

APPENDIX G - AIRPORT PRIMARY RUNWAY CONSTRUCTION EXPERIENCES

INTRODUCTION

This appendix is a compilation of findings from different airports with experience in Primary Runway construction similar to what is anticipated at Dickinson. Both Alternatives G and H would require significant portions of Runway 14-32 to be closed in order to complete the construction work. Airports were contacted which have dealt with similar construction dilemmas to determine lessons learned that may be applicable to the Dickinson Theodore Roosevelt Regional Airport issues. The results of the information collected is compiled in **Table 1 – Airport Construction Experiences**.

In summary the experience from these different airports around the country was:

- Major Pavement Rehabilitation or partial closures can be accomplished in tight time frame weekend windows.
- Major Pavement Reconstruction requires an alternate runway at the airport or nearby to accommodate the majority of airline operations.
- Inability to accommodate airline operations whether it is weekend closures or multi-month restricted use, does have a significant effect on airlines, the airport and community.

Table 1 – Airport Construction Experiences

Northwest Arkansas Regional Airport AR (XNA)		
2012 Enplanements 546,845	Runway(s): 8,800' x 150'	Nearest Airports: Fort Smith Regional (FSM) 80 miles
Project: Reconstruction of 35% of PCC Runway		Cost: \$28.8 m
Construction/Phasing	To accommodate runway reconstruction, a 100' x 8,800' parallel taxiway (with paved shoulders allowing 150' width for runway) was constructed west of primary runway with full precision instrument capability.	
Airline Adjustments	Airlines were able to continue operations without any negative impact. Airlines wrote letters showing strong disapproval of nightly closures and the potential impact the 8-hour nightly closure would have on passengers regularly missing connections.	
Alternatives	Airport examined several alternatives including overnight closure. These were 5.5 hours per night and 8 hours per night. Construction cost was estimated as follows: 5.5 hours per night, \$106.3m (4 years); 8 hours per night, \$74.4m (3 years).	
Applicable to DIK	Completing an alternate landing surface prior to work on the primary runway allows airlines to continue operations without negatively impacting passengers.	
Tucson International Airport AZ (TUS)		
2012 Enplanements 1,710,649	Runway(s): 10,996' x 150'; 8,408' x 75'; 7,000' x 150'	Nearest Airports: Davis Monthan AFB 9 miles
Project: Mill and Overlay		Cost: \$11.1m
Construction/Phasing	4" Mill and Overlay Primary Runway. Work done with 30-day closure of primary runway. Work completed with 24 hours/day operations during 30-day period	
Airline Adjustments	Work was completed in the Fall of 2006 to avoid high summer heat. Airlines still were required to reduce passenger loads to operate from shorter 7000' runway.	
Alternatives	ANG shifted F-16 operations to Davis Monthan AFB. Airlines did not shift operations for this construction.	
Applicable to DIK	An alternate runway with sufficient length can allow airlines to maintain most services to passengers.	
Telluride Regional Airport CO (TEX)		
2012 Enplanements 7,828	Runway(s): 7,111' x 100'	Nearest Airports: Montrose (MJT) 65 miles
Project: Runway Reconstruction		Cost: NA
Construction/Phasing	NA	
Airline Adjustments	All airline operations ceased for duration of project.	
Alternatives	NA	
Applicable to DIK	Passenger impact of only 7,828 annual enplanements was not comparable, so no further investigation was conducted.	
Augusta Regional GA (AGS)		
2012 Enplanements 271,740	Runway(s): 8,001' x 150'; 6,002' x 75'	Nearest Airports: Columbia SC (CAE) 74 miles
Project: Runway Reconstruction		Cost: \$13.6m
Construction/Phasing	Phase 1 - Crosswind Runway was returned to previous 150' width; Phase 2 – 141,000 sy of concrete poured in 114-day closure of primary runway; Phase 3 – Crosswind Runway returned to 75' width	
Airline Adjustments	NA	
Alternatives	none	
Applicable to DIK	An alternate runway with sufficient length can allow airlines to maintain most services to passengers.	

Table 1 – Airport Construction Experiences

Billings Logan International MT (BIL)		
2012 Enplanements 440,277	Runway(s): 10,521' x 150'; 3,800' x 75'; 5,503' x 75'	Nearest Airports: Cody (COD) 108 miles; Bozeman (BZN) 152 miles
Project: Mill and Overlay		Cost: \$6m
Construction/Phasing	Primary Runway was closed for 6 weekends in summer of 2013. Closure from 09:00 Fridays until 18:00 Sundays. The work was 2" of milling with 3" overlay. Paving section work was typically completed by Sunday mornings and remainder of Sunday was spent cleaning up and completing temporary painting. Construction went well since contractor's stockpiled materials in preparation for paving and an asphalt plant was placed on site.	
Airline Adjustments	Horizon and United both did quick turns for passengers Friday mornings and Sunday evenings to accommodate passenger loads. Planes were extremely full but still experienced 25% reduction in enplanements. Some passengers booked through COD or BZN when BIL was closed to airline service.	
Alternatives	There were no viable alternatives to consider.	
Applicable to DIK	Weekend closures were viable for Billings as the asphalt work could readily be made usable with little pavement elevation changes. The airlines required advance coordination and even with only weekend closures experienced a 25% loss of passengers. This is not applicable to the DIK project.	
Asheville Regional Airport NC (AVL)		
2012 Enplanements 318,395	Runway(s): 8,001' x 150'	Nearest Airports: Greenville SC (GSP) 60 miles
Project: Rebuild Entire Primary Runway		Cost: \$64m
Construction/Phasing	Phase 1-2 – Construction of parallel taxiway (100' x 7,000') west of current runway to serve as temporary runway; Phase 3-4 – Reconstruct Primary Runway (increase separation from current parallel taxiway by 75' and raise runway end to correct line of sight); Phase 5 – convert temporary runway to parallel taxiway	
Airline Adjustments	Airlines provided letters and strong support for chosen alternative. Advised airport and FAA that if airport was closed for 5-6 months, the airlines would shift their passengers and services to other airports and never return.	
Alternatives	5-6 month closure was examined but once airlines made it clear that they would not return to Asheville after the closure, the FAA and airport dismissed this idea.	
Applicable to DIK	Airline service in a community is much more volatile than the airports and FAA often realize. Short-term market disruptions (5-6 months) can have extreme long-term consequences including complete loss of airline service.	

Table 1 – Airport Construction Experiences

Lawton-Fort Sill Regional Airport OK (LAW)		
2012 Enplanements 55,678	Runway(s): 8,599' x 150'	Nearest Airports: Wichita Falls TX (SPS) 48 miles
Project: Concrete Overlay in Two Phases		Cost: \$2.7m in 2001 and \$4.3m in 2013
Construction/Phasing	Phase 1 (2001) – 6000' of primary runway was overlain with concrete and parallel taxiway (6,200' x 75') was used as runway with no instrument approach. Work completed in 4 months. Phase 2 (2013) – 2000' of primary runway was overlain with concrete. 5000' of existing primary runway was used for airlines.	
Airline Adjustments	American Eagle changed from ERJ's to SAAB 340's to be able to operate from shorter runway. Enplanements in 2013 suffered as a result of capacity reduction. DFW is 120nm from LAW and American Eagle had SAAB 340's in their fleet at the time. SAAB 340s are no longer flown by American Eagle.	
Alternatives	NA	
Applicable to DIK	When the airline has a fleet that can operate from the shorter runway and the stage length is short enough then the impact on passengers can be minimized. However, regional airlines do not have a great deal of flexibility with fleet choice as capacity is often dictated by the major airline that they are serving.	
Sioux Falls Joe Foss Field SD (FSD)		
2012 Enplanements 453,007	Runway(s): 8,999' x 150'; 8,000' x 150'; 3,151' x 75'	Nearest Airports: Sioux City (SUX) 96 miles
Project: Reconstruct Runway/Runway Intersection		Cost: \$7.9m
Construction/Phasing	Full depth reconstruction of 750' of each runway. 17" PCC and 29" P-209. Scheduled 4 weekend closures to allow 2 good weekends for weather. Closure was from 14:00 Fridays until 20:00 Mondays (78 hours per weekend)	
Airline Adjustments	Airlines cancelled flights 1 year in advance for the 4 selected weekends. Liquidated damages were set at varying rates up to \$25,000/hour based on impact to airlines of not reopening on time.	
Alternatives	Busing to Sioux City was considered but airlines determined it would not be worth the effort considering the construction could be limited to only up to 4 weekends.	
Applicable to DIK	The loss of the primary runway and one crosswind left the airport with only a 3,151' x 75' runway which had no ability to accommodate airline service.	
Rapid City Regional Airport SD (RAP)		
2012 Enplanements 252,592	Runway(s): 8,701' x 150'; 3,601' x 75'	Nearest Airports: Ellsworth AFB 17 miles
Project: Runway Reconstruction		Cost: \$8m
Construction/Phasing	Runway was totally reconstructed in 1997 including sub-base. Work was divided into two sections so that a runway of sufficient length for general aviation could be in place.	
Airline Adjustments	All airlines shifted flights to Ellsworth AFB. The passengers were ticketed at RAP then bused to Ellsworth. Arriving passengers were transported back to RAP by bus from Ellsworth.	
Alternatives	NA	
Applicable to DIK	A nearby runway of sufficient length to accommodate passengers was available. This is not an option for DIK.	

Table 1 – Airport Construction Experiences

Tri-Cities Regional Airport TN (TRI)		
2012 Enplanements 206,904	Runway(s): 8,000' x 150'; 4,442' x 150'	Nearest Airports: Asheville NC (AVL) 89 miles
Project: Runway Mill and Overlay		Cost: \$15m
Construction/Phasing	Nightly closures began in July 2013 to disable CAT II lighting. 2 weekend closures were conducted in September for pavement work. Started 20:00 on Fridays through 09:00 on Mondays. Temporary painting was installed and night work has continued to the present for lighting work. (Lighting experienced delays due to contractor not ordering materials on time, then winter weather)	
Airline Adjustments	Airlines cancelled flights for affected weekends beginning 1 year in advance. The airport reported a loss of airport revenue of \$70,000 for just the two weekend closures.	
Alternatives	NA	
Applicable to DIK	This type of project could be done over a short closure window. The work still resulted in a significant financial loss to the airport particularly considering it was only for two weekends.	
Fargo Hector International Airport ND (FAR)		
2012 Enplanements 369,969	Runway(s): 9,001' x 150'; 6,302' x 100'; 3,801' x 75'	Nearest Airports: Grand Forks (GFK) 80 miles
Project: Runway 18-36 Reconstruction		Cost: \$18.3m
Construction/Phasing	Parallel Taxiway was converted to temporary Runway over the course of a 22-hour period & under aircraft movements. Concurrent phases north and south of the crosswind runway occurred during the reconstruction.	
Airline Adjustments	Airlines agreed to limited size aircraft of DC-9 or smaller for utilizing parallel taxiway as a temporary runway.	
Alternatives	NA	
Applicable to DIK	An alternate landing surface with sufficient length can allow airlines to maintain most services to passengers.	

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