STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
AVIATION OFFICE

Statewide Airfield Pavement Management Program
Crystal River Airport
(General Aviation)
Crystal River, Florida
(District 7)

April 9, 2008

Prepared for:
Florida Department of Transportation
Aviation Office

by:
URS Corporation Inc. / MACTEC Engineering & Consulting, Inc. / Planning Technology, Inc. / ASC Geosciences, Inc.

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EXECUTIVE SUMMARY

URS Corporation, Inc., MACTEC Engineering and Consulting, Inc. (MACTEC), Planning Technology, Inc. (PTI), and ASC Geosciences, Inc. (ASCG) were awarded with a contract to provide services in support of the Florida Department of Transportation (FDOT) Aviation Office for Phase II of the Statewide Aviation Pavement Management program. As part of this contract, MACTEC conducted pavement condition survey for airside pavements at Crystal River Airport, evaluated the condition and developed a maintenance and rehabilitation program to improve conditions to prescribed minimum levels.

The total pavement area in 2006 at Crystal River Airport is 716,470 square feet. The breakdown of pavement area for each pavement use is provided as follows:

Pavement Area by Pavement Use

Use	Area, SqFt	% of Total Area
Runway	276,000	39
Taxiway	187,085	26
Apron	253,385	35
Total	**716,470**	**100**

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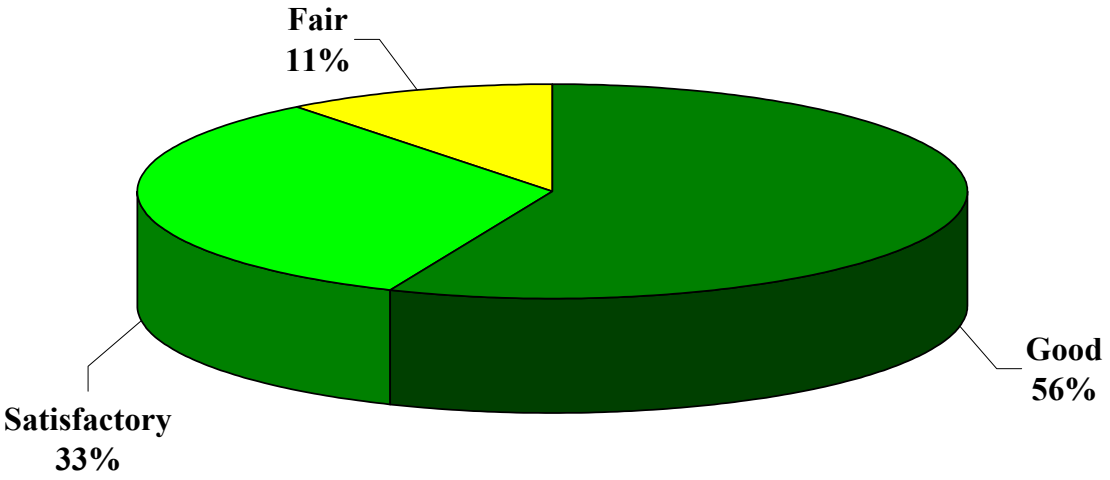
The overall area-weighted Pavement Condition Index (PCI) of the areas in 2006 is 84, representing a Satisfactory overall network condition.

The figure below provides the PCI distribution by rating category for the network. Approximately 89% of the network is in Good and Satisfactory condition while 11% of the network is in Fair condition.

The condition summary by pavement use table illustrates the area-weighted PCI computed individually for each use. On average, the runways are in Good condition, while the taxiways and aprons are in Satisfactory condition.

Network PCI Distribution by Rating Category



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Condition Summary by Pavement Use

Use	Area-Weighted PCI
Runway	88
Taxiway	81
Apron	81
All	84

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The immediate M&R needs include only T-Hangars Apron as summarized in the following table

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Immediate Major M&R Needs

Branch	Section	Section Area, SqFt	Major M&R Funded**	PCI Before	Maintenance	PCI After
AP T-HANG	4205	81,000	$55,890	70	Major M&R >= Critical	100
		Total	**$55,890**	**84***	**← Network Avg. PCI →**	**84***

* This table shows the area-weighted PCI before and after Major M&R and routine maintenance work for the first year of the 10-year plan. It includes all pavement sections at Crystal River Airport, including those sections not shown in this table.
** Cost figures are rounded down. Sum may be different. Costs are adjusted for inflation.

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A forecast of Major M&R needs for a 10-year period, starting from 2008, was developed using an unlimited budget. The analysis identified ongoing maintenance needs and major M&R during that interval.

10 Year M&R Costs under Unlimited Funding Scenario

Year	Preventive	Major M&R >= Critical	Major M&R < Critical	Total
2008	$25,199	$55,890	$0	$81,089
2009	$63,470	$0	$0	$63,470
2010	$73,458	$0	$0	$73,458
2011	$67,766	$0	$192,825	$260,591
2012	$70,250	$0	$78,344	$148,594
2013	$83,790	$0	$0	$83,790
2014	$86,747	$0	$82,208	$168,955
2015	$81,622	$0	$219,925	$301,546
2016	$95,938	$0	$0	$95,938
2017	$108,820	$0	$27,338	$136,157
Total	**$757,059**	**$55,890**	**$600,639**	**$1,413,589**

Note: Cost figures are rounded down. Sum may be different. Costs are adjusted for inflation.

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The 10 year analysis suggests an annual budget on the order of $142,000 would be needed for the next 10 years and the majority (54%) of this budget would go to preventive activities. As a result, the area-weighted PCI would decrease from 84 in 2006 to 79 in 2017.

It is important to note that although preventative and some major M&R activities would have to be conducted over several years, the area-weighted PCI value for all Crystal River Airport pavements in 2017 may remain near 79. The airport manager should realize that what is most important is that the pavement repair work (preventative and major M&R) that has been identified for Crystal River Airport is conducted at some point in the 10-year plan.

1. INTRODUCTION

The State of Florida has more than 100 public airports that are vital to the Florida economy as well as the economy of the United States. These public airports range from small general aviation airports to large international hub airports. These airports serve business travelers, tourism, and cargo operations crucial to the daily life of the people of Florida.

There are millions of square yards of pavement for the runways, taxiways, aprons and other areas that support aircraft operations. The timely and proper maintenance and rehabilitation (M&R) of these pavements allows the airports to operate efficiently, economically and without excessive down time. In order to support the planning, scheduling, and design of the M&R activities, FDOT has implemented pavement management system technology.

This report describes the procedures used to ensure that the appropriate engineering and scientific standards of care, quality, budget, and schedule requirements are implemented at your airport as a result of your participation in the Statewide Aviation Pavement Management Program.

1.1 Purpose

This Florida Airport Pavement Evaluation Report is intended to:

- Describe, briefly, the Florida Department of Transportation (FDOT) Aviation Office Statewide Pavement Management Program and the roles and responsibilities of the program's participants
- Provide background information on pavement management principles, objectives, and benefits to the participating airport
- Outline the procedures used to collect, evaluate and report pavement inspection results at your airport
- Present the findings from the inspection and analysis of the needs for maintenance and rehabilitation activities for this airport.

1.2 FDOT Aviation PMS Program

In 1992, FDOT implemented a Pavement Management System (PMS) program to improve the knowledge of pavement conditions at public airports in the State system, identify maintenance needs at individual airports, automate information management, and establish standards to address future needs. The FDOT Aviation Office participated in the development of a proprietary software pavement management system and developed and populated a pavement management database that provided valuable information for establishing M&R policies, estimating M&R costs, and developing recommendations for performing routine pavement maintenance. This system was implemented and condition surveys performed in 1992 and 1993 and again updated in 1998 and 1999. The proprietary system, AIRPAV, is no longer supported.

In 2004, the FDOT Aviation Office undertook a project to update the PMS Program software utilized for the PMS program. The Aviation Office selected a consultant team consisting of URS Corporation, Inc., MACTEC Engineering and Consulting, Inc. (MACTEC), Planning Technology, Inc. (PTI), and ASC Geosciences, Inc. (ASCG) to aid with the implementation of the program update. This project involved a review of the AIRPAV software and other available

PMS software. As a result of this review, MicroPAVER was selected as the software for the update project. Condition data from the 1998/1999 surveys were converted to the MicroPAVER system.

The inventory of the pavement systems and drawings of the pavements were updated to reflect maintenance, rehabilitation, and construction activities since 1998/1999 to the extent that information was available. Detailed, specific procedures for the inspection and collection of pavement data were developed for this project. A web-site (www.floridaairportpavement.com) was developed for the input of data under secure procedures. The site also has a public section for dissemination of information to the general public.

1.3 Organization

The FDOT Aviation Office manages the day-to-day details of the Statewide PMS and the updates. The Aviation Office Airport Engineering Manager serves as the Program Manager (PM) monitoring the work of the Consultant. The Aviation Office has review and approval authority for each program task.

1.3.1 *Consultant Role*

The Consultant (MACTEC Engineering and Consulting/URS Corporation/Planning Technology/ASC Geosciences) developed the PMS based upon procedures outlined in FAA Advisory Circular 150/5380-6B Guidelines and Procedures for Maintenance of Airport Pavements (FAA/AC) and ASTM D 5340 Standard Test Method for Airport Pavement Condition Index Surveys (2004). The Consultant provides technical and administrative assistance to the Aviation Office PM, during the execution of this program, which involves the continuing evaluation of airport pavements and updating of the PMS. A website is available to view and update airport information, including construction activities and pavement condition data. In addition, pavement evaluation reports will be available for viewing and download from the site (www.floridaairportpavement.com).

1.3.2 *Airport Role*

The airports are the ultimate client for each of the field inspections and reports. Individual airports will be provided final deliverables prepared by the Consultant that have been reviewed and approved by the FDOT Aviation Office. The airport should review system inventory drawings in their folder in the pavement management website and add maintenance and rehabilitation activities conducted on airside pavements on the website system inventory form.

1.4 Pavement Types and Pavement Management

1.4.1 *Pavement basics*

A pavement is a prepared surface designed to provide a continuous smooth ride at a certain speed and to support an estimated amount of traffic for a certain number of years. Pavements are constructed of a combination of subgrade soils, subbases, bases and surfacing. There are mainly two types of pavements;

- Flexible pavement, composed of asphalt concrete (AC) surface, and
- Rigid pavement composed of Portland cement concrete (PCC) surface.

Both pavement types use a combination of layered materials and thicknesses in order to support the traffic loads and protect the underlying subgrade soil. Flexible pavements (AC) dissipate the load from layer to layer until the load magnitude is small enough to be supported by the subgrade soil. In rigid pavements (PCC), the Portland cement concrete supports most of the load, the base or subbase layer is mainly constructed to provide a smooth and continuous platform for the concrete. Due to the different nature of both pavement types and their materials, flexible and rigid pavements have different distresses and failure mechanisms. Understanding the mechanics and failure modes of both pavement types will assist engineers in making adequate and long lasting repairs or rehabilitation to the pavement structures.

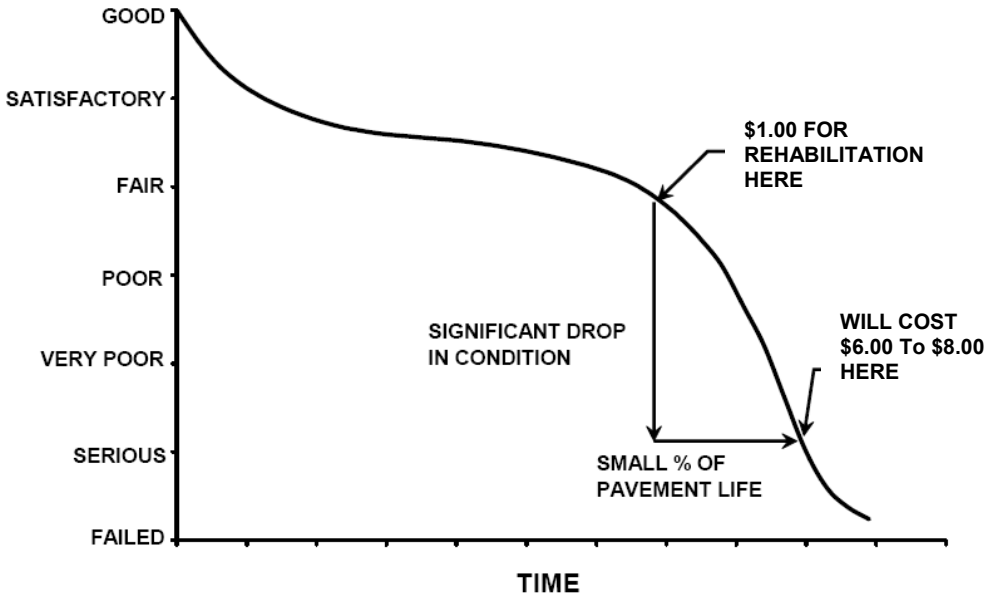
1.4.2 *Pavement Management System Concept*

A pavement management system (PMS) is a tool to assist engineers, planners and managing agencies in making decisions when planning pavement M&R. The management of pavements involves scheduling pavement maintenance and rehabilitation before pavements deteriorate to a condition where reconstruction (the most expensive alternative) is the only solution. Figure 1-1, taken from FAA/AC 5380-7A Pavement Management System, illustrates how a pavement generally deteriorates and the relative cost of rehabilitation at various times throughout its life. Note that during the first 75 percent of a pavement's life, it performs relatively well. After that, however, it begins to deteriorate rapidly. The number of years a pavement stays in "Satisfactory" condition depends on how well it is maintained. The illustration demonstrates the cost of maintaining the pavement above a critical condition before rapid deterioration occurs is much less compared to maintaining pavements after substantial deterioration has occurred.

Pavements deteriorate at an accelerated rate with increasing traffic and limited M&R resources. Planned maintenance and rehabilitation, essentially preventing pavements from reaching deteriorated conditions, helps managers/owners/agencies stretch and maximize the use of their budgets and prolong the life of the pavements. A PMS provides a tool to schedule and plan maintenance and rehabilitation based on engineering information and existing and predicted conditions of pavements.

There are several components or elements that are essential to a PMS. The first steps in the implementation of a PMS are to know and clearly identify what needs to be managed, the limits of the managing agency's responsibilities and the condition of the existing pavements. Once the cause and the extent of pavement problems are known, the appropriate maintenance and/or rehabilitation can be planned. By using local unit costs and expected yearly budgets, a multi year M&R plan can be determined.

Figure 1-1: Pavement Life Cycle



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Pavements deteriorate even if they do not carry any traffic. Pavement distresses may be attributed to climate, environment, materials, construction or traffic. Knowing the cause, extent and predominance of pavement distresses helps determine the most appropriate maintenance or rehabilitation work needed. Planning and applying preventive maintenance prolongs pavement life and minimizes future pavement repair costs. By projecting the rate of deterioration, a life cycle cost analysis can be performed for various alternatives, and the optimal time of application of the most feasible alternative can be determined. Such a decision is critical in order to avoid higher M&R costs at a later date.

A PMS enables the managing agency to identify and maintain the pavement conditions, keeping them at the upper end of the service life-condition curve. At this point, the total annual costs between maintaining a good pavement above a critical condition is much less than rehabilitating a poor pavement that has rapidly deteriorated beyond a critical condition level.

A PMS is a long-term planning tool that will result in an overall improvement of the pavement network condition and will also result in savings by applying the appropriate maintenance and rehabilitation activity at the appropriate time. Accurate estimates and timely M&R decisions and budgeting are of great importance when managing approximately 300 million square feet of Florida airside pavements.

1.4.3 *Pavement Inspection Methodology for PMS*

Pavement condition assessment is one of the primary decision variables in any airport pavement management system. Pavement condition assessments generally include visual surveys in

accordance with ASTM D 5340, *Standard Test Method for Airport Pavement Condition Index Surveys* and structural evaluation. Pavement condition surveys assess the functional condition of the pavement surface. Typically, most problems within a pavement structure will eventually reflect to the pavement surface. The structural condition and relative support of the pavement layers can be assessed utilizing non-destructive deflection testing (NDT) as well as other in-depth engineering evaluation or sampling and testing methods.

Pavement sections are broken down into sample units as established in FAA AC 150/5380-6B and ASTM D 5340. Sample unit sizes are approximately 5000 ± 2000 square feet for AC-surfaced pavements and 20 ± 8 slabs for PCC-surfaced pavements. Before the field inspections, the sampling plan was developed based on previous sampling and modified based on the available knowledge of branches, sections, use patterns, construction types and history. The sampling rate used for FDOT Statewide Pavement Management Program is provided in Table 1-1 below.

Table 1-1: Sampling Rate for FDOT Condition Surveys

AC Pavements			PCC Pavements		
N	n		N	n	
	Runway	Others		Runway	Others
1-4	1	1	1-3	1	1
5-10	2	1	4-6	2	1
11-15	3	2	7-10	3	2
16-30	5	3	11-15	4	2
31-40	7	4	16-20	5	3
41-50	8	5	21-30	7	3
≥51	20% but ≤20	10% but ≤10	31-40	8	4
			41-50	10	5
			≥51	20% but ≤20	10% but ≤10

Where *N = total number of sample units in section*
n = number of sample units to inspect
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The sample units to inspect are determined by a systematic random sampling technique. This means that the locations are determined such that they are distributed evenly throughout the section. In the case when nonrepresentive distresses are observed in the field, additional sample units were added.

The distress quantities and severity levels from the sample units are used to compute the PCI value for each section. PCI values range from 0 to 100. MicroPAVER provides a rating scale that relates PCI to pavement condition, with a PCI between 0 and 10 considered 'Failed' pavement and a PCI between 86 and 100 considered 'Good' pavement, with five other conditions for PCI values between 11 and 85. Figure 1-2 shows the PCI scale.

Figure 1-2: PCI Rating Scale

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1.5 Definitions

Aviation Office - The Aviation Office is charged with responsibility for promoting the safe development· of aviation to serve the people of the State of Florida. The Aviation Office worked closely with FDOT District Aviation Specialists, during development of this project. District Aviation Specialists will consult with airport owners in implementation of project recommendations.

Base Course - Base Course is a layer of manufactured material, usually crushed rock (aggregate) or stabilized material (asphalt or concrete or Florida Limerock), immediately beneath the surface course of a pavement, which provides support to the surface course.

Branch – (Facility in prior system) - A runway, taxiway or apron is called a Branch. This is an easy reference to a recognizable component of airport pavement. In this report, Branch ID maintains the original AirPAV identification where 100 series through 3000 series facilities are taxiways, 4000 and 5000 series facilities are aprons (the 5000 series represent runup aprons and turnarounds), and 6000 series facilities are runways. It also includes the common designation for the item e.g. RW 18-36.

Category - The Category classifies the airport according to the type and volume of aircraft traffic, as follows:

- GA – for general aviation or community airports
- RL – for regional relievers or small hubs
- PR – for primary

Critical PCI – The PCI value considered to be the threshold for M&R decisions. PCI above the Critical generate economical activities expected to preserve and prolong acceptable condition. M&R for PCI values less than Critical make sense only for reasons of safety or to maintain a pavement in operable condition. A pavement section is expected to deteriorate very quickly once it reaches the Critical PCI and the unit cost of repair increases significantly.

Distress Type - A distress type is a defined visible defect in pavement evidenced by cracking, vertical displacement or deterioration of material. In PCI technology, 16 distinct distress types for asphalt surfaced and 15 for Portland cement concrete surfaced pavements have been described and rated according to the impact their presence has on pavement condition.

Florida DOT (FDOT) - Florida Department of Transportation was represented in this project by the Office of Aviation.

Localized M&R (Maintenance and Repair) – Localized M&R is a temporizing activity performed on existing pavement to extend its serviceability and/or to improve rideability. Localized M&R can be applied either as a safety (stop-gap) measure or preventive measure. Common localized maintenance methods include crack sealing, joint sealing, and patching.

Global M&R- Global M&R is defined as activities applied to entire pavement sections with the primary objective of slowing the rate of deterioration. These activities are primary for asphalt surfaced pavements, e.g. surface treatments.

MicroPAVER – A commercially available software subsidized by FAA and agencies in the US Department of Defense developed to support engineered management of pavement assets using a condition based approach. This software has the functionality such that if properly implemented, maintained and operated it meets the pavement management system requirements described by FAA in Advisory Circular 150/5380-7A.

Minimum Condition Level - A threshold PCI value established by FDOT to represent the targeted minimum pavement condition that is desirable in the Florida Airport System. These values were established with consideration of pavement function and airport type. For instance, runways have higher minimum condition levels than aprons, and Primary airports have higher minimum condition levels than General Aviation airports.

Major M&R (e.g. Rehabilitation) – Activities performed over the entire area of a pavement section that are intended to restore and/or maintain serviceability. This includes asphalt overlays, milling and replacing asphalt pavement, reconstruction with asphalt, reconstruction with Portland Cement Concrete (PCC) pavements, and PCC overlays.

Network Definition – (Airport Sketch in prior system) – A Network Definition is a CAD drawing which shows the airport pavement outline with Branch and Section boundaries. This sketch is intended to assist the user of the report to quickly associate information from the text to a location on the airport. This drawing also includes the PCI sample units and is used to identify

those sample units to be surveyed, i.e. the sampling plan. The Network Definition for the airport in this report is in Appendix A along with a table of inventory data.

Pavement Condition Index (PCI) – The Pavement Condition Index is a number which represents the condition of a pavement segment at an instant in time. It is based on visual identification and measurement of specific distress types commonly found in pavement which has been in service for a period of time. The definitions and procedures for determining the PCI are found in ASTM D 5340-04, "Standard Test Method for Airport Pavement Condition Index Surveys," published by ASTM International.

Pavement Evaluation – A systematic approach undertaken by trained and experienced personnel intended for determination of the condition, serviceability, and best corrective action for pavement. Techniques to standardize pavement evaluation include the Pavement Condition Index procedures.

Pavement Management – Pavement management is a broad function that uses pavement evaluation and pavement performance trends as a basis for planning, programming, financing, and maintaining a pavement system.

Rank – Pavement rank in MicroPAVER determines the priority to be assigned to a pavement section when developing an M&R plan. Pavement sections are ranked as follows according to their use:

- P – for Primary pavements, such as primary runways, primary taxiways, and primary aprons
- S – or Secondary pavements, such as secondary runways, secondary taxiways, and secondary aprons
- T – for Tertiary pavements such as "T' hangars and slightly used aprons

Reconstruction – Reconstruction includes removal of existing pavement, preparation of subgrade, and construction of new pavement with new, or recycled materials. Reconstruction is indicated when distress types evident at the surface indicate failure in the pavement structure or subgrade of a type, and to an extent, not correctable by less extensive construction.

Rehabilitation – Rehabilitation represents construction using existing pavement for a foundation. Rehabilitation most commonly consists of an overlay of existing pavement with a new asphalt or concrete surface. Recently, technology has expanded the options to include recycling of existing pavement, and incorporating engineering fabrics or thin layers of elasticized materials to retard reflection of distress types through the new surface.

Sample Unit – Uniformly sized portions of a Section as defined in ASTM D 5340. Sample units are a means to reduce the total amount of pavement actually surveyed using statistics to select and survey enough area to provide a representative measure of Section PCI. Sample Unit sizes are 5,000 ± 2,000 square feet for AC-surfaced pavements and 20 ± 8 slabs for PCC-surfaced pavements.

Section – (Feature in prior system) - Sections subdivide Branches into portions of similar pavement. Sections are prescribed by pavement structure, age, condition and use. Sections are identified on the airport Network Definition. They are the smallest unit used for determining M&R requirements based on condition.

Section ID – A short form identification for the pavement Section that maintains the original AirPAV identification where 100 series through 3000 series sections are taxiways, 4000 and 5000 series sections are aprons (the 5000 series represent run-up aprons and turnarounds), and 6000 series sections are runways.

Use – In MicroPAVER use is the term for the function of the pavement area. This is either Runway, Taxiway, or Apron for purposes of the FDOT Statewide Aviation Pavement Management System.

2. NETWORK DEFINITION

Crystal River Airport (CGC) is located in Citrus County, Florida. The Board County of Commissioners owns and controls the airport administratively through the Director of Public Works and operationally through a contracted Fixed Base Operations (FBO) manager. The airport focuses primarily on serving general aviation aircraft and has two non-intersecting runways: Runway 09-27 and Runway 18-36. Runway 09-27 has a full parallel taxiway. Crystal River Airport is designated as a General Aviation (GA) airport and is located in District 7 of the Florida Department of Transportation.

The pavements within the network are defined in MicroPAVER in terms of manageable units that help to organize the data into similar groups. An organizational hierarchy is used to establish these units. The airport pavement network is subdivided into separate branches (runways, taxiways, or aprons) that have distinctly different uses. Branches are then divided into sections with similar pavement construction and performance that may share other common attributes. Sections are manageable units used to organize the data collection and are treated individually during the rehabilitation planning stage.

The network definition is used to identify changes in the network since the most recent update in 1998/1999 and also to plan the field inspection activities for 2006 survey. Prior to the field inspection process, the network definition drawing was updated. The purpose of this update is to compare the previous airport configuration and history with the current airport configuration and history and update the existing drawing showing network branch, section and sample unit designations to match the current configuration. This drawing serves not only as a primary guide for the airfield inspectors but also as an important history record.

The updated network definition fields of Crystal River Airport are provided in Table 2-1 and the updated network definition drawing of the airport is given in Appendix A. The field of ***Rank*** in Table 2-1 is defined in the definitions section in section 1.

Table 2-1: Crystal River Airport Network Definition

Branch Name	Section ID	Rank
MAIN APRON	4105	P
	4110	P
	4115	P
	4120	P
T-HANGARS APRON	4205	T
RUNWAY 9-27	6105	P
	6110	P
	6115	P
	6120	P
CONNECTOR TAXIWAY TO AP	205	P
	210	P
PARALLEL TAXIWAY TO RW 9-27	107	P
	109	P
	115	P
	118	P
	130	P
	105	T

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3. PAVEMENT INVENTORY

The detailed pavement inventory was updated to reflect the network definition update and field inspection results.

The total pavement area in 2006 at Crystal River Airport is 716,470 square feet. The breakdown of pavement area for each pavement use is provided in Table 3-1.

Table 3-1: Pavement Area by Pavement Use

Use	Area, SqFt	% of Total Area
Runway	276,000	39
Taxiway	187,085	26
Apron	253,385	35
Total	**716,470**	**100**

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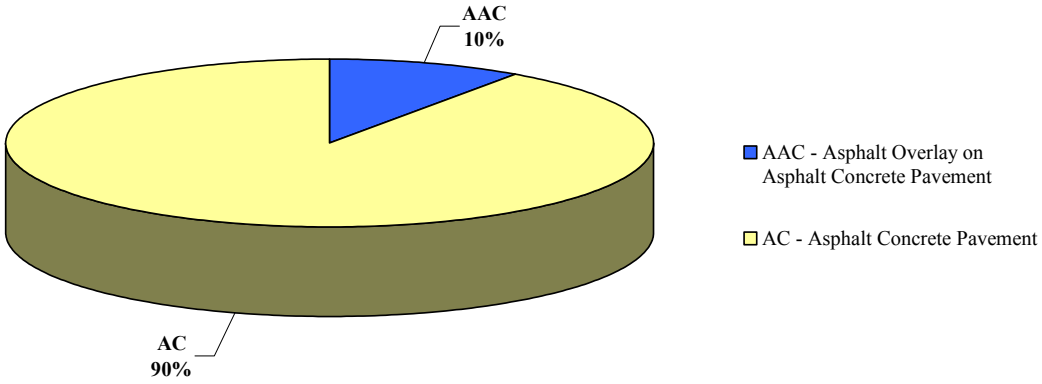
Figure 3-1 presents the breakdown of the pavement area at Crystal River Airport by surface type.

Figure 3-1: Pavement Area by Surface Type



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Details of pavement section information including section dimensions, rank, surface type, last construction date and last inspection date are given in Appendix A.

4. PAVEMENT CONDITION

Pavement conditions were inspected in accordance with the methods outlined in FAA AC 150/5380-6B and ASTM D 5340 "Standard Practice for Airport Pavement Condition Index Surveys." These procedures define distress type, severity and quantity for sampling areas within each section to determine the Pavement Condition Index (PCI).

Pavement condition inspections at Crystal River Airport were performed in October 2006. Data were recorded in the field using hand-held PDA (personal digital assistant) technology. The identifying information for each sample unit was pre-loaded into the PDA, and the survey results were entered directly, at the time of inspection. This simplified data handling and management.

During the inspections Global Positioning System (GPS) coordinates were recorded at the centroid of each sample unit. The centroid is usually the geometric center of the area but in cases where sample units are irregular in shape this is the center of mass. These data are presented in tables on updated Network Definition drawings available from the website.

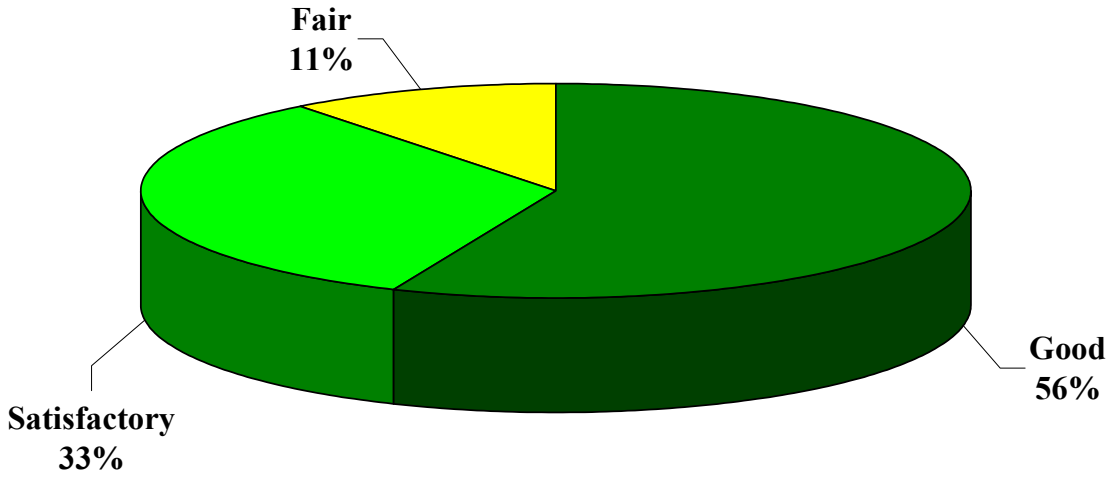
After the completion of data collection, the data were imported into MicroPAVER and PCI values were calculated for the pavement sections.

Appendix B includes detailed distress data generated by MicroPAVER, Appendix C contains a table and a map of PCI results by section inspected in 2006, and Appendix D contains a table of PCI results by branch.

According to the 2006 survey, the overall area-weighted PCI at Crystal River Airport is 84, representing a Satisfactory overall network condition.

Figure 4-1 provides the PCI distribution by rating category for the network.

Figure 4-1: Network PCI Distribution by Rating Category



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Approximately 89% of the network is in Good and Satisfactory condition while 11% of the network is in Fair condition. Table 4-1 illustrates the area-weighted PCI computed individually for each pavement use.

Table 4-1: Condition by Pavement Use

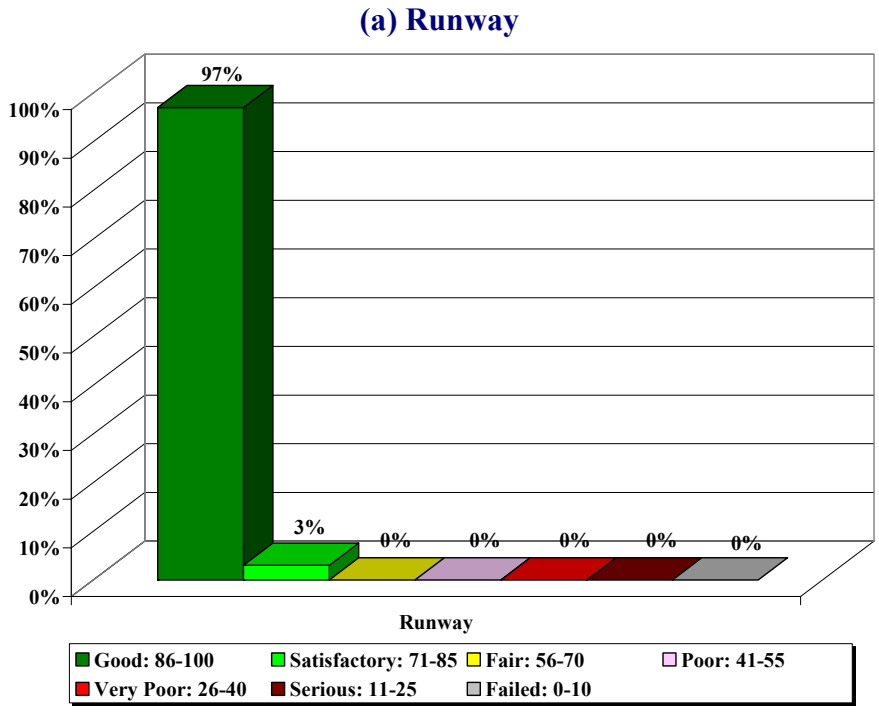
Use	Area-Weighted PCI
Runway	88
Taxiway	81
Apron	81

Prepared by VVD *Checked by TH*

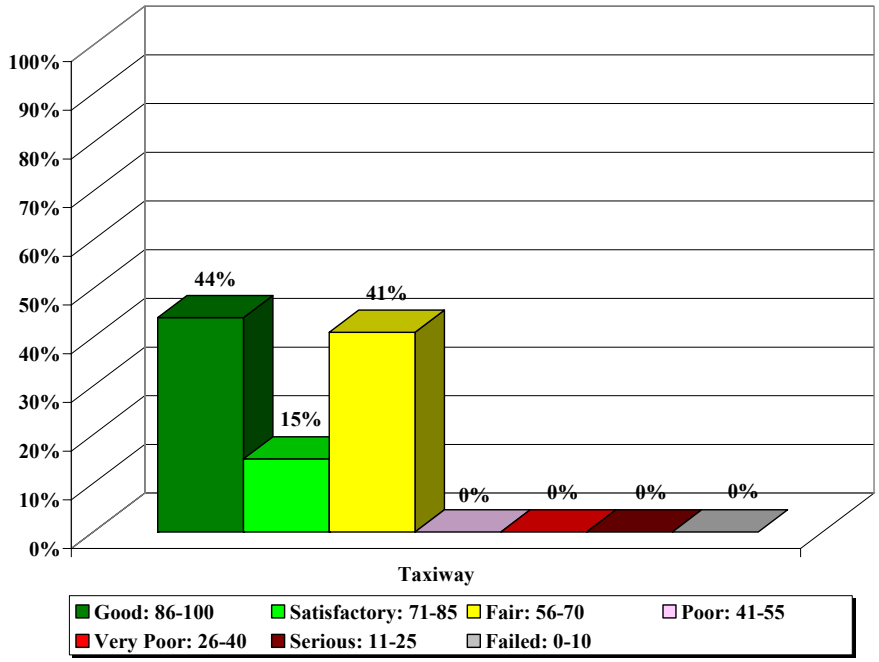
On average, the runways are in Good condition while the taxiways, and aprons are in Satisfactory condition.

Figure 4-2 presents the breakdown of PCI by range for each pavement use.

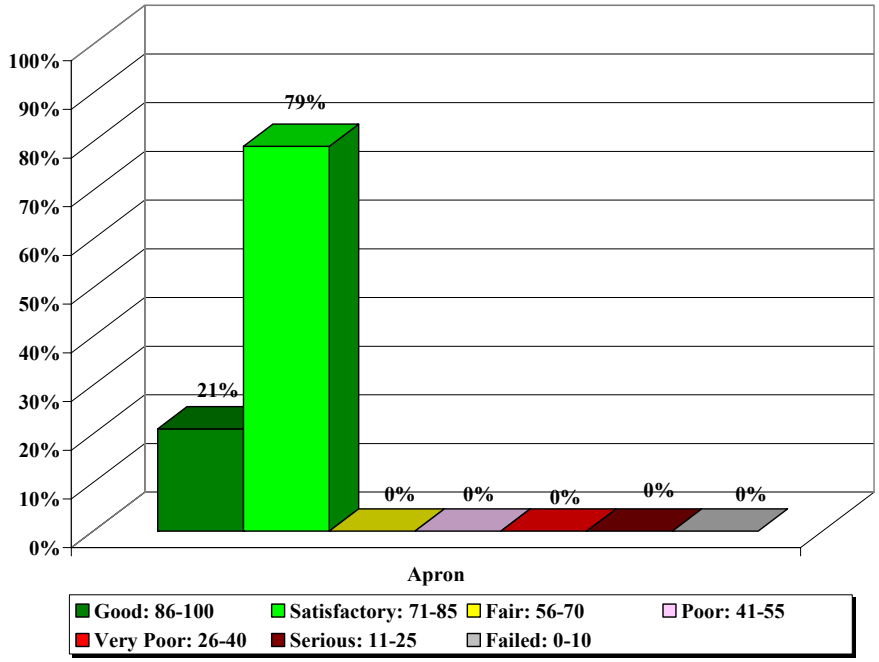
Figure 4-2: Percentage of Pavement Area within Each PCI Range by Pavement Use



(b) Taxiway



(c) Apron



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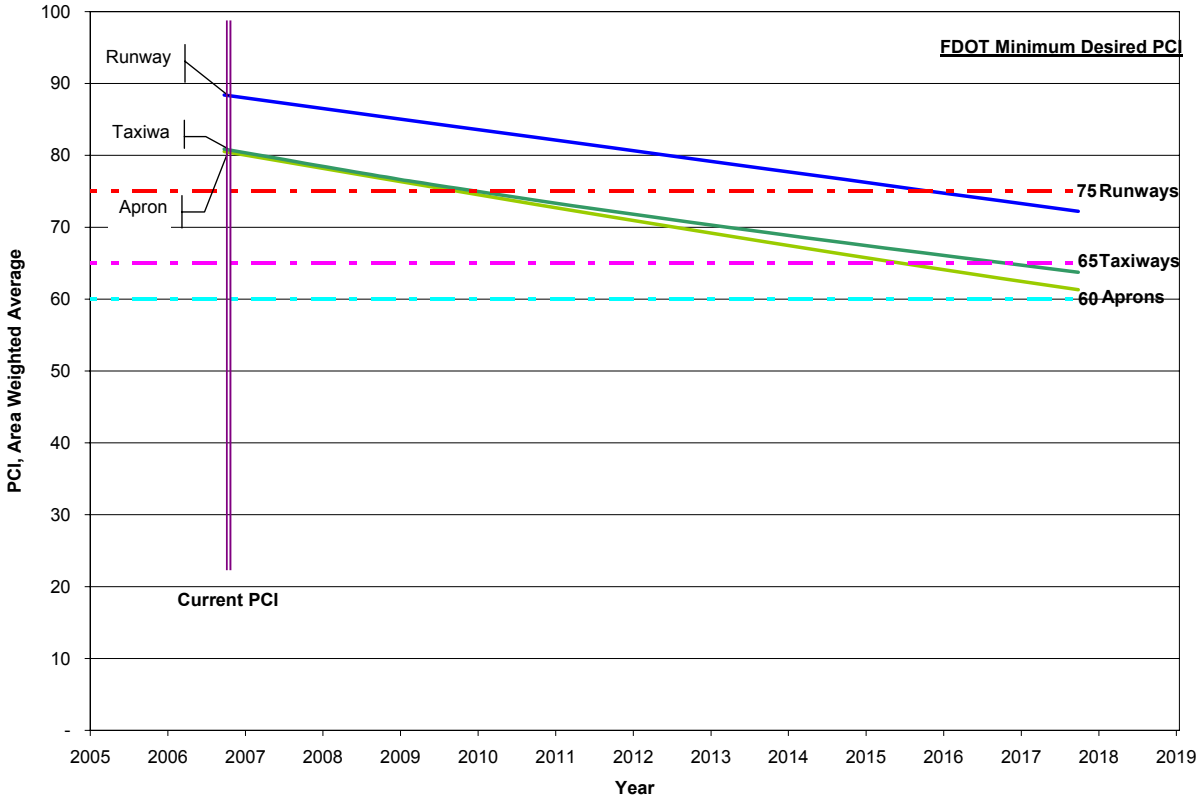
5. PAVEMENT CONDITION PREDICTION

Performance prediction models or deterioration curves for PCI were used to develop a condition forecast. The performance models were developed for combinations of variables such as pavement use (runway, taxiway or apron), surface type (AC or PCC) and airport category (GA, RL, or PR). Figure 5-1 illustrates the predicted performance of pavements at Crystal River Airport based on current condition, age since last construction and the deterioration model appropriate for the type of pavement. The figure presents the forecast for each pavement use and displays the FDOT minimum condition criteria for General Aviation (GA) airports.

Figure 5-1: Predicted PCI by Pavement Use



Prepared by VVD *Checked by TH*

Appendix C presents the tabular summary of the predicted Section PCI for each year from 2008 to 2017.

6. MAINTENANCE POLICIES AND COSTS

6.1 Policies

Maintenance and rehabilitation (M&R) policies are sets of rules used to develop repair recommendations for distresses encountered during the visual inspections.

Maintenance refers to repair-type activities that are applied to specific distress types on the pavement. These activities are preventative and/or corrective in nature, and are recommended to help achieve the performance goal.

Table 6-1 provides the list of the maintenance activities used in MicroPAVER to treat specific distress types. These repairs are used in an analysis only if there is an inspection within one year prior to the first year of the analysis period. MicroPAVER applies repairs to these distresses and adjusts the PCI based on specific rules.

Rehabilitation is warranted when the pavement condition decreases below a critical point such that the deterioration is extensive or rate of deterioration is so great that routine maintenance is no longer cost-efficient. This critical point is called "Critical PCI." The critical PCI levels for different pavement and branch types established in Phase I of Statewide Pavement Management Program were reviewed and updated for development of the M&R plan for the airport. Sections above critical PCI levels receive routine maintenances while pavements predicted to deteriorate below their respective critical PCI level during the analysis period will be identified for Major M&R. Table 6-2 gives the critical PCI levels for General Aviation Airports.

Table 6-1: Routine Maintenance Activities for Airfield Pavements

Surface	Distress	Severity*	Work Type	Code	Work Unit
AC	Alligator Crack	M, H	Patching - AC Deep	PA-AD	SqFt
	Bleeding	N/A	No Localized M&R	NONE	SqFt
	Block Crack	M, H	Crack Sealing – AC	CS-AC	SqFt
	Corrugation	L, M, H	Patching - AC Deep	PA-AD	SqFt
	Depression	M, H	Patching - AC Deep	PA-AD	SqFt
	Jet Blast	N/A	Patching - AC Deep	PA-AD	SqFt
	Joint Ref. Crack	M, H	Crack Sealing – AC	CS-AC	Ft
	L & T Crack	M, H	Crack Sealing – AC	CS-AC	Ft
	Oil Spillage	N/A	Patching - AC Shallow	PA-AS	SqFt
	Patching	M, H	Patching - AC Deep	PA-AD	SqFt
	Polished Agg.	N/A	No Localized M&R	NONE	SqFt
	Raveling	L	Surface Sealing - Rejuvenating	SS-RE	SqFt
		M	Surface Seal - Coal Tar	SS-CT	SqFt
		H	Microsurfacing	MI-AC	SqFt
	Rutting	M, H	Patching - AC Deep	PA-AD	SqFt
	Shoving	M, H	Grinding (Localized)	GR-LL	SqFt
	Slippage Crack	N/A	Patching - AC Shallow	PA-AS	SqFt
	Swelling	M, H	Patching - AC Deep	PA-AD	SqFt
PCC	Blow-Up	L, M, H	Patching - PCC Full Depth	PA-PF	SqFt
	Corner Break	M, H	Patching - PCC Full Depth	PA-PF	SqFt
	Linear Crack	M, H	Crack Sealing – PCC	CS-PC	Ft
	Durability Crack	H	Slab Replacement – PCC	SL-PC	SqFt
		M	Patching - PCC Full Depth	PA-PF	SqFt
	Jt. Seal Damage	M, H	Joint Seal (Localized)	JS-LC	Ft
	Small Patch	M, H	Patching - PCC Partial Depth	PA-PP	SqFt
	Large Patch	M, H	Patching - PCC Full Depth	PA-PF	SqFt
	Popouts	N/A	No Localized M&R	NONE	SqFt
	Pumping	N/A	No Localized M&R	NONE	SqFt
	Scaling	H	Slab Replacement – PCC	SL-PC	SqFt
	Faulting	M, H	Grinding (Localized)	GR-PP	Ft
	Shattered Slab	M, H	Slab Replacement – PCC	SL-PC	SqFt
	Shrinkage Crack	N/A	No Localized M&R	NONE	Ft
	Joint Spall	M, H	Patching - PCC Partial Depth	PA-PP	SqFt
	Corner Spall	M, H	Patching - PCC Partial Depth	PA-PP	SqFt

*L = Low, M = Medium, H = High

Prepared by BX *Checked by TH*

Table 6-2: Critical PCI for General Aviation Airports

Use	Critical PCI
Runway	65
Taxiway	65
Apron	65

Prepared by BX *Checked by TH*

It should be noted that critical PCI is not the same as Minimum PCI or Minimum Condition. The Minimum PCI is a value set by the user so pavement sections are rehabilitated before they fall below the set minimum. Table 6-3 gives the targeted, or desired, Minimum PCI values for runways, taxiways, and aprons of General Aviation Airports.

Table 6-3: Desired Minimum PCI for General Aviation Airports

Minimum PCI		
Runway	**Taxiway**	**Apron**
75	65	60

Prepared by BX *Checked by TH*

Typical Major M&R activities range from overlays to reconstruction. Based on the critical PCI values in Table 6-2 and our experience with pavement management systems, the PCI trigger range when the likely activity would be a mill and resurface was 31 to 55 and reconstruction at a PCI of 30 or lower. One important concept of pavement management systems is that it is cost effective to maintain pavements that are already in good condition rather than wait for them to get worse and require more expensive rehabilitation. With this objective, microsurfacing has been recommended to maintain pavements that have a PCI from 56 and 79. Microsurfacing is a surface treatment suggested for pavements in Fair to Satisfactory condition to extend the pavement life by five to seven years.

Crack sealing and full-depth patching are the M&R activities recommended to repair pavements with PCI values between 80 and 90. MicroPAVER considers these as preventative M&R with their primary objective being to slow the rate of pavement deterioration. While the trigger PCI for mill and overlay has been set to 55, MicroPAVER also assigns mill and overlay to sections with a PCI greater than 55 if they exhibit some structural distress. Table 6-4 summarizes the M&R activities for General Aviation Airports based on PCI value.

Table 6-4: M&R Activities for General Aviation Airports

	Activity	PCI Range
Maintenance	Crack Sealing and Full-Depth Patching	80 and 90
Rehabilitation	Microsurfacing (AC) or Concrete Pavement Restoration (PCC)	56 to 79
	Mill and Overlay (AC) or Concrete Pavement Restoration (PCC)	31 to 55
	Reconstruction	30 and less

Prepared by BX *Checked by TH*

6.2 Unit Costs

FDOT cost databases for airports and highway pavement maintenance and rehabilitation were reviewed in Phase I of Statewide Pavement Mangement Program in order to determine meaningful costs for the program. Table 6-5 presents the unit costs summary.

Table 6-5: Maintenance Unit Costs for FDOT

Code	Name	Cost	Unit
PA-AL	Patching – AC Leveling	$2.00	SqFt
PA-AS	Patching – AC Shallow	$4.00	SqFt
PA-PF	Patching – PCC Full Depth	$50.00	SqFt
PA-PP	Patching – Partial Depth	$35.00	SqFt
SL-PC	Slab Replacement	$15.00	SqFt
CS-PC	Crack Sealing – PCC	$2.00	Ft
UN-PC	Undersealing – PCC	$3.00	Ft
CS-AC	Crack Sealing – AC	$2.00	Ft
GR-PP	Grinding (Localized for PCC)	$20.00	Ft
GR-LL	Grinding (Localized for AC)	$6.00	SqFt
JS-LC	Joint Seal (Localized)	$1.75	Ft
JS-SI	Joint Seal – Silicon	$2.50	Ft
PA-AD	Patching – AC Deep	$7.00	SqFt
OL-AT	Overlay – AC Thin	$1.50	SqFt
SS-CT	Surface Seal – Coal Tar	$0.20	SqFt
SS-RE	Surface Seal – Rejuvenating	$0.15	SqFt
ST-SS	Surface Treatment – Slurry Seal	$0.25	SqFt
ST-ST	Surface Treatment – Sand Tar	$0.25	SqFt
MI-AC	Microsurfacing	$0.90	SqFt

Prepared by BX *Checked by TH*

The improvement in condition due to maintenance actions applied to specific distresses is only performed when an inspection is recent and only in the first year of the M&R analysis. In subsequent years MicroPAVER calculates M&R costs based on expected unit costs for pavements in a range of PCI. That is, for low PCI it is expected that the repair would be significant (e.g. reconstruction) and therefore very costly. Using available unit cost data the Major M&R Cost By Condition table was set up as shown in Table 6-6. The cost assigned to each range of PCI is based on a Transportation Cost Report provided by Office of Planning Policy of FDOT where the unit costs of reconstruction and resurfacing of airfield pavements were included. These costs were then assigned to the appropriate PCI range to arrive at a cost per square foot necessary to restore pavements at that PCI level to new condition, i.e. a PCI of 100.

Table 6-6: M&R Activities and Unit Costs by Condition for General Aviation Airports

	Activity	PCI Trigger	Cost/SqFt
Maintenance	Crack Sealing and Full-Depth Patching	90	$0.06
		80	$0.24
Rehabilitation	Microsurfacing (AC) or Concrete Pavement Restoration (PCC)	70	$0.69
		60	$3.42
	Mill and Overlay (AC) or Concrete Pavement Restoration (PCC)	50	$6.29
		40	$6.29
	Reconstruction	30	$13.62
		20	$13.62

Prepared by BX *Checked by TH*

A 3% inflation rate per year was applied to the unit costs during the M&R analysis.

7. PAVEMENT REHABILITATION NEEDS ANALYSIS

Maintenance and Rehabilitation (M&R) analyses were performed after the condition data were calculated and MicroPAVER was customized with the maintenance policies and cost settings described in the previous section.

The objective of the M&R analysis is to observe the effect of different fiscal scenarios on the network condition, over a period of ten years, starting from 2008. The analysis was conducted using an unlimited budget. An unlimited budget allows all M&R needs to be identified along with the associated cost regardless of priority.

Table 7-1 presents the M&R needs list of immediate needs for Major M&R, i.e. Year 1 of the forecast. The importance of this listing is that it points out the major activities triggered by the current condition of the pavements.

The 10 year forecast results are shown in Figure 7-1, illustrating the effect on pavement condition (PCI) of doing no maintenance versus having unlimited funds and performing all M&R actions based on the policies.

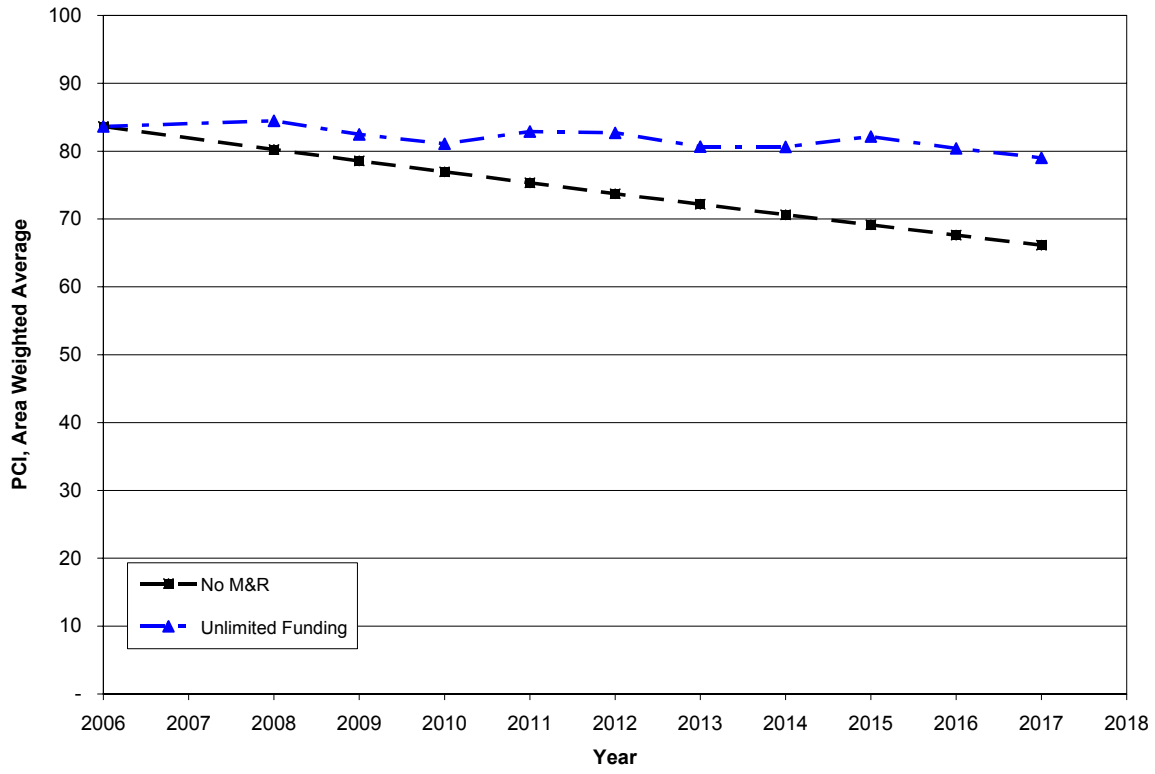
Table 7-1: Summary of Immediate Major M&R Needs

Branch	Section	Section Area, SqFt	Major M&R Funded**	PCI Before	Maintenance	PCI After
AP T-HANG	4205	81,000	$55,890	70	Major M&R >= Critical	100
		Total	**$55,890**	**84***	**← Network Avg. PCI →**	**84***

* This table shows the area-weighted PCI before and after Major M&R and routine maintenance work for the first year of the 10-year plan. It includes all pavement sections at Crystal River Airport, including those sections not shown in this table.
** Cost figures are rounded down. Sum may be different. Costs are adjusted for inflation.

Prepared by VVD *Checked by TH*

Figure 7-1: Budget Scenario Analysis



Prepared by VVD *Checked by TH*

The following network level observations can be made from the figure above:

- The PCI will deteriorate from 84 in 2006 to 66 in 2017 if no M&R activities are performed.
- The PCI will remain at or above 79 through the 10-year analysis period under the unlimited budget scenario. A 2017 PCI of 79 with this scenario is 13 PCI points higher than a "No M&R" scenario. The total cost for Major M&R over this 10-year period is about $600,000.

8. MAINTENANCE AND REHABILITATION PLAN

The M&R analysis results include activities that likely exceed a typical annual budget level. These activities would need to be evaluated for feasibility and desirability based on the airport's future plans. In an effort to identify appropriate budget levels the 10 year M&R analysis was evaluated to determine levels needed to address several specific areas: preventive maintenance, major activities for pavements in poor condition (Major M&R for PCI less than Critical), and activities that would be desirable to preserve good pavement conditions where they exist (Major M&R for PCI greater than or equal to Critical).

Table 8-1 provides the summary results under the critical PCI scenario.

Table 8-1: M&R Costs under Unlimited Funding Scenario

Year	Preventive	Major M&R >= Critical	Major M&R < Critical	Total
2008	$25,199	$55,890	$0	$81,089
2009	$63,470	$0	$0	$63,470
2010	$73,458	$0	$0	$73,458
2011	$67,766	$0	$192,825	$260,591
2012	$70,250	$0	$78,344	$148,594
2013	$83,790	$0	$0	$83,790
2014	$86,747	$0	$82,208	$168,955
2015	$81,622	$0	$219,925	$301,546
2016	$95,938	$0	$0	$95,938
2017	$108,820	$0	$27,338	$136,157
Total	**$757,059**	**$55,890**	**$600,639**	**$1,413,589**

Note: Cost figures are rounded down. Sum may be different. Costs are adjusted for inflation.

Prepared by VVD *Checked by TH*

The M&R analysis suggests an annual budget on the order of $140,000 would be needed for the next 10 years and the majority (54%) of this budget would go to preventive activities rather than major M&R repairs due to the overall Satisfactory condition of the airport. According to the analysis, the major M&R repairs would take place starting from Year 4 (2011). The unlimited budget scenario provides the basis for estimating the total repair cost. In reality, it is neither operationally nor fiscally prudent.

Appendix E provides details of M&R plan by year under the unlimited funding scenario and the map of the 10-year M&R plan was provided in Appendix F. It is important to understand that a PMS is a network level tool and the M&R costs provided in this report are only for planning purposes.

9. VISUAL AIDS

9.1 GIS Linked Shape File

The pavement inventory data and pavement condition were linked to the airport's shape file to graphically show the inventory and condition of the airport via color coding shown on the shape file. The coding provides a visual representation that illustrates the PCIs for each pavement section.

Selected digital photographs taken during the pavement inspection were provided in an Appendix G to provide visual support to special pavement conditions or distress observed during the inspection of the facility.

10. RECOMMENDATIONS

Pavement condition inspections were performed at Crystal River Airport and a 10-year M&R plan was developed based on the unlimited funding scenario.

The following recommendations were made based on 2006 condition inspections and M&R analysis results:

- Runway 9-27 is in overall Good condition, with no immediate need for M&R.
- T-Hangars Apron will require immediate funding to correct some distresses observed. Further evaluation of these features is necessary in order to develop repair plans.

APPENDIX A

NETWORK DEFINITION MAP
AND
PAVEMENT INVENTORY TABLE

Table A-1: Pavement Inventory

Network Name	Network ID	Branch Name	Branch ID	Section ID	Length, Ft	Width, Ft	Area, SqFt	Rank	Surface	Last Const. Date	Last Insp. Date
CRYSTAL RIVER AIRPORT	CGC	MAIN APRON	AP MAIN	4105	550	125	68,750	P	AAC	1/1/1998	10/25/2006
CRYSTAL RIVER AIRPORT	CGC	MAIN APRON	AP MAIN	4110	150	130	19,500	P	AC	1/1/1998	10/25/2006
CRYSTAL RIVER AIRPORT	CGC	MAIN APRON	AP MAIN	4115	230	130	29,900	P	AC	1/1/1998	10/25/2006
CRYSTAL RIVER AIRPORT	CGC	MAIN APRON	AP MAIN	4120	130	387	54,235	P	AC	1/1/2005	1/1/2005*
CRYSTAL RIVER AIRPORT	CGC	T-HANGARS APRON	AP T-HANG	4205	405	200	81,000	T	AC	1/1/1998	10/25/2006
CRYSTAL RIVER AIRPORT	CGC	RUNWAY 9-27	RW 9-27	6105	3,000	60	180,000	P	AC	1/1/2001	10/24/2006
CRYSTAL RIVER AIRPORT	CGC	RUNWAY 9-27	RW 9-27	6110	1,300	60	78,000	P	AC	1/1/2001	10/24/2006
CRYSTAL RIVER AIRPORT	CGC	RUNWAY 9-27	RW 9-27	6115	150	60	9,000	P	AC	1/1/2001	10/24/2006
CRYSTAL RIVER AIRPORT	CGC	RUNWAY 9-27	RW 9-27	6120	150	60	9,000	P	AC	1/1/2001	10/24/2006
CRYSTAL RIVER AIRPORT	CGC	CONNECTOR TAXIWAY TO AP	TW CONN	205	1,400	22	30,800	P	AC	1/1/1965	10/24/2006
CRYSTAL RIVER AIRPORT	CGC	CONNECTOR TAXIWAY TO AP	TW CONN	210	600	30	21,315	P	AC	1/1/1997	10/25/2006
CRYSTAL RIVER AIRPORT	CGC	PARALLEL TAXIWAY TO RW 9-27	TW PARALL	105	2,725	23	63,000	T	AC	1/1/1965	10/24/2006
CRYSTAL RIVER AIRPORT	CGC	PARALLEL TAXIWAY TO RW 9-27	TW PARALL	107	1,500	30	45,000	P	AC	1/1/1992	10/24/2006
CRYSTAL RIVER AIRPORT	CGC	PARALLEL TAXIWAY TO RW 9-27	TW PARALL	109	110	40	7,600	P	AC	1/1/2001	10/24/2006
CRYSTAL RIVER AIRPORT	CGC	PARALLEL TAXIWAY TO RW 9-27	TW PARALL	115	110	30	3,978	P	AC	1/1/1965	10/24/2006

See note at end of table.

Table A-1: Pavement Inventory

Network Name	Network ID	Branch Name	Branch ID	Section ID	Length, Ft	Width, Ft	Area, SqFt	Rank	Surface	Last Const. Date	Last Insp. Date
CRYSTAL RIVER AIRPORT	CGC	PARALLEL TAXIWAY TO RW 9-27	TW PARALL	118	110	40	7,392	P	AC	1/1/2001	10/24/2006
CRYSTAL RIVER AIRPORT	CGC	PARALLEL TAXIWAY TO RW 9-27	TW PARALL	130	110	40	8,000	P	AC	1/1/2001	10/24/2006

Note: If new construction, then survey date = last construction date and PCI is set to 100 by MicroPAVER.

* Sections not surveyed due to reasons such as re-sectioning, no escort, not accessible at the time of survey.

APPENDIX B

PCI RE-INSPECTION REPORT

APPENDIX C

2006 CONDITION MAP AND TABLES

Table C-1: Pavement Condition Index

Network Name	Network ID	Branch Name	Branch ID	Section ID	Length, Ft	Width, Ft	Area, SqFt	Rank	Surface	Last Const. Date	Last Insp. Date	2006 PCI
CRYSTAL RIVER AIRPORT	CGC	MAIN APRON	AP MAIN	4105	550	125	68,750	P	AAC	1/1/1998	10/25/2006	79
CRYSTAL RIVER AIRPORT	CGC	MAIN APRON	AP MAIN	4110	150	130	19,500	P	AC	1/1/1998	10/25/2006	84
CRYSTAL RIVER AIRPORT	CGC	MAIN APRON	AP MAIN	4115	230	130	29,900	P	AC	1/1/1998	10/25/2006	74
CRYSTAL RIVER AIRPORT	CGC	MAIN APRON	AP MAIN	4120	130	387	54,235	P	AC	1/1/2005	1/1/2005*	96
CRYSTAL RIVER AIRPORT	CGC	T-HANGARS APRON	AP T-HANG	4205	405	200	81,000	T	AC	1/1/1998	10/25/2006	73
CRYSTAL RIVER AIRPORT	CGC	RUNWAY 9-27	RW 9-27	6105	3,000	60	180,000	P	AC	1/1/2001	10/24/2006	89
CRYSTAL RIVER AIRPORT	CGC	RUNWAY 9-27	RW 9-27	6110	1,300	60	78,000	P	AC	1/1/2001	10/24/2006	87
CRYSTAL RIVER AIRPORT	CGC	RUNWAY 9-27	RW 9-27	6115	150	60	9,000	P	AC	1/1/2001	10/24/2006	97
CRYSTAL RIVER AIRPORT	CGC	RUNWAY 9-27	RW 9-27	6120	150	60	9,000	P	AC	1/1/2001	10/24/2006	80
CRYSTAL RIVER AIRPORT	CGC	CONNECTOR TAXIWAY TO AP	TW CONN	205	1,400	22	30,800	P	AC	1/1/1965	10/24/2006	70
CRYSTAL RIVER AIRPORT	CGC	CONNECTOR TAXIWAY TO AP	TW CONN	210	600	30	21,315	P	AC	1/1/1997	10/25/2006	74
CRYSTAL RIVER AIRPORT	CGC	PARALLEL TAXIWAY TO RW 9-27	TW PARALL	105	2,725	23	63,000	T	AC	1/1/1965	10/24/2006	96
CRYSTAL RIVER AIRPORT	CGC	PARALLEL TAXIWAY TO RW 9-27	TW PARALL	107	1,500	30	45,000	P	AC	1/1/1992	10/24/2006	69
CRYSTAL RIVER AIRPORT	CGC	PARALLEL TAXIWAY TO RW 9-27	TW PARALL	109	110	40	7,600	P	AC	1/1/2001	10/24/2006	87
CRYSTAL RIVER AIRPORT	CGC	PARALLEL TAXIWAY TO RW 9-27	TW PARALL	115	110	30	3,978	P	AC	1/1/1965	10/24/2006	89

See note at end of table.

Table C-1: Pavement Condition Index

Network Name	Network ID	Branch Name	Branch ID	Section ID	Length, Ft	Width, Ft	Area, SqFt	Rank	Surface	Last Const. Date	Last Insp. Date	2006 PCI
CRYSTAL RIVER AIRPORT	CGC	PARALLEL TAXIWAY TO RW 9-27	TW PARALL	118	110	40	7,392	P	AC	1/1/2001	10/24/2006	73
CRYSTAL RIVER AIRPORT	CGC	PARALLEL TAXIWAY TO RW 9-27	TW PARALL	130	110	40	8,000	P	AC	1/1/2001	10/24/2006	86

Note: If new construction, then survey date = last construction date and PCI is set to 100 by MicroPAVER.
* Sections not surveyed due to reasons such as re-sectioning, no escort, not accessible at the time of survey.

Table C-2: Pavement Condition Prediction

Network ID	Branch ID	Section ID	2006 PCI	PCI Forecast									
				2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
CGC	AP MAIN	4105	79	75	73	71	69	68	66	64	62	60	58
CGC	AP MAIN	4110	84	80	78	76	74	73	71	69	67	66	64
CGC	AP MAIN	4115	74	70	69	67	65	64	62	61	59	58	57
CGC	AP MAIN	4120	96	92	90	88	86	84	82	80	79	77	75
CGC	AP T-HANG	4205	73	69	68	66	65	63	61	60	59	57	56
CGC	RW 9-27	6105	89	86	85	83	82	80	79	77	76	74	73
CGC	RW 9-27	6110	87	84	83	81	80	78	77	75	74	72	71
CGC	RW 9-27	6115	97	94	93	91	90	88	87	85	84	82	81
CGC	RW 9-27	6120	80	77	76	74	73	71	70	68	67	65	64
CGC	TW CONN	205	70	67	66	65	64	63	62	60	59	58	57
CGC	TW CONN	210	74	71	70	69	67	66	65	64	63	61	60
CGC	TW PARALL	105	96	91	88	86	84	82	80	78	76	75	73
CGC	TW PARALL	107	69	67	65	64	63	62	61	60	58	57	56
CGC	TW PARALL	109	87	83	81	79	77	75	74	72	71	70	68
CGC	TW PARALL	115	89	84	82	80	79	77	75	74	72	71	70
CGC	TW PARALL	118	73	70	69	68	67	65	64	63	62	61	59
CGC	TW PARALL	130	86	82	80	78	76	75	73	72	70	69	68

Note: If new construction, then survey date = last construction date and PCI is set to 100 by MicroPAVER.

APPENDIX D

AREA-WEIGHTED PCI RESULTS BY BRANCH

Table D-1 Condition Summary by Branch

Network	Branch Name	2006 PCI
CRYSTAL RIVER AIRPORT	MAIN APRON	84
CRYSTAL RIVER AIRPORT	T-HANGARS APRON	73
CRYSTAL RIVER AIRPORT	RUNWAY 9-27	88
CRYSTAL RIVER AIRPORT	CONNECTOR TAXIWAY TO AP	72
CRYSTAL RIVER AIRPORT	PARALLEL TAXIWAY TO RW 9-27	84

APPENDIX E

MAJOR M&R PLAN BY YEAR

Table E-1: Major M&R Plan by Year

Network	Branch Use	Branch ID	Section ID	Surface	Area, SqFt	Year	PCI Before Maint.	Activities	PCI After Maint.	Cost
CGC	APRON	AP T-HANG	4205	AC	81,000	2008	70	Microsurfacing	100	$55,890
CGC	TAXIWAY	TW CONN	205	AC	30,800	2011	64	Microsurfacing	100	$78,351
CGC	TAXIWAY	TW PARALL	107	AC	45,000	2011	64	Microsurfacing	100	$114,474
CGC	APRON	AP MAIN	4115	AC	29,900	2012	64	Microsurfacing	100	$78,344
CGC	TAXIWAY	TW CONN	210	AC	21,315	2014	64	Microsurfacing	100	$59,250
CGC	TAXIWAY	TW PARALL	118	AC	7,392	2014	63	Microsurfacing	100	$22,958
CGC	APRON	AP MAIN	4105	AAC	68,750	2015	63	Microsurfacing	100	$219,925
CGC	RUNWAY	RW 9-27	6120	AC	9,000	2017	64	Microsurfacing	100	$27,338

APPENDIX F

10-YEAR M&R MAP

APPENDIX G

PHOTOGRAPHS

RW 9-27 Section 6115 SU 98: Low Severity L/T Cracking (October 24, 2006)

RW 9-27 Section 6105 SU 126: Low Severity L/T Cracking (October 24, 2006)

RW 9-27 Section 6110 SU 161: Low to Medium Severity L/T Cracking (October 24, 2006)

TW PARALL Section 118 SU 100: Section Overview (October 24, 2006)

RW 9-27 Section 6110 SU 171: Low Severity Weathering (October 24, 2006)

RW 9-27 Section 6105 SU 131: Low Severity L/T Cracking (October 24, 2006)

TW PARALL Section 107 SU 120: Low Severity Weathering (October 24, 2006)

TW PARALL Section 107 SU 115: Low Severity Weathering (October 24, 2006)

TW PARALL Section 107 SU 100: Overview (October 24, 2006)

TW CONN Section 205 SU 101: Low Severity Patching (October 24, 2006)

TW CONN Section 205 SU 103: Medium Severity Weathering (October 24, 2006)

TW CONN Section 205 SU 103: Low Severity Patching and Medium Severity Weathering (October 24, 2006)

TW CON Section 210 SU 300: Overview (October 24, 2006)

AP T-HANG Section 4205 SU 301: Low Severity Weathering (October 24, 2006)