CS'dh|U'1 gUmācfYhU
)1 'cZhYgfZW|gUWEX



&": U 'Hb' 1D77L

GhVa Yhcf Zi 'Hh 'lg UxZZfYbWcZYj U'cbUu'c'hhcf VUWUg gXVnd YjU' c'fVhg' 'HU'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 Udh hY'cbh**
- ◆ **<|| 'E; f'bh 'c'cbhc'XU'bg'f'f'g'f'cb'**



&" G UMFYXGUVFD77L

=hfgNMh VUWgUYVUWghUMFU]hcZifcfacydWgVWU gczj YcUjh' UxwfhDSgiUYgdhffHY\| \!severity level of this distress type, as defined below, lghZfYXlc UgUg UMFYXgU'ZU`dWgcfVUWgUYWdUjbxkjh bUWbf VUZhYXgUgUgUW\ cfhXUgUgY YWbfVU"

Gj YfHg

- ◆ **@k! Slab is broken into four or five pieces with the vast majority of the cracks fjh Y,) dWVhcZck!gj Yfhn**
- ◆ **AWja !(1) Slab is broken into four or five pieces with over 15 percent of the VUWgZaYja gj Yfhn\| \!gj YfhnVUWg/cffgUlgVc_Y]hc'gl' cfacydWgkjh'gj Y,) dWVhcZhYVUWgZck! /**
- ◆ **<|\! 5hlgY Y'Zgj YfhnYgUlgWYXg UMFYfHgUlgVc_Y]hc' four or five pieces with some or all of the cracks of high severity; (2) slab is Vc_Y]hc'gl' cfacydWgkjh'gj Y%) dWVhcZhYVUWgZaYja! cf \|\!gj Yfhn**

FYUfcdhbg

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



' \$' >chGdUgfD77L

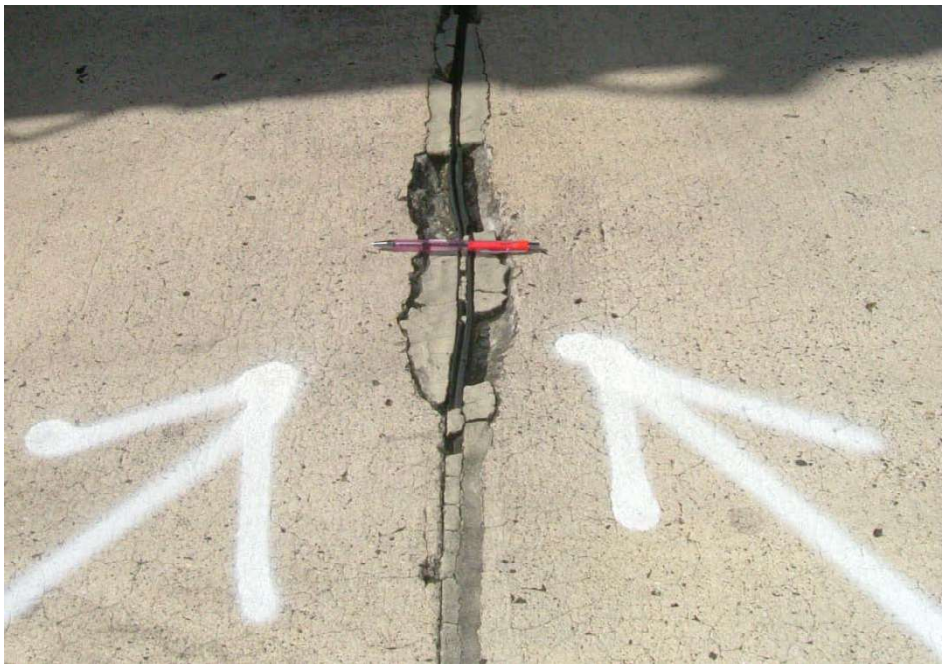
>chigU'h lghYXghN fU'bcZhYgUVX Ygkjh b&ZYh'ZhYgXyZHY'cH'
5'chigU i gUmXygdhN Nbxj YHJUmhfi [\ hYgUzVhHfGgXghY'chH
UbU' Y'GU'h' f'g' l'Zca YWg'j YgYg'gU'hY'cH'UWU gXVn' b' f'U'cb'
cZb'Ad'f'g'VYaU'h'U'g'cf'f'U'W'U'g' K'Y'U' W'U'Y'U'hY'cH'U'g'XVn'
c'j'Y'k'c'f' h' l'W'a'V'b'X'k'h' l'U'Z'W'U'g'g'U'ch'Y'W'g'Y'c'Z'g'U'h''

GjYfNg

- ◆ @k! c'j'Y'&ZYh'cd' U'X'g'V'c' Y'b'hc'bc'ac'f'Y'h'U'bh'f'Y'd'W'g'X'V'X'V'n
'ck'c'fa'Y'i'a' g'j'Y'f'h'W'g'k'h' \h'Y'c'f'bc': C8'd'h'U'z'c'f'g'&'Y'g'h'U'
&ZYh'cd' U'X'g'V'c' Y'b'hc'ac'f'Y'h'U'bh'f'Y'd'W'g'k'h' \h'Y': C8'c'f'f'Y'
X'a'U'Y'd'h'U'/
- ◆ A'Y'i'a'! c'j'Y'&ZYh'cd' U'X'g'V'c' Y'b'hc'ac'f'Y'h'U'bh'f'Y'd'W'g'X'V'X'V'n' \h'
c'fa'Y'i'a' W'g'c'f'g'a'Y': C8'd'h'U'Y' l'g'h'z'c'f'g'&'Y'g'h'U'&ZYh'cd' '
U'X'g'V'c' Y'b'hc'c'W'g'c'f'U'a' Y'f'X'k'h' g'a' Y'c'Z'h'Y'd'W'g'c'g'Y'c'f'U'g'h'z'
W'g'h' W'g'X'V'Y': C8'c'f'f'Y'X'a'U'Y'd'h'U'/
- ◆ <ll\! c'j'Y'&ZYh'cd' U'X'g'V'c' Y'b'hc'ac'f'Y'h'U'bh'f'Y'd'W'g'X'V'X'V'n'c'Y'
c'f'ac'f' \ \ g'j'Y'f'h'W'g'k'h' \ \ : C8'd'h'U'

FYUfCd'bg

- ◆ @k! BcU'f'cb/
- ◆ A'Y'i'a'! d'Z'fa' U'd'f'U'X'h'd'U'W'
- ◆ <ll\! d'Z'fa' U'd'f'U'X'h'd'U'W'



'% 7cbfGdUgd77L

7cbfGdUd ghYfjYh'cfVfUXkbcZhYgUkjhJbUdIdJaUYn&ZnZ
hYwbf"5 wbfGdU XZGZca UwbYfVU JbUdYgUUh'YgXdkkUX
lcJbfgVhY'chk\]YhYfU YfXgjYfU 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'
AYfja È%hYgU'lgMc_Yb]bc'kcd'afYd]WgXbXVnchYaYfja'
gjYfhnVWgkjh`JhYcfbc: CS'ddHfU/cf&hYgU'lgXbXVnchYaYfja'
AYfja È%hYgU'lgMc_Yb]bc'kcd'afYd]WgXbXVnchYaYfja'
gjYfhnVWgkjh`JhYcfbc: CS'ddHfU/cf&hYgU'lgXbXVnchYaYfja'
- ◆ <||È%hYgU'lgMc_Yb]bc'kcd'afYd]WgXbXVnchYaYfja'
gjYfhnVWgkjh`JhYcfbc: CS'ddHfU/cf&hYgU'lgXbXVnchYaYfja'
AYfja È%hYgU'lgMc_Yb]bc'kcd'afYd]WgXbXVnchYaYfja'
gjYfhnVWgkjh`JhYcfbc: CS'ddHfU/cf&hYgU'lgXbXVnchYaYfja'

FYUfCdHbg

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



' & 5G fD77L

5G 'lgW gXVnWw JW fDUkbVWkYbU_UlgUkXWUbfDUUj Yg JWa JbMUG
k\JWZfa U|Y' HY|YUgfvGkUfZUgh 'Y dHgdbk\JWa UnA UYhY
WbWYUkXUWthGf WfYg' 5` UlgfYacgicZb JfcXVWVnhYcbfUk
Ww YHkjh|bhYdj Ya YH' 5G' WUWj 'a UnYUWYUfXVnWw JW'dj Ya YH
XjWg'

Jlg U|bXWUfghU5G' a UnYdYgHh|bWXY'

% 7UWj 'cZhYWbWYdj Ya YHfZb|bUa UfdUMB

& K\JZVckbz fufcfhYWcfX|Y'cfgh|j 'a UnYdYgHhUfYUW
gfWY

" 5|[fYUyddi|g

(" bWUg|bWbWYj'c|a YfU dHgdb|hUa UnfYg 'h|bXgdf|bcZUXWf'cf
JH|fU'g| WfYgcf dngJUYa Ylg'9| UadYgcZ| dHgdb|bWXYg'cj| 'cZ
UgdUhdj Ya Ylg'|\hWb|j|j'zgUzi |h|z'c|ha|gU|| ba YHbXU|f|g|bcz
'c|h|gUgcf Y dHgdb'c|h|j'Yg'

6WU g'5G' 'ga Uf|U'XVnWw5G' 'gl' YbU ncfYgHhfc| [\c|hYdj Ya Yh
gW|b' 7cf| UxWbWYcNfc| fU| JWUngg'ghYcbnW|j|j Ya YhcXc'
WbZfa hYdYgBwCZ5G' HYZ`ck|j| g'c'XY_Yh|ba|bXk\Yb|Xb|j|j|'
hYdYgBwCZ5G' hfc| [\j|g|U|bg|W|b

%; YbUn5G' XgYggYfYbdcVg|YX|bhYz|g|zk' nUgUZYWg|f|W|b' b
Wb|g|z|U|g|f|b|U|YUW|j| W'cW|f|hYX|c|Z|W|g|f|W|b|U|X|g|U|d|f|Y|h
k|h|b|hYz|g|n|f'

& 5G' 'lgXZVnWwJWZca 8!7UWj 'VnhYdYgBwCZUWj 'dM|bXWUf|c'
hY'c|hW 8!7UWj 'dYXca|b|HmXjYcdgUgUg|YgcZdfUYWUg|c'
'c|hWgUk|b|fWUW|j| k|h|b|hYgU'

" 5G' 'lgXZVnWwJWZca 'AUf7UWj #GU|j 'VnhYdYgBwCz|g|U'g|'hgZ
Y dHgdb'

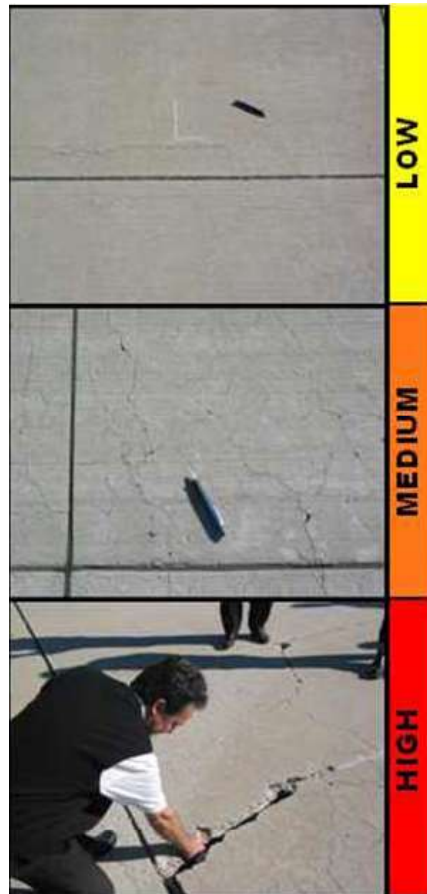
GjYfhi@jYg

@ A|jaUlebc: cf||bCVVNSUaUyECSE'ddnh|UZca VWGf'clhgcf5GF' fYUXdddi lg/VWGUhYg fZWFYH| \HFYXa|b|hn?aa'cf~Yg|@|hY lebcY|NSWCZag Ya YH|bdj Ya YHcf g ffdi b|H| g|f VifYgcfYYa Ylg'

Gca Y: CS'ddnh|U/|b|N|gXgkYH| 'cfchY: CS'fYag U'a YhcXga UnWY f|e|fYX A UnWY|NSWCZg'Uvag Ya YH|bX'cf ga YXa U Yle UXW|h| g|f VifYgcfYYa Ylg'

A A Y|a 5GF Xg|ng|gXZf|H|UXZca ~ck Vm|U|H| 'd|Ycfad|YcZHY ZE~ck|H|. |b|N|gX: CS'ddnh|U|b|N|gX|W|H| 'cZHYgU'zga YZU|a Ylg' Uch| VWGcfU|W|H|f|g|N|d|g|fYg|H|g fZWFddi lg'Z|W|N|Y|a Un cW|Z|U|b|c|Zk|X|VWGUfYXa|b|hn?aa'cfk|X|f|h|U|a UnWY g V|j|X|X|V|h|| \HfVWUg'

< C|YcfVh'cZHYZE~ck|H| Y|g|h %|@|cgYcfalg|H| W|N|Y|ZU|a Ylgk\|W d|g\|| \: CS'ddnh|U|Z &EGU'g fZWF|H|f|H|U|X|Z|b|H|c|g|H|Z|W|H|n X|f|U|X|U|X|d|j Ya YH|f|e| |f|g|aa Y|U|H|f|U|f'a UnU'g'f|e| |f|Y|Y|U|g|e' UXW|h|g|f VifYgcfYYa Ylg'



APPENDIX D

DETAILED PAVEMENT CONDITION DATA



FY-hgNMcBfYdch

5@SCH555 %

; YDUPASUY

' #%#555&

DfY%Z%

BVkc. 98B

BuY

9fncgYAihjU5jcbh

6fUBW 58%

BuY

5dcb\$%ahncgY

IgY

5DFCB

5fU

%&)(G: h

GVkch \$%

cZ &

: fca.

HUkU5&

H.

9fYcZDjYh

@Gj7cbh %555%

GfUW 557

: Ua]m

5@SCH5dcbg

NcbY

7UWcfm

FU. G

5fU

*)Z) G: h

@Y[h.

'%: h

KPh.

8: h

GUg

GU@Y[h.

: h

GUWPh.

: h

>ch@Y[h.

: h

Gcd Xf.

GfYHhdY

; fUX \$

@Ug \$

GVkch7caaYlg

Kcf_SUY %55%)

Kcf_HdY Bk7cbhUcb!hU

7cX BI!B

=AUcfA/ F. HfY

Kcf_SUY %55%

Kcf_HdY 7cXA]~UXjYUm

7cX AC@

=AUcfA/ F. HfY

@Gj7cbh'SUY %55%

HUcladyg %&

GfYk %

7cbhcbg D7= %5

=hgNMcB7caaYlg

CladyBiaVf. 88%

HdY

F

5fU

)555G: h

D7= %5

Clady7caaYlg

OBc8jdyg2

BYkcf.	98B			BuY	9HGHgYAtjVU5jbbh		
GfUW	F9 &			BuY	FihkUn!& 9HGHgY	I gY	FI BK5M 5fU)%\$ \$\$ Gz h
GWfch	\$&			cZ ' : fca.	GWfcb\$%	H.	GWfcb\$ @gh7chd' *#\$\$%
GfZAW	557			: Ua]m 5@SCHFKg	NbY	7UH[cfm	FUb. D
5fU	&)	\$\$\$ Gz h		@Y[h.	&)\$: h	K]h.	%\$: h
GUg				GU@Y[h.	: h	GUVK]h.	: h >ch@Y[h. : h
Gci Xf.				GfYWHdY	; fUX \$		@byg \$
GWfcb7caa Ylg							
Kcf_8UY	%##)			Kcf_HdY Bk7chj Vcb' h]U		7cX BI !-B	=gAUcfA/ F. HiY
Kcf_8UY	*#\$\$%			Kcf_HdY GfZAWfUaYH] Gh] YG]ha"		7cX GHG	=gAUcfA/ F. : UgY
Kcf_8UY	*#\$\$%			Kcf_HdY GfYUn]57GfVfU		7cX C@5G	=gAUcfA/ F. HiY
@gh7chd'8UY	%#\$\$%			HRUcladYg)+		GfjYhX -	
7ch]chd	D7=	,	&				
hgNWfcb7caa Ylg							
QladYBi aVf.	\$			HdY	F	5fU	) \$\$\$ \$ Gz h D7= +*
QladY7caa Ylg							
(,	@/ H7F			@		+'\$\$: h	
(,	@/ H7F			A		+'\$\$: h	
)+	K95H 9F-B;			@		) \$\$\$ \$ Gz h	
QladYBi aVf.	%			HdY	F	5fU	) \$\$\$ \$ Gz h D7= +&
QladY7caa Ylg							
(,	@/ H7F			@		) \$\$\$ : h	
(,	@/ H7F			A		% \$\$\$: h	
)+	K95H 9F-B;			@		) \$\$\$ \$ Gz h	
QladYBi aVf.	%			HdY	F	5fU	) \$\$\$ \$ Gz h D7= -\$
QladY7caa Ylg							
(,	@/ H7F			@		\$'\$\$: h	
)+	K95H 9F-B;			@		) \$\$\$ \$ Gz h	
QladYBi aVf.	&			HdY	F	5fU	) \$\$\$ \$ Gz h D7= +
QladY7caa Ylg							
(,	@/ H7F			@		% \$\$\$: h	
(,	@/ H7F			A		) \$\$\$ : h	
)+	K95H 9F-B;			@		) \$\$\$ \$ Gz h	
QladYBi aVf.	&			HdY	F	5fU	) \$\$\$ \$ Gz h D7= ,-
QladY7caa Ylg							
(,	@/ H7F			@		* \$\$\$: h	
)+	K95H 9F-B;			@		) \$\$\$ \$ Gz h	
QladYBi aVf.	')			HdY	F	5fU	) \$\$\$ \$ Gz h D7= ,-
QladY7caa Ylg							
(,	@/ H7F			@		) \$\$\$ : h	
)+	K95H 9F-B;			@		) \$\$\$ \$ Gz h	
QladYBi aVf.	(%			HdY	F	5fU	) \$\$\$ \$ Gz h D7= ,%
QladY7caa Ylg							
(,	@/ H7F			@		% \$\$\$: h	
(,	@/ H7F			A		\$'\$\$: h	
)+	K95H 9F-B;			@		) \$\$\$ \$ Gz h	
QladYBi aVf.	(+			HdY	F	5fU	) \$\$\$ \$ Gz h D7= +
QladY7caa Ylg							
(,	@/ H7F			@		% \$\$\$: h	
(,	@/ H7F			A		) \$\$\$ : h	
)+	K95H 9F-B;			@		) \$\$\$ \$ Gz h	

QādYBiaVf.)'

HdY

F

5fU

)SSSSGeh

D7= +

QādY7caaYlg

(, @/ H7F

@

)SS :h

(, @/ H7F

A

)SS :h

)+ K95H9F-B;

@

)SSSS Geh

BYkcf.	98B	BuY	9HGHg/AihjVU5jibh
GfUW	F9 &	BuY	FihkUin!& 9HGHg
GWch \$	z ' : fca.	GWcb&&	H. FihkUin!& 9HGHg
GfUW 57	: Ua]m 5@SCHFKg	NbY	7UH[cfm
5fU	*\$ \$Geh @Y[h.	*9 : h	K]h. %\$: h
GUg	GU@Y[h.	: h	GUVK]h. : h
Gci Xf.	GfYHhY	; fUX \$	>ch@Y[h. : h
GWcb7caa Ylg			@bY \$
Kcf_SUY *#48%	Kcf_HdY GdY7caYlg!5[[fUY		7cX 65!5; =AUcfA/ F. :Ug
Kcf_SUY *#88%	Kcf_HdY Bk7caYlg!h]U		7cX BI!B =AUcfA/ F. HiY
@gihg!SUY %4#8%	HUcladYg %&		GfjYX (
7ch]cbg D7= ,-			
-hgNWcb7caa Ylg			
QadYBi aVf. \$&	HdY F	5fU	) \$\$\$ \$Geh D7= ,-
QadY7caa Ylg			
(, @/ H7F	@	+\$\$\$: h	
) + K95H 9F-B;	@	) \$\$\$ \$Geh	
QadYBi aVf. 9	HdY F	5fU	) \$\$\$ \$Geh D7= ,-
QadY7caa Ylg			
(, @/ H7F	@	) \$\$\$ : h	
) + K95H 9F-B;	@	) \$\$\$ \$Geh	
QadYBi aVf. \$	HdY F	5fU	) \$\$\$ \$Geh D7= ,-
QadY7caa Ylg			
(, @/ H7F	@	) \$\$\$ : h	
) + K95H 9F-B;	@	) \$\$\$ \$Geh	
QadYBi aVf. %	HdY F	5fU	) \$\$\$ \$Geh D7= ,-
QadY7caa Ylg			
(, @/ H7F	@	) \$\$\$ : h	
) + K95H 9F-B;	@	) \$\$\$ \$Geh	

BYkcf.	98B	BláY	9H6HgYAlhVU5j6bh
GfUW	F9 &	BláY	FibkÚn!&9H6HgY I gY FIEK5M 5fU)%\$SSGé h
GMfch	\$%	z ' : fca.	FibkÚn) 9bX H. GMfcb\$& @Uj7cbgH' *#889%
GfUW	57	: Úa]m 5@SCHFKg	NbY 7UH[cfm FUb. D
5fU	%)\$SSGé h	@Y[h. %)\$: h	K]Ph. %\$: h
GUg	GU@Y[h.	: h	GUVK]Ph. : h >ch@Y[h. : h
Gci Xf.	GfYWHdY	; fUX \$	@Ujg \$
GMfcb7caaYlg			
Kcf_SUY *#889%	Kcf_HdY	GU7dG?5[[fUY	7cXV 65!5; =AUcfA/ F. :UgY
Kcf_SUY *#889%	Kcf_HdY	Bk7cbgVcb!h]U	7cXV BI!B =AUcfA/ F. HiY
@Uj7cbgH' SUY %4#88%	HBUcladYg	"	GfjYbX)
7cbgH' D7= ,-			
-bgMfcb7caaYlg			
QádYBi aVf. \$	HdY	F	5fU)SS\$SSGé h D7= -(
QádY7caaYlg			
)+ K95H9F-B;	@	)SS\$SS Gé h	
QádYBi aVf. %	HdY	F	5fU)SS\$SSGé h D7= ,-
QádY7caaYlg			
(, @/ H7F	@	)SS\$: h	
)+ K95H9F-B;	@	)SS\$SS Gé h	
QádYBi aVf. %	HdY	F	5fU)SS\$SSGé h D7= ,(
QádY7caaYlg			
(, @/ H7F	@	\$'SS : h	
(, @/ H7F	A	\$'SS : h	
)+ K95H9F-B;	@	)SS\$SS Gé h	
QádYBi aVf. &	HdY	F	5fU)SS\$SSGé h D7= ,-
QádY7caaYlg			
(, @/ H7F	@	)SS\$: h	
)+ K95H9F-B;	@	)SS\$SS Gé h	
QádYBi aVf. ' %	HdY	F	5fU)SS\$SSGé h D7= ,-
QádY7caaYlg			
(, @/ H7F	@	)SS\$: h	
)+ K95H9F-B;	@	)SS\$SS Gé h	

BYkcf.	98B	BuY	9H6HgVAitjVU5j6bh				
GfUW	H5	BuY	HIjkUis9H6HgY	IgY	H5L-K5M	5fU	%(z) Gc h
GWch	\$%	cZ %	: fca. HIjkUis%		H. HIjkUis(		@Gj7cbgH *#488%
GfUW	557	: Ua]m 5@SCH57HIjkUg	NbY		7UH[cfm		FUb. D
5fU	%(z) Gc h	@Y[h.	(z((: h	K]Ph.	) : h		
GUg		GU@Y[h.	: h	GUVK]Ph.	: h	>ch@Y[h.	: h
Gci Xf.		GfYWHdY		; fUX \$		@Uyg \$	
GWcb7caaYlg							
Kcf_8UY %44%)		Kcf_HdY Bk7cbgVcb!h]U			7cXY BI!B		=AUcfA/ F. HiY
Kcf_8UY *#488%		Kcf_HdY GjYUa57GfVfU			7cXY C@5G		=AUcfA/ F. HiY
@Gj7cbg!8UY %4488%		HBUAdYg ' &		GfjYX)			
7cb]cbg D7= -,							
-bgNWcb7caaYlg							
QAdYBi aVf. \$&		HdY	F	5fU	)&S5S Gc h	D7= --	
QAdY7caaYlg							
)+ K95H 9F-B;		@		' S5S Gc h			
QAdYBi aVf. \$		HdY	F	5fU	)&S5S Gc h	D7= --	
QAdY7caaYlg							
)+ K95H 9F-B;		@		' S5S Gc h			
QAdYBi aVf. %		HdY	F	5fU	)&S5S Gc h	D7= -,	
QAdY7caaYlg							
)+ K95H 9F-B;		@		*S5S Gc h			
QAdYBi aVf. &		HdY	F	5fU	)&S5S Gc h	D7= -,	
QAdY7caaYlg							
)+ K95H 9F-B;		@		*S5S Gc h			
QAdYBi aVf. '\$		HdY	F	5fU	)&S5S Gc h	D7= -,	
QAdY7caaYlg							
)+ K95H 9F-B;		@		*S5S Gc h			

BVkc.	98B	BuY	9HGHgYAtjVU5jcbh				
GfUW	H5%	BuY	HIjkUis%9HGHgY	Ig	H5L-K5M	5fU	,ž-- Gē h
GWch	\$&	cZ &	: fca. Gwcb\$%		H. HIjkUis	@Gj7cbgH	*#488%
GfUW	557	: Ua]m	5@SCH57HIjkUig	NbY	7UH[cfm	FUb. G	
5fU		(ž') Gē h	@V[h.	%* : h	K]h.	'): h	
GUg		GU@V[h.	: h	GUVK]h.	: h	>ch@V[h.	: h
Gci XE.		GfYVHhV		; fUX \$		@Ug \$	
GWcb7caa Ylg							
Kcf_8UY %44%)		Kcf_HhV Bk7cbgVcb! :hU			7cX BI!B	=AUcfA/ F. HhY	
Kcf_8UY *#488%		Kcf_HhV GjYUa57GhVhU			7cX C@5G	=AUcfA/ F. HhY	
@Gj7cbgH 8UY %4488%		HhUcAdYg %			GfjYhX %		
7cb]cbg D7= --							
-hgWcb7caa Ylg							
GAdYBaVf. \$%		HhV F	5fU	(+)'5\$Gē h	D7= --		
GAdY7caa Ylg							
)+ K95H9FB;		@	&888 Gē h				

BVkf.	98B	BuY	9HGH/AitjVU5jbbh				
GfUW	H5%	BuY	HI]kUis%9HGHg	Ig	H5L-K5M	5fU	,ž-- Gē h
GMch	\$%	cZ &	: fca. FibkUis!&		H. GMcbS&	@Gj7cbgH	*#489%
GfUW	57	: Ua]m	5@SCH57HI]kUig	NbY	7UH[cfm	FUb. G	
5fU		(Z% Gē h	@V[h.	, ' : h	K]Ph.	() : h	
GUg		GU@V[h.	: h	GUVK]Ph.	: h	>ch@V[h.	: h
Gci XE.		GfYVHdY		; fUX \$		@Ug \$	
GMcb7caa Ylg							
Kcf_8UY	%#489%)	Kcf_HdY	Bk7cbgVcb! :hU		7cX BI!-B	=AUcfA/ F. HiY	
Kcf_8UY	*#489%	Kcf_HdY	&'qYUm		7cX C@S&	=AUcfA/ F. HiY	
@Gj:hgI'8UY	%#489%	HUCladYg	%		GfjYX	%	
7cb]cbg	D7= -%						
-hg]cb7caa Ylg							
QadYBi aVF.	\$%	HdY	F	5fU	(%('SSGē h	D7= -%	
QadY7caa Ylg							
(, @/ H7F		@		+ 'SS : h			
) + K95H 9F-B;		@		(%('SS Gē h			

BYkcf.	98B		BuY	9HGHgYAtjVU5jcbh			
GfUW	H&		BuY	HIjkUis&9HGHgY	IgY	H5L-K5M	5fU
GMch	%	cZ %	: fca.	FibkUis!&		H. HIjkUis	@gh7cbg! *#88%
GfUW	57	: Ua]m	5@SCH57HIjkUig	NbY		7UH[cfm	FUb. G
5fU		%Z*) G&h	@Y[h.	&) : h	K]Ph.	') : h	
GUg		GU@Y[h.	: h	GUVK]Ph.	: h	>ch@Y[h.	: h
Gci Xf.		GfYWHuY		; fUX \$		@Ug \$	
GMcb7caaYlg							
Kcf_8UY	##%)		Kcf_HuY	Bk7cbg! Vcb! h]U	7cX	BI!-B	=AUcfA/ F. HiY
Kcf_8UY	*#88%		Kcf_HuY	6G7cig! 5[[f]UY	7cX	65!5;	=AUcfA/ F. : UgY
Kcf_8UY	*#88%		Kcf_HuY	7cadYfYfWdg! Vcb! 57	7cX	7F!57	=AUcfA/ F. HiY
@gh7cbg! 8UY	##88%		HRUcladyg	'	GfjYmX	'	
7cb]cbg	D7=	+\$					
hg]Vcb7caaYlg							
QldYBi aVf.	%	HuY	F	5fU	)+, '88G&h	D7=	+&
QldY7caaYlg							
(, @/ H7F		@		)888 : h			
(, @/ H7F		A		%888 : h			
)& F5J9@B;		@		'8888 G&h			
)+ K95H9F-B;		@		)(, '888 G&h			
QldYBi aVf.	%&	HuY	F	5fU	(%8888G&h	D7=	, &
QldY7caaYlg							
(, @/ H7F		@		%888 : h			
(, @/ H7F		A		(888 : h			
)+ K95H9F-B;		@		(%8888 G&h			
QldYBi aVf.	\$	HuY	F	5fU	)() 8888G&h	D7=	*\$
QldY7caaYlg							
(, @/ H7F		@		(-'888 : h			
(, @/ H7F		A		)'888 : h			
)\$ D5H7<-B;		@		%88888 G&h			
)& F5J9@B;		@		%8888 G&h			
)+ K95H9F-B;		@		(%8888 G&h			

BYkcf.	98B			BUaY	9HGHgYAihjVU5jibh		
GfUW	H5'			BUaY	HI]kUis' 9HGHgY	I gY	H5L-K5M 5fU
GM]ch	%	cZ %	: fca.	FibkUis' !&		H. HI]kUis	@Gj7chj' %%%)
GfUW	57	: Ua]m	5@SCH57HI]kUig	NbY		7UH]cfm	FUb. G
5fU		SSS + Gc h	@Y[h.	&' :h	K]Ph.	\$: h	
GUg		GUV@Y[h.		:h	GUVK]Ph.	:h	>ch@Y[h. :h
Gci XE.		GfYVHndY			; fUX \$		@Uyg \$
GM]cb7caaYig							
Kcf_8UY %%%)				Kcf_HndY Bk7chj' Vcb' h]U		7cX BI!B	=AUcfA/ F. HiY
@Gj7chj' 8UY %%%)				HRUladYg (		GfjYnX (
7chj' D7= -+							
hg]GM]cb7caaYig							
QladYBi aVF. %		HndY	F	5fU	(,)'SSGc h	D7= - \$	
QladY7caaYig							
(, @/ H7F		@		SSSS : h			
) + K95H 9F-B;		@		(,)'SS Gc h			
QladYBi aVF. S&		HndY	F	5fU	)(-+'SSGc h	D7= --	
QladY7caaYig							
) + K95H 9F-B;		@		SSSS Gc h			
QladYBi aVF. \$		HndY	F	5fU	)\$ SSSGc h	D7= --	
QladY7caaYig							
) + K95H 9F-B;		@		%SSS Gc h			
QladYBi aVF. \$		HndY	F	5fU	(*SSSSGc h	D7= --	
QladY7caaYig							
) + K95H 9F-B;		@		%SSS Gc h			

BYkcf.	98B			BuY	9HGHgYAtjVU5jcbh		
GfUW	H5(			BuY	HIjkUis(9HGHgY	IgY	H5L-K5M 5fU
GWch	%	cZ %	: fca.	HIjkUis		H. FilkUis!&	@Gj7cbgH *#488%
GfUW	57	: Ua]m	5@SCH57HIjkUg	NbY		7UH[cfm	FUb. G
5fU		%z& Gc h	@Y[h.	'** :h	K]Ph.	'):h	
GUg		GU@Y[h.	:h	GUVK]Ph.	:h	>ch@Y[h.	:h
Gci Xf.		GfYWHdY		; fUX \$		@Uyg \$	
GWcb7caa Ylg							
Kcf_8UY %44%)		Kcf_HdY Bk7cbgUcb!h]U			7cXY BI!B	=AUcfA/ F. HiY	
Kcf_8UY *#488%		Kcf_HdY &'qYUm			7cXY C@S&	=AUcfA/ F. HiY	
@Gj7cbgH 8UY %4488%		HUCladYg (			GfjYXK '		
7cbgH D7= -\$							
-bgNWcb7caa Ylg							
QadYBi aVf. \$%		HdY	F	5fU	)&S\$Gc h	D7= ,-	
QadY7caa Ylg							
(, @/ H7F		@		()'SS :h			
) + K95H 9F-B;		@		)&S\$Gc h			
QadYBi aVf. \$&		HdY	F	5fU	)&S\$Gc h	D7= ,,	
QadY7caa Ylg							
(, @/ H7F		@		%'SS :h			
(, @/ H7F		A		*'SS :h			
) + K95H 9F-B;		@		)&S\$Gc h			
QadYBi aVf. \$		HdY	F	5fU	'-)'SSGc h	D7= -(
QadY7caa Ylg							
) + K95H 9F-B;		@		'-)'SS Gc h			

BVkf.	98B		BuY	9H6H/AiHjVU5jcbh				
GfUW	H7%		BuY	HIjkU7dbNMfS%8H6Hj I g	H5L-K5M	5fU		-ž() Gē h
GWch	\$%	cZ %	: fca.	HIjkU5	H.	HI]UYS%		@g7cbh' %%%)
GfUW	57	: Ua]m	5@SCH57HI]kUg	NbY	7U]cfm			Fub. G
5fU		-ž() Gē h	@Y[h.	'%:h	K]h.	&:h		
GUg		GU@Y[h.	:h	GUVK]h.	:h	>ch@Y[h.		:h
Gci XE.		GfYHhY		; fUX \$		@Ug \$		
GWcb7caaYlg								
Kcf_8UY %%%)			Kcf_HhY Bk7cbh' h]U		7cX BI!B			=AUcfA/ F. HhY
@g7cbh'8UY %%%)			HRUladYg &		GfjYhX &			
7cbh' D7= ,&								
hgNWcb7caaYlg								
QladYBiaVF. \$%		HhY	F	5fU	)SSSSGē h	D7= +&		
QladY7caaYlg								
(, @/ H7F		@		)'SS :h				
)\$ D5H<-B;		@		%9'SS Gē h				
)+ K95H9F-B;		@		(\$)'SS Gē h				
QladYBiaVF. \$&		HhY	F	5fU	(+)'SSGē h	D7= -(
QladY7caaYlg								
)+ K95H9F-B;		@		(+)'SS Gē h				

Bvkcf.	98B	BuY	9HGHgYAlh]U5]bcb				
6fUW	H 5B, %	BuY	HI]kUia U]f\$%9HGHgY	I g	H5L-K5M	5fU	%)Z\$%Gh
GWfch	%	Z %	: fca.	5dcb%	H.	9HGHgYAlh]U5]bcb	@]h7cb]h' %%%)
GfUW	57	: Ua]m	5@SCH57HI]U5]bcb	NbY	7UH]cfm		Fub. H
5fU	%)Z\$%Gh	@]h.	,(- :h	K]h.			
GUg		GU@]h.	:h	GUVK]h.	:h	>]h@]h.	:h
Gci Xf.		GfYHhY		; fUX \$		@]h \$	
GWfcb7caa Yhg							
Kcf_8UY %%%)		Kcf_HndY Bk7cb]h]U5]bcb			7cX BI!-B		=AUcfA/ F. HhY
@]h7cb]h'8UY %%%)		HRUcladYg)%			GfjYhX %		
7cb]h7cb]h' D7= * &							
hg]h7cb]h'7caa Yhg							
QadYBiaVf. %		HndY	F	5fU	()\$S\$Gh	D7= +'	
QadY7caa Yhg							
(' 6@C7? 7F57?-B		@		%\$S\$ Gh			
(@/ H7F		@		'\$S\$:h			
(@/ H7F		A		%&'\$S\$:h			
QadYBiaVf. \$		HndY	F	5fU	()\$S\$Gh	D7= *\$	
QadY7caa Yhg							
(' 6@C7? 7F		@		+\$S\$ Gh			
() 89DF9GCB		A		)'\$S\$ Gh			
(@/ H7F		@		\$S\$:h			
(@/ H7F		A		%'\$S\$:h			
(@/ H7F		<		'\$S\$:h			
QadYBiaVf. \$		HndY	F	5fU	()\$S\$Gh	D7= *,	
QadY7caa Yhg							
(' 6@C7? 7F		@		%\$S\$ Gh			
() 89DF9GCB		A		('S\$ Gh			
(@/ H7F		@		\$S\$:h			
(@/ H7F		A		%\$S\$:h			
QadYBiaVf. \$		HndY	F	5fU	()\$S\$Gh	D7= +%	
QadY7caa Yhg							
(' 6@C7? 7F		@		*\$S\$ Gh			
() 89DF9GCB		A		%\$S\$ Gh			
(@/ H7F		@		'&'\$S\$:h			
QadYBiaVf. %&		HndY	F	5fU	)+\$S\$Gh	D7=)\$	
QadY7caa Yhg							
(' 6@C7? 7F		@		\$S\$ Gh			
(' 6@C7? 7F		A		)\$S\$ Gh			
() 89DF9GCB		A		'\$S\$ Gh			
(@/ H7F		@		\$S\$:h			
(@/ H7F		A		%\$S\$:h			
)\$ D5H7<-B		@		*, '\$S\$ Gh			
QadYBiaVf. %		HndY	F	5fU	)+\$S\$Gh	D7= +&	
QadY7caa Yhg							
(' 6@C7? 7F		@		,')\$S\$ Gh			
(@/ H7F		@		%-'\$S\$:h			
(@/ H7F		A		%\$S\$:h			
QadYBiaVf. %		HndY	F	5fU	)+\$S\$Gh	D7=))	
QadY7caa Yhg							
(' 6@C7? 7F		@		))\$S\$ Gh			
() 89DF9GCB		@		('\$S\$ Gh			
() 89DF9GCB		A		'\$S\$ Gh			
(@/ H7F		@		*('\$S\$:h			
(@/ H7F		A		-\$S\$:h			

QādYBī aVF. & QādY7caaYlg	HndY	F	5fYU	(, \$\$\$\$Gē h	D7= -(
(@/ H7F	@		*-'\$\$: h		
QādYBī aVF. & QādY7caaYlg	HndY	F	5fYU	(, \$\$\$\$Gē h	D7= ,&
(@/ H7F	@		\$\$\$\$: h		
(@/ H7F	A		)\$\$ : h		
QādYBī aVF. & QādY7caaYlg	HndY	F	5fYU	(, \$\$\$\$Gē h	D7=)-
(' 6@C7? 7F	@		,*\$\$ Gē h		
() 89DF9GCB	@		%''\$\$ Gē h		
(@/ H7F	@		+('\$\$: h		
(@/ H7F	A		%\$\$: h		
QādYBī aVF. '% QādY7caaYlg	HndY	F	5fYU	(, \$\$\$\$Gē h	D7= (%
(' 6@C7? 7F	@		%\$\$ Gē h		
() 89DF9GCB	@		%\$\$ Gē h		
() 89DF9GCB	A		('\$\$ Gē h		
(@/ H7F	@		)*\$\$ : h		
(@/ H7F	A		'- \$\$: h		
(@/ H7F	<		)\$\$ : h		
QādYBī aVF. ') QādY7caaYlg	HndY	F	5fYU	)*&'\$\$Gē h	D7=)%
(' 6@C7? 7F	@		*\$\$ Gē h		
(@/ H7F	@		\$\$: h		
(@/ H7F	A		*)'\$\$: h		
QādYBī aVF. (\$ QādY7caaYlg	HndY	F	5fYU	)*&'\$\$Gē h	D7= (*
(' 6@C7? 7F	@		%\$\$ Gē h		
(' 6@C7? 7F	A		)\$\$ Gē h		
() 89DF9GCB	@		+)'' Gē h		
() 89DF9GCB	A		&'\$\$ Gē h		
(@/ H7F	@		&&'\$\$: h		
(@/ H7F	A		'*)'\$\$: h		
QādYBī aVF. (+ QādY7caaYlg	HndY	F	5fYU	(+\$\$\$\$Gē h	D7= (-
(' 6@C7? 7F	@		\$\$ Gē h		
() 89DF9GCB	A		%\$\$ Gē h		
(@/ H7F	@		*'+'\$\$: h		
(@/ H7F	A		' \$'\$\$: h		
(@/ H7F	<		&'\$\$: h		
QādYBī aVF.)\$ QādY7caaYlg	HndY	F	5fYU	(+\$\$\$\$Gē h	D7= *+
(@/ H7F	@		(\$\$: h		
(@/ H7F	A		&\$\$: h		
QādYBī aVF.)' QādY7caaYlg	HndY	F	5fYU	'(), '\$\$Gē h	D7= +\$
(@/ H7F	@		-%\$\$: h		
(@/ H7F	A		%*''\$\$: h		

BYkcf.	98B	BuY	9HGHgYAIh]MU5]bcbh
6fUW	H2%	BuY	HI]UBYS%9HGHgY I g H5L-K5M 5fU , (Z% Gz h
GM]ch	\$%	cZ %	: fca. HI]kUn7cbNMfS H. 5W]gFcdX @]h7cb]h' %%%)
GfUW	57	: Ua]m	5@SCH57HI]UBg NcbY 7UH]cfm FUb. H
5fU		, (Z% Gz h	@]h. %& h K]h.) \$: h
GUg		GU@]h.	: h GUVK]h. : h >]h@]h. : h
Gci Xf.		GfYWHdY	; fUX \$ @]h \$
GM]cb7caa Ylg			
Kcf_8UY %%%)		Kcf_HndY Bk7cb]h Vcb' h]U	7cX BI !-B =AUcfA/ F. H]Y
@]h]h]h]8UY %%%+8%		HRUcladYg %	GfjYhX ,
7cb]h]h] D7= ,+			
hgNM]cb7caa Ylg			
QladYBiaVf. \$		HndY F	5fU) \$\$\$\$ Gz h D7= ,-
QladY7caa Ylg			
(, @/ H7F		@	+'\$\$: h
(, @/ H7F		A	,'\$\$: h
) + K95H 9F-B;		@	) \$\$\$\$ Gz h
QladYBiaVf. \$		HndY F	5fU) \$\$\$\$ Gz h D7= - \$
QladY7caa Ylg			
(, @/ H7F		@	% '\$\$: h
) + K95H 9F-B;		@	) \$\$\$\$ Gz h
QladYBiaVf. \$		HndY F	5fU) \$\$\$\$ Gz h D7= -(
QladY7caa Ylg			
) + K95H 9F-B;		@	) \$\$\$\$ Gz h
QladYBiaVf. %&		HndY F	5fU) \$\$\$\$ Gz h D7= -(
QladY7caa Ylg			
) + K95H 9F-B;		@	) \$\$\$\$ Gz h
QladYBiaVf. %		HndY F	5fU (% \$\$\$\$ Gz h D7= +(
QladY7caa Ylg			
() 89F9GCB		@	,'\$\$ Gz h
(, @/ H7F		@	,'\$\$: h
(, @/ H7F		A	) '\$\$ : h
) \$ D5H7<-B;		@	) '\$\$ Gz h
) + K95H 9F-B;		@	(\$)'\$\$ Gz h
QladYBiaVf. %		HndY F	5fU &(\$\$\$\$ Gz h D7= +\$
QladY7caa Ylg			
() 89F9GCB		@	% '\$\$ Gz h
(, @/ H7F		@	' \$\$\$: h
(, @/ H7F		A	*-'\$\$: h
) + K95H 9F-B;		@	&(\$\$\$\$ Gz h
QladYBiaVf. %		HndY F	5fU ') %\$\$\$ Gz h D7= - \$
QladY7caa Ylg			
(, @/ H7F		@	' '\$\$: h
(, @/ H7F		A	% \$\$\$: h
) + K95H 9F-B;		@	') %\$\$\$ Gz h
QladYBiaVf. %		HndY F	5fU (-, \$\$\$ Gz h D7= ,(
QladY7caa Ylg			
(, @CB; H 8-B5@HF5BGJ9FC9' @			+'\$\$: h
7F57?-B;			
(, @CB; H 8-B5@HF5BGJ9FC9' A) '\$\$: h
7F57?-B;			
(- C-@GD@@; 9		B	\$\$\$ Gz h
) + K95H 9F-B;		@	(-, \$\$\$ Gz h

APPENDIX E
DISTRESS SUMMARY REPORT



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°		°#			V) @k α					
°		h#								
k		°#			OV8ey) @° Ouk° Vd°- lo° #k° #N8°	#)	O		7	
k		°#			OV8ey) @° Ouk° Vd°- lo° #k° #N8°	#)	U		7	
k		°#			‡ - ° u- k08°	#)	O		o7	
k		°°#			OV8ey) @° Ouk° Vd°- lo° #k° #N8°	#)	O		7	
k		°°#			OV8ey) @° Ouk° Vd°- lo° #k° #N8°	#)	U		7	
k		°°#			‡ - ° u- k08°	#)	O		o7	
k		°#			OV8ey) @° Ouk° Vd°- lo° #k° #N8°	#)	O		7	
k		°#			‡ - ° u- k08°	#)	O		o7	
u		°°#			‡ - ° u- k08°	#)	O		o7	
u		°#			OV8ey) @° Ouk° Vd°- lo° #k° #N8°	#)	O		7	
u		°#			‡ - ° u- k08°	#)	O		o7	
u		°°#			‡ - ° u- k08°	#)	O		o7	
u		°#			OV8ey) @° Ouk° Vd°- lo° #k° #N8°	#)	O		7	
u		°#			OV8ey) @° Ouk° Vd°- lo° #k° #N8°	#)	U		7	
u		°#			h u# 08°	#)	O		o7	
u		°#			k † - 08°	#)	O		o7	
u		°#			‡ - ° u- k08°	#)	O		o7	

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"	o	o	o)))	o	j	j)
				V	U	U			y	
u		°#			OV8ey) @° Ouk° Vof- lo` #k° #M8.....	#)	O		7	
u		°#			‡ - ° u- kQ8.....	#)	O		o7	
u		°#			OV8ey) @° Ouk° Vof- lo` #k° #M8.....	#)	O		7	
u		°#			OV8ey) @° Ouk° Vof- lo` #k° #M8.....	#)	U		7	
u		°#			‡ - ° u- kQ8.....	#)	O		o7	
u#		°#			OV8ey) @° Ouk° Vof- lo` #k° #M8.....	#)	O		7	
u#		°#			h u#- Q8.....	#)	O		o7	
u#		°#			‡ - ° u- kQ8.....	#)	O		o7	
u#		°#								
u° V8		°#			"O#Mk° #M8.....	#)	O		o7	
u° V8		°#			"O#Mk° #M8.....	#)	U		o7	
u° V8		°#			) - Hk α@V.....	\	O		o7	
u° V8		°#			) - Hk α@V.....	\	U		o7	
u° V8		°#			OV8ey) @° Ouk° Vof- lo` #k° #M8.....	#)	=		7	
u° V8		°#			OV8ey) @° Ouk° Vof- lo` #k° #M8.....	#)	O		7	
u° V8		°#			OV8ey) @° Ouk° Vof- lo` #k° #M8.....	#)	U		7	
u° V8		°#			h u#- Q8.....	#)	O		o7	
uO		°#			) - Hk α@V.....	\	O		o7	
uO		°#			OV8ey) @° Ouk° Vof- lo` #k° #M8.....	#)	O		7	

APPENDIX F

PAVEMENT CONDITION REPORTS

F1: Section Forecasted Pavement Condition Rating

F2: Branch PCI Rating

F3: Branch FOD Rating



Appendix F1
Forecasted Section PCI
Enterprise Municipal Airport (EDN)

Branch ID	Section ID	Forecasted PCI						
		2021	2022	2023	2024	2025	2026	2027
A01	01	98	95	93	91	89	87	84
A01	02	98	96	93	91	89	87	85
R0523	01	85	81	77	74	71	70	70
R0523	02	77	74	72	70	70	70	68
R0523	03	85	81	77	74	71	70	70
TA	01	96	94	92	89	87	84	82
TA1	01	88	85	83	81	79	77	75
TA1	02	98	96	94	92	89	86	84
TA2	01	66	62	57	52	48	45	43
TA3	01	95	93	90	87	85	82	80
TA4	01	87	84	82	80	78	76	74
TC01	01	80	78	76	73	71	68	64
TC02	01	99	98	96	94	92	89	86
THANG01	01	56	52	47	45	42	39	35
TL01	01	84	82	80	78	76	73	71

6fUw7cbXjcbFYbch DUY%Z&
DjYaYHSUUVgy 5@SCHS88 %

6fUw78	Bi a VfcZ GMjcbg	G a 'GMjcb' @b|h HE	5j| 'GMjcb' KPh HE	Hi Y5fYU fGe HE	I gy	5j YU Y D7=	GRbXEX 8Yj Ujcb' D7=	KM| \HX 5j YU Y D7=
59%	&	* 8888	88'88	%&ž)('88	5DFCB	%8888	\$88	%8888
F9 &	'	)29'88	%8888	)%88 8888	FI BK5M	, *1E+	" \$	,)'8
H5	%	(ž('88	)'88	%(ž)'88	H5L-K5M	-, '88	\$88	-, '88
H5%	&	&&'88	(9'88	, ž--'88	H5L-K5M	-)'88	('88	-)'88
H5&	%	&)'88	)'88	%ž*)'88	H5L-K5M	+988	\$88	+988
H5'	%	&'88	9'88	888 +88	H5L-K5M	-+'88	\$88	-+'88
H5(	%	'**'88	)'88	%ž&'88	H5L-K5M	- \$88	\$88	- \$88
H79%	%	'%'88	&'88	-ž()'88	H5L-K5M	, 888	\$88	, 888
H78&	%	,)'88	)+'88	+ž(+88	H5L-K5M	%8888	\$88	%8888
H5B; 9%	%	,(-'88	)(+'88	9)ž 9'88	H5L-K5M	* 888	\$88	* 888
H89%	%	%ž 888	)\$88	, (ž%'88	H5L-K5M	, +'88	\$88	, +'88

' #%&@& 6fubW7cbYhcbFYkfh DJY&cZ&
 DjYaYHSUWUy 5@BCH&&& %

I gY7UW| cfm	Bi a VYfcZ GWI|cbg	HEU'5fYU|c: IL	5f|ha Y|W 5j YU| YD7=	5j YU| YG|B D7=	KY| \ BX 5j YU| YD7=
5DFCB	&	%&ž) ('SS	%SSSS	\$SS	%SSSS
FI BK5M	'	)%SS SSSS	, *!+	' " \$	,)'S
H5L-K5M	%	), &|' 'SS	, +'*\$	%&&&	+ " (
5@@	%	%SSZ (' 'SS	, - 'S-	%!+	, '!" &

6fUBW:8	Bi a VfcZ GVMcbg	G a 'GVMcb' @b|h HIL	5j| 'GVMcb' KPh HIL	Hi Y5fYU RGe HIL	I gY	5j YU Y : CS' Dc:hb|U	GRbXEX 8Y|U|cb' : CS'Dc:R	KY| \ FAX 5j YU Y : CS'Dc:hb
AO1	2	62200	20700	12875400	APRON	000	000	000
RO23	3	510500	10000	51050000	RUNWAY	2367	377	2547
TA	1	484400	3500	16475500	TAXIWAY	1100	000	1100
TA1	2	22900	4000	889000	TAXIWAY	1450	450	1421
TA2	1	23500	3500	1535500	TAXIWAY	4300	000	4300
TA3	1	23300	2500	2003700	TAXIWAY	1200	000	1200
TA4	1	36600	3500	1572400	TAXIWAY	2000	000	2000
TC01	1	31700	2900	995500	TAXIWAY	2900	000	2900
TC02	1	8500	5700	784700	TAXIWAY	000	000	000
THANG01	1	84900	54700	25530100	TAXIWAY	4800	000	4800
TLO1	1	124200	5000	8431600	TAXIWAY	2200	000	2200

Pavement Database: ALDOT_220316

I gY7UH| cfm	B| a VVfcZ GWM|cbg	HEU'5fYU|G: IL	5f|ha Y|W 5j YU| Y: CS	5j YU| YGB : CS Dc|Hb|U	KY| \HX 5j YU| Y: CS D
APRON	2	128,75400	000	000	000
RUNWAY	3	510,50000	2367	377	2547
TAXIWAY	10	582,18900	2140	1423	3015
ALL	15	1,221,44300	1900	1398	2501

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 Preventive Repair Policy

Distress	Distress Severity	Description	Code	Work Type	Work Unit
41	Medium	ALLIGATOR CR	PA-AD	Patching - AC Full-Depth	SqFt
41	High	ALLIGATOR CR	PA-AD	Patching - AC Full-Depth	SqFt
42	N/A	BLEEDING	PA-AS	Patching - AC Partial-Depth	SqFt
43	High	BLOCK CR	PA-AD	Patching - AC Full-Depth	SqFt
43	Medium	BLOCK CR	CS-AC	Crack Sealing - AC	Ft
44	Low	CORRUGATION	PA-AS	Patching - AC Partial-Depth	SqFt
44	High	CORRUGATION	PA-AS	Patching - AC Partial-Depth	SqFt
44	Medium	CORRUGATION	PA-AS	Patching - AC Partial-Depth	SqFt
45	Medium	DEPRESSION	PA-AD	Patching - AC Full-Depth	SqFt
45	Low	DEPRESSION	PA-AD	Patching - AC Full-Depth	SqFt
45	High	DEPRESSION	PA-AD	Patching - AC Full-Depth	SqFt
47	High	JT REF. CR	CS-AC	Crack Sealing - AC	Ft
47	Medium	JT REF. CR	CS-AC	Crack Sealing - AC	Ft
48	High	L & T CR	CS-AC	Crack Sealing - AC	Ft
48	Medium	L & T CR	CS-AC	Crack Sealing - AC	Ft
49	N/A	OIL SPILLAGE	PA-AD	Patching - AC Full-Depth	SqFt
50	High	PATCHING	PA-AD	Patching - AC Full-Depth	SqFt
50	Medium	PATCHING	PA-AD	Patching - AC Full-Depth	SqFt
52	High	RAVELING	PA-AS	Patching - AC Partial-Depth	SqFt
53	High	RUTTING	PA-AD	Patching - AC Full-Depth	SqFt
53	Low	RUTTING	PA-AD	Patching - AC Full-Depth	SqFt
53	Medium	RUTTING	PA-AD	Patching - AC Full-Depth	SqFt
55	N/A	SLIPPAGE CR	PA-AD	Patching - AC Full-Depth	SqFt
56	Low	SWELLING	PA-AD	Patching - AC Full-Depth	SqFt
56	Medium	SWELLING	PA-AD	Patching - AC Full-Depth	SqFt
61	Low	BLOW-UP	PA-PF	Patching - PCC Full Depth	SqFt
61	Medium	BLOW-UP	PA-PF	Patching - PCC Full Depth	SqFt
61	High	BLOW-UP	PA-PF	Patching - PCC Full Depth	SqFt
62	Medium	CORNER BREAK	PA-PF	Patching - PCC Full Depth	SqFt
62	High	CORNER BREAK	PA-PF	Patching - PCC Full Depth	SqFt
62	Low	CORNER BREAK	CS-PC	Crack Sealing - PCC	Ft
63	Medium	LINEAR CR	CS-PC	Crack Sealing - PCC	Ft
63	High	LINEAR CR	PA-PP	Patching - PCC Partial Depth	SqFt
64	Medium	DURABIL. CR	PA-PF	Patching - PCC Full Depth	SqFt
64	High	DURABIL. CR	SL-PC	Slab Replacement - PCC	SqFt
65	High	JT SEAL DMG	JS-LC	Joint Seal (Localized)	Ft
65	Medium	JT SEAL DMG	JS-LC	Joint Seal (Localized)	Ft
66	High	SMALL PATCH	PA-PP	Patching - PCC Partial Depth	SqFt
66	Medium	SMALL PATCH	PA-PP	Patching - PCC Partial Depth	SqFt
67	Medium	LARGE PATCH	PA-PF	Patching - PCC Full Depth	SqFt

Appendix G2
Localized Preventive Repair Policy

Distress	Distress Severity	Description	Code	Work Type	Work Unit
67	High	LARGE PATCH	PA-PF	Patching - PCC Full Depth	SqFt
69	N/A	PUMPING	JS-LC	Joint Seal (Localized)	Ft
70	Medium	SCALING	PA-PP	Patching - PCC Partial Depth	SqFt
70	High	SCALING	SL-PC	Slab Replacement - PCC	SqFt
71	High	FAULTING	GR-PP	Grinding (Localized)	Ft
71	Medium	FAULTING	GR-PP	Grinding (Localized)	Ft
72	Medium	SHAT. SLAB	SL-PC	Slab Replacement - PCC	SqFt
72	High	SHAT. SLAB	SL-PC	Slab Replacement - PCC	SqFt
74	High	JOINT SPALL	PA-PP	Patching - PCC Partial Depth	SqFt
74	Medium	JOINT SPALL	PA-PP	Patching - PCC Partial Depth	SqFt
75	Medium	CORNER SPALL	PA-PP	Patching - PCC Partial Depth	SqFt
75	High	CORNER SPALL	PA-PP	Patching - PCC Partial Depth	SqFt
76	Medium	ASR	SL-PC	Slab Replacement - PCC	SqFt
76	High	ASR	SL-PC	Slab Replacement - PCC	SqFt

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.

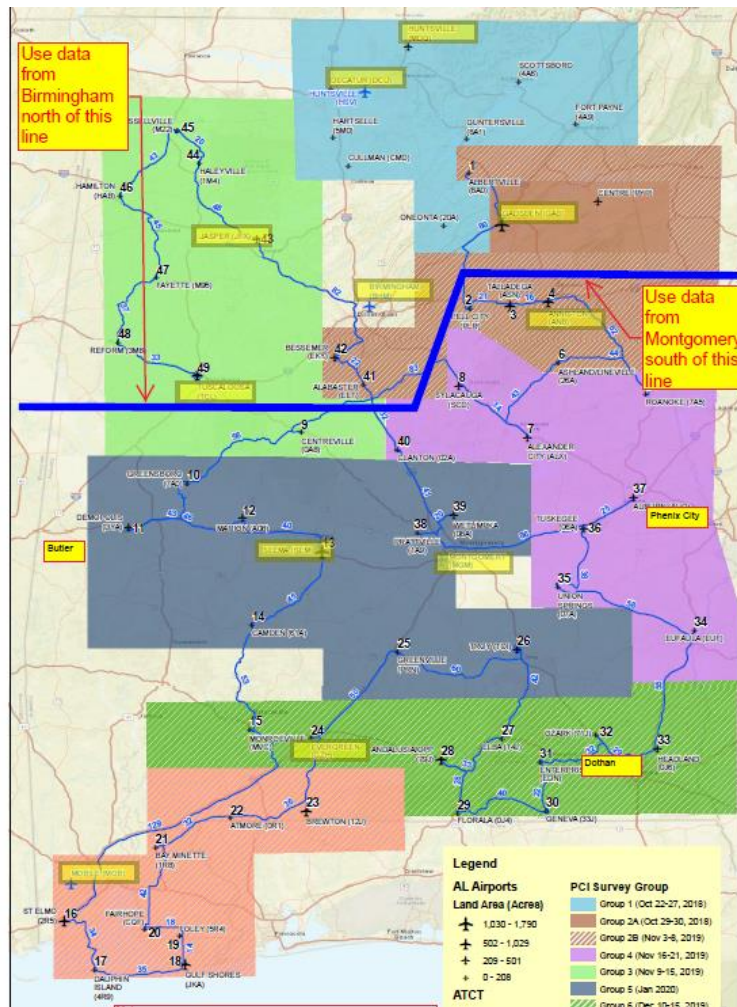


Figure 1: RSMMeans Unit Costs Locations.

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	Florala	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
Enterprise Municipal Airport (EDN)

Branch & Section	2021	2022	2023	2024	2025	2026	2027
A01-01	Preventive \$159.92 Before:97.6 After:97.6	Preventive \$316.34 Before:95.39 After:95.39	Preventive \$482 Before:93.18 After:93.18	Preventive \$657.31 Before:90.97 After:90.97	Preventive \$842.71 Before:88.76 After:88.76	Preventive \$1039.34 Before:86.55	Preventive \$1246.29 Before:84.34
R0523-01	Preventive + Required Project Global MR \$98480.68 Before:83.51 After:90.36	Preventive \$2219.92 Before:87.22 After:87.22	Preventive \$2948.4 Before:83.52 After:83.52	Preventive \$3758.79 Before:79.56 After:79.56	Preventive \$4516.82 Before:75.82 After:75.82	Preventive \$5196.1 Before:72.76 After:72.76	Preventive \$5719.88 Before:70.75 After:70.75
R0523-02	Preventive + Required Project Global MR \$172162.93 Before:76.08 After:83.8	Preventive \$6037.95 Before:79.86 After:79.86	Preventive \$7280.89 Before:76.08 After:76.08	Preventive \$8404.9 Before:72.95 After:72.95	Preventive \$9279.88 Before:70.86 After:70.86	StopGap \$3404.02 Before:69.92 After:69.92	StopGap \$3550.4 Before:69.79 After:69.79
R0523-03	Preventive + Required Project Global MR \$36109.58 Before:83.51 After:90.36	Preventive \$813.97 Before:87.22 After:87.22	Preventive \$1081.08 Before:83.52 After:83.52	Preventive \$1378.22 Before:79.56 After:79.56	Preventive \$1656.17 Before:75.82 After:75.82	Preventive \$1905.24 Before:72.76 After:72.76	Preventive \$2097.29 Before:70.75 After:70.75

Appendix I1
PCIP Summary
Enterprise Municipal Airport (EDN)

Branch & Section	2021	2022	2023	2024	2025	2026	2027
TA-01	Preventive \$750.01 Before:95.55 After:95.55	Preventive \$1146.15 Before:93.39 After:93.39	Preventive + Required Project Global MR \$154845.99 Before:90.91 After:97.26	Preventive \$821.22 Before:95.54 After:95.54	Preventive \$1254.15 Before:93.38 After:93.38	Preventive \$1776.19 Before:90.9 After:90.9	Preventive \$2359.49 Before:88.26 After:88.26
TA1-01	Preventive + Required Project Global MR \$3719.95 Before:86.93 After:94.51	Preventive \$34.31 Before:92.17 After:92.17	Preventive \$46.99 Before:89.59 After:89.59	Preventive \$60.79 Before:86.93 After:86.93	Preventive \$74.89 Before:84.36 After:84.36	Preventive \$88.84 Before:81.99 After:81.99	Preventive \$102.41 Before:79.83 After:79.83
TA1-02	Preventive \$13.94 Before:97.12 After:97.12	Preventive \$23.11 Before:95.36 After:95.36	Preventive + Required Project Global MR \$4438.6 Before:93.17 After:98.43	Preventive \$15.24 Before:97.12 After:97.12	Preventive \$25.25 Before:95.36 After:95.36	Preventive \$38.3 Before:93.17 After:93.17	Preventive \$53.89 Before:90.67 After:90.67
TA2-01	StopGap + Required Project Global MR \$13763.44 Before:64.57 After:73.77	Preventive \$451.23 Before:71.31 After:71.31	StopGap \$195.05 Before:68.29 After:68.29	StopGap \$264.7 Before:64.57 After:64.57	StopGap \$350.4 Before:60.17 After:60.17	StopGap \$442 Before:55.29 After:55.29	StopGap \$537.76 Before:50.45 After:50.45

Appendix I1
PCIIP Summary
Enterprise Municipal Airport (EDN)

Branch & Section	2021	2022	2023	2024	2025	2026	2027
TA3-01	Preventive + Required Project Global MR \$17754.67 Before:94.04 After:98.84	Preventive \$48.89 Before:97.68 After:97.68	Preventive \$84.72 Before:96.1 After:96.1	Preventive \$133.23 Before:94.05 After:94.05	Preventive \$192.33 Before:91.65 After:91.65	Preventive \$260.25 Before:89.04 After:89.04	Preventive \$332.52 Before:86.4 After:86.4
TA4-01	Preventive + Required Project Global MR \$14063.25 Before:85.93 After:93.65	Preventive \$145.65 Before:91.2 After:91.2	Preventive \$194.81 Before:88.57 After:88.57	Preventive \$247.1 Before:85.93 After:85.93	Preventive \$299.73 Before:83.43 After:83.43	After:83.43	After:83.43

After:83.43 3

