



**THE CORPORATION OF THE CITY OF STRATFORD**

**RFP12 - 01**

**ENGINEERING SERVICES – RUNWAY REHABILITATION PROJECT**

**ADDENDUM #1, MONDAY, JANUARY 30, 2012**

**STRATFORD MUNICIPAL AIRPORT**

**CLOSING DATE: 2:00:00 p.m., Wednesday, February 15, 2012**

**DIRECTIVE**

This Addendum shall form an integral part of the above project.

This Addendum must be acknowledged in the appropriate space and on the Form of Proposal for submission. Proposals not identifying this Addendum, as required, may be rejected as informal.

This Addendum is to provide the attached geotechnical report of 2006.



**AIRFIELD PAVEMENT CONDITION SURVEY  
STRATFORD MUNICIPAL AIRPORT  
STRATFORD, ONTARIO**

**for**

**STRATFORD MUNICIPAL AIRPORT**

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**Distribution:**

4 cc: Stratford Municipal Airport  
1 cc: Community Airports Group Co-operative (+email)  
1 cc: PML Kitchener  
1 cc: PML Toronto

PML Ref.: 06KF057  
Report: 1  
September 19, 2006

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Report: 1

Mr. Andy Woodham  
Stratford Municipal Airport  
R.R. #1  
Stratford, Ontario  
N5A 6S2

Dear Mr. Woodham

**Airfield Pavement Condition Survey**  
**Stratford Municipal Airport**  
**Stratford, Ontario**

We are pleased to present our report on the geotechnical pavement assessment recently completed on the airside pavements at the above referenced site.

**Methodology**

Peto MacCallum Ltd. (PML) reviewed the available pavement construction information and conducted a visual examination of the airside pavements at the Stratford Airport on June 13, 2006.

The visual condition survey was generally carried out in accordance with Transport Canada procedures and included photographs of typical conditions. A site plan for the airport is provided in Appendix I. The airport includes a main Runway 05-23 which is 1525 m by 30 m and a secondary runway which is 1210 m by 15 m including a portion south of Runway 05-23 which is considered Taxiway B.

**Pavement History**

**Runway 05-23**

The date of original runway construction is unknown, however, Runway 05-23 was reconstructed in 1988 and extended in 1993. For both the reconstruction and extension, the pavement component thicknesses were 500 mm Granular B, 150 mm Granular A and 80 mm asphalt. PML supplied inspection and testing services during both reconstruction and extension of the runway. Taxiway A was also reconstructed in 1988.



### Runway 17-35

The date of original runway construction is unknown, however, in 1988 during reconstruction of Runway 05-23, Runway 17-35 was also partially reconstructed from a point 90 m south to 275 m north of the intersection with Runway 05-23. The reconstructed pavement component thicknesses comprised 350 mm Granular B, 150 mm Granular A and 80 mm asphalt.

In about 1994 the balance of the Runway 17-35 was reconstructed. The northern portion, from a point 275 m north of Runway 05-23 to the 17 end, was reconstructed with a pavement structure similar to Runway 05-23 comprising 500 mm Granular B, 150 mm Granular A and 80 mm asphalt. South of Runway 05-23 the runway was to be abandoned and used as a taxiway (Taxiway B). The pavement in this area was pulverized and provided with 50 mm of new asphalt.

### Apron/General Aviation Areas

The details of when the Apron and General Aviation Area pavements were constructed are unknown but it is believed the Apron was constructed in the early 1990's and the General Aviation Areas were constructed in the mid 1990's. The Apron was also expanded to the north in the mid 1990's.

### Condition Survey

For details of the current pavement condition we refer to Table I appended. Table I provides a summary of the condition rating of each airside pavement area.

In general, the pavements constructed in 1988 all exhibit similar poor to fair pavement conditions. The 1988 pavements include the original length of Runway 05-23, 365 m of Runway 17-35 at the intersection with Runway 05-23, Taxiway A and the main Apron (which may have been constructed slightly later). In general, these pavements exhibit major transverse and longitudinal cracking. The longitudinal and transverse cracks are typically cupped and exhibit secondary cracking. Crack widths are up to 50 mm. Photo 1 through 8 show typical conditions of these pavements.



The remainder of the airside pavements constructed after 1993 are exhibiting good to excellent conditions. These areas include the 1993 extension to Runway 05-23, the reconstruction of the balance of Runway 17-35 (beyond the intersection) including Taxiway B, the General Aviation Area as well as the northern Apron Expansion.

These pavements are exhibiting minimal transverse or longitudinal cracking. Typical photographs of these pavements are shown in Photos 9 through 14.

It is noteworthy that the only significant difference in the pavement structures is that the asphalt specification was modified, starting with the 1993 extension, to include a higher asphalt cement content and a softer penetration grade asphalt cement. We believe this has resulted in a significant difference in performance with the softer and richer asphalt mixes tolerating thermal stresses much better.

### **Recommendations**

As noted above, about half of the pavements at the Stratford Airport are in good to excellent condition and the balance are in poor to fair condition.

As a general rule, in order to ensure long-term performance, cracks in the pavement must be sealed to prevent moisture penetration into the granular base/subbase layers. This moisture penetration causes loss of support as well as erosion or loss of material through the crack. Normally, cracks should be routed and sealed as they form. Sealing of the cracks helps to minimize their propagation and also minimizes the potential for Foreign Object Damage (FOD) as a result of deterioration of the cracks. Once cracks become either too large, or too frequent, sealing of cracks becomes impractical and it then becomes necessary to either reconstruct the pavement or provide an overlay. Placing the overlay at the correct time is critical. Postponing placement of an overlay allows the pavement to continue to crack and/or the existing cracks to become more severe. These cracks will then quickly reflect through the new overlay.



About half of the pavement surfaces at the Stratford Airport (pavements constructed prior to 1993) are exhibiting significant distress including major transverse and longitudinal cracking with significant cupping at the cracks.

The documented distress on these airside pavement areas is generally associated with ageing and thermal effects. Consequently, future pavement rehabilitation is required to improve the surface/ride condition.

It is our opinion that the pavement on the original portion of Runway 05-23, Runway 07-35 at the intersection, Taxiway A and the Main Apron are experiencing significant distress and some form of rehabilitation is now required. One option would be to place an overlay on the existing asphalt, however, as noted previously the crack pattern in the existing asphalt is extensive and will reflect up through the new surface within a few years and then ongoing crack maintenance will be required. An overlay would be considered appropriate for the Main Apron, however, the cracks are too extensive on the remaining areas.

As an alternative, considering site conditions, we believe that the most suitable method of rehabilitation of the original portion of Runway 05-23, Runway 07-35 at the intersection, and Taxiway A would involve pulverizing the asphalt and mixing with the existing granular base. The exposed granular base could then be reggraded / reshaped to allow for grade adjustments, followed by placement of a minimum 50 mm of Granular A base and 80 mm of new HMAC placed in two lifts. This process would eliminate the potential for reflection cracking of the existing crack pattern through the new asphalt (compared to simply providing an overlay).

If nothing is done at the airport the existing cracks will continue to propagate and deteriorate causing an increasing Foreign Object Damage (FOD) hazard.



Based on our assessment of the pavements, we would recommend the following activities be considered for future planning purposes.

<b>YEAR</b>	<b>ACTIVITY</b>	<b>BUDGET ESTIMATE (\$)</b>
2007	Pulverize the existing asphalt and place 50 mm of new Granular A and 80 mm of new asphalt on Taxiway A, Runway 05-23 (original length) and Runway 17-35 (at intersection)	900,000
2007	Provide a 50 mm overlay on Main Apron.	150,000
2009	Crack sealing	10,000
2013	Provide a 50 mm overlay on Runway 05-23 extension, Runway 17-35 (beyond intersection), Taxiway B, Apron Expansion, and General Aviation Areas.	300,000

The above estimate is based on current (2006) unit rates and is provided for general planning purposes only and does not include any engineering design or contract administration fees. The cost includes only paving related expenses and does not include lighting and navigation modifications or line painting.

Prior to detail design of any pavement rehabilitation, a geotechnical program involving boreholes should be carried out to assess existing asphalt and granular thicknesses and confirm subgrade strength and frost susceptibility as well as verify if any pavement strengthening is required. Following completion of the borehole program, detailed construction recommendations can be provided.



We trust this report has been completed within our terms of reference, and is sufficient for your present requirements. If you have any questions or require further information, please do not hesitate to contact our office.

Sincerely

Peto MacCallum Ltd.

A handwritten signature in cursive script, appearing to read 'G. Mitchell', is written over the typed name and title.

G. Mitchell, MEng. P.Eng.  
Branch Manager and  
Manager, Geotechnical Services



GM:sh

Enclosure(s):  
Table 1 - Pavement Condition/Defect Survey Report  
Photographs 1 to 14  
Appendix I - Site Plan

19-Sep-06

**TABLE 1  
PAVEMENT CONDTION/DEFECT SURVEY REPORT  
FOR THE YEAR: 2006**

Airport: Stratford Municipal Airport		Asphalt Surfaces											Portland Cement Pavement							All Surfaces			Remarks				
Facility	Description	Inspection Year	Chainage From	Chainage To	Installation Year	General Condition	Rehabilitation Year	Alligator Cracking	Map Cracking	Transverse Cracking	Longitudinal Cracking	Rutting	Ravelling	Corner Cracking	Edge Cracking	Slab Cracking	Scaling	Surficial Spalling	Joint Spalling	Joint Faulting	Joint Sealant failure	Frost Heave		Subgrade Settlement	Patching	Smoothness	Maintenance Required
Runway 05-23	Original 1150 m length				4		0	0	3/4	3/4	0/0	1/1										0/0	1/1	0			
Runway 05-23	375 m Extension				9		0	0	1/1	1/1	0/0	1/1										0/0	0/0	0			
Runway 17-35	90 m South to 275 m north of Runway 05-23				4		0	0	3/4	3/4	0/0	1/1										0/0	1/1	1			
Runway 17-35	275 North of Runway 05-23 to 17 End				9		0	0	0/0	1/1	0/0	1/1										0/0	0/0	0			
Taxiway A	Taxiway N-S				4		0	0	3/4	3/4	0/0	1/1										0/0	1/1	0			
Taxiway B	Taxiway E-W and south end of Runway 17-35				9		0	0	0/0	1/1	0/0	1/1										0/0	0/0	0			
Apron - Main					6		0	0	2/2	2/2	0/0	1/1										0/0	1/1	0			
Apron - Extension					9		0	0	1/1	1/1	0/0	1/1										0/0	0/0	0			
General Aviation Areas					8		0	0	1/1	1/1	0/0	1/1										0/0	0/0	1			

**Legend:**

General Condition Rating		10	9	8	7	6	5	4	3	2	1					
		Excellent	Good	Fair	Poor	Very Poor										

Defect Rating:  
0: None 1: Minor 2: Moderate 3: Major 4: Extreme

Double Rating:  
Extent of Defect x/- -/x Severity of Defect

**Note:**



Photo 1: Overview of Airport



Photo 2: Typical condition of reconstructed portion of Runway 05-23 (1988 construction).



Photo 3: Typical transverse and longitudinal cracks on reconstructed portion of Runway 05-23. Note cupping at cracks.



Photo 4: Typical transverse and longitudinal cracks on reconstructed portion of Runway 05-23. Note cupping at cracks.



Photo 5: Typical transverse and longitudinal cracks on reconstructed portion of Runway 05-23. Note cupping and secondary cracking at cracks.



Photo 6: Typical condition of Runway 17-35 in the vicinity of intersection with Runway 05-23 (1988 construction).



Photo 7: Typical condition of main Apron.



Photo 8: Typical condition of Taxiway A.



Photo 9: Typical condition of extension of Runway 05-23 (1993 construction).



Photo 10: Typical condition of northern portion of Runway 17-35 (1995 construction).



Photo 11: Typical condition of Taxiway B (abandoned Runway 17-35).



Photo 12: Typical condition of Taxiway B (E-W Portion).



Photo 13: Typical condition of Apron Extension.



Photo 14: Typical condition of General Aviation Areas.



## **APPENDIX I**

### AIRPORT SITE PLAN

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

# Emergency Response Grid Map and Site Layout

A  
B  
C  
D  
E  
F  
G  
H  
I  
J  
K

