CHAPTER THREE
PURPOSE AND NEED FOR THE PROPOSED REPLACEMENT AIRPORT

This chapter describes the purpose of the proposed replacement airport at St. George, Utah and the need for the proposed replacement airport.

The purpose of the proposed replacement of St. George Municipal Airport (SGU) is to remedy numerous design standard deficiencies and to enable the forecast growth in aircraft activity and commercial passenger demand to be safely and efficiently accommodated. The needs that the proposed replacement airport are intended to meet are summarized in **Table 3.1**.

Additionally, the runway and taxiway facilities at the proposed replacement airport would provide adequate design separations to allow for the installation of a low visibility instrument approach, which would further increase airport efficiency by reducing delays during low visibility weather conditions.

The following sections provide further detail regarding the specific purpose and need for the replacement airport.

3.1 PURPOSE OF THE PROPOSED REPLACEMENT AIRPORT

The objective of the City of St. George is to develop an airport capable of accommodating, in a safe and efficient manner, the forecast growth of passenger enplanements, aircraft activity, and the changing fleet of aircraft needed to serve the community through 2020. The existing airport does not meet the essential design standards required to support the forecast of future airport activity. Physical constraints at the existing airport and in the surrounding area make it impractical to expand and upgrade the airport at its existing site to remedy these deficiencies, the most notable of which are various deviations from the Federal Aviation Administration (FAA) airport design standards and insufficient runway length to serve the type of aircraft forecast to meet commercial travel demand. See **Section 3.2**, ***Need for the Proposed Replacement Airport***, for further detail regarding the forecast growth and airport design deficiencies at SGU.

Table 3.1
NEEDS FOR PROPOSED REPLACEMENT AIRPORT

ITEM	NEED	LIMIT AT EXISTING AIRPORT	DIFFERENCE
DESIGN AIRCRAFT TO SERVE FORECAST PASSENGER DEMAND	**50 TO 100-SEAT REGIONAL JET**	**30-SEAT TURBOPROP**	**20-70 SEATS PER AIRCRAFT**
Runway Takeoff Length	9,300 ft.	6,606 ft.	-2,694 ft.
Design Standards			
Runway Centerline to Aircraft Parking	500 ft.	265 ft.	-235 ft.
Runway Centerline to Hold Line	250 ft.	125 ft.	-125 ft.
Runway Safety Area [1] Width	500 ft.	150 ft.	-350 ft.
Runway Safety Area Length Beyond Runway End	1,000 ft.	300 ft.	-700 ft.
Runway Object Free Area [2] Width	800 ft.	500 ft.	-300 ft.
Runway Object Free Area Length Beyond Runway End	1,000 ft.	300 ft.	-700 ft.
Taxiway Width	50 [3] ft.	40 ft.	-10 ft.
Taxiway Safety Area Width	118 ft.	79 ft.	-39 ft.
Taxiway Object Free Area Width	186 ft.	131 ft.	-55 ft.
Runway Orientation	01-19	16-34	N/A
Percent Wind Coverage (10.5 kt. crosswind component)	94.1%	93.1%	-1.0 percentage pt.

Notes:

[1] Runway Safety Area (RSA): An area adjacent to the runway, which is capable of supporting the occasional passage of aircraft without causing structural damage under dry conditions.

[2] Runway Object Free Area (OFA): A two dimensional ground area centered on the runway centerline which is clear of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

[3] The standard taxiway width is 60 feet for aircraft in Airplane Design Group III with a wheelbase equal to or greater than 60 feet (i.e., the MD-80 series aircraft), which is not projected to serve St. George.

Sources: FAA Advisory Circular 150/5300-13, *Airport Design*; FAA Advisory Circular 150/5340-1H, *Standards for Airport Markings*; *Site Selection and Master Plan, St. George Municipal Airport*, prepared by Creamer & Noble Engineers and Barnard Dunkelberg & Company. October 1998.

The purpose of the proposed replacement airport is to develop an airport that would fully accommodate forecast demand for air service in the community and would also meet all applicable FAA design standards. In order to meet the forecast demand at SGU (See **Section 3.2.2**), an airport must be developed that meets the standards for the Airport Reference Code (ARC) Design Category[1] D-III, with a runway of sufficient length to accommodate commercial regional jets and business jets. The current airport is classified as ARC Design Category B-II and has a runway length of 6,606 feet. The topography of the existing site does not allow for the required expansion to meet ARC D-III standards or for construction of needed safety areas for the current runway.

The existing airport's classification of ARC Design Category B-II accommodates aircraft with approach speeds in the range of 91 to 121 knots and wingspans in the range of 49 to 79 feet. The proposed replacement airport at St. George would be classified as ARC Design Category D-III, which accommodates aircraft with approach speeds in the range of 141 to 166 knots and wingspans in the range of 79 to 118 feet.[2] However, this does not mean that aircraft in lower or higher categories cannot operate at the airport; the design aircraft represents the operational and physical characteristics of the type of aircraft most likely to operate at the airport.

3.2 NEED FOR THE PROPOSED REPLACEMENT AIRPORT

The need for the proposed replacement of SGU is based on current facility deficiencies, as outlined in the *1998 Site Selection and 1998 Master Plan* (*1998 Master Plan*)[3], which are projected to become increasingly problematic, due to forecast growth in passenger travel demand through the year 2020,[4] and which cannot be corrected at the existing airport site, due to topographical constraints.

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1 As described in FAA Advisory Circular 150/5300-13, Change 7, *Airport Design*, Ch. 1, Paragraph 4, Airport Reference Code, October 1, 2002, the ARC is a coding system used to relate airport design criteria to the operational and physical characteristics of the aircraft intended to operate at an airport, which are represented by a design aircraft. The design aircraft is the most demanding aircraft type currently using, or projected to use, an airport, with a minimum of 500 operations per year, and can either be one aircraft, or a group of aircraft. The first component of the ARC is a capital letter (A, B, C, or D with A being the lowest, and D being the highest) that refers to the approach speed of the design aircraft in its landing configuration. The second component, which is depicted by a Roman numeral (I, II, III, IV, V, or VI with I being the lowest and VI being the highest) that refers to wingspan of the design aircraft. Together, the two components relate aircraft operational and physical characteristics to the required design criteria of various airport dimensions, such as runway and taxiway widths, runway to taxiway separation standards, and obstacle clearance items. Under this methodology, safety margins are provided in the physical design of airport facilities.

2 FAA Advisory Circular 150/5300-13 Change 7, *Airport Design, Ch. 1, Regulatory Requirements and Definition of Terms.* October 1, 2002.

3 *Site Selection and Master Plan, St. George Municipal Airport*, prepared by Creamer & Noble Engineers and Barnard Dunkelberg & Company, October 1998.

4 *2004 Year End Passenger Report*, St. George Municipal Airport. January 3, 2005.

The *1998 Master Plan* identified facility deficiencies at SGU in the areas listed below, which are described in further detail in **Section 3.2.3, *Airport Deficiencies***.

- Airfield design standards
- Runway length
- Runway orientation

Because SGU cannot expand at its existing location to meet Federal design standards that are required to accommodate existing aircraft and future demand, a replacement airport must be built at a new site that would allow for such expansion.

3.2.1 CURRENT STATUS OF ST. GEORGE MUNICIPAL AIRPORT

FAA Advisory Circular 150/5300-13, Airport Design, designates dimensional design standards for the safe operation of airports. As previously stated in **Section 3.1** of this chapter, the existing airport is classified as an ARC Category B-II airport with the design capability to serve aircraft with approach speeds in the range of 91 to 121 knots and wingspans in the range of 49 to 79 feet. However, the physical constraints of the existing airport property do not allow for full compliance with all Category B-II airport design standards including runway centerline to taxiway centerline separation and runway centerline to aircraft parking at the terminal. Thus, the airport is subject to a Modification of Standards waiver issued by the FAA that allows Category B-II aircraft to operate at SGU despite the conflict with FAA standards.

A Modification of Standards waiver is issued for any change to FAA standards (other than dimensional standards for runway safety areas) applicable to airport design, construction, or an equipment procurement project that results in lower costs, greater efficiency, or is necessary to accommodate an unusual local condition on a specific project, when adopted on a case-by-case basis.[5] The Modification of Standards waiver issued for SGU accommodates the deviations from FAA's airport design standards, which are due to the constraints imposed by the topography of the existing airport site. This topography also prohibits the expansion necessary to fully comply with the Category B-II airport design standards established by the FAA.

As shown in **Exhibit 3.1, *Topography at Existing Airport Site***, SGU sits atop a mesa that drops off steeply to the south, east, and west. This effectively eliminates the possibility of extending the Federally-mandated safety areas at the existing airport site. The design standard deficiencies of the existing airport are reviewed in detail in **Section 3.2.3.1** of this chapter. Upgrading the existing airport site to comply with ARC D-III design standards would be a massive engineering undertaking involving at least the following actions.

[5] FAA Order 5300.1F, *Modifications to Agency Airport Design, Construction, and Equipment Standards*. June 30, 2000.

- To provide adequate runway safety areas (RSAs)and object free areas (OFAs) on the south end of the runway, the elevation of the land extending 1,000 feet off the runway-end would have to be raised by up to 200 feet. In order to provide a stabilized slope, estimated at approximately 4:1, additional fill would be needed for another 1,000 feet beyond the end of the RSA. This would require the relocation of Indian Hills Drive and Heritage Drive. It would also require the acquisition and clearance of existing development in the Heritage Drive area.
- To provide adequate RSAs and OFAs on the north end of the runway, fill would be needed at the northwest end of the OFA up to a depth of 100 feet. The provision of a stabilized 4:1 slope extending west from the fill area would require the relocation of Bluff Street. Alternatively, a retaining wall could be built to protect the fill area, but its height would approximate 100 feet. In addition, the airport entrance road, which extends through the RSAs and OFAs would have to be relocated to the west and north, requiring additional fill.
- The parallel taxiways would need to be moved outward from the runway by 200 feet to provide the required 400-foot separation standard from the runway. This would remove approximately half of the aircraft tie-down spaces at the airport and would effectively eliminate the future T-hangar area on the west side of the runway. It would also result in the loss of nearly all the parking apron at the passenger terminal.
- The provision of the required 500-foot separation between the runway centerline and aircraft parking would result in the loss of nearly all other airport parking areas and tie-down areas on the airfield.
- The replacement of the parking apron and tie-down areas lost to the provision of adequate safety areas and taxiway separation would require relocation of the airport terminal, several fixed-base operator (FBO) buildings and hangars, automobile parking areas, and the airport access road.
- Relocation of the aircraft parking areas, the airport terminal, several FBO buildings and hangars, and the automobile parking areas would require substantial amounts of fill on the east and west sides of the airport. On the west side, the depth of the required fill could range from 40 to 150 feet. On the east side, up to 100 feet of fill could be required. Stabilization of the fill areas would require the construction of substantial retaining walls or the provision of additional fill to provide for stable slopes.
- A project of this magnitude would most likely require the airport to be closed intermittently during construction of the required fill areas, which would interrupt commercial air service and possibly displace general aviation operators.

While the modifications to the existing site, described above, would enable the airport to comply with ARC D-III standards, they would not involve any runway lengthening. Lengthening of the runway to 9,300 feet, as proposed in the *1998 Master Plan*, would require even more massive quantities of fill and would require the relocation of several other roads and developed areas off the runway ends.

In light of the deficiencies at the existing airport, the City of St. George commissioned the *1998 Master Plan* to determine the feasibility of continuing the use of the existing airport as compared to locating a site to develop a replacement airport facility. Results of the *1998 Master Plan* confirmed deficiencies at the existing airport and advised the development of a replacement airport at a new site.

3.2.1.1 SGU Airport Certification Related to FAR Part 139 Revisions

A revised version of Federal Aviation Regulation (FAR) Part 139, *Certification of Airports*, became effective June 9, 2004. The most notable change in this revision is the requirement that airports provide dedicated Aircraft Rescue and Fire-Fighting (ARFF) coverage for scheduled air carrier aircraft with more than 10 passenger seats. The previous version of FAR Part 139 required ARFF coverage for scheduled air carrier aircraft with more than 30 passenger seats. Because the existing airport has scheduled air carrier service by 30-seat Embraer 120 (EMB-120) aircraft, it has been operating under a Limited airport operating certificate under the previous version of FAR Part 139 and did not provide ARFF coverage. However, in order to meet the provisions of the revised FAR Part 139, the City has established a full-time ARFF facility at the existing airport.

The revised FAR Part 139 requirements have caused the airport's operating certificate to be re-designated as Class II rather than Limited. As shown in **Table 3.2**, under the revised FAR Part 139, airports that have scheduled air service by aircraft with 10 to 30 seats and have the capability to receive unscheduled air carrier operations by aircraft with greater than 30 seats are now designated as Class II. Further conditions of the Class II designation are that unscheduled air carrier operations must obtain prior approval from the airport manager before operating at the airport, and the types of aircraft must be consistent with the airport's approved design group, which is Category B-II in the case of the existing airport at St. George.

Table 3.2
TYPES OF AIR CARRIER AIRCRAFT PERMITTED TO SERVE EACH CLASS OF CERTIFICATED AIRPORT

Type of Air Carrier Aircraft	CLASS OF CERTIFICATED AIRPORT			
	Class I	Class II	Class III	Class IV
Scheduled Large Air Carrier Aircraft (30+ seats)	X			
Unscheduled Large Air Carrier Aircraft (30+ seats)	X	X		X
Scheduled Small Air Carrier Aircraft (10-30 seats)	X	X	X	

Source: Federal Aviation Regulation (FAR) Part 139, Certification of Airports, effective June 9, 2004.

3.2.2 FUTURE DEMAND

Demand forecasts for SGU were developed in this EIS for both constrained and unconstrained future conditions, as shown in **Table 3.3** (see also **Appendix E, *Aviation Activity Forecasts***).[6] The constrained condition assumes that the existing airport would remain in service as the only local airport, without facility improvements. Thus, future aviation activity would be constrained by the limitations of the existing facility. The unconstrained condition, on the other hand, assumes that the future demand for air service could be fully met through any necessary airport facility improvements.

For the constrained forecast scenario, the 2003 Terminal Area Forecast (TAF) did not reflect the 13.8 percent growth in enplanements that the airport experienced in 2003. This vigorous growth continued in early 2004 when the forecast was being prepared. The FAA's TAF does not recognize proposed airports. Thus, the TAF was not suitable for the unconstrained forecast scenario.

As shown in **Table 3.3**, the number of passenger carrier operations with the constrained future condition is forecast to increase by 64 percent by 2020 with an 81 percent increase in the number of enplaned passengers during the same time period. The constrained forecast assumes that passenger demand would continue to be served by 30-seat turboprop aircraft through the forecast period. Total aircraft operations, which is a combination of passenger carrier, all-cargo, non-commercial air taxi, general aviation, and military operations, are forecast to increase by 23 percent by 2020.

In contrast, the unconstrained future condition shows that the number of passenger carrier operations is forecast to increase by only 22 percent by 2020, but the number of enplaned passengers is forecast to increase by 158 percent during the same time period. The unconstrained future condition would allow for an increased number of commercial service passengers to be accommodated at St. George by a lower number of commercial service operations than would be possible with the constrained future condition. This is because the unconstrained future forecasts are based on the assumption that the local St. George market would be able to support regional jet service with aircraft that typically seat 50 to 100 passengers, which are of substantially greater capacity than the 30-seat turboprops that are now the maximum size of commercial service aircraft that can operate at SGU.

[6] FAA reviewed the forecast prepared by Landrum & Brown for this EIS and stated that they believe the forecast assumptions and methodology used to prepare the forecast are reasonable based on sound analytical methods. E-mail to Consultant from Robert Bowles, FAA. June 17, 2004.

Table 3.3
SUMMARY OF AVIATION ACTIVITY AND FORECASTS, 2003-2020

AIRCRAFT OPERATIONS (TAKEOFFS AND LANDINGS)	ACTUAL	CONSTRAINED FORECAST			UNCONSTRAINED FORECAST			2004 TAF		
	2003	2010	2020	Change 2003-2020	2010	2020	Change 2003-2020	2010	2020	Change 2003-2020
Passenger Carrier	6,056	7,320	9,910	64%	6,940	7,360	22%	6,783	8,278	37%
All-Cargo	2,104	2,184	2,184	4%	2,184	2,184	4%	2,184	2,184	4%
Non-Commercial Air Taxi	1,095	1,360	1,360	24%	1,260	1,360	24%	4,291	5,417	395%
General Aviation	34,249	36,640	40,070	17%	36,640	40,070	17%	34,310	38,102	11%
Military	210	210	210	0%	210	210	0%	210	210	0%
Total	**43,714**	**47,614**	**53,734**	**23%[1]**	**47,234**	**51,184**	**17%[1]**	**47,778**	**54,191**	**24%[1]**
Enplaned Passengers	**45,583**	**58,900**	**82,500**	**81%[1]**	**78,500**	**117,700**	**158%[1]**	**54,538**	**68,914**	**51%[1]**

[1] Percentages are averages.

Notes: The constrained future condition assumes that the existing airport would remain in service as the only local airport, without facility improvements. The unconstrained forecast assumes that the future demand for air service would be fully met through the provision of required airport improvements and facilities.

FAA reviewed the forecast prepared by Landrum & Brown for this EIS and stated that they believe the forecast assumptions and methodology used to prepare the forecast are reasonable based on sound analytical methods. E-mail to Consultant from Robert Bowles, FAA. June 17, 2004.

The 2004 TAF does not contemplate a replacement airport and therefore is comparable only to the constrained forecast condition of the existing airport.

Sources: Landrum & Brown analysis, 2004.
Federal Aviation Administration, 2004 Terminal Area Forecast.
See **Appendix E**, ***Aviation Activity Forecasts*.**

Regional jets offer the advantages of greater speed and longer range than turboprops, with noise levels that are quite similar to turboprops, and in some cases are quieter. The use of regional jets at SGU would allow SkyWest Airlines to begin service between St. George and Denver as United Express, which they have identified as a potentially viable market, as well as increase the capacity of their Delta Connection flights between St. George and Salt Lake City.[7]

The unconstrained forecasts assume that all-cargo, non-commercial air taxi, general aviation, and military operations would remain the same as in the constrained forecast scenario. This is because the existing airport imposes no significant constraints to the demand for these services, in contrast to the constraints posed for commercial passenger service. Total aircraft operations, which include passenger carriers, all-cargo, non-commercial air taxi, general aviation, and military operations, are forecast to increase by 17 percent by 2020 with the unconstrained forecast.

As previously stated in this chapter, SGU is currently classified under ARC Design Category B-II, with an attached Modification of Standards waiver issued by the FAA. Although the Modification of Standards waiver allows the airport to continue operations as they exist today, it does not address the need for expansion to accommodate future demand.

The existing airfield facilities limit passenger aircraft to short-range turboprop equipment such as the Embraer 120 Brasilia. Construction of the replacement airport will allow the airlines to add larger, longer-range aircraft to their local fleets such as the CRJ-200, CRJ-700, and Dash 8-400. These longer-range aircraft will allow service to many more cities than can reasonably be served today, such as Denver.

With the replacement airport, competition from Las Vegas becomes the limiting factor instead of the airfield. The majority of local demand will continue to be served by McCarran due to the large number of non-stop markets served and low fares available.

According to the *1998 Master Plan's* unconstrained forecast demand, future aircraft types that could be expected to operate at SGU are in higher categories than the B-II aircraft currently operating at SGU. The updated aviation activity forecasts prepared for this EIS, and summarized in **Table 3.3**, support that projection. Typically, as higher categories of aircraft begin to use an airport, the airport's dimensional standards are updated and expanded as necessary for the safe operation of the higher category aircraft. In the case of SGU however, the airport expansion required to safely accommodate the forecast aircraft types cannot be

[7] Telephone conversation between Consultant and Steve Hart, Vice President Market Planning, SkyWest Airlines, April 28, 2004. Telephone conversation between Consultant and Eric Kristensen, Vice President Planning, SkyWest Airlines, May 4, 2004. See **Appendix E, *Aviation Activity Forecasts*.**

accomplished at the existing site, due to topographical constraints. Descriptions of the higher category commercial, corporate, and charter aircraft types projected to operate at the airport in the future are listed in **Table 3.4*, Aircraft Types Forecast to Operate at SGU in the Future***.

As shown in **Table 3.4**, the Canadair Regional Jet 200 (CRJ-200), 700 (CRJ-700), 900 (CRJ-900), Embraer 145 (ERJ-145), 170 (ERJ-170), 175 (ERJ-175), 190 (ERJ-190), 195 (ERJ-195), and the Dash 8-200 and 8-300 are forecast to provide scheduled daily commercial service at SGU in the future. The CRJ-200 and CRJ-700 are part of SkyWest Airlines' current aircraft fleet, but do not operate at the existing airport because it does not provide the aircrafts' required takeoff distance and also fails to meet other dimensional standards necessary for the operation of such aircraft. **Table 3.5 and Table 3.6** show additional detailed information regarding runway takeoff requirements and airport dimensional standards needed to support the type aircraft forecast to operate at the proposed replacement airport.

Although the CRJ-900, ERJ-145, ERJ-170, ERJ-175, ERJ-190, ERJ-195, and Dash 8-200 and 8-300 do not currently operate at SGU, they are representative of commercial aircraft types that could potentially serve the proposed replacement airport to meet the forecast demand. The runway and navigation facilities at the proposed replacement airport would provide the required operational environment for each of the commercial aircraft types listed in **Table 3.4**.

The facilities at the proposed replacement airport would also provide the required operational environment for several corporate and charter aircraft. Because such operations are forecast to occur only occasionally, they are considered to be unscheduled. The Falcon 900, Falcon 2000, Gulfstream 400 (G-IV), Gulfstream 500 (G-V), and Lear 45 are representative of corporate aircraft that could potentially operate at the proposed replacement airport. The Boeing 737-500 (B737-500) and Boeing MD-90 (MD-90) aircraft types are representative of charter aircraft that could potentially operate at the proposed replacement airport. It should be noted that the forecast aircraft types listed in this section are only representative of potential aircraft that could operate at SGU in the future and are not meant to be an exhaustive listing.

Table 3.4
AIRCRAFT TYPES FORECAST TO OPERATE AT SGU IN THE FUTURE

AIRCRAFT TYPE[1]	ENGINE TYPE	DESIGN GROUP[17]	SEAT CAPACITY	OPERATION TYPE/FREQUENCY
Canadair Regional Jet 200 (CRJ-200)[2]	Jet	C-II	50	Scheduled Commercial/Daily
Canadair Regional Jet 700 (CRJ-700)[2]	Jet	C-II	70	Scheduled Commercial/Daily
Canadair Regional Jet 900 (CRJ-900)[3]	Jet	C-III	80	Scheduled Commercial/Daily
Embraer 145 (ERJ-145)[4]	Jet	C-II	50	Scheduled Commercial/Daily
Embraer 170 (ERJ-170)[5]	Jet	C-II	70-78	Scheduled Commercial/Daily
Embraer 175 (ERJ-175)[6]	Jet	C-III	78-86	Scheduled Commercial/Daily
Embraer 190 (ERJ-190)[7]	Jet	C-III	94-106	Scheduled Commercial/Daily
Embraer 195 (ERJ-195)[8]	Jet	C-III	106-118	Scheduled Commercial/Daily
Falcon-900[9]	Jet	B-II	5-8	Unscheduled Corporate/Occasional
Falcon-2000[10]	Jet	B-II	6-8	Unscheduled Corporate/Occasional
Gulfstream 400 (G-IV)[11]	Jet	D-II	11-19	Unscheduled Corporate/Occasional
Gulfstream 500 (G-V)[12]	Jet	B-III	14-19	Unscheduled Corporate/Occasional
Lear 45[13]	Jet	C-I	9	Unscheduled Corporate/Occasional
Dash 8-200 and 8-300[14]	Turboprop	A-III	37	Scheduled Commercial/Daily
Boeing 737-500 (B737-500)[15]	Jet	C-III	100-120	Charter/Occasional
Boeing MD 90 (MD-90)[16]	Jet	C-III	150-170	Charter/Occasional

Sources:

1. Landrum & Brown analysis. 2004.
2. SkyWest Airlines Aircraft Information. On-line at www.skywest.com/. 2003.
3. Mesa Air Group Aircraft Fleet Information. On-line at www.mesa-air.com/. 2002.
4. Embraer ERJ-145 Performance Specifications. On-line at www.embraer.com/. Retrieved March 30, 2004.
5. Embraer ERJ-170 Performance Specifications. On-line at www.embraer.com/. Retrieved May 6, 2004.
6. Embraer ERJ-175 Performance Specifications. On-line at www.embraer.com/. Retrieved May 6, 2004.
7. Embraer ERJ 190 Performance Specifications. On-line at www.embraer.com/. Retrieved May 6, 2004.
8. Embraer ERJ-195 Performance Specifications. On-line at www.embraer.com/. Retrieved May 6, 2004.
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17. FAA Aircraft Characteristics Database. On-line at http://www.faa.gov/arp/airchardb/. March 11, 2005.
    Aircraft Characteristics. Burns & McDonnell. 1998/1999.
    Aircraft Manufacturers' Data. Landrum & Brown, 2005.

Table 3.5
EXISTING AIRPORT DIMENSIONAL STANDARDS FOR ARC B-II AIRCRAFT TYPES

REPRESENTATIVE ARC B-II AIRCRAFT TYPE CURRENTLY IN SCHEDULED OPERATION AT SGU: EMB-120	INSTRUMENT APPROACH VISIBILITY MINIMUMS NOT LOWER THAN 3/4-STATUTE MILE (IN FEET)[1]	EXISTING DIMENSION (IN FEET)
ITEM		
Runway Width	75 ft.	100 ft.
Runway Centerline to Taxiway Centerline Both Taxiways	240 ft.	200 ft.[2]
Runway Centerline to Aircraft Parking	250 ft.	265 ft.
Runway Centerline to Hold Line East side & West side	200 ft.	125 ft.[3]
Runway Safety Area Width Both Runway Ends	150 ft.	150 ft.
Runway Safety Area Length Beyond Runway End[5] Both Runway Ends	300 ft.	300 ft.
Runway Object Free Area Width[6] Both Runway Ends	500 ft.	500 ft.
Runway Object Free Area Length Beyond Runway End Both Runway Ends	300 ft.	300 ft.4
Taxiway Width		
Taxiway A (east side)	35 ft.	40 ft.
Taxiway B (west side)	35 ft.	35 ft.
Taxiway Safety Area Width Both Taxiways	79 ft.	79 ft.

Notes:

1. Existing airport approach visibility minimums
2. FAA modification of standard was approved in 1978.
3. FAA modification of standard was approved in 1995.
4. The existing Object Free Area length was recently extended to meet criteria by relocating Runway 16 threshold.
5. Runway Safety Area (RSA): An area adjacent to the runway that is capable of supporting the occasional passage of aircraft without causing structural damage under dry conditions.
6. Runway Object Free Area (OFA): A two-dimensional ground area centered on the runway centerline which is clear of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

ARC (Airport Reference Code) is a coding system used to relate airport design criteria to the operational and physical characteristics of the aircraft intended to operate at the airport.

SGU is currently classified to accommodate ARC Design Category B-II aircraft, which includes aircraft with approach speeds of 91 to 121 knots and wingspans of 49 to 79 feet.

Sources: FAA Advisory Circular 150/5300-13, *Airport Design*; FAA Advisory Circular 150/5340-1H, *Standards for Airport Markings*; St. George Municipal Airport Certification Specifications. October 7, 2003.

Table 3.6
DIMENSIONAL STANDARDS FOR ARC D-III AIRCRAFT TYPES

ITEM	APPROACH VISIBILITY MINIMUMS LOWER THAN 3/4-STATUTE MILE (IN FEET)[1]	DIMENSION AT EXISTING AIRPORT (IN FEET)	DIFFERENCE (IN FEET)
Runway Width	100 ft.[2]	100 ft.	0 ft.
Runway Centerline to Taxiway Centerline	400 ft.	200 ft.	-200 ft.
Runway Centerline to Aircraft Parking	500 ft.	265 ft.	-235 ft.
Runway Centerline to Hold Line	250 ft.	125 ft.	-125 ft.
Runway Safety Area[5] Width	500 ft.[3]	150 ft.	-350 ft.
Runway Safety Area Length Beyond Runway End	1,000 ft.	300 ft.	-700 ft.
Runway Object Free Area[6] Width	800 ft.	500 ft.	-300 ft.
Runway Object Free Area Length Beyond Runway End	1,000 ft.	300 ft.	-700 ft.
Taxiway Width	50 ft.[4]	40 ft.	-10 ft.
Taxiway Safety Area Width	118 ft.	79 ft.	-39 ft.
Taxiway Object Free Area Width	186 ft.	131 ft.	-55 ft.

Notes:

1. The specified dimensional criteria are the same for "approach visibility minimums not lower than ¾-statute mile."
2. The standard runway width is 150 feet for airplanes with maximum certificated takeoff weights greater than 150,000 pounds.
3. The required runway safety area width is 500 feet where the airport elevation is 1,000 feet or less above mean sea level. The required width increases by 20 feet for each additional 1,000 feet of elevation. This would equate to an approximate 560-foot safety area width at St. George Municipal Airport.
4. The standard taxiway width is 60 feet for aircraft in Airplane Design Group III with a wheel base equal to or greater than 60 feet (i.e., the MD-80 series aircraft).
5. Runway Safety Area (RSA): An area adjacent to the runway, which is capable of supporting the occasional passage of aircraft without causing structural damage under dry conditions.
6. Runway Object Free Area (OFA): A two dimensional ground area centered on the runway centerline which is clear of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

ARC (Airport Reference Code) is a coding system used to relate airport design criteria to the operational and physical characteristics of the aircraft intended to operate at the airport.

ARC Design Category D-III includes aircraft with approach speeds of 144 to 166 knots and wingspans of 79 to 118 feet.

Sources: FAA Advisory Circular 150/5300-13, *Airport Design*; FAA Advisory Circular 150/5340-1H, *Standards for Airport Markings*; *Final Environmental Assessment for the Proposed Replacement Airport at St. George, Utah*. Safety Standards, Page 10 and Runway Deficiencies, Page 16. Prepared by Creamer & Noble, Engineers and Barnard Dunkelberg & Company. January 30, 2001.

Landrum & Brown analysis, 2004.

3.2.3 AIRPORT DEFICIENCIES

The *1998 Master Plan* identified facility deficiencies at SGU in the areas of: 1) airfield design standards, 2) runway length, and 3) runway orientation. These deficiencies are experienced at the existing airport in its current topographically-constrained condition and are expected to become more significant as local travel demand increases to support service by larger and more complex aircraft. The existing airport site cannot be expanded at its current location to meet the design standards of the types of aircraft forecast to operate at SGU in the future. **Section 3.2.3.1 through Section 3.2.3.3** of this chapter provide detailed explanations of these three areas of facility deficiency at SGU.

3.2.3.1 Airfield Design Standards

SGU is restricted to its existing ARC B-II designation because the site lacks the expansion area required to provide facilities that could accommodate current and forecast future aircraft types. As shown in **Table 3.5, *Existing Airport Dimensional Standards for ARC B-II Aircraft Types***, the design criteria deficiencies that are found at the existing site include runway centerline to taxiway centerline separation and runway centerline to hold-line separation. Although the FAA issued a Modification of Standards waiver for these design deficiencies, their presence prohibits the installation of a low visibility instrument approach at the existing site. The runway and taxiway facilities at the proposed replacement airport would provide adequate design separations to allow for the installation of a low visibility instrument approach, which would increase airport efficiency by reducing delays during low visibility weather conditions.

Table 3.6, *Dimensional Standards for ARC D-III Aircraft Types*, compares the existing airport's dimensions with the airside dimensional standards that would be required to accommodate the forecast representative aircraft fleet. The existing airport site falls far short of meeting the ARC D-III standards in the following respects:

- Runway-taxiway separation at the airport is only half of the required distance;
- Substandard separation between the runway centerline and aircraft parking areas;
- Runway safety area and object free area dimensions are also far below the required distances; and
- The taxiway width and taxiway safety areas are also below the standard.

In addition, as discussed in **Section 3.2.1**, ***Current Status of St. George Municipal Airport***, the topography at the existing site makes it impractical to develop the necessary improvements at the existing airport to meet the forecast future demand for air service.

3.2.3.2 Runway Length Deficiencies

Table 3.7 also shows the runway length requirements of aircraft forecast to operate at St. George based on the unconstrained forecast. Runway length requirements for aircraft operating in the SGU area are based on the following factors:

- Airport elevation
- Mean maximum daily temperature of the hottest month
- Runway gradient
- Critical aircraft type expected to use the airport
- Stage length of the longest nonstop trip destination

The operational runway length requirements for aircraft are greatly affected by elevation, temperature, and runway gradient. The calculation for runway length requirements at SGU are based on an elevation of 2,939.2 feet above Mean Sea Level (MSL), 101.0 degrees Fahrenheit (F) mean Normal Maximum Temperature, and a maximum Effective Runway Gradient of 1.13 percent.

The unconstrained forecast identifies commercial service aircraft and general aviation aircraft that are forecast to meet the future aviation demand at SGU. As shown in **Table 3.7, *Runway Takeoff Length Requirements***, several of the forecast aircraft types require a runway length of at least 8,000 feet for safe operation. The existing Runway 16/34 measures 6,606 feet, which is the maximum runway length that can be accommodated at the current airport site, due to topography constraints.

A displaced threshold of 195 feet on Runway 16 further reduces the total useable landing length to 6,411 feet. The threshold is displaced (shifted down from the end of the paved runway) to allow adequate clearance over terrain for landing aircraft.[8] The displaced threshold is available for taxi and takeoff on Runway 16 and for landing rollout on Runway 34, but is not available for landing on Runway 16.

As shown in **Table 3.7**, the existing Runway 16/34, with a takeoff length of 6,606 feet, falls short of the 7,000-foot runway length that is required to fully accommodate the current operation of SkyWest Airlines' Embraer 120 (EMB-120), which is the aircraft type used by both Delta Connection and United Express at SGU. The current runway length is also too short to accommodate the aircraft types forecast to operate at the airport in the future.

[8] FAA Order 7400.2E, Change 3, *Procedures for Handling Airspace Matters*. May 15, 2003.

Table 3.7
RUNWAY TAKEOFF LENGTH REQUIREMENTS

CURRENT AIRCRAFT TYPE	REQUIRED TAKEOFF LENGTH (IN FEET)
Embraer 120 (EMB–120)	7,000
FORECAST AIRCRAFT TYPES	**REQUIRED TAKEOFF LENGTH (IN FEET)**
75% of fleet / 60% useful load	6,560 ft.
100% of fleet / 60% useful load	8,690 ft.
75% of forecast aircraft types / 90% useful load	9,320 ft.
100% of forecast aircraft types / 90% useful load	11,520 ft.
Canadair Regional Jet 200ER (CRJ-200)	8,000 ft.[1]
Canadair Regional Jet 700 (CRJ-700)	8,000 ft.[1]
Falcon 900EX	9,624 ft.[2]
Gulfstream 400 (G-IV) and 500 (G-V)	9,504 ft.[2]
Lear 45	8,027 ft.[2]
Dash 8-311[5]	6,966 ft.[2]
Boeing 737-500 (B737-500) (approximate 1,000 NM stage length)	7,100 ft.[3]
Boeing MD-90-10 (MD-90)	7,200 ft.[4]

Notes:

1. SkyWest Airlines estimated optimal takeoff runway length requirement for airfield elevation of 3,000 feet AMSL
2. Aircraft manufacturers' data and ICAO formula calculations by Landrum & Brown. Assumes maximum takeoff weight.
3. Creamer & Noble Engineers estimate utilizing manufacturer's operation manual for the CFM56-3C engine at 112,500 lb. takeoff weight
4. Creamer & Noble Engineers estimate utilizing manufacturer's operation manual for the IAE V2500-D5 engine at 120,000 lb. takeoff weight
5. Dash 8-311 is representative of the Dash 8-200 and 8–300 type aircraft.

   Runway lengths were calculated based on an airport elevation of 2,939.2 feet AMSL; mean normal maximum temperature of 101.0°F, and maximum effective runway gradient of 1.13%. The recommended runway lengths are the same for both wet and dry runway conditions.

   The following Regional Jet and corporate aircraft could potentially serve the proposed replacement airport at St. George in the future:

   - Canadair Regional Jet 900 (CRJ-900)
   - Embraer 145 (ERJ-145)
   - Embraer 170 (ERJ-170)
   - Embraer 175 (ERJ-175)
   - Embraer 190 (ERJ-190)
   - Embraer 195 (ERJ-195)
   - Falcon-2000
   - Gulfstream 400 (G-IV)
   - Gulfstream 500 (G-V)

Sources: *Final Environmental Assessment for the Proposed Replacement Airport at St. George, Utah*. Table 1.4, *Runway Takeoff Length Requirements*, Pages 15-16. Prepared by Creamer & Noble Engineers and Barnard Dunkelberg & Company. January 30, 2001.

Landrum and Brown analysis, 2004

The shorter runway forces Delta Connection and United Express (both operated by SkyWest Airlines) to suffer periodic passenger or cargo payload departure penalties when the temperature exceeds 100 degrees F. These penalties typically involve removing passengers and their luggage from a flight in order to ensure that the aircraft takeoff weight does not exceed maximum limits. As many as four passengers would need to be removed from a flight when daily temperatures reach 100 degrees F, and as many as seven passengers would need to be removed with a daily temperature of 110 degrees F. SkyWest officials have indicated that they desire an airport at St. George with sufficient runway length to operate the forecast aircraft types during conditions in which air temperatures exceed 100 degrees F.[9]

SkyWest's existing fleet of Canadair Regional Jets, which are forecast to operate at the proposed replacement airport as part of the unconstrained activity forecast, require a runway takeoff length of at least 8,000 feet. The existing runway length falls far short of this requirement. A runway length of 9,300 feet would accommodate approximately 75 percent of the fleet of aircraft (large aircraft less than 60,000 pounds) forecast to operate at the airport in the future, operating with an average of 90 percent useful loads. Because it is not anticipated that every forecast aircraft type would operate at the airport every day, a runway length was determined for the proposed replacement airport that would best accommodate an average mix of the forecast Category D-III aircraft types on a given future day, while meeting all FAA airport design and safety standards for such aircraft.

3.2.3.3 Runway Orientation Deficiencies

The existing airport operates with a single runway oriented north-south at magnetic headings of 340 degrees and 160 degrees. As a general planning principal, an airport's primary runway should be oriented in the direction of the prevailing wind. In addition, runways should be developed to ensure that aircraft are able to safely operate when strong winds are from other than the prevailing direction. Further, aircraft are able to properly land and takeoff on a runway as long as the crosswind component (perpendicular to the direction of travel) is not excessive.

For planning purposes, the allowable crosswind component is dependent upon the Airport Reference Code (ARC) for the airport. SGU is currently classified in the ARC B-II design category. Based on the largest aircraft operating at the airport (the EMB-120) the maximum allowable crosswind component is 13 knots. However, because a significant proportion of aircraft using the airport are light, single-engine aircraft with greater sensitivity to crosswinds, their needs must be considered in runway layout development. These lighter, single-engine aircraft are subject to a 10.5-knot maximum crosswind component. Utilizing the 13-knot and 10.5-knot crosswind components, the wind analysis indicates that the existing runway provides the wind coverage listed in **Table 3.8**.

[9] Telephone conversation between Consultant and Steve Hart, Vice President Market Planning, SkyWest Airlines, April 28, 2004. Telephone conversation between Consultant and Eric Kristensen, Vice President Planning, SkyWest Airlines, May 4, 2004.

Table 3.8
EXISTING RUNWAY 16/34 WIND COVERAGE

RUNWAY	PERCENTAGE OF TIME THAT RUNWAY IS USEABLE	
	13-KNOT CROSSWIND COMPONENT	10.5-KNOT CROSSWIND COMPONENT
Runway 16	64.82%	62.50%
Runway 34	31.36%	30.59%
Total - Runway 16/34	96.18%	93.09%

Source: *Final Environmental Assessment for the Proposed Replacement Airport at St. George, Utah. Runway Deficiencies*, Page 18. Prepared by Creamer & Noble Engineers and Barnard Dunkelberg & Company. January 30, 2001.

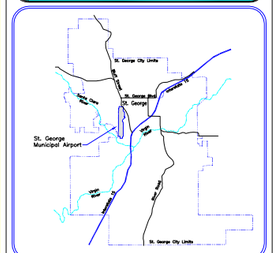
The typical design objective for a runway system is to be able to provide wind coverage for conditions that would apply at least 95 percent of the time. The wind coverage provided by the existing runway system sufficiently meets this objective for the 13-knot crosswind component, yet is deficient for the 10.5-knot crosswind component.[10]

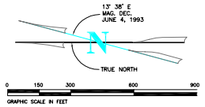
Due to the existing airport's site constraints, which prohibit the development of a crosswind runway, it is not possible to enhance wind coverage for the 10.5-knot crosswind component at the current site. Utilizing the existing wind data for SGU, a range of acceptable runway orientations were identified in the *1998 Master Plan* to satisfy the recommended 95 percent wind coverage requirements for the 10.5-knot crosswind component. Through analysis of wind data collected by the Utah Department of Transportation at the proposed replacement airport site, it was determined that a Runway 01/19 alignment (oriented to magnetic headings of approximately 10 degrees and 190 degrees) would provide 94.1 percent wind coverage for the 10.5-knot crosswind component and 96.7 percent wind coverage for the 13-knot crosswind component. It would further provide 99 percent wind coverage for the 16-knot crosswind component.[11] The new orientation at the proposed replacement airport would thereby provide improved crosswind availability as compared to the existing airport.

[10] Landrum & Brown analysis, 2004.

[11] *Final Environmental Assessment for the Proposed Replacement Airport at St. George, Utah. Runway Deficiencies,* Page 18. Prepared by Creamer & Noble Engineers and Barnard Dunkelberg & Company. January 2001.

VICINITY MAP





NON-STANDARD CONDITIONS

ITEM	AIRPORT REFERENCE CODE		STANDARD		NON-STANDARD CONDITION		REMARKS
	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	
TAXIWAY HOLDLINES R/W CENTERLINE SEPARATION	B-II	B-II	200'	200'	125'	125'	

MODIFICATION OF STANDARDS

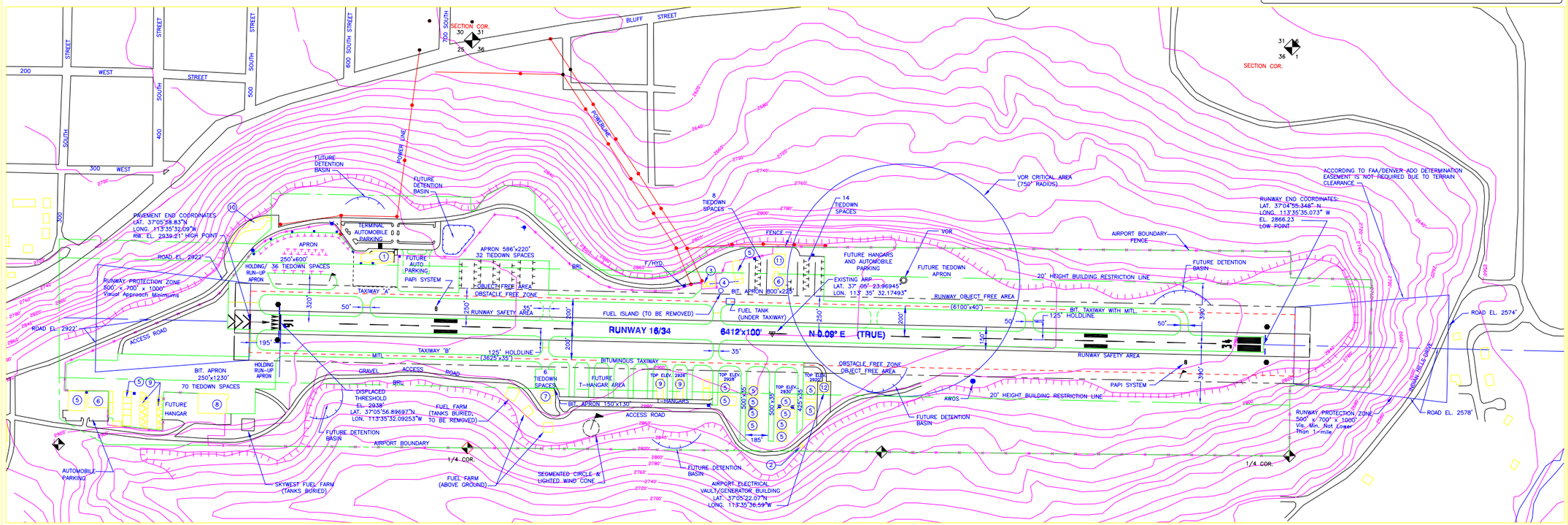
NO.	DESCRIPTION	APPROVAL DATE
1.	200' BETWEEN RUNWAY/TAXIWAY CENTERLINE	1978
2.	TAXIWAY "A" ENCROACHES INTO RUNWAY PRIMARY SURFACE IN SOME PLACES	NOT APPROVED

REVISIONS

No.		Date

RUNWAY 16/34 DECLARED DISTANCES

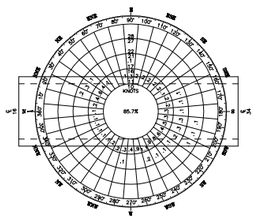
ITEM	RUNWAY 16		RUNWAY 34		
	EXISTING	FUTURE	EXISTING	FUTURE	
TAKEOFF RUN AVAILABLE (TORA)	6,607	6,607	6,607	6,607	
TAKEOFF DISTANCE AVAILABLE (TODA)	6,607	6,607	6,607	6,607	
ACCELERATE-STOP DISTANCE AVAILABLE (ASDA)	6,607	6,607	6,412	6,412	
LANDING DISTANCE AVAILABLE (LDA)	6,412	6,412	6,412	6,412	



BUILDING LEGEND

NO.	BUILDING	TOP ELEVATION
1.	AIRPORT TERMINAL BUILDING	2949'
2.	BEACON TOWER	
3.	EQUIPMENT STORAGE	
4.	FBO-SERVICE	
5.	EXECUTIVE HANGARS	
6.	FBO-SHOP & HANGAR	2927.5'
7.	DIXIE COLLEGE HANGAR	
8.	SKY WEST MAINTENANCE HANGAR	2971.1'
9.	T-HANGAR	
10.	RESTAURANT/RESIDENCE/MOTEL	2945'
11.	COMMERCIAL AIR FREIGHT SERVICE	
12.	ELEC. VAULT/GEN. BUILDING	2920.15'

WINDROSE



RUNWAY 16-34 93.09% 96.19%
SOURCE: U.D.O.T. - MAY 19, 1989 TO MAY 21, 1993
SITE: SITE ONE (PROPOSED NEW AIRPORT LOCATION)
NUMBER OF OBSERVATIONS: 35,840

RUNWAY DATA

	RUNWAY 16/34	
	EXISTING	*FUTURE*
RUNWAY WIDTH AND LENGTH	100' X 6412'	*100' X 6412'*
FAR PART 77 CATEGORY	B/C	*B/C*
APPROACH VISIBILITY MINIMUMS	VISUAL/1-MILE	*VISUAL/1-MILE*
RUNWAY LIGHTING	MIRL	*MIRL*
RUNWAY MARKING	VIS/NON-PREC	*VIS/NON-PREC*
RUNWAY SAFETY AREA	150' X 7012'	*150' X 7012'*
RUNWAY OBJECT FREE AREA	500' X 7012'	*500' X 7012'*
RUNWAY OBSTACLE FREE ZONE (OFZ)(1)	400' X 6812'	*400' X 6812'*
INSTRUMENT RUNWAY	NO/YES	*NO/YES*
NAVIGATIONAL AIDS	VOR-DME	*VOR-DME*
LANDING AIDS	BEACON/PAPI/REILS	*BEACON/PAPI/REILS*
APPROACH SURFACES	20:1/34:1	*20:1/34:1*
PAVEMENT STRENGTH (IN 1000 LBS.)	26s	*26s*
PAVEMENT TYPE	ASPHALT	*ASPHALT*
EFFECTIVE RUNWAY GRADIENT %	1.13	*1.13*
TOUCHDOWN ZONE ELEVATION (TDZE) (2)	2939.21'/2904.0'	*2939.21'/2904.0'*
% WIND COVERAGE (13/10.5 KNOTS)	96.19/93.09	*96.19/93.09*
AIRPORT REFERENCE CODE	B-II	*B-II*
RUNWAY LINE-OF-SIGHT	Criteria met	*Criteria met*
MAX GRADIENT WITHIN RUNWAY LENGTH %	1.56	*1.56*
CRITICAL AIRCRAFT	EMBRAER BRASILIA	*EMBRAER BRASILIA*

Notes: (1) NO OFZ PENETRATIONS
(2) TDZE REFLECTS THE HIGHEST ELEVATION IN THE FIRST 3,000' OF THE LANDING SURFACE

AIRPORT DATA

ITEM	EXISTING	*FUTURE*
AIRPORT ELEVATION (AMSL)	2939.21'	*2939.21'*
AIRPORT REFERENCE POINT (ARP)	LAT. 37° 05' 23.96945" LON. 113° 35' 32.17493"	*LAT. 37° 05' 23.96945" LON. 113° 35' 32.17493"*
MEAN MAX TEMP. HOTTEST MONTH	101°F	*101°F*
AIRPORT PROPERTY (ACRES)	263	*263*
UNICOM (MHz)	-	-
NPIAS CATEGORY	PRIM. COMM. SERVICE	*PRIM. COMM. SERVICE*
CONTROL TOWER (MHz)	-	-
TAXIWAY MARKING	CENTERLINE	*CENTERLINE*
TAXIWAY "A" LIGHTING	MITL	*MITL*
TAXIWAY "B" LIGHTING	REFLECTORS	*REFLECTORS*

LAYOUT PLAN LEGEND

ITEM	EXISTING	*FUTURE*
BUILDING RESTRICTION LINE	BRL	*BRL*
AIRPORT PROPERTY LINE		
FENCE		
AVIGATION EASEMENT		
RUNWAY PROTECTION ZONE		
BUILDINGS		
AIRFIELD PAVEMENT		
FUEL STORAGE	F	*F*
BEACON		
LIGHTED WIND CONE & SEGMENTED CIRCLE		
PRECISION APPROACH PATH INDICATOR(PAPI)		
RUNWAY END IDENTIFIER LIGHTS(REILS)		o
FIRE HYDRANT		

SPONSOR APPROVAL DATE

NOTES

NOTE:
1. THIS DRAWING SHOULD NOT BE USED AS A STANDARD FOR PLANNING OR DESIGN.
2. RUNWAY TRUE BEARING TAKEN FROM NOAA/NOS OBSTRUCTION CHART #OC 5742 (JUNE 1993).
3. PART 77 CRITERIA WAS USED TO DETERMINE OBSTRUCTION ELEVATIONS OF ROADS.
4. CLEAR ZONE OBSTRUCTIONS BY ACCESS ROADS AND FENCELINE WERE FAA COORDINATED AND APPROVED IN 1978.
5. PART 77.25 SURFACE OBSTRUCTIONS LISTED IN "OBSTRUCTION" TABLE FAA COORDINATED 1978.
6. ALL COORDINATE DATA IS PROVIDED BY CREAMER & NOBLE ENGINEERS AND IS NAD 83.
7. ORIGINAL DRAWING FROM CREAMER & NOBLE ENGINEERS.

ST. GEORGE MUNICIPAL AIRPORT
ST. GEORGE, UTAH

EXISTING AIRPORT LAYOUT

Barnard Dunkelberg & Company
Tulsa, Oklahoma

FIGURE NUMBER
METRIC SCALE
SCALE 1" = 300'
DATE JUNE 2000
DRAWING NUMBER 1 OF 7

St. George Municipal Airport
Environmental
Impact
Statement

FEDERAL AVIATION ADMINISTRATION

Topography at Existing Airport Site (ALP)

EXHIBIT

3.1

6/25/2004
Prepared by: Landrum & Brown
Filename: H:\SGU EIS\ALP\existing\EX3._Topo Existing ALP.dwg