APPENDIX D
RUNWAY LENGTH ANALYSIS

This appendix includes the runway length analysis for Gnoss Field Airport that was prepared for the Environmental Impact Statement and the Environmental Impact Report to verify an appropriate length for Gnoss Field Airport Runway 13/31.

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RUNWAY LENGTH ANALYSIS

D.1 SUMMARY

Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5325-4B, *Runway Length Requirements for Airport Design* was followed to verify the necessary runway length to meet the purpose and need for this project, which is to accommodate existing aviation activity, as reflected by the critical aircraft, the Cessna 525, that regularly uses the airport. DVO is designated as an Airport Reference Code B-I airport and is designed to accommodate aircraft such as the Cessna 525 with a wingspan of 49 feet or less, and an approach speed of 91 to 121 knots.

AC 150/5325-4B, Paragraph 202, *Design Approach*, provides two methods calculating a recommended runway length. Airport planners can either use the appropriate "runway length curves" in AC 150/5325-4B for the weight and characteristics of a critical aircraft or a family grouping of critical aircraft under consideration, or the airport planner can determine the necessary runway length from an airport planning manual (APM) for a specific critical aircraft.

This runway length determination follows Chapter 4 and Chapter 5 of FAA AC 150/5325-4B, which describes the process for using an APM in calculating runway length. Eight specific variable factors are considered when establishing the appropriate runway length. Table D-1 of this appendix shows those variable factors as applied to the Cessna 525 and summarizes the results of the runway length analysis using an APM for the Cessna 525. See Section D.2 below for a detailed description of the runway length analysis.

Table D-1
SUMMARY OF RUNWAY LENGTH DETERMINATION FOR DVO
Gnoss Field Airport

VARIABLE FACTORS		AIRPLANE PERFORMANCE CHARACTERISTICS TURBOJET (UTILIZING AIRPLANE MANUFACTURER'S AIRPORT PLANNING MANUALS (APM[i]) CHAPTER 4)
Airplane Type		Cessna 525[ii]
Flap Setting		15° Flaps for Takeoff performance, "Land" for Landing performance
Operating Weights	Takeoff	MTOW – 10,700 lbs.[iii]
	Landing	MLW – 9,900 lbs.
Airport Elevation		Sea Level
Temperature	Takeoff	86° F[iv]
	Landing	86° F
Wind	Takeoff	Zero wind
	Landing	Zero wind
Runway Surface Conditions	Takeoff	Wet (turbo)
	Landing	Wet (turbo)
Difference in Centerline Elevation	Takeoff	Zero
	Landing	n/a
Runway Length for Takeoff		4,400 ft. (rounded from 4,390 ft.)
Runway Length for Landing		3,100 ft. (rounded from 3,093 ft.)

Table Notes:

i. FAA Approved Airplane Flight Manual Citation CJ1+ Model 525, Cessna Aircraft Company, Revision 3 March 27, 2012 was the APM used for this determiniation.

ii. Cessna 525 was identified as the critical aircraft based on the number of annual operations estimated to exceed 500 and the runway length requirements of the aircraft exceeding those of the other aircraft operating at DVO.

iii. Maximum Takeoff Weight (MTOW) was selected for this analysis because it is typical to use MTOW for general aviation airports where destinations are not readily available and can change dependent upon the specific requirements of individual passengers. In addition, an analysis of radar data for DVO found that typical destinations for the Cessna 525 and other business jets operating from DVO were at a distance where MTOW would be the selected weight if a payload analysis were conducted.

iv. The mean daily maximum temperature of the hottest month for DVO is 82° F. The Cessna 525 Airplane Flight Manual does not identify a runway length for 82° F. Therefore, the closest/higher temperature available (86° F) was used to ensure that the runway length analysis did not underestimate runway length. This methodology was confirmed through a telephone conversation between Landrum and Brown and a Sr. Customer Support Engineer at Cessna Aircraft Company, on April 12, 2013. Cessna confirmed that it was appropriate to use the higher temperature value to calculate runway length for a mean daily maximum temperature of 82°, Record of telephone conversation is in Administrative File.

D.2 INTRODUCTION

Marin County has prepared several evaluations of the Airport's operations and facilities, including the 1989 Airport Master Plan[1], the 1997 Update of the Airport Master Plan, the 2002 Preliminary Design Report for the proposed runway extension[2], and the evaluations leading up to the preparation of this EIS[3]. These studies identified the limitations regarding the Airport's ability to accommodate existing aircraft and aviation users for which the Airport was designed. Specifically, the Airport cannot fully accommodate existing aviation activity, as represented by the critical aircraft, the Cessna 525, an Airport Reference Code B-1 business jet[4] that regularly uses the Airport, under hot weather and other adverse weather conditions.[5] The existing runway at DVO is 3,300 feet long and as a result cannot fully accommodate the operations of the critical aircraft.

FAA Advisory Circular (AC) 150/5325-4B *Runway Length Requirements for Airport Design*[6], is the FAA's guidance document for identifying the appropriate runway length for airport runways.

AC 150/5325-4B, Paragraph 101 *Background*, describes runway length factors and evaluations as follows:

"Airplanes today operate on a wide range of *available* runway lengths. Various factors, in turn, govern the *suitability* of those available runway lengths, most notably airport elevation above mean sea level, temperature, wind velocity, airplane operating weights, takeoff and landing flap settings, runway surface condition (dry or wet), effective runway gradient, presence of obstructions in the vicinity of the airport, and, if any, locally imposed noise abatement restrictions or other prohibitions. Of these factors, certain ones have an operational impact on available runway lengths. That is, for a given runway the usable length made available by the airport may not be entirely *suitable* for all types of airplane operations."

AC 150/5300-13A, *Airport Design,* Paragraph 105b *Design Aircraft*, states describing aircraft using an airport that:

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1. *Airport Master Plan Marin County Airport Gnoss Field*, 1989.
2. Cortright & Seibold, *Preliminary Design Report, Runway Extension, Gnoss Field*, 2002.
3. Landrum & Brown*, Gnoss Field Airport Runway Length Analysis, 2008 & 2013.* (Appendix D of this EIS).
4. The critical aircraft for DVO is the Cessna 525 business jet, also known as the Cessna Citation 525 or Citation CJ1+. See Appendix D, Attachment 1, *Basis for Determination of the Critical Aircraft for DVO*, and the remainder of Chapter Two for details regarding the how the critical aircraft was determined.
5. For the purpose of this EIS, hot weather is defined as the mean daily maximum temperature of the hottest month at the Airport (FAA A/C 150/5325-4B paragraph 506) and adverse weather conditions include wet runways, icy runways, and crosswinds.
6. Advisory Circular 150/5325-4B, *Runway Length Requirements for Airport Design*, Federal Aviation Administration, July 1, 2005, errata July 31, 2008.

"The first consideration of the airport planner should be the safe operation of aircraft likely to use the airport. Any operation of an aircraft that exceeds design criteria of the airport may result in either an unsafe operation or a lesser safety margin unless air traffic control standard operating procedures are in place for those operations."

Paragraph 105b goes on to state:

"However, it is not the usual practice to base the airport design on an aircraft that uses the airport infrequently, and it is appropriate and necessary to develop air traffic control standard operating procedures to accommodate faster and/or larger aircraft that use the airport occasionally."

As stated in AC 150/5300-13A *Airport Design*, Paragraph 105a, *Applicability of Airport Design Standards*:

"Airport designs that are based on large aircraft never likely to be served by the airport are not economical."

The general approach to the selection of airport dimensional design standards is described in FAA Order 5090.3C *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*, Paragraph 3-4 *Airport Dimensional Standards* which states:

"Airport dimensional standards (such as runway length and width, separation standards, surface gradients, etc.) should be selected which are appropriate for the critical aircraft that will make substantial use of the airport in the planning period. Substantial use means either 500 or more annual itinerant operations or scheduled commercial service. The critical aircraft may be a single aircraft or a composite of the most demanding characteristics of several aircraft. The critical aircraft is used to identify the appropriate Airport Reference Code for airport design criteria."

In regard to the critical aircraft AC 150/5325-4B, Paragraph 102 b (1) states:

"Identify the list of critical design airplanes that will make regular use of the proposed runway for an established planning period of at least five years. For Federally funded projects, the definition of the term *"substantial use"* quantifies the term "regular use."

As described in detail in Attachment 1, *Basis for Determination of the Critical Aircraft for DVO*, the critical aircraft (also called the design aircraft, or critical design aircraft) for DVO is the Cessna Citation 525 (Cessna 525), business jet, also known as the Cessna Citation CJ1+.

AC 150/5325-4B *Runway Length Requirements for Airport Design* provides guidelines for airport designers and planners to determine recommended runway lengths for new runways or extensions to existing runways. AC 150/5325-4B, Paragraph 101 states regarding runway length determinations that:

"In summary, the goal is to construct an available runway length for new runways or extensions to existing runways that is suitable for the forecasted critical design aircraft."

AC 150/5325-4B, Paragraph 103 further states:

"The design objective for the main primary runway is to provide a runway length for all airplanes that will regularly use it without causing operational weight restrictions."

For airport projects receiving Federal funding, the use of the methods described in AC 150/5325-4B to determine runway length is mandatory. This Runway Length Analysis used the procedures in AC 150/5325-4B to verify the necessary runway length met the purpose and need of this project, which, consistent with AC 150/5325-4B, is: To allow existing aircraft, as represented by the critical aircraft at DVO to operate at Maximum Gross Take Off Weight under hot weather and other adverse weather conditions.

AC 150/5325-4B Paragraphs 502 to 509 and AC 150/5325-4B Table 5-1, identify eight specific variable factors that affect runway length that must be considered in determining the recommended runway length for an airport. These are:

- Airplane Type
- Flap Setting
- Operating Weights (for Takeoff and Landing)
- Airport Elevation
- Temperature
- Wind
- Runway Surface Conditions
- Difference in Centerline Elevation (i.e., is the runway level or does it slope from one end to the other producing uphill and downhill conditions).

For aircraft with a Maximum Certificated Takeoff Weight (MTOW) of 60,000 pounds or less, such as the critical aircraft for this project, the Cessna 525 business jet, AC 150/5325-4B, Paragraph 202, *Design Approach*, provides two methods for considering the eight factors described above and additional factors to determine a recommended runway length. Airport planners can either use the appropriate "runway length curves" in AC 150/5325-4B for the weight and characteristics of a critical aircraft or a family grouping of critical aircraft under consideration, or the airport planner can determine the necessary runway length from an airport planning manual (APM) for a specific critical aircraft.

In this EIS, the APM for the critical aircraft, the Cessna 525, was used to verify the necessary runway length instead of runway length curves. The APM for the Cessna 525 was used instead of runway length curves because the Cessna 525 has a more demanding runway length requirement than what is shown for the B-I family grouping in Figure 2-1 of AC 150/5325-4B.

D.3 RUNWAY LENGTH ANALYSIS

AC 150/5325-4B Chapters 4 and 5 describes procedures for calculating necessary runway lengths from an APM[7]. The Cessna 525 has two APM documents available. The first is a Flight Planning Guide[8], which provides an overview of the operating characteristics for the aircraft. The second is the Aircraft Flight Manual[9], which provides a more detailed and complete description of operating characteristics for the aircraft. The FAA considers both a Flight Planning Guide and an Aircraft Flight Manual as reliable sources of information and both of these were used in this analysis. Using these two APMs available for the Cessna 525, the following input was used to verify the recommended runway length requirement for DVO to meet the project purpose and need. The project purpose and need is to allow existing aircraft, as represented by the critical aircraft at DVO, to operate at Maximum Gross Takeoff Weight under hot weather and other adverse weather conditions.

Input Data:

Airplane Type: Cessna 525.

Flap Settings: 15° Flaps for Takeoff performance, “Land” for Landing performance

Operating Weights

Maximum design landing weight: 9,900 pounds

Maximum design takeoff weight: 10,700 pounds[10]

Airport elevation: Sea Level

Mean daily maximum temperature of the hottest month: 82° Fahrenheit

Wind: Zero wind velocity

Runway Surface Conditions: Wet (wet used for turbojets)

Maximum difference in runway centerline elevation: 1 foot

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7 Although AC 150/5325-4B Chapter 4 is titled *Runway Lengths for Regional Jets and those Airplanes with a Maximum Certificated Takeoff Weight of More Than 60,000 Pounds*, the procedures in Chapter 4 are followed for runway length calculations for any size aircraft that is based on an Aircraft Planning Manual.

8 Citation CJ1+ Flight Planning Guide, Cessna Aircraft, February 2007. Note that the documentation from Cessna Aircraft, uses both Citation CJ1+ and Model 525 when referring to the Cessna 525.

9 FAA Approved Airplane Flight Manual Citation CJ1+ Model 525, Cessna Aircraft Company, Revision 3 March 27, 2012. Note that the documentation from Cessna Aircraft, uses both Citation CJ1+ and Model 525 when referring to the Cessna 525.

10 Maximum Takeoff Weight (MTOW) was selected for this analysis because it is typical to use MTOW for general aviation airports where destinations are not readily available and can change dependent upon the specific requirements of individual passengers. In addition, an analysis of radar data for DVO found that typical destinations for the Cessna 525 and other business jets operating from DVO were at a distance where MTOW would be the selected weight if a payload analysis were conducted.

Calculations:

Landing Length Requirement

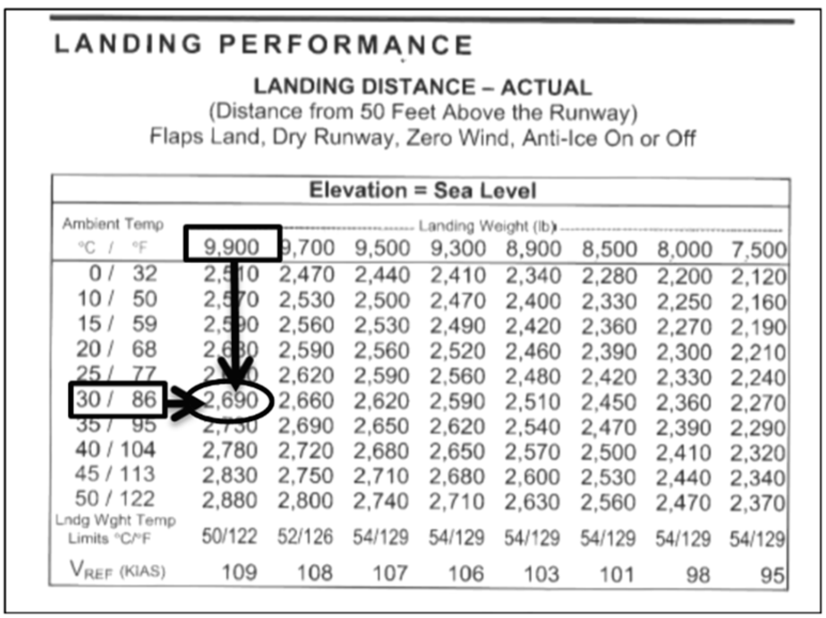
(1) Step 1 – the Cessna 525 APM (Flight Planning Guide) provides one landing chart with regard to flap settings (see below).

(2) Steps 2 and 3 – Find the table for the airport elevation of Sea Level. Enter the landing weight axis at 9,900 pounds and proceed vertically to the Ambient Temperature of 30° Celsius (C) /86° Fahrenheit (F)[11].

(3) Step 4 – Proceed horizontally to the length axis to read 2,690 feet.

(4) Step 5 –Adjust the obtained length for wet landing operations for the Cessna 525 because it is a turbojet-powered airplane. The 15-percent adjustment results in a landing length for wet conditions of 3,093 feet.

(5) The landing length requirement is 3,093 feet. **Note:** Round lengths of 30 feet and over to the next 100-foot interval. Thus, the landing length for design is 3,100 feet.



LANDING PERFORMANCE

LANDING DISTANCE – ACTUAL
(Distance from 50 Feet Above the Runway)
Flaps Land, Dry Runway, Zero Wind, Anti-Ice On or Off

Elevation = Sea Level

Ambient Temp °C / °F	Landing Weight (lb) 9,900	9,700	9,500	9,300	8,900	8,500	8,000	7,500
0 / 32	2,510	2,470	2,440	2,410	2,340	2,280	2,200	2,120
10 / 50	2,570	2,530	2,500	2,470	2,400	2,330	2,250	2,160
15 / 59	2,590	2,560	2,530	2,490	2,420	2,360	2,270	2,190
20 / 68	2,630	2,590	2,560	2,520	2,460	2,390	2,300	2,210
25 / 77	[illegible]	2,620	2,590	2,560	2,480	2,420	2,330	2,240
30 / 86	2,690	2,660	2,620	2,590	2,510	2,450	2,360	2,270
35 / 95	2,730	2,690	2,650	2,620	2,540	2,470	2,390	2,290
40 / 104	2,780	2,720	2,680	2,650	2,570	2,500	2,410	2,320
45 / 113	2,830	2,750	2,710	2,680	2,600	2,530	2,440	2,340
50 / 122	2,880	2,800	2,740	2,710	2,630	2,560	2,470	2,370
Lndg Wght Temp Limits °C/°F	50/122	52/126	54/129	54/129	54/129	54/129	54/129	54/129
V_{REF} (KIAS)	109	108	107	106	103	101	98	95

11 The mean daily maximum temperature of the hottest month for DVO is 82° F. The Cessna 525 Airplane Flight Manual does not identify a runway length for 82° F. Therefore, the closest/higher temperature available (86° F) was used to ensure that the runway length analysis did not underestimate runway length. This methodology was confirmed through a telephone conversation between Landrum and Brown and a Sr. Customer Support Engineer at Cessna Aircraft Company, on April 12, 2013. Cessna confirmed that it was appropriate to use the higher temperature value to calculate runway length for a mean daily maximum temperature of 82°, Record of telephone conversation is in Administrative File.

Takeoff Length Requirement

(1) Step 1 – the Cessna 525 APM (Airplane Flight Manual) provides a takeoff table for Sea Level with a flap setting of 15-degrees and a wet runway (see below).

(2) Steps 2 and 3 – Enter the horizontal weight axis at 10,700 pounds and proceed vertically to the and proceed vertically to the Ambient Temperature of 30° Celsius (C) /86° Fahrenheit (F).

(3) Step 4 – Proceed horizontally to the length axis, the result is 4,390 feet.

(4) Step 5 – No need to adjust for non-zero effective runway gradient

(5) The takeoff length requirement is 4,390 feet. **Note:** Round lengths of 30 feet and over to the next 100-foot interval. Thus, the takeoff length for design is 4,400 feet.

The final necessary runway length for DVO to allow existing aircraft, as represented by the critical aircraft at DVO, the Cessna 525, to operate at Maximum Gross Take Off Weight under hot weather and other adverse weather conditions, is 4,400 feet.

SECTION IV - PERFORMANCE
TAKEOFF

MODEL 525

TAKEOFF FIELD LENGTH - FEET

(OVER 35 FOOT SCREEN HEIGHT)

FLAPS - 15°
SEA LEVEL

CONDITIONS: WET RUNWAY ANTI-ICE OFF

RUNWAY GRADIENT - ZERO
LANDING GEAR - DOWN
SPEED BRAKES - RETRACT

INOPERATIVE ENGINE - WINDMILLING AFTER V1
OPERATIVE ENGINE - TAKEOFF THRUST

SOME CONDITIONS DO NOT MEET CLIMB REQUIREMENTS. OBTAIN ALLOWABLE WEIGHT FROM MAXIMUM TAKEOFF WEIGHT TABLES.

WEIGHT = 10700 LBS VENR = 128 KIAS

TEMP DEG C	TAILWIND 10 KTS V1 KIAS	TAILWIND 10 KTS DIST FT	ZERO WIND V1 KIAS	ZERO WIND DIST FT	HEADWINDS 10 KTS V1 KIAS	HEADWINDS 10 KTS DIST FT	HEADWINDS 20 KTS V1 KIAS	HEADWINDS 20 KTS DIST FT	HEADWINDS 30 KTS V1 KIAS	HEADWINDS 30 KTS DIST FT	VR KIAS	V2 KIAS
–25	96	4580	96	3310	96	2980	96	2670	96	2400	105	111
–20	95	4690	95	3390	95	3040	95	2730	95	2450	105	111
–15	95	4800	95	3470	95	3120	95	2800	95	2510	105	111
–10	95	4920	95	3550	95	3190	95	2870	95	2570	105	111
–5	95	5040	95	3630	95	3260	95	2930	95	2630	105	111
0	95	5160	95	3710	95	3340	95	3000	95	2690	105	111
5	95	5280	95	3800	95	3410	95	3070	95	2750	105	111
10	95	5410	95	3880	95	3480	95	3130	95	2810	105	111
15	95	5530	95	3960	95	3560	95	3200	95	2870	105	111
20	95	5650	95	4040	95	3630	95	3260	95	2930	105	111
25	93	5440	93	3950	94	3650	95	3370	96	3110	106	111
30	92	5500	95	4390	96	4060	97	3750	98	3460	106	111
35	94	6130	98	4880	99	4510	100	4170	100	3840	107	111
40	96	6840	100	5420	101	5010	101	4620	102	4260	107	111
43	98	7290	101	5760	102	5320	103	4910	103	4520	108	111
44	98	7450	101	5880	102	5430	103	5000	104	4610	108	111

WEIGHT = 10500 LBS VENR = 126 KIAS

TEMP DEG C	TAILWIND 10 KTS V1 KIAS	TAILWIND 10 KTS DIST FT	ZERO WIND V1 KIAS	ZERO WIND DIST FT	HEADWINDS 10 KTS V1 KIAS	HEADWINDS 10 KTS DIST FT	HEADWINDS 20 KTS V1 KIAS	HEADWINDS 20 KTS DIST FT	HEADWINDS 30 KTS V1 KIAS	HEADWINDS 30 KTS DIST FT	VR KIAS	V2 KIAS
–25	96	4530	96	3290	96	2960	96	2660	96	2380	104	110
–20	96	4640	96	3360	96	3020	96	2720	96	2440	104	110
–15	95	4750	95	3440	95	3100	95	2780	95	2500	104	110
–10	95	4870	95	3520	95	3170	95	2850	95	2560	104	110
–5	95	4980	95	3600	95	3240	95	2910	95	2620	104	110
0	95	5100	95	3680	95	3310	95	2980	95	2680	104	110
5	95	5220	95	3760	95	3390	95	3050	95	2740	104	110
10	95	5340	95	3840	95	3460	95	3110	95	2800	104	110
15	95	5460	95	3920	95	3530	95	3170	95	2850	104	110
20	95	5580	95	4000	95	3600	95	3240	95	2910	104	110
25	93	5370	93	3870	93	3500	94	3230	95	2980	105	110
30	91	5220	94	4170	95	3860	96	3560	97	3280	105	110
35	93	5810	96	4640	97	4290	98	3960	99	3650	106	110
40	95	6490	99	5150	99	4760	100	4400	101	4050	106	110
44	97	7060	100	5590	101	5160	102	4760	102	4390	107	110
45	97	7220	100	5700	101	5270	102	4860	103	4480	107	110
46	98	7380	101	5820	102	5380	102	4960	103	4570	107	110

ATTACHMENT 1

BASIS FOR DETERMINATION OF THE CRITICAL AIRCRAFT FOR DVO

Attachment 1, *Basis for Determination of the Critical Aircraft for DVO*

FAA Order 5090.3C *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*, Paragraph 3-4 *Airport Dimensional Standards*, defines the critical aircraft (also called the design aircraft or critical design aircraft) as the single aircraft or composite of the most demanding characteristics of several aircraft that make substantial use of the airport. “Substantial use” of a general aviation airport is defined as 500 or more annual itinerant operations or scheduled commercial service. Per AC 150/5325-4B the definition of the term “substantial use” quantifies the “regular use” of an airport. As there is no scheduled commercial airline service at DVO, the most demanding aircraft with 500 annual itinerant operations at DVO (i.e., is the most demanding aircraft with regular user of the airport) is identified as the critical aircraft for the airport. The Cessna 525 business jet was identified as the critical aircraft for DVO through the process described below.

An aviation forecast (Appendix C) for DVO was prepared as a prelude to the EIS/EIR being formally initiated. Like most non-towered airports, DVO does not keep a daily record of the exact number of aircraft operations that occur, or the type of aircraft that are operated. Therefore, determining the exact number of operations by a specific aircraft type at DVO required integration of various data sources and the application of professional judgment based on the best available data.

Radar data covering the DVO area was collected for the time period of January 2007 through December 2007 from the FAA’s Airspace and Aeronautical Information Management Laboratory archives.[12] **Table 1, *DVO Aircraft Operations Summary***, presents a summary of the radar data collected during this time period. Because DVO does not have an airport traffic control tower, which would keep daily counts of activity, this was the best available data to provide actual operations by specific aircraft types.

While the radar data was the best available data, it was noted that the radar data collected for DVO did not include all operations that used the Airport during the calendar year 2007 because of the distance of the radar equipment from DVO (located at Oakland International Airport) and the terrain surrounding DVO (radar coverage). The number of operations collected through the radar data (3,155 operations) is substantially less than DVO management’s estimate of the number of operations that occurred at the airport in 2007 (85,000 operations).[13] Non-towered general aviation airports like DVO estimate annual activity based on input from fixed-based operators who sell fuel and other services to pilots, numbers

[12] Email correspondence between Barry Franklin, FAA Protection Specialist and Barry Davis, FAA on March 20, 2008.

[13] FAA Form 5010-1, FAA Aerospace Forecast 2010-2031, Airport User Interviews, 2004 Proposed Runway Extension Benefit Cost Analysis, Gnoss Field Airport Management, Landrum & Brown Analysis.

of based aircraft at the airport, and observations of activity. This information is submitted to the FAA through FAA-Form 5010-1 and is then incorporated into the FAA's Terminal Area Forecast for that airport.

Since the number of annual operations identified by radar data was known to be substantially less that the number of annual operations identified by other methods, the radar data could not be directly used to determine the most demanding (i.e., critical) aircraft that exceeded 500 annual itinerant operations at DVO. Therefore, the fleet mix of aircraft identified from the radar was compared to other information regarding the aircraft fleet mix at DVO.

The radar data was compared to a summary of aircraft based at DVO and interviews with pilots using DVO. The fleet mix of aircraft reported from radar data was similar to the fleet mix of aircraft identified by other means. Therefore, the fleet mix of aircraft identified from radar data was used to calculate how many of the estimated 85,000 annual operations were attributable to each different type of aircraft identified in the radar data. This calculation was then reviewed to determine the most demanding aircraft that had more than 500 annual operations. This aircraft was the Cessna 525.[14]

The list of based aircraft at DVO had at least one Cessna 525 based at DVO. In addition, EIS preparers noted the presence of a Cessna 525 aircraft parked at the Airport during a site visit. Interviews with nine Airport stakeholders were held on February 13, 2008 (see Attachment 2, *DVO Users Correspondence*). These interviews confirmed that the Cessna 525 was based at and operated regularly from DVO.

While the number of operations reported in the radar data for the Cessna 525 was less than 500, when the total number of annual itinerant operations estimated for DVO are taken into account, it is reasonable to assume that the Cessna 525 completes more than 500 annual itinerant operations, and is the critical aircraft for DVO.

Although this determination of the critical aircraft was made several years ago it is still considered valid because the conditions that were in place in 2008 at DVO have remained similar through today. First, the general operating levels and types of activities at DVO have remained fairly consistent since 2008. Secondly, the Cessna 525 remains the most demanding B-I category aircraft known to operate at DVO. Finally, while it is impossible to know the exact number of operations by any one aircraft at DVO because the Airport does not have an airport traffic control tower, the Cessna 525 remains a commonly used business jet and continues to be a popular choice for pilots choosing to operate at DVO.

[14] Landrum & Brown technical memo to Administrative File, May 30, 2013

Table 1
DVO AIRCRAFT OPERATIONS SUMMARY

AIRCRAFT	AIRPORT REFERENCE CODE	OPERATIONS IN RADAR DATA
Grumman Cheetah	A-I	21
Socata Trinidad Tb-20	A-I	43
Beechcraft 55	A-I	14
Beechcraft 76	A-I	3
Beechcraft Bonanza	A-I	143
Beechcraft Musketeer Super III	A-I	2
Cessna 172	A-I	183
Cessna 210	A-I	48
Cessna 303	A-I	3
Cessna 310	A-I	46
Cessna 350 (Columbia 350)	A-I	22
Cirrus 22	A-I	145
Mooney M20	A-I	27
Piper 28	A-I	107
Piper 46	A-I	78
Pilatus PC-12	A-I	181
Socata TBM 700	A-I	202
Piper Cheyenne 400	B-I	86
Beechcraft 58	B-I	22
Beechcraft King Air 90	B-I	19
Cessna 182	B-I	160
Cessna 206	B-I	30
Cessna 340	B-I	38
Cessna 425	B-I	108
Cessna 525	B-I	228
Learjet 31	B-I	33
Piper 32	B-I	83
Cessna 525A	B-II	144
Beechcraft King Air 90 T	B-II	95
Beechcraft Super King Air 200	B-II	225
Beechcraft Super King Air 300	B-II	57
Beechcraft Super King Air 350	B-II	89
Cessna 441	B-II	18
Cessna 525B	B-II	155
Cessna 550	B-II	120
Cessna 560	B-II	177
Total Operations		**3,155**

Source: FAA Radar Data from January 1, 2007 to December 31, 2007.

ATTACHMENT 2

DVO USERS CORRESPONDENCE

Gnoss Field (DVO) EIS
Stakeholders Meeting – Summary
2/13/08 1:30pm & 3:00pm

Attendees:

- Ken Robbins – DVO
- Dave Ward – AirWard
- Dan Drohan – Former Owner of Sunset Aviation
- Ray Maldonado – Sunset Aviation
- Pat Scanlon- Scanlon Aviation
- Ted Fullmer - Kelleher Corp
- Wright Bass
- Jeff Rothman – Direct Avionics
- TJ Neff – Aircraft sales
- Mark Robertson
- Rob Adams – Landrum & Brown
- Monica Geygan – Landrum & Brown
- Nick Brown – Landrum & Brown
- Mark Heusinkveld – Landrum & Brown

Summary:

- Public perception of DVO is that it provides a substandard level of service for an area as affluent as Marin County.
  - o DVO has been pretty much dismissed by local communities as a viable airport because of the lack of runway.
- Many operations are pushed away from DVO because of Runway length, usually pushed to APC, OAK, STS.
  - o APC – Napa County
  - o OAK – Oakland
  - o STS – Sonoma County, Santa Rosa
- CEO of Int'l Fireman's Fund drives to APC because the plane he likes cannot operate out of DVO.
- Stage lengths often suffer in summertime for all Citations.
- An overwhelming theme among the aviation community is that DVO is a dangerous place to fly, because of short runway and strong crosswinds.
- 4,000' is the minimum safe runway length for most turbine operators.
  - o Insurance Underwriting aspect is driving Runway Limitations, (risk analysis), not aircraft performance.

- There have been two brake failures in past 5 years, both have resulted in excursions from runway.
  - o Very fortunate to have no injuries or a/c damage!

Specific Comments:

- Dave Ward – Flight training school.
  - o 5 aircraft based at DVO
  - o 20-25 operations a day

- Dan Drohan – Former Owner of Sunset Aviation (Sold in May to Fractional Operation)
  - 9 aircraft based at DVO
  - 10-20 aircraft operations a day
  - 27 total aircraft
  - Could relocate 5-8 aircraft to DVO with proposed extension
  - Conduct organ transplant flights for coordinators and teams
  - Air medical transport with Learjet
  - DVO is only helicopter location in the county for their operations

- Patrick Scanlon – Scanlon Aviation
  - 2 aircraft based at DVO (operates Air Taxi and flight training using Cirrus SR20/22 aircraft)
  - 5-6 aircraft operations a day
  - Reported revenue loss due to lack of runway length
  - Insurance Underwriting aspect is driving Runway Limitations, (risk analysis), not aircraft performance.
  - Demand to do business in Marin is there. They will come via some mode of transportation.
  - Fuel load issues in the summer preclude flights by certain jets.

- TJ Neff – Aircraft Sales
  - Aircraft sales may be affected by runway length.
  - Probably losing some sales to Napa, Santa Rosa.

- John Ward – Flight School
  - 15-20 operations (C-172, Bonanza)

- Ted Fullmer – Kelleher Corp
  - Piper Cheyenne 4
  - 300 ops a year, mostly west coast
  - Likely to upgrade aircraft in coming years to something with equal performance (jet and probably be the new CJ4)
  - Company policy that Jets are not safe to fly out of DVO
  - Has had to run back to back flights due to payload restrictions.
  - Would have to downgrade aircraft when replacing Piper unless runway is extended.

- Wright Bass
  - Flies Conquest aircraft.
  - West coast trips.
  - Considering a Citation jet.
  - Might have to divert to other airports if not light on fuel
  - Takeoff is the real issue for him
  - Would enhance safety to have an extension for smaller aircraft due to crosswinds.
  - When foggy would have to divert to STS.

- Jeff Rothman – Direct Avionics
  - Manages CJ2/CJ3 aircraft.
  - 2-3 times a week.
  - Business in real estate in Nevada, LA, Washington State.
  - Extra runway distance gives safety margins.

MARIN COUNTY AIRPORT – GNOSS FIELD
Environmental Impact Statement/
Environmental Impact Report

INTRODUCTORY MEETING
SIGN-IN SHEET

February 13, 2008

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2/13/08

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