GWINNETT COUNTY - BRISCOE FIELD

PAVEMENT EVALUATION REPORT

JULY 2002

GEORGIA AVIATION SYSTEM PLAN

The preparation of this document was financed in part through a planning grant from the Federal Aviation Administration, Department of Transportation, under the provisions of the Airport and Airway Improvement Act of 1982, as amended. This financial commitment is not to be construed that the FAA approves of all the recommendations and does not represent a binding financial obligation to provide federal funding. The contents of this publication reflect the views of the author(s), who is responsible for the facts and accuracy of the data presented herein. The opinions, findings and conclusions in this publication are those of the author(s) and not necessarily those of the Department of Transportation, State of Georgia or the Federal Aviation Administration.

GWINNETT COUNTY-BRISCOE FIELD

PAVEMENT EVALUATION REPORT

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July 2002

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PAVEMENT EVALUATION REPORT

Introduction

In 2001, the Georgia Department of Transportation (GDOT), Aviation Programs, retained Wilbur Smith Associates, assisted by Applied Pavement Technology, Inc. (APTech), to update the Georgia Aviation System Plan (GASP). APTech's portion of the project involved updating the 1998 State Airport Pavement Management System (APMS) by reevaluating the 94 general aviation airports included in the original APMS plus incorporating eight commercial service airports. The ultimate goal of this project was to provide the airports and the State with the pavement information and analytical tools that can help them identify pavement related needs, optimize the selection of projects and treatments over a multi-year period, and evaluate the long-term impacts of their project priorities.

As part of the GASP Update, an evaluation of the pavement conditions at Gwinnett County - Briscoe Field was conducted in 2001. The results of this evaluation are presented within this report and can be used by GDOT, the Federal Aviation Administration (FAA), and Gwinnett County - Briscoe Field to monitor the condition of pavements and to identify, prioritize, and schedule pavement maintenance and rehabilitation actions at the airport.

Pavement conditions were assessed using the Pavement Condition Index (PCI) procedure – the industry standard in aviation for visually assessing the condition of pavements. During a PCI inspection, inspectors identify signs of deterioration on the surface of the pavement. The types, severities, and amounts of distress present in a pavement are quantified during the pavement survey. This information is then used to develop a composite index (PCI number) that represents the overall condition of the pavement in numerical terms, ranging from 0 (failed) to 100 (excellent).

The PCI number provides an overall measure of condition and an indication of the level of maintenance or rehabilitation work that will be required to maintain or repair a pavement. This number also provides an objective means of prioritizing and scheduling pavement rehabilitation work. Further, the individual distress information, such as cracking or rutting, provides insight into what is causing the pavement to deteriorate. These factors can then be used to select the appropriate maintenance or rehabilitation action to correct the problem. PCI data also serve as the basis for a computerized APMS – a tool that is used to track pavement condition, identify pavement repair needs, and develop prioritized maintenance and rehabilitation programs with associated schedules and budgets.

The importance of identifying not only the best repair alternative, but also the optimal time of repair, is illustrated in Figure 1. This figure shows that during the first 75 percent of the life of a pavement, approximately 40 percent of the pavement deterioration takes place. After this point, the pavement deteriorates much faster. The financial impact of delaying repairs until the second drop in condition can mean repair expenses 4 to 5 times higher than repairs triggered over the first 75 percent of the pavements life. By evaluating the condition of pavements, and using an

APMS to project future pavement condition, the most economical time to apply pavement maintenance and rehabilitation can be identified.

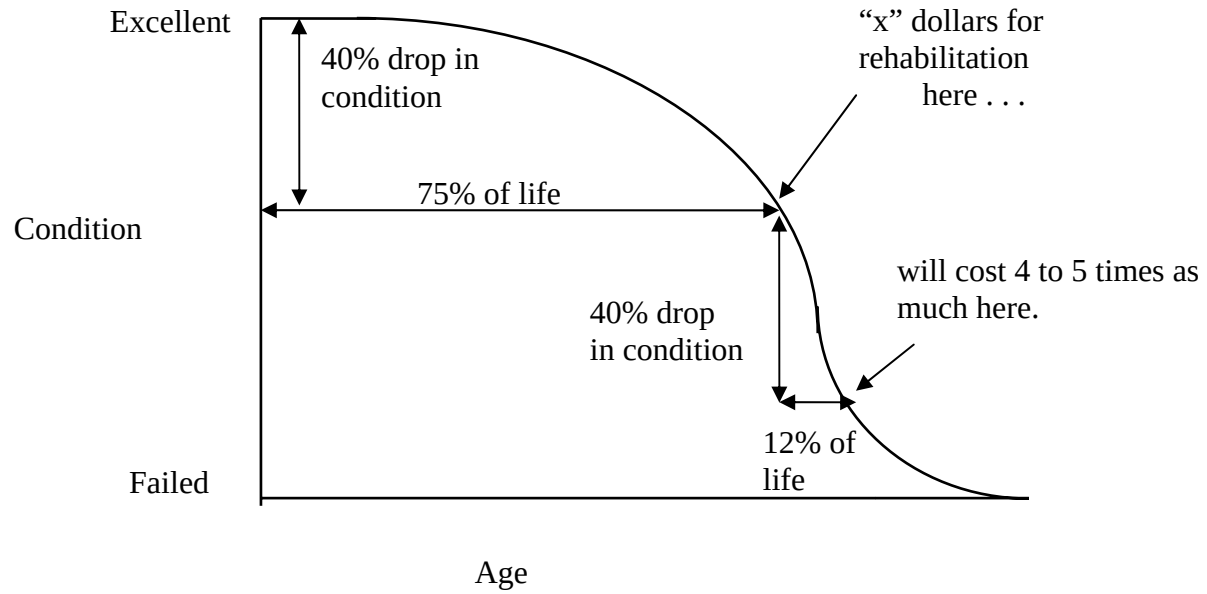

Figure 1. Pavement condition versus cost of repair.

This report contains the results of the 2001 pavement evaluation, as well as a diskette containing the Micro PAVER pavement management software database developed during this project.

Scope of Work

This project included the collection of pavement history information, the development of CAD maps, the evaluation of current pavement condition, and the development of a computerized APMS. The APMS was then used to prepare a 5-year pavement maintenance and rehabilitation program at the state level for the GDOT and the FAA to use as a planning tool.

Individual reports, such as this one, were prepared for each of the project airports to communicate the results of the pavement inspections. A statewide analysis report and an executive summary report were also developed. The statewide analysis report presents the overall results of the study and provides detailed recommendations for future maintenance and rehabilitation actions at the airports. The executive summary presents an overview of the current condition of the State's airports and a summary of the recommended 5-year maintenance and rehabilitation program.

Project Results

Pavement Inventory

Gwinnett County - Briscoe Field has over 3,266,807 square feet of pavement. Figure 2 shows the area of the pavement system, broken out by pavement use (runway, taxiway, and apron). This figure also shows the average age of the pavements.

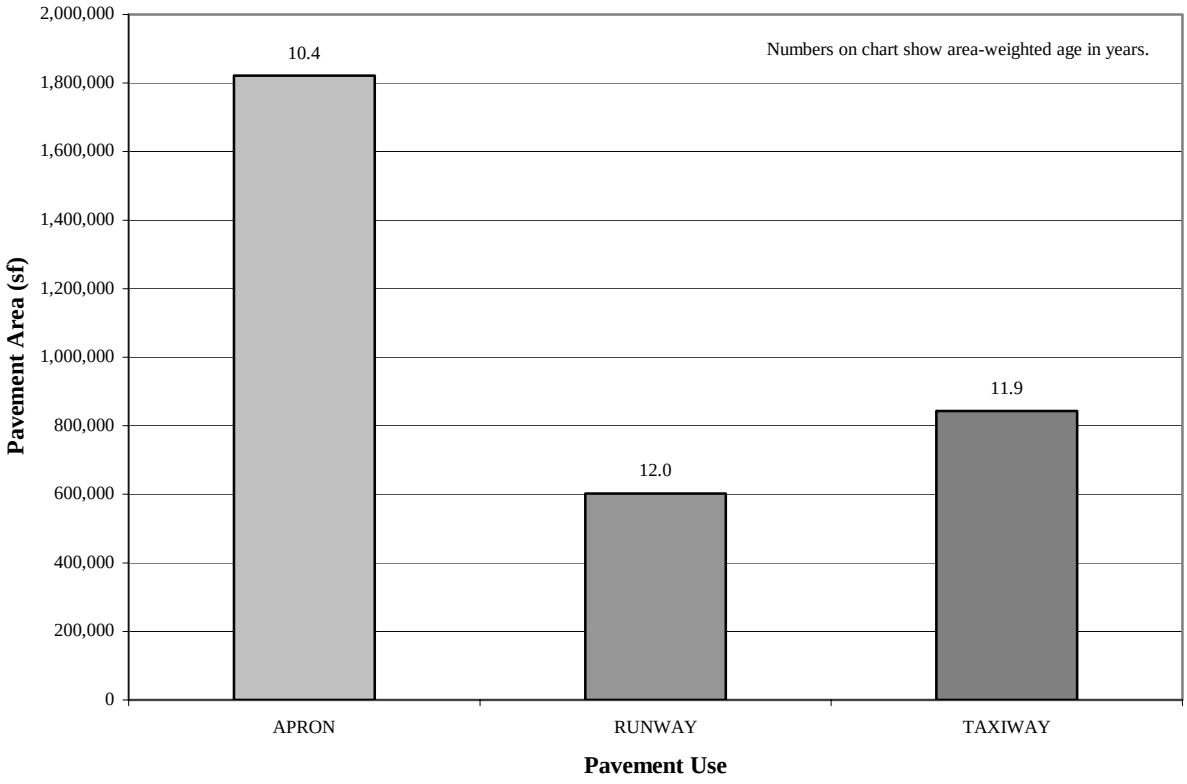

Figure 2. Pavement inventory.

Figure 3 is a network definition map that identifies the pavements at Gwinnett County - Briscoe Field evaluated during this project. This map shows how the pavement network was divided into branches, sections, and sample units for pavement management purposes. It also shows the nomenclature used in the Micro PAVER pavement management database to identify the different pavement areas. Finally, the map summarizes the construction history information compiled during the records review and identifies the areas inspected during the visual survey.

Figure 3. Network Definition Map (11 x 17 except for very large airports that need larger map folded into a map sleeve.

A branch is a single entity that serves a distinct function. For example, a runway is considered a branch because it serves a single function (allowing aircraft to take off and land). Taxiways and aprons are also separate branches.

A branch may be further divided into sections. Traditionally, sections are defined as parts of the branch that share common attributes, such as cross-section, last construction date, traffic level, and performance. Using the traditional approach, if a runway was built in 1968 and then extended in 1984, it would be comprised of two separate sections. A modified approach to defining pavement sections has become increasingly popular with state aviation agencies in recent years and has been adopted by GDOT. The basic premise of this approach is that the section is considered the management unit of the APMS, and that it should represent a pavement area where it is realistic to expect that pavement maintenance or rehabilitation would be undertaken. For example, if a runway was built in 1968 and then extended in 1984, in the database this runway would be represented by a single section, even though there are two distinct construction periods. This is because in the future if repair work is scheduled for that runway it is probable that it will be programmed for the entire runway and not just a portion of it.

To estimate the overall condition of each pavement section, each section is subdivided into sample units. Portions of these sample units are then evaluated during pavement inspections and this information is extrapolated to predict the condition of the section as a whole.

PCI Procedure

APTech inspected the pavements at Gwinnett County - Briscoe Field using the PCI procedure. This procedure is described in FAA AC 150/5380-6 and ASTM Standard D5340. A network-level sampling rate was used during the inspection, and the sample units inspected are identified on the network definition map shown in Figure 3.

The PCI provides a numerical indication of overall pavement condition, as illustrated in Figure 4. The types and amounts of deterioration are used to calculate the PCI value of the section. The PCI ranges from 0 to 100, with 100 representing a pavement in excellent condition. It should be noted that a PCI value is based on visual signs of pavement deterioration and does not provide a measure of structural capacity.

Typical Pavement Surface	PCI
	100
	60
	5

Figure 4. Visual representation of PCI scale.

In general terms, pavements with a PCI of 60 to 100 that are not exhibiting significant load-related distress will benefit from preventive maintenance actions, such as crack sealing and surface treatments. Pavements with a PCI of 40 to 60 may require major rehabilitation, such as an overlay. Often, when the PCI is less than 40, reconstruction is the only viable alternative due to the substantial damage to the pavement structure. Figure 5 illustrates how the appropriate repair type varies with the PCI of a pavement section.

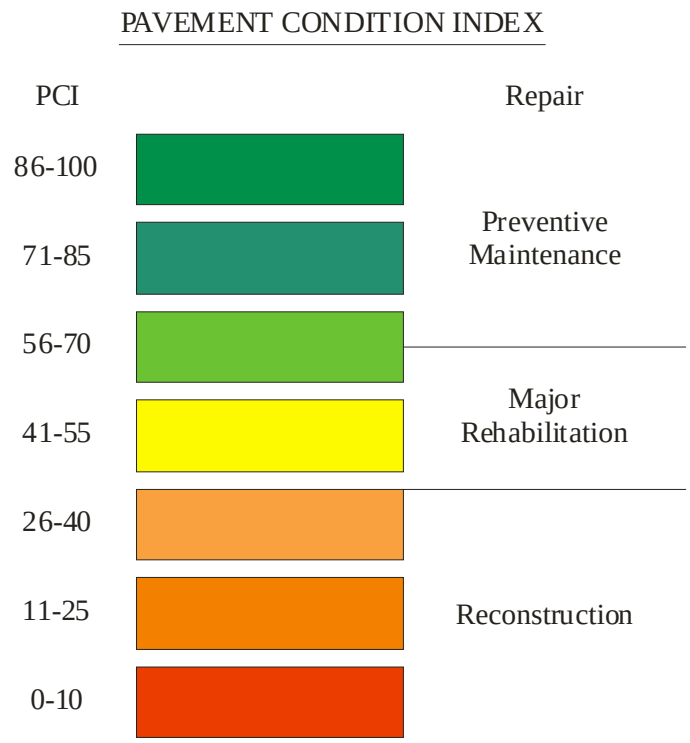

Figure 5. PCI versus repair type.

The types of distress identified during the PCI inspection provide insight into the cause of pavement deterioration. PCI distress types are characterized as load-related (such as alligator cracking on hot-mix asphalt [HMA] pavements or corner breaks on portland cement concrete [PCC] pavements), climate/durability-related (such as weathering [climate-related on HMA pavements) and D-cracking [durability-related on PCC pavements]), and other (distress types that cannot be attributed solely to load or climate/durability). Understanding the cause of distress helps in selecting a rehabilitation alternative that corrects the cause and thus eliminates its recurrence.

Appendix A contains tables for asphalt and concrete pavements indicating the typical types of distresses that may be identified during a PCI survey, the likely cause of each distress type, and feasible maintenance strategies for addressing each distress type.

Inspection Comments

The inspection of Gwinnett County-Briscoe Field was completed on October 20, 2001. Twenty-nine sections were defined for the purpose of this inspection.

Runway 7-25

Runway 7-25 is composed of just one section, R725LW-10, that is fair condition. The majority of the distresses are environmentally related but there are some areas containing load-associated distress. The load-associated distresses were found in small quantities and are low and medium-severity alligator cracking. The environmental distresses found are low and medium-severity

longitudinal and transverse (L&T) cracking and low-severity weathering. The only other distress type identified is low-severity patching.

Taxiways

The parallel taxiway is composed of three sections although two of them are run-up areas adjacent to the mainline. Section TALW-10 is the mainline section and is in fair condition. The predominant distress is sealed, low-severity L&T cracking. Other distresses included low-severity patching and low-severity weathering. Sections TALW-20 and TALW-30 represent the run-up pads and both are in excellent condition with no noted distress.

Section TBLW-10 is a connector taxiway and is in good condition. Sealed and unsealed, low-severity L&T cracks are the predominant distress. Other distresses include low and medium-severity weathering and a low-severity depression.

The portion of Taxiway C west of Taxiway D has been removed leaving approximately half of the sample units from the previous survey. The taxiway is only one section TCLW-10, and is in poor condition with significant amounts of distress, although none are rated high-severity. The predominant distresses identified include low and medium-severity alligator, block, and L&T cracking.

Taxiway C1 is a short connector taxiway constructed in 2000. The taxiway consists of one section, TC1LW-10, and it is in excellent condition with no observed distress.

Taxiways D, E, F, and G are parallel to each other, have similar work histories, are each composed of one section, and all have similar conditions. The section designations fore these sections are TDLW-10, TELW-10, TFLW-10, and TGLW-10. The taxiways are in good condition with moderate amounts of sealed and unsealed, low and medium-severity L&T cracking and small quantities of low and medium-severity weathering. TDLW-10 also contains relatively small quantities of low-severity alligator cracking.

Taxiway H has had portions realigned since the 1998 condition inspections requiring the section to be split into three sections. Section THLW-10 is in fair condition with significant amounts of low and medium-severity block cracking. Section THLW-20 was constructed since the previous inspection and is in excellent condition with no noted distresses. Section THLW-30 is in fair condition with significant amounts of low and medium-severity block cracking and small quantities of weathering.

Aprons

The airport has several distinct apron areas located around the airport. Branch A01 is located on the north side of the airport and is comprised of sections A01LW-10 through A01LW-70. Section A01LW-10 is in very good condition with small quantities of low-severity L&T cracking and patching noted.

A01LW-20 is the largest section in the branch and it is in good condition. Sealed and unsealed, low and medium-severity L&T cracking are the predominant distresses. In several areas, small

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LOCATION: Gwinnett County - Briscoe Field
Lawrenceville, Georgia

PAGE TITLE: Pavement Condition Index Map

PROJECT DATE:	CREATION DATE:	PROJECT MANAGER:	JOB NUMBER:
19-Dec-02	19-Dec-02	MRB	00-060-AM1
DRAWING SCALE:	LAST MODIFIED DATE:	REVISED BY:	DRAWN BY:
1" = 500'	8/5/2002	JJS	KMP
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ruts from standing aircraft were also identified, and the seal coat is starting to age but has not deteriorated enough to be considered a distress.

Section A01LW-30 is in poor condition with significant quantities of distress. The section is exhibiting relatively high amounts of all severity levels of alligator cracking along with large areas of low and medium-severity patches.

Section A01LW-40 is in poor condition with all severity levels of shattered slabs and corner breaks. Also identified in this section are low and medium-severity linear cracks, patches, and joint spalls.

Section A01LW-50 is in very good condition with limited amounts of unsealed, low-severity L&T cracking and oil spillage.

Section A01LW-60 is in good condition but is exhibiting some load related distresses; predominantly low-severity alligator cracking. Other distresses include unsealed, low-severity L&T cracking and low-severity weathering.

Section A01LW-70 is in poor condition with significant amounts of medium- and high-severity alligator cracking. Other observed distresses include low and medium-severity block cracking, L&T cracking, and weathering.

Apron branches A02, A03, and A04 are all located on the south side of the facility. A02 is composed of two sections in the southwest corner of the facility. Section A02LW-10 is in good condition with moderate amounts of sealed, low-severity L&T cracking. A few areas of low-severity patching and low-severity weathering are also noted. Section A02LW-20 has been constructed since the 1998 condition inspections, and it is in excellent condition with no noted distresses.

Branch A03 is located to the east of section A02LW-10 and is composed of two sections. Section A03LW-10 is in good condition with moderate amounts of sealed, low-severity L&T cracking. It should be noted that the surface treatment is beginning to age but it has not deteriorated enough to be considered a distress. Section A02LW-20 is newly constructed pavement and is exhibiting no distress.

Sections A04LW-10 and A04LW-20 are located off of Taxiway A between Taxiways E and F. A04LW-10 is in good condition with the predominant distress being unsealed, low-severity L&T cracking. A04LW-20 connects the previous section with Taxiway A, and it is in excellent condition. Relatively small quantities of unsealed, low-severity L&T cracking were observed.

T-Hangers

There are two T-hanger areas at this airport and both are constructed from PCC. THANGLW-10 is in fair condition with the predominant distresses being linear cracks of all severity levels. Also noted on the section were low-severity shattered slabs, shrinkage cracking, low-severity patching, low-severity corner breaks, and low-severity joint spalling.

THANGLW-20 is in good condition with moderate amounts of low-severity linear cracks and shrinkage cracking. Other observed distresses include low-severity corner breaks and medium-severity linear cracks. This section did not have any joint sealant present.

Overall Pavement Condition

The 2001 area-weighted condition of Gwinnett County - Briscoe Field is 78, with conditions ranging from 11 to 100 [on a scale of 0 (failed) to 100 (excellent)]. Figures 6 and 7 provide graphs summarizing the overall condition of the pavements at Gwinnett County - Briscoe Field. Figure 8 is a map that displays the condition of the pavements evaluated. Table 1 summarizes the results of the pavement evaluation.

Appendix B presents photographs taken during the PCI inspection, and Appendix C contains a detailed inspection report. The detailed inspection report provides information on the quantity of the different types and severities of distresses observed during the visual survey.

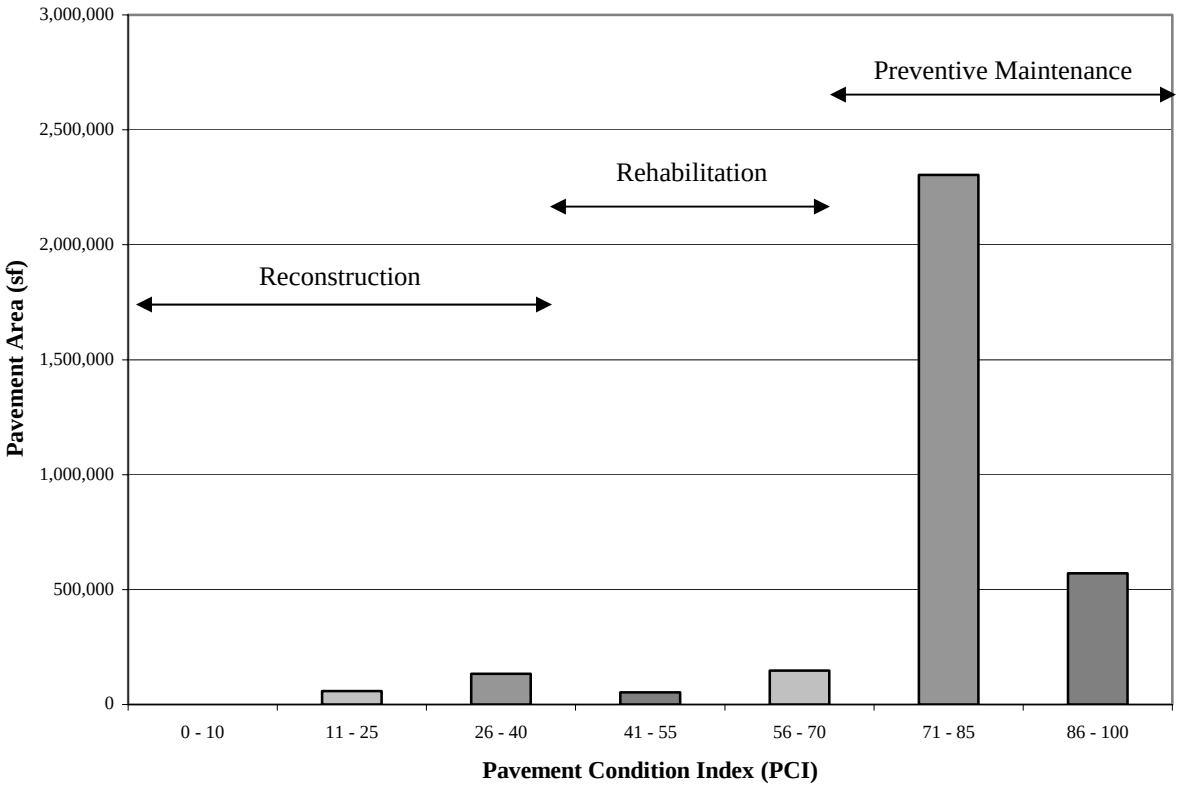


Figure 6. Condition distribution.

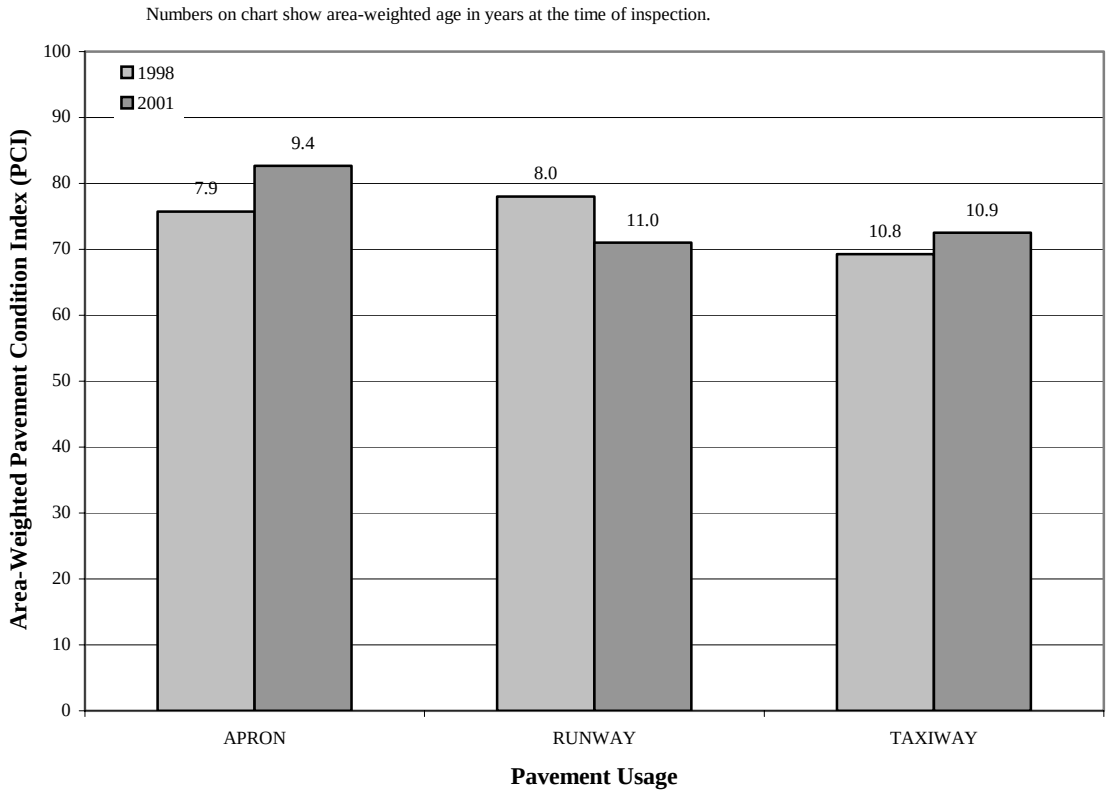


Figure 7. Condition by use.

Figure 8. INSERT PCI MAP
(11 x 17)

Table 1. 2001 pavement inspection results.

GWINNETT COUNTY – BRISCOE FIELD								
BRANCH ID	SECTION ID	SURFACE TYPE [1]	SECTION AREA (sf)	LCD [2]	2001 PCI	% Distress due to:		DISTRESS TYPES [5]
						LOAD [3]	CLIMATE OR DURABILITY [4]	
A01LW	10	AAC	165,750	1991	97	0	62	PATCHING, L & T CR, OIL SPILLAGE
A01LW	20	AAC	765,825	1991	85	29	71	L & T CR, PATCHING, RUTTING
A01LW	30	AAC	12,230	1970	11	71	29	ALLIGATOR CR, L & T CR, PATCHING
A01LW	40	PCC	11,700	1970	16	80	7	LARGE PATCH, CORNER BREAK, JOINT SPALL, JT SEAL DMG, LINEAR CR, SHAT. SLAB, SCALING
A01LW	50	AAC	5,250	1991	95	0	63	OIL SPILLAGE, L & T CR
A01LW	60	AAC	34,530	1991	71	54	46	L & T CR, WEATH/RAVEL, ALLIGATOR CR
A01LW	70	AAC	34,325	1970	20	40	59	L & T CR, WEATH/RAVEL, BLOCK CR, OIL SPILLAGE, PATCHING, ALLIGATOR CR
A02LW	10	AC	227,500	1990	78	0	100	L & T CR, WEATH/RAVEL, PATCHING
A02LW	20	AC	154,541	2000	100	0	0	N/A
A03LW	10	AC	192,000	1990	79	0	100	L & T CR
A03LW	20	AC	50,874	2000	100	0	0	N/A
A04LW	10	AC	24,750	2000	90	0	13	L & T CR, PATCH/UT CUT
A04LW	20	AC	11,503	2000	97	0	100	L & T CR
R725LW	10	AC	602,100	1990	71	35	65	WEATH/RAVEL, PATCHING, L & T CR, ALLIGATOR CR
TALW	10	AC	311,600	1990	78	0	100	L & T CR, PATCHING, WEATH/RAVEL
TALW	20	AC	20,838	2000	100	0	0	N/A
TALW	30	AC	34,152	2000	100	0	0	N/A
TBLW	10	AC	23,300	1990	77	28	71	WEATH/RAVEL, DEPRESSION, L & T CR, ALLIGATOR CR
TC1LW	10	AC	16,149	2000	100	0	0	N/A
TCLW	10	AAC	133,768	1979	32	41	59	L & T CR, BLOCK CR, ALLIGATOR CR, WEATH/RAVEL
TDLW	10	AC	45,237	1990	64	64	36	L & T CR, WEATH/RAVEL, PATCHING, ALLIGATOR CR
TELW	10	AC	48,640	1990	78	23	77	L & T CR, WEATH/RAVEL, ALLIGATOR CR
TFLW	10	AC	34,870	1990	80	0	100	L & T CR, WEATH/RAVEL
TGLW	10	AC	34,081	1990	77	0	99	BLEEDING, L & T CR

Table 1 (continued). 2001 pavement inspection results.

BRANCH ID	SECTION ID	SURFACE TYPE [1]	SECTION AREA (sf)	LCD [2]	2001 PCI	% Distress due to:		DISTRESS TYPES [5]
						LOAD [3]	CLIMATE OR DURABILITY [4]	
THANGLW	10	PCC	102,085	1994	65	72	21	SHRINKAGE CR, CORNER SPALL, JOINT SPALL, JT SEAL DMG, LARGE PATCH, LINEAR CR, SHAT. SLAB, CORNER BREAK
THANGLW	20	PCC	29,086	1999	71	70	27	LINEAR CR, CORNER BREAK, JT SEAL DMG, SHAT. SLAB, SHRINKAGE CR
THLW	10	AC	26,143	1990	53	0	100	BLOCK CR
THLW	20	AC	86,603	2000	100	0	0	N/A
THLW	30	AC	27,377	1990	54	0	100	BLOCK CR, WEATH/RAVEL

NOTES:

[1]See Figure 3 for the location of the branch.

[2] AC = asphalt cement concrete; AAC = asphalt overlay on AC; PCC = portland cement concrete; APC = asphalt overlay on PCC.

[3] LCD = last construction date.

[4] Distress due to load includes those distresses attributed to a structural deficiency in the pavement, such as alligator (fatigue) cracking, rutting, or shattered concrete slabs.

[5]Distress due to climate or durability includes those distresses attributed to either the aging of the pavement and the effects of the environment (such as weathering and raveling or block cracking in asphalt pavements) or to a materials-related problem (such as durability cracking in a concrete pavement).

[6] L & T CR = longitudinal and transverse cracking.

5-Year Pavement Maintenance and Rehabilitation Recommendations

As part of the statewide analysis, a 5-year pavement maintenance and rehabilitation program was developed for Gwinnett County - Briscoe Field. The initial steps in generating this program were developing maintenance policies and determining unit cost information for maintenance and rehabilitation actions. A copy of this information is provided in Appendix D. Please note that this information was developed in conjunction with the GDOT and is of a general nature for the entire state.

For purposes of this analysis, pavement repair was categorized as follows:

- major rehabilitation (reconstruction, overlay), and
- localized preventive maintenance (a preventive maintenance action that is applied only to a distressed area, such as crack sealing or patching).

Many budget scenarios were investigated during the statewide analysis, and the results of those may be found in the statewide detailed analysis report. For the purposes of this report, however, only the results of the unlimited budget scenario (where all identified projects are funded) are presented. The analysis results identify those pavement areas that are predicted to need major rehabilitation within the next 5 years, as well as those recommended for preventive maintenance actions.

An unlimited budget was used in the analysis with the goal of maintaining the pavement above its critical PCI value. For runway pavements this value is 65. The rest of the pavements on the airport were assigned a value of 60. In general, preventive maintenance is recommended for pavements with a PCI above the critical value while major rehabilitation is recommended for pavements that have a PCI below the critical value. An inflation rate of 3 percent was used during the analysis.

A summary of the 5-year pavement maintenance and rehabilitation program is presented in Table 2. Detailed information on the recommendations for localized maintenance in Year 1 of the analysis is contained in Appendix E and Appendix F. In Year 1, all distresses observed during the inspection are considered in determining viable localized maintenance projects. Preventive maintenance recommendations that are identified in subsequent years only address crack sealing those cracks in asphalt pavements that were rated as low severity at the time of inspection.

Note that these recommendations are based upon a broad network level analysis and are meant to provide the Airport with an indication of the type of pavement-related work required during the next 5 years. Further engineering investigation will need to be performed to identify exactly which repair action is most appropriate and to more accurately estimate the cost of such work. In addition, the cost estimates provided were based on a statewide policy and each airport should adjust the maintenance policies and unit costs to match its own approach to pavement maintenance and to reflect local costs.

Major rehabilitation projects may be clustered in the first year of the analysis. Obviously, for economic and operational reasons, this work will often need to be distributed over several years. It is important to remember that regardless of the recommendations presented within this report, the Airport is responsible for repairing pavements where existing conditions pose a hazard to safe operations.

Table 2. 5-year program under an unlimited funding analysis scenario.

Branch[1]	Section	Year	Type of Repair[2]	Estimated Cost[3]
R725LW	10	2002	Preventive	$3,479
TCLW	10	2002	Major M&R	$282,148
TDLW	10	2002	Major M&R	$34,028
THLW	10	2002	Major M&R	$19,665
THLW	30	2002	Major M&R	$20,594
A01LW	10	2002	Preventive	$568
A01LW	20	2002	Preventive	$2,160
A01LW	30	2002	Major M&R	$27,640
A01LW	40	2002	Major M&R	$26,442
A01LW	60	2002	Major M&R	$25,974
A01LW	70	2002	Major M&R	$77,575
THANGLW	10	2002	Major M&R	$76,791
THANGLW	20	2002	Major M&R	$21,879
R725LW	10	2006	Preventive	$65,315
TALW	10	2006	Preventive	$32,643
TBLW	10	2006	Preventive	$857
TELW	10	2006	Preventive	$3,227
TFLW	10	2006	Preventive	$2,419
TGLW	10	2006	Preventive	$2,711
A01LW	20	2006	Preventive	$22,592
A02LW	10	2006	Preventive	$24,945
A03LW	10	2006	Preventive	$22,086

[1]See Figure 3 for the location of the branch.

[2]Major Rehabilitation: overlay, mill and overlay, reconstruction, and so on;
Preventive Maintenance: crack sealing, patching, joint resealing, and so on.

[3]Cost estimates based on broad statewide policy and should be adjusted to reflect local costs.

General Maintenance Recommendations

In addition to the specific maintenance actions presented in Appendix E and Appendix F, it is recommended that the following strategies be considered for prolonging pavement life:

1. Conduct an aggressive campaign against weed growth through timely herbicide applications. Vegetation growing in pavement cracks is very destructive and significantly increases the rate of pavement deterioration.

2. Implement a periodic crack sealing program. Keeping water and debris out of the pavement system through sealing cracks is a proven method for cost-effectively extending the life of the pavement system.

3. Closely monitor heavy equipment movement, such as construction equipment, emergency equipment, and fueling equipment, to make sure that it is only operating on pavement designed to accommodate the heavy loads this type of equipment often applies.

Failure to restrict heavy equipment to appropriate areas may result in the premature failure of Airport pavements.

Summary

This report documents the results of the pavement evaluation conducted at Gwinnett County - Briscoe Field. During a visual inspection of the pavements in 2001, it was found that the overall condition of the pavement network is a PCI of 78. A 5- year pavement repair program was generated for the Airport, which revealed that approximately $795,738 needs to be expended on the pavement system in order to preserve its condition.

APPENDIX A

CAUSE OF DISTRESS TABLES

Table A-1. Cause of pavement distress, asphalt-surfaced pavements.

Distress Type	Probable Cause of Distress	Feasible Maintenance Strategies
Alligator Cracking	Fatigue failure of the asphalt concrete surface under repeated traffic loading	If localized, partial- or full-depth asphalt patch. If extensive, major rehabilitation needed.
Bleeding	Excessive amounts of asphalt cement or tars in the mix and/or low air void content	Spread heated sand, roll, and sweep. Another option is to plane excess asphalt. Or, remove and replace.
Block Cracking	Shrinkage of the asphalt concrete and daily temperature cycling; it is not load associated	At low severity levels, crack seal and/or surface treatment. At higher severities, consider overlay.
Corrugation	Traffic action combined with an unstable pavement layer	If localized, mill. If extensive, remove and replace.
Depression	Settlement of the foundation soil or can be "built up" during construction	Patch.
Jet Blast	Bituminous binder has been burned or carbonized	Patch.
Joint Reflection	Movement of the concrete slab beneath the asphalt concrete surface because of thermal and moisture changes	At low and medium severities, crack seal. At higher severities, especially if extensive, consider overlay.
Longitudinal and Transverse Cracking	Cracks may be caused by 1) poorly constructed paving lane joint, 2) shrinkage of the AC surface due to low temperatures or hardening of the asphalt, or 3) reflective crack caused by cracks in an underlying PCC[1] slab	At low and medium severity levels, crack seal. At higher severities, especially if extensive, consider overlay options.
Oil Spillage	Deterioration or softening of the pavement surface caused by the spilling of oil, fuel, or other solvents	Patch.
Patching	N/A	Replace patch if deteriorated.
Polished Aggregate	Repeated traffic applications	Aggregate seal coat is one option. Could also groove or mill. Overlay is another option.
Raveling and Weathering	Asphalt binder may have hardened significantly	Patch if isolated. If low-severity, consider surface treatment if extensive. At medium and high severity levels, consider major rehabilitation if extensive.
Rutting	Usually caused by consolidation or lateral movement of the materials due to traffic loads	Patch medium and high severity levels if localized. If extensive, consider major rehabilitation.
Shoving	Where PCC pavements adjoin flexible pavements, PCC "growth" may shove the asphalt pavement	Mill and patch as needed.
Slippage Cracking	Low strength surface mix or poor bond between the surface and next layer of pavement structure	Partial- or full-depth patch.
Swelling	Usually caused by frost action or by swelling soil	Patch if localized. Major rehabilitation if extensive.

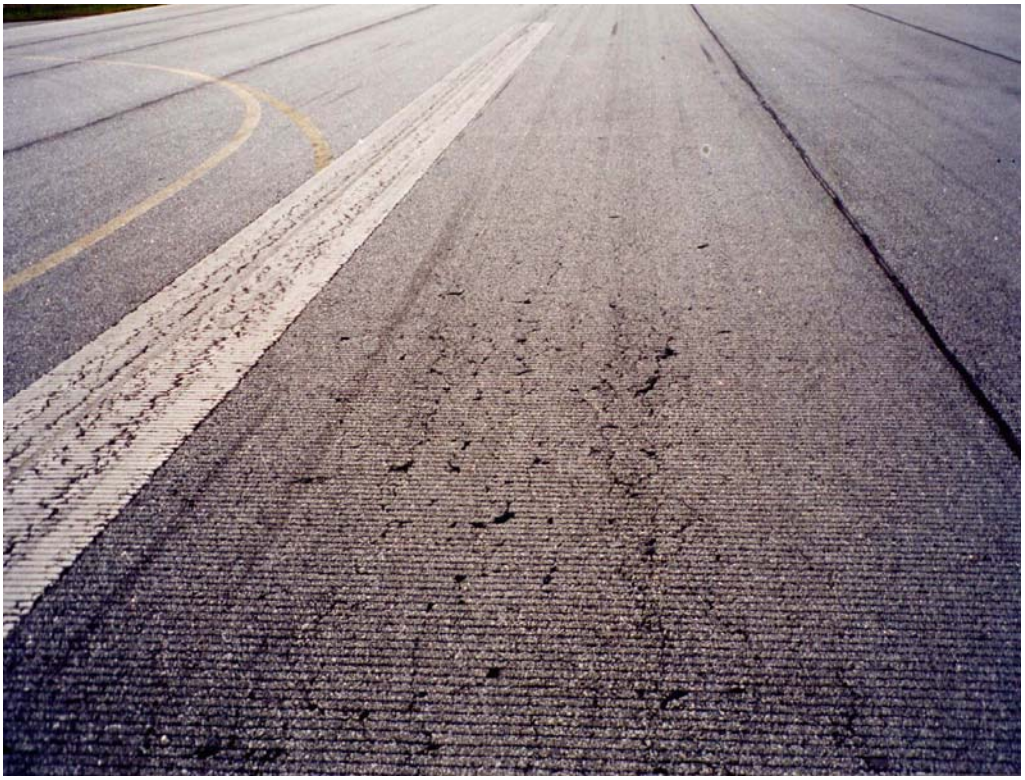
[1]PCC: portland cement concrete

Table A-2. Cause of pavement distress, portland cement concrete pavements.

Distress Type	Probable Cause of Distress	Feasible Maintenance Strategies
Blow-Up	Incompressibles in joints	Partial- or full-depth patch. Slab replacement.
Corner Break	Load repetition combined with loss of support and curling stresses	Seal cracks at low severity. Full-depth patch.
Cracks	Combination of load repetition, curling stresses, and shrinkage stresses	Seal cracks. At high severity, may need full-depth patch or slab replacement.
Durability Cracking	Concrete's inability to withstand environmental factors such as freeze-thaw cycles	Full-depth patch if present on small amount of slab. At higher severity levels, once it has appeared on most of slab, slab replacement.
Joint Seal Damage	Stripping of joint sealant, extrusion of joint sealant, weed growth, hardening of the filler (oxidation, loss of bond to the slab edges, or absence of sealant in joint	Replace joint seal.
Patching (Small and Large)	N/A	Replace patches if deteriorated.
Popouts	Freeze-thaw action in combination with expansive aggregates	Monitor.
Pumping	Poor drainage, poor joint sealant	Seal cracks and joints. Underseal is an option if voids have developed. Establish good drainage.
Scaling	Overfinishing of concrete, deicing salts, improper construction, freeze-thaw cycles, poor aggregate, and alkali-silica reactivity	At low severity levels, do nothing. At medium and high severity levels, partial-depth patches or slab replacement.
Settlement	Upheaval or consolidation	At higher severity levels, leveling patch or grind to restore smooth ride.
Shattered Slab	Load repetition	Replace slab.
Shrinkage	Setting and curing of the concrete	Monitor.
Spalling (Joint and Corner)	Excessive stresses at the joint caused by infiltration of incompressible materials or traffic loads; weak concrete at joint combined with traffic loads	Partial-depth patch.

APPENDIX B

PHOTOGRAPHS



Alligator cracking in section R725LW-10.

L&T cracking in section R725LW-10.

Patch in section R725LW-10.

Overview of paving lane and longitudinal crack in section R725LW-10.

Overview of section TCLW-10.

Overview of block cracking in section TCLW-10.

Overview of section TDLW-10.

Overview of section TELW-10.

Overview of section TFLW-10.

Overview of section TGLW-10.

Overview of section THLW-10.

Overview of section THLW-20.

Overview of sections THLW-20 and A01LW-20.

Overview of section THLW-30.

Overview of section A01LW-10.

Overview of sections A01LW-10 and THANGLW-10.

Overview of section A01LW-20.

Overview of section A01LW-30.

Shattered slab in section A01LW-40.

Overview of section A01LW-60.

APPENDIX C

INSPECTION REPORT

APPENDIX D

MAINTENANCE POLICIES AND UNIT COSTS

Table D-1. GDOT's preventive maintenance policy, asphalt-surfaced pavements.

Distress Type	Severity Level	Maintenance Action
Alligator Cracking	Low	Monitor
	Medium	Patch (major rehabilitation if extensive)
	High	Patch (major rehabilitation if extensive)
Bleeding	N/A	Monitor (major rehabilitation required if skid resistance significantly impacted by the distress)
Block Cracking	Low	Monitor
	Medium	Crack Seal
	High	Crack Seal (major rehabilitation if extensive)
Corrugation	Low	Monitor
	Medium	Patch (major rehabilitation if extensive)
	High	Patch (major rehabilitation if extensive)
Depression	Low	Monitor
	Medium	Patch
	High	Patch
Jet Blast	N/A	Patch
Joint Reflection Cracking	Low	Monitor
	Medium	Crack Seal
	High	Crack Seal (major rehabilitation if extensive)
Longitudinal and Transverse Cracking	Low	Monitor
	Medium	Crack Seal
	High	Crack Seal (major rehabilitation if extensive)
Oil Spillage	N/A	AC Patch
Patching	Low	Monitor
	Medium	Monitor
	High	Patch
Polished Aggregate	N/A	Monitor (major rehabilitation required if skid resistance significantly impacted by the distress)
Raveling and Weathering	Low	Monitor (global preventive maintenance action such as surface treatment if extensive)
	Medium	Patch if localized
	High	Patch if localized
Rutting	Low	Monitor
	Medium	Patch (major rehabilitation if extensive)
	High	Patch (major rehabilitation if extensive)
Shoving	Low	Monitor
	Medium	Patch
	High	Patch
Slippage Cracking	N/A	Patch (major rehabilitation if extensive)
Swelling	Low	Monitor
	Medium	Patch
	High	Patch

Table D-2. GDOT's preventive maintenance policy, portland cement concrete pavements.

Distress Type	Severity Level	Maintenance Action
Blow-Up	Low	Patch
	Medium	Patch
	High	Patch
Corner Break	Low	Crack Seal
	Medium	Crack Seal
	High	Patch
Cracks	Low	Crack Seal
	Medium	Crack Seal
	High	Crack Seal
Durability Cracking	Low	Monitor
	Medium	Patch
	High	Slab Replacement
Joint Seal Damage	Low	Monitor
	Medium	Joint Seal
	High	Joint Seal
Patching	Low	Monitor
	Medium	Patch
	High	Patch
Popouts	N/A	Monitor
Pumping	N/A	Monitor
Scaling	Low	Monitor
	Medium	Slab Replacement
	High	Slab Replacement
Settlement	Low	Monitor
	Medium	Monitor
	High	Grinding
Shattered Slab	Low	Crack Seal
	Medium	Slab Replacement
	High	Slab Replacement
Shrinkage	N/A	Monitor
Spalling (Joint and Corner)	Low	Monitor
	Medium	Patch
	High	Patch

Table D-3. Unit costs for GDOT preventive maintenance actions, non-commercial service airports.

Maintenance Action	Unit Cost ($/sf)
Patching	1.02
Crack Sealing	1.28
Slab Replacement	2.04
Joint Sealing	1.60

Table D-4. GDOT's unit costs based on PCI ranges, non-commercial service airports.

	PCI Range							
Work Type	0 – 29	30 – 39	40 – 49	50 – 59	60 – 69	70 – 79	80 – 89	> 89
Major Rehabilitation: Northern GA	$20.34/sy	$6.77/sy	$6.77/sy	$6.77/sy	$6.77/sy	$4.90/sy	$4.90/sy	$4.90/sy
Major Rehabilitation: Southern GA	$19.52/sy	$5.86/sy	$5.86/sy	$5.86/sy	$5.86/sy	$4.27/sy	$4.27/sy	$4.27/sy

APPENDIX E

YEAR 2002 MAINTENANCE PLAN
ORGANIZED BY SECTION

Table E-1. 2002 maintenance plan organized by section.

Plan Year	Network	Branch	Section	Distress Description	Severity	Work Description	Work Qty.	Work Unit	Unit Cost	Work Cost
2002	LAWRENCEVI	A01LW	10	OIL SPILLAGE	L	Patching	557	SF	$1.02	$568
2002	LAWRENCEVI	A01LW	20	L & T CR	M	Crack Sealing	1,688	LF	$1.28	$2,160
2002	LAWRENCEVI	R725LW	10	L & T CR	M	Crack Sealing	2,718	LF	$1.28	$3,479

APPENDIX F

YEAR 2002 MAINTENANCE PLAN
ORGANIZED BY REPAIR TYPE

Table F-1. 2002 maintenance plan organized by repair type.

Plan Year	Network	Branch	Section	Distress Description	Severity	Work Description	Work Qty.	Work Unit	Unit Cost	Work Cost
2002	LAWRENCEVI	A01LW	20	L & T CR	M	Crack Sealing	1,688	LF	$1.28	$2,160
2002	LAWRENCEVI	R725LW	10	L & T CR	M	Crack Sealing	2,718	LF	$1.28	$3,479
2002	LAWRENCEVI	A01LW	10	OIL SPILLAGE	L	Patching	557	SF	$1.02	$568