

CHAPTER THREE ALTERNATIVES

3.1 INTRODUCTION AND BACKGROUND

The Council on Environmental Quality regulations (Title 40 Code of Federal Regulations [CFR] § 1502.14) for, implementing the National Environmental Policy Act (NEPA) of 1969, require that Federal agencies perform the following tasks:

- Rigorously explore and objectively evaluate all reasonable alternatives and, for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated;
- Devote substantial treatment to each alternative considered in detail, including the Proposed Action, so that reviewers may evaluate their comparative merits;
- Include reasonable alternatives not within the jurisdiction of the lead agency; and
- Include the alternative of no action.

3.2 RANGE OF ALTERNATIVES

The analysis of EIS alternatives was an independent examination by the Federal Aviation Administration (FAA) using a two-step screening process. The first step in the screening process was to identify if an alternative could meet the purpose for the Sponsor's Proposed Project as described in detail in Chapter Two, *Purpose and Need*. Alternatives that did not meet the purpose for the project were excluded from further review. The second step was to further evaluate the remaining alternatives for additional considerations, including significant environmental, operational, cost considerations, and reasonable, possible and prudent alternative considerations. These considerations were associated with direct impacts on existing facilities that would result in substantial redevelopment, or inhibit development or maintenance of existing transportation infrastructure. The following summarizes the considerations used in the alternatives evaluation:

- **Environmental Considerations:** Alternatives with substantially higher adverse impacts beyond those of the Sponsor's Proposed Project were not evaluated in detail. The EIS also recognized the *Clean Water Act* Section 404(b)(1) guidelines, which provides that the U.S. Army Corps of Engineers (USACOE) would only permit the least environmentally damaging practicable alternative.
- **Operational Considerations:** Alternatives that clearly reduced the safe and efficient use of navigable airspace in the U.S. or would derogate the safety of aircraft and airport operations at DVO as compared to existing conditions were not retained for detailed consideration.
- **Cost Considerations:** Alternatives with costs substantially greater than the Sponsor's Proposed Project were considered impracticable.

- **Reasonable, Possible and Prudent Alternative Considerations:**

Reasonable alternatives are those that are feasible and prudent from a technical and economic standpoint and using common sense. 49 USC § 47106 (c)(1)(B) and FAA Order 5050.4B, paragraph 1007 (e)(4) state that the Secretary of Transportation may approve a project Grant-in-Aid application for a project involving a new airport, a new runway, or a major runway extension, having significant adverse effects. However, the Secretary may do so only after finding that no possible or prudent alternative that meets the Purpose and Need exists and making a finding that all possible planning to minimize harm has been taken. An alternative is considered "possible" (i.e. "feasible") if, as a matter of sound engineering principles, it can be built. The term prudent refers to rational judgment. FAA Order 5050.4B, paragraph 1007 (e)(5) provides the following factors for the FAA to use to decide if an alternative is prudent:

 1. Does it meet the project's purpose and need?
 2. Does it cause extraordinary safety or operational problems?
 3. Are there unique problems or truly unusual factors present with the alternative?
 4. Does it cause unacceptable and severe adverse social, economic, or other environmental impacts?
 5. Does it cause extraordinary community disruption?
 6. Does it cause added construction, maintenance, or operational costs of an extraordinary magnitude?
 7. Does it result in an accumulation of factors that collectively, rather than individually, have adverse impacts that present unique problems or reach extraordinary magnitudes?"

These seven factors were considered during the evaluation of the alternatives for this EIS.

The alternatives that the FAA considered in this analysis are grouped into eight categories including the No Action alternative, two off-site, and five on-site alternatives.

NO ACTION ALTERNATIVE

In accordance with the Council on Environmental Quality (CEQ) regulations, a No Action Alternative must be carried forward in the assessment of environmental impacts.¹ The No Action Alternative was included in the evaluation of potential

¹ FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Projects*, April 28, 2006, Chapter 10, Section 1001. EIS PURPOSE. 40 CFR § 1502.1 states the primary purpose of an EIS is to be an "action-forcing tool" to ensure Federal government programs and actions meet NEPA's goals and policies. The EIS allows the agency to take a "hard look" at the environmental impacts of the No Action, the proposed action, and its reasonable alternatives.

environmental consequences in this EIS, as required by 40 CFR § 1502.14(d). With a No Action Alternative, the airfield would remain as it is today, without an extension to the existing runway and no associated taxiway extension and levee relocations. Although not always reasonable, feasible, prudent, or practicable, the No Action Alternative is a potential alternative under CEQ regulations and provides a basis of comparison for the assessment of future conditions/impacts.

3.3 OFF-SITE ALTERNATIVES

This section evaluates the use of other means of transportation, including the use of other airports, highway, rail, and telecommunications technology to satisfy the purpose and need for this project, as described in Chapter Two, *Purpose and Need*.

3.3.1 USE OF OTHER AIRPORTS

The use of other airports in the region is examined to determine if the relocation of operations to another airport is feasible and if it would postpone, reduce, or eliminate the need for extending the existing runway at DVO.

Airports across the country function as an inter-related system. To coordinate and fund this system, the FAA developed the National Plan of Integrated Airport Systems (NPIAS), a system of 3,344 of the nation's 5,280 aviation facilities that are open to the public. The aviation facilities included in the NPIAS are significant to the national aerospace system and eligible to receive Federal funding. One of the guiding principles of the NPIAS is that: "The airport system should be extensive, providing as many people as possible with convenient access to air transportation, typically by having most commuters with no more than 20 miles of travel to the nearest NPIAS airport."² This is particularly true for general aviation airports, which tend to serve the communities immediately adjacent to the airport.

DVO is a NPIAS airport and provides general aviation access to the City of Novato, as well as other cities to the south of the Airport (including San Rafael, Larkspur, Corte Madera, and Sausalito) and generally for unincorporated areas of Marin County. There are six other airports serving general aviation activity that are located within a reasonable driving distance of DVO, including Sonoma Valley Airport (0Q3), Petaluma Municipal Airport (O69), Napa County Airport (APC), Half Moon Bay (HAF), Charles M. Schulz-Sonoma County Airport (STS), and San Rafael Airport (CA35). Available runway length is one of the primary ways to evaluate the ability of one of these airports to meet the purpose and need. As discussed in Appendix D, *Runway Length Analysis*, the runway length needed for DVO to meet the purpose of the project is 4,400 feet. Of these regional general aviation facilities, three have runways that are shorter than 4,400 feet (0Q3, O69, and CA35) and three have runways that are longer than 4,400 feet (APC, HAF, and STS).

² Federal Aviation Administration, National Plan of Integrated Airport Systems (2007-2013). Accessed online at: http://www.faa.gov/airports_airtraffic/airports/planning_capacity/npias/reports/index.cfm?sect=2007, November 14, 2013.

Table 3-1 summarizes the major facilities and key aviation activity characteristics of each of the aforementioned airports as compared to DVO. The location of each of these airports is shown on **Exhibit 3-1, General Aviation and Commercial Service Airports Closest to Gness Field Airport.**

Each of the Bay Area reliever airports provides runway capacity and landside support facility relief to San Francisco International Airport (SFO) and Oakland International Airport (OAK). As such, these airports reduce airspace congestion and improve the safety of the runway system at both airports (SFO and OAK). Gness Field, Petaluma, and Half Moon Bay Airports are designated by the FAA as reliever airports for SFO, while Napa County Airport is a reliever for OAK. Reliever airports can also reduce airspace capacity conflicts with large passenger aircraft that typically serve both SFO and OAK. As major commercial service international airports, SFO and OAK prohibit the full range of general aviation flight activities that designated general aviation airports allow, such as flight training activities. Therefore, the use of SFO and OAK are not alternatives for use of general aviation airports.

3.3.1.1 Sonoma Valley Airport (0Q3)

Sonoma Valley Airport is a privately owned general aviation airport that is open to the public and serves the Sonoma Valley. The airport is located approximately seven nautical miles and 16 driving miles north of DVO. Vehicle access is provided by State Highways SR-37 and SR-121. The airport has two runways; one runway is 2,700 feet in length and the other is 1,500 feet in length. These runway lengths limit the traffic at Sonoma Valley to light aircraft only (i.e., single and multi-engine piston aircraft, almost no turbine activity). The 1997 operations report from Sonoma Valley states that 330 aircraft were based on the field and undertook 11,500 operations. In 2007, there were 16,060 operations and 123 based aircraft.

Given the proximity of Sonoma Valley Airport to DVO and the Novato area, it is possible that pilots who cannot efficiently use DVO could operate from this airport if it had a runway long enough to accommodate their needs. Because the runways at Sonoma Valley Airport are considerably shorter than the runway at DVO, the airport in its current configuration would not meet the need for a runway of 4,400 feet in length. Other factors that reduce the feasibility of this option include airport ownership and site constraints, as well as environmental considerations. The issue of airport ownership is important because Marin County (the Sponsor of this project) does not own or operate Sonoma Valley Airport. Therefore, it is not reasonable to assume that Marin County would invest in infrastructure for the extension of the runway at that airport because it has no authority to implement any improvements at that airport. In addition, FAA and Marin County do not have the authority to divert air transportation activity from DVO to other area airports.

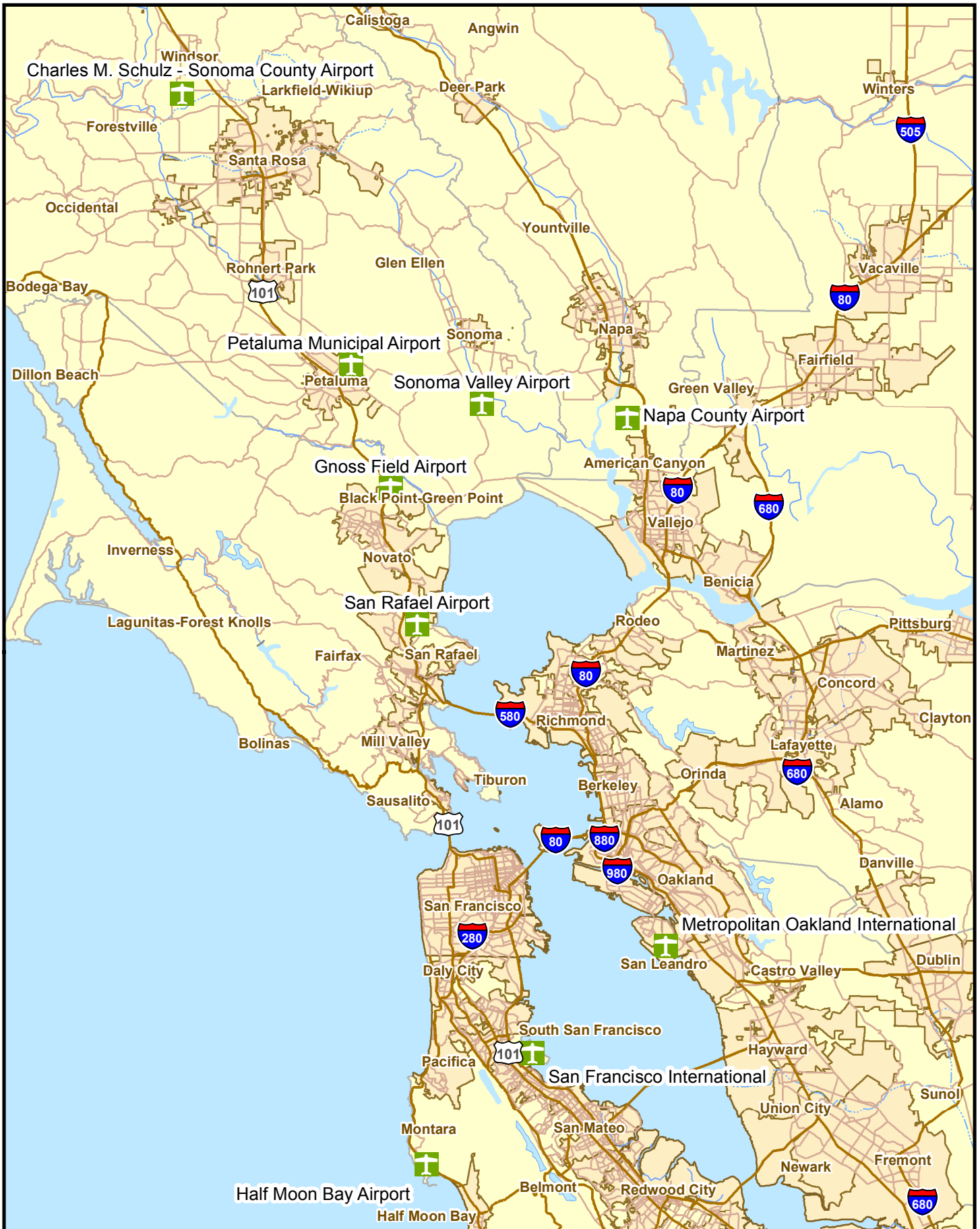
**Table 3-1
AIRPORTS SERVING GENERAL AVIATION THAT ARE CLOSEST TO GNOSS FIELD AIRPORT
Gross Field Airport**

Airport Name	Gross Field	Sonoma Valley	Petaluma Municipal	Napa County	Half Moon Bay	Charles M. Schulz - Sonoma County	San Rafael Airport	
Airport Code	DVO	0Q3	O69	APC	HAF	STS	CA35	
NPIAS Role	Reliever	General Aviation	Reliever	Reliever	Reliever	Commercial Service - Nonhub Primary	GA Private Use	
Distance from DVO (in driving miles)	0	16	14	29	49	36	11	
Distance from DVO (in nautical miles)	0	7	7	14	38	25	8	
Control Tower	NO	NO	NO	YES	NO	YES	NO	
Acreage	90	79	220	804	325	1,014	100	
Number of Runways	1	2	1	3	1	2	1	
Runway Dimensions (Length x Width; in feet)	13-31: 3,300x75	7-25: 2,700x45 17-35: 1,500x50	11-29: 3,600x75	6-24: 5,007x150 18L-36R: 2,510x75 18R-36L: 5,931x150	12-30: 5,000x150	14-32: 5,119x150 2-20: 5,002x100	4-22: 2,140x30	
ILS	NO	NO	NO	NO	NO	YES	NO	
Hangars/ Buildings	196	43	27	25	50	261	110	
Annual Operations¹ Based Aircraft²	FY 1997	n/a	11,500	50,200	141,922	60,150	134,732	n.a.
	FY 2007	85,058	16,060	53,200	122,623	60,150	132,739	n.a.
Based Aircraft²	FY 1997	298	330	203	247	70	413	n.a.
	FY 2007	296	123	203	228	70	415	100

- 1 Annual operations and based aircraft data was obtained from the FAA TAF for all airports with the exception of Sonoma Valley. Sonoma Valley Airport is not included in the TAF so operations and based aircraft counts were obtained from airnav.com and *Regional Airport System Plan, General Aviation Element, Final Report*, Regional Airport Planning Committee, June 2003.
- 2 NPIAS Role defined in National Plan of Integrated Airport Systems (NPIAS)
 - Commercial service airports are defined as public airports receiving scheduled passenger service and having 2,500 or more enplaned passengers per year.
 - Nonhub Primary airports are Commercial Service airports that enplane less than 0.05 percent of all commercial passenger enplanements but have more than 10,000 annual enplanements.
 - General Aviation airports do not receive scheduled commercial service or do not meet the criteria for classification as a commercial service airport.
 - Reliever airports are high-capacity general aviation airports in major metropolitan areas.

Sources: Landrum & Brown Analysis, FAA Form 5010-1; FAA TAF, airnav.com

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Site constraints due to the proximity of surrounding roadways and active-use of surrounding private property limit this airport's ability to physically expand beyond its current property boundary. Environmental considerations would also need to be addressed. Relocating operations from DVO to Sonoma Valley Airport would result in longer surface vehicle commutes for airport users located south of DVO, which is the primary population area served by DVO. As a result of longer commutes, an increase in surface vehicle air emissions would occur.

The use of Sonoma Valley Airport as an alternative does not meet the purpose 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, because the longest existing runway is shorter than 4,400 feet. Furthermore, it is not reasonable to assume that Sonoma Valley Airport would be expanded to offer a longer runway based on the airport ownership issues and site constraints. In addition, the airport is located in close proximity to sloughs and wetland areas to the west/southwest, which limit its ability to expand beyond the current property boundary. Finally, environmental considerations, such as increased surface vehicle air emissions, would result from the use of Sonoma Valley Airport. Based on this information, using Sonoma Valley Airport to address the needs of DVO is not a reasonable, feasible, prudent, or practicable alternative to the Sponsor's Proposed Project and will not be carried forward for more detailed environmental analysis in this EIS.

3.3.1.2 Petaluma Municipal Airport (O69)

Petaluma Municipal Airport, classified as a reliever airport, is owned by the City of Petaluma and primarily serves the residents of Petaluma. This airport is located approximately 7 nautical miles and 14 driving miles north of DVO. Vehicle access is provided by Highway 101. Petaluma Municipal Airport has one runway that is 3,600 feet in length and 75 feet in width. Like DVO, the Airport's runway length limits the type of aircraft that are able to use the airport to mainly piston engine aircraft and a few turbine aircraft operations. In 2007, the airport reported 53,200 operations and 203 based aircraft.

Given the proximity of Petaluma Municipal Airport to DVO and the Novato Area, it is possible that pilots who cannot efficiently use DVO could operate from this airport if it had a runway long enough to accommodate their needs. While Petaluma Municipal Airport does have a longer runway than DVO, it falls short of the needed length of 4,400 feet. Further, the current Airport Layout Plan (ALP) on file with FAA does not indicate a proposed long term runway extension at Petaluma Municipal Airport. Marin County (the Sponsor of this project) does not own or operate Petaluma Municipal Airport. Therefore, it is not reasonable to assume that Marin County would invest in infrastructure for the extension of the runway at that airport because it has no authority to implement any improvements at that airport. In addition, FAA and Marin County do not have the authority to divert air transportation activity from DVO to other area airports.

Relocating operations from DVO to Petaluma Municipal Airport would result in longer surface vehicle commutes for airport users located south of DVO, which is

the primary population area served by DVO. As a result of longer commutes, an increase in surface vehicle air emissions would occur.

The use of Petaluma Municipal Airport as an alternative does not meet the purpose 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. Furthermore, it is not reasonable to assume that Petaluma Municipal Airport would be expanded to offer a longer runway as their current ALP on file with FAA does not indicate a proposed long term runway extension. Finally, environmental considerations such as increased surface vehicle air emissions would result from the use of Petaluma Municipal Airport. Based on this information, using Petaluma Municipal Airport to address the needs of DVO is not a reasonable, feasible, prudent, or practicable alternative to the Sponsor's Proposed Project and will not be carried forward for more detailed environmental analysis in this EIS.

3.3.1.3 Napa County Airport (APC)

Napa County Airport is located 14 nautical miles and 29 driving miles east of DVO. APC is designated as a reliever airport by the FAA. It is owned by Napa County. Vehicle access is provided by State Highways SR-37 and SR-29. The airport has three runways measuring 5,007 feet, 2,510 feet, and 5,931 feet in length. Unlike DVO or the other airports mentioned thus far, these runway lengths allow APC to accommodate a significant amount of general aviation turbine aircraft operations without restrictions. APC is also the closest airport that is served by an FAA Airport Traffic Control Tower (ATCT), thus enabling the airport to operate at a higher capacity. In 2007, APC reported a total of 122,623 annual operations and had 228 based aircraft.

From an operational standpoint for pilots, given the proximity of Napa County Airport to DVO in nautical miles, it is possible that pilots who cannot efficiently use DVO could operate from this airport for basic needs such as refueling while enroute to another ultimate destination (i.e., not DVO or APC). However, for those travelling specifically to/from Novato, the driving distance to Napa County Airport makes it less likely that this airport would be an efficient alternate destination. Relocating operations from DVO to Napa County Airport would result in longer surface vehicle commutes for airport users located south of DVO, which is the primary population area served by DVO. As a result of longer commutes, an increase in air emissions would occur.

Napa County Airport has two runways with lengths longer than 4,400 feet. However, because of increased drive time and the local demand in the Novato area the use of Napa Airport is not a reasonable alternative to meet the purpose 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. In addition, FAA and Marin County do not have the authority to divert air transportation activity from DVO to other area airports. Finally, environmental considerations such as increased surface vehicle air emissions would result from the use of Napa County Airport. Based on this information, using Napa County Airport

to address the needs of DVO is not a reasonable, feasible, prudent, or practicable alternative to the Sponsor's Proposed Project and will not be carried forward for more detailed environmental analysis in this EIS.

3.3.1.4 Half Moon Bay Airport (HAF)

Half Moon Bay Airport is located 38 nautical miles and 49 driving miles south of DVO. Vehicle access is provided by Highway 101 for travel across the Golden Gate Bridge, and then continuing on Highway 101 or State Highway CA-1 through the City of San Francisco. HAF is owned by San Mateo County and has been designated by FAA as a reliever airport for SFO. HAF has one runway measuring 5,000 feet in length, which allows HAF to accommodate a substantial number of the business jet aircraft. HAF does not have an FAA ATCT. In 2007, HAF reported a total of 60,150 annual operations and had 70 based aircraft.

From an operational standpoint for pilots, given the distance of HAF from DVO in nautical miles, it is possible that pilots who cannot efficiently use DVO could operate from this airport for basic needs such as refueling while enroute to another ultimate destination, although there are other airports with similar services located closer to DVO. Further, for those travelling specifically to/from Novato, the extensive driving distance to HAF makes it is unlikely that this airport would be an efficient alternate destination. Relocating operations from DVO to HAF would result in longer automobile commutes for most DVO airport users, as HAF is located substantially south of DVO. As a result of longer commutes, an increase in surface vehicle air emissions would occur.

Half Moon Bay Airport has one runway with a length longer than 4,400 feet. However, because of increased drive time and the local demand in the Novato area the use of Half Moon Bay Airport is not a reasonable alternative to meet the purpose 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. In addition, FAA and Marin County do not have the authority to divert air transportation activity from DVO to other area airports. Finally, environmental considerations such as increased surface vehicle air emissions would result from the use of Half Moon Bay Airport. Based on this information, using Half Moon Bay Airport to address the needs of DVO is not a reasonable, feasible, prudent, or practicable alternative to the Sponsor's Proposed Project and will not be carried forward for more detailed environmental analysis in this EIS.

3.3.1.5 Charles M. Schulz–Sonoma County Airport (STS)

Charles M. Schulz-Sonoma County Airport is located 25 nautical miles and 36 driving miles northwest of DVO. Vehicle access is provided by Highway 101. The airport is a non-hub primary commercial service airport that accommodates both general aviation and commercial service aircraft operations. STS has two runways measuring 5,119 feet and 5,002 feet in length.³ As a result, STS has

³ Sonoma County completed a Final Environmental Assessment in August 2013, to extend both runways; one to 6,000 feet long and the other to 5,202 feet long in order to meet FAA Airport

sufficient runway length to accommodate most general aviation turbine aircraft without restrictions. STS has an FAA ATCT. This airport served 132,739 operations in 2007 and had 415 based aircraft.

From an operational standpoint for pilots, given the distance of STS from DVO in nautical miles, it is possible that pilots who cannot efficiently use DVO could operate from this airport for basic needs such as refueling while enroute to another ultimate destination, although there are other airports with similar services located closer to DVO. Further, for those traveling specifically to/from Novato, the extensive driving distance to STS makes it is less likely that this airport would be an efficient alternate destination. Relocating operations from DVO to STS would result in longer surface vehicle commutes for people located south of DVO, which is the primary population area served by DVO. As a result of longer commutes, an increase in surface vehicle air emissions would occur.

Charles M. Schulz-Sonoma County Airport has two runways with lengths longer than 4,400 feet. However, because of increased drive time and the local demand in the Novato area, the use of Charles M. Schulz-Sonoma County Airport is not a reasonable alternative to meet the purpose 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. In addition, FAA and Marin County do not have the authority to divert air transportation activity from DVO to other area airports. Finally, environmental considerations such as increased surface vehicle air emissions would result from the use of STS. Based on this information, using Charles M. Schulz-Sonoma County Airport to address the needs of DVO is not a reasonable, feasible, prudent, or practicable alternative to the Sponsor's Proposed Project and will not be carried forward for more detailed environmental analysis.

3.3.1.6 San Rafael Airport (CA35)

San Rafael Airport is a privately owned - private use airport with a 2,140 foot long by 30-foot wide runway. This airport is not open for public use. The existing runway length at CA35 makes it unable to accommodate most of the twin engine aircraft that currently operate at DVO. There are 100 aircraft based on the field, all of which are single engine piston aircraft. The airport is located eight nautical miles south of DVO.

Given the proximity of San Rafael Airport to DVO and the Novato Area, it is possible that pilots who cannot efficiently use DVO could operate from this airport if it had a runway long enough to accommodate their needs. Currently it falls short of the need of 4,400 feet. Further, CA35 is a private airport and therefore is not required to provide access to the public as does DVO. Neither the FAA nor Marin County have the authority to divert air transportation activity from DVO to other area airports.

Design Standards for RSA and to decouple the overlapping runway ends as recommended by the FAA's Runway Safety Action Team.

The use of San Rafael Airport as an alternative does not meet the purpose 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. Based on this information, using San Rafael Airport to address the needs of DVO is not a reasonable, feasible, prudent, or practicable alternative to the Sponsor's Proposed Project and will not be carried forward for more detailed environmental analysis in this EIS.

3.3.2 OTHER MODES OF TRANSPORTATION AND/OR TELECOMMUNICATIONS

Other modes of transportation or communication that were considered as alternatives to the Sponsor's Proposed Project include highway travel, conventional and high-speed rail travel, and telecommunications. These modes or alternatives to transportation were considered for their potential to meet the purpose and need of the proposed runway extension at DVO.

3.3.2.1 Highway

People choose to use DVO for three primary purposes – flight training, recreation, and business travel. In terms of an alternative to using DVO, the first two uses (flight training and recreation) include air travel as an inherent part of the activity. Flight training is most effectively conducted by participating in a flight school and practicing takeoffs and landings. Recreational flyers enjoy flying as an activity and choose to spend time sightseeing from the air or visiting other airports. Neither of these uses can be replaced by driving.

Business travel can potentially be accomplished through driving, although there are general limits to how far people will drive for business due to the value of their time. When looking at commercial air travel, most business travelers will choose air travel when the driving distance is between 250 and 500 miles. Beyond 500 miles (or roughly one 10-hour day of driving), business travelers will almost always choose air travel over driving. The general threshold for driving time becomes even smaller when you start to consider business travelers that have the resources to charter private aircraft, which is done at DVO. These travelers choose DVO over Oakland International and San Francisco International airports primarily because of the ability to maximize their time due to the on-demand nature of this service. Given this, it is reasonable to assume that the distance DVO business travelers are willing to drive is less than the typical business traveler using commercial airlines.

The highway alternative does not meet the purpose at DVO 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, or the need to address insufficient runway length at DVO. Therefore, the use of a highway as a means to address the needs at DVO is not a reasonable, prudent, or practicable alternative to the Sponsor's Proposed Project and will not be carried forward for more detailed environmental analysis.

3.3.2.2 Conventional and High-Speed Rail

The use of rail as an alternative to air travel is examined below.

CONVENTIONAL RAIL

Amtrak

Amtrak provides conventional rail travel in the U.S. A review of Amtrak service finds that Amtrak does not provide service to/from Marin County.⁴ The closest Amtrak stations are located in Oakland and Martinez, California, which are 35 miles and 40 miles from Novato, respectively. The lack of passenger rail service in Marin County makes Amtrak service an unacceptable alternative to business air transport to/from DVO.

Sonoma Marin Area Rail Transit Project

The Sonoma-Marín Area Rail Transit District (SMART) project includes development of a 70-mile-long passenger railroad along the existing Northwestern Pacific Railroad right of way through Marin and Sonoma counties. The rail line will run from Cloverdale, at the north end of Sonoma County, to Larkspur, where the Golden Gate Ferry connects Marin County with San Francisco. Stations are to be located at major population and job centers of the North Bay, including San Rafael, Novato, Petaluma, Cotati, Rohnert Park, Santa Rosa, Windsor, and Healdsburg. The project is currently in the building stage, which involves selection of vehicles, station construction, and final engineering work. The estimated project cost is \$690 million, the majority of which would be funded by a voter-approved one-quarter percent sales tax increase. Since that vote, the economic downturn has reduced SMART's projected revenues by several hundred million dollars over the 20-year life of the sales tax, leaving the agency short of the money needed to complete the project as originally envisioned. Consequently, SMART's Board of Directors has decided to build in stages. Construction on the Phase 1 Segment, 37 miles from downtown San Rafael with Railroad Square in Santa Rosa, began in 2012 and will connect the two largest cities in the North Bay and all of the cities in between. Passenger train service is scheduled to begin in 2016. Future segments, ultimately completing the project from Larkspur to Cloverdale, will be built as additional revenues become available.⁵ However, the limits of the rail service to these select locations make it an unacceptable alternative to air transport to/from DVO.

HIGH-SPEED RAIL

The California High Speed Rail Authority is studying the potential for developing high-speed passenger rail service in California. The proposed California high-speed train system encompasses more than 800 route miles and would provide intercity

⁴ Amtrak, on-line at: <http://www.amtrak.com/> Retrieved October 8, 2013.

⁵ *Sonoma Marin Area Rail Transit Project*, On-line at: www.sonomamarintrain.org Retrieved November 14, 2013.

travel in California between the major metropolitan centers of Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego. The proposed high-speed train would be capable of operating speeds up to 220 miles per hour (mph) and designed for an ultimate speed of 250 mph on a fully grade-separated alignment with an expected trip time from San Francisco to Los Angeles of two hours and forty minutes, or less. Interface with commercial airports, mass transit, and the highway network would be provided as part of the system. A Final Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Proposed California High-Speed Train System was completed in August 2005 and a Final Bay Area to Central Valley High-Speed Train (HST) Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS) was completed in May 2008. Preliminary design is currently underway. The project would be built in phases with completion anticipated in 2028.⁶

Ridership forecasts for the California HST Project estimate 88–117 million passengers annually by 2030 for the entire 800-mile high-speed train network. Of the 33 million air trips forecast to be made in the year 2030, it is forecast that approximately 12 million would be attracted to high-speed trains, bringing the level of air traffic in California back to the levels of 2000, slightly higher than it is today. In other words, it is estimated that most of the growth in air traffic would be diverted, leaving airport capacity for international and out-of-state flights. Of the 911 million auto travelers forecast in 2030 to make vehicle trips between the points to be served by the high-speed rail, approximately 6 percent or 50 million would be attracted to high-speed trains. Within the regions that have several stations (Los Angeles Basin, the San Francisco Bay Area, and San Diego County), it is forecast that another 25 million auto trips, less than one percent of the local urban area auto travel, would be eliminated in favor of the use of high-speed rail.⁷

The current plans for this high-speed rail line do not include a direct connection to Marin County. Therefore, business travelers that currently use DVO to fly to California destinations that would be served by this rail line would have to drive into San Francisco to board the train. As discussed above for driving, the DVO business traveler values time and the ability to access specific locations quickly. The likelihood of the California high-speed rail reducing the demand at DVO in any meaningful way is unlikely given that it would take additional time to drive to the station and the destinations are relatively limited.

The use of high-speed rail service as an alternative does not meet the purpose 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, or the need to address insufficient runway length that precludes the critical aircraft from operating at maximum gross take-off weight under adverse weather conditions. Nor would the availability of a local transit rail system, and a

⁶ California High Speed Rail 2012 Business Plan , on-line at http://www.cahighspeedrail.ca.gov/Business_Plan_reports.aspx accessed November 13, 2013

⁷ California High Speed Rail Authority, on-line at: <http://www.cahighspeedrail.ca.gov/> Retrieved November 13, 2013.

state high-speed rail system, be expected to meet the needs of DVO users. The local transit system is designed to compete with vehicle use on local highways during peak commute and shopping periods. The local rail system would not provide service to typical DVO aircraft destinations. The same is true of the high-speed rail system. The high-speed rail system is designed to link major cities in California, and is not expected to provide service to typical DVO aircraft destinations. While high-speed rail is planned for the San Francisco Bay Area at some point in the near future, it is not a prudent, reasonable, feasible, or practicable alternative to the Sponsor's Proposed Project and will not be carried forward for more detailed environmental analysis.

3.3.2.3 Telecommunications

The potential for telecommunications to affect the need for business travel has been studied since two-way video-conferencing technology became available on the commercial market in the 1980s. Constantly emerging technology continues to improve the availability, affordability, reliability, and speed of voice and data communication. Continued technological advances and the widespread installation of fiber optics and other communications technology will continue to make telecommunication alternatives more widely available.

A survey completed in 2003 by American Express polled 800 business travelers from eight countries including the U.S. Findings of this survey indicate:

...travelers value business travel as a tool to maintain and develop customer relationships: asked if business travel is essential to growing a business, more the 89% of the respondents agreed, either strongly or slightly. A majority of respondents from each country agreed on some level...

The American Express survey also shows that some business travelers use Web meetings and teleconferencing in place of travel, but the majority clearly considers in-person meetings with clients or business associates superior. More than 35% say that this year (2003), they have used such technology (virtual meeting) – either frequently or occasionally – instead of traveling. However, a combined 65 percent say they do not do virtual meetings very much or at all.

Asked if teleconferencing or web facilities offer an adequate substitute to face-to-face meetings, nearly two thirds-(65%) said no, while 35 percent differed. ...Even among those who gave equal consideration to virtual meetings and in-person meetings, 75 percent said that telecommunication is only appropriate for conferring for an hour or less.⁸

Evidence indicates that the use of telecommunications and video-conferencing may be increasing to satisfy business needs, but there is no indication that it would satisfy all business needs and thereby reduce the need for travel. It may complement or supplement travel, but is not seen as a substitute by a majority of

⁸ The Practice, *International Business Travelers Sacrificing Comfort For Low Prices*, American Express Survey Shows, August 2003, http://home3.americanexpress.com/corp/pc/2003/sacrificing_comfort.asp Retrieved September 20, 2006.

the public for business travel. In addition, the impact of improvements in the communication field would have little or no effect on flight training and recreational flyers.

This alternative does not meet the purpose 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, or the need to address insufficient runway length that precludes the critical aircraft from operating at maximum gross take-off weight under adverse weather conditions. While communication technology may reduce the demand for air travel by a small amount, it would not replace the need for air travel. Therefore, telecommunication technology is not a prudent, reasonable, feasible, or practicable alternative to the Sponsor's Proposed Project and will not be carried forward for more detailed environmental analysis.

Based on the analysis presented above, the use of other modes of transportation will not meet the purpose 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.

3.4 ON-SITE ALTERNATIVES

3.4.1 RUNWAY DEVELOPMENT ALTERNATIVES AND SCREENING RESULTS

Four runway development alternatives were initially identified for evaluation (plus the No Action Alternative). These alternatives were further screened to determine if they could substantially meet the purpose 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, and the need to address insufficient runway length at DVO. The analysis of runway length identified that 4,400 feet was the minimum length to accommodate the critical aircraft (see Appendix D for more information). Therefore, alternatives that included shorter runway lengths were considered but not retained for detailed review because they did not meet the purpose and need for the project. The purpose and need statements are discussed in detail in Chapter Two, *Purpose and Need*.

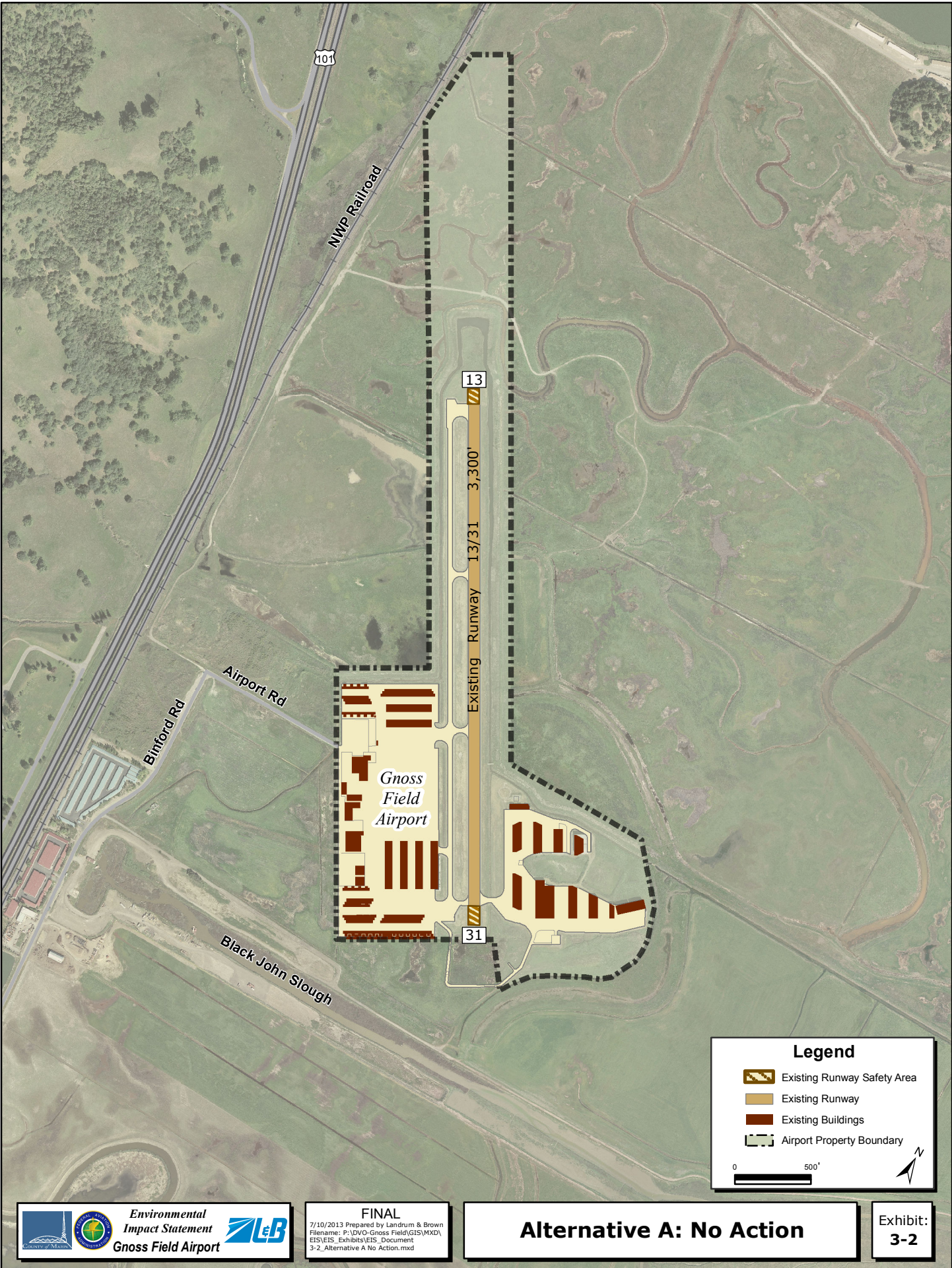
The runway development alternatives presented below all meet the purpose and need for the project. As such, the second screening for the additional considerations (significant operational and environmental drawbacks, and cost) was performed. DVO would remain open during construction under any development alternative and any operational modifications during construction would be address in a Construction Safety and Phasing Plan.

The runway development alternatives, along with the screening results of each are included in the following sections.

3.4.1.1 Alternative A: No Action

Alternative A (No Action), is identified as the No Action Alternative in this EIS. This alternative assumes that Runway 13/31 would be maintained at its current length and no associated taxiway extension, Runway Safety Area (RSA) extension, realignment of drainage channels, extension of levees, or reprogramming of navigational aids would occur. **Exhibit 3-2, Alternative A: No Action**, presents a graphic depiction of Alternative A. Preliminary evaluation of Alternative A is as follows:

- Environmental: Would not result in physical environmental impacts (wetlands or cultural resources).
- Operational: Would continue the use of non-standard RSA and would not address the need for more runway length to accommodate current aircraft operators.
- Cost: No direct costs, but indirect costs would occur as a result of not meeting FAA standards and not providing the runway length to accommodate the current aircraft. Indirect costs include the loss of revenue to the Airport due to the fact that some pilots would choose not to use DVO, therefore depriving the County of revenues associated with the sale of fuel to these aircraft.
- Reasonable, Possible and Prudent Alternative Considerations:
 1. Does it meet the project's purpose and need? **No**.
 2. Does it cause extraordinary safety or operational problems? **No**.
 3. Are there unique problems or truly unusual factors present with the alternative? **No**.
 4. Does it cause unacceptable and severe adverse social, economic, or other environmental impacts? **No**.
 5. Does it cause extraordinary community disruption? **No**.
 6. Does it cause added construction, maintenance, or operational costs of an extraordinary magnitude? **No**.
 7. Does it result in an accumulation of factors that collectively, rather than individually, have adverse impacts that present unique problems or reach extraordinary magnitudes? **No**.
- Determination: This alternative does not meet the purpose and need for the project. The No Action Alternative was included in the evaluation of potential environmental consequences in this EIS, as required by 40 CFR § 1502.14(d).



3.4.1.2 Alternative B: Extend Runway to the Northwest by 1,100 Feet (Sponsor's Proposed Project)

Alternative B (Sponsor's Proposed Project), includes an extension of Runway 13/31 to the northwest by 1,100 feet for a total runway length of 4,400 feet at the existing runway width of 75 feet. In addition, this alternative would include extension of the parallel taxiway to match the length of the runway; extension of the existing FAA standard 120-foot wide RSA centered on the runway centerline to match the length of the runway; inclusion of FAA standard 240-foot RSA at each end of the runway in addition to the 1,100 foot runway extension; corresponding realignment of drainage channels to drain the extended runway, taxiway and RSA; corresponding levee extension to protect the extended runway, taxiway, and RSA from flooding; and relocation of the navigational aids that pilots use for approach to landing at the Airport to reflect the extended runway. **Exhibit 3-3, Alternative B: Sponsor's Proposed Project**, presents a graphic depiction of Alternative B. Preliminary evaluation of Alternative B is as follows:

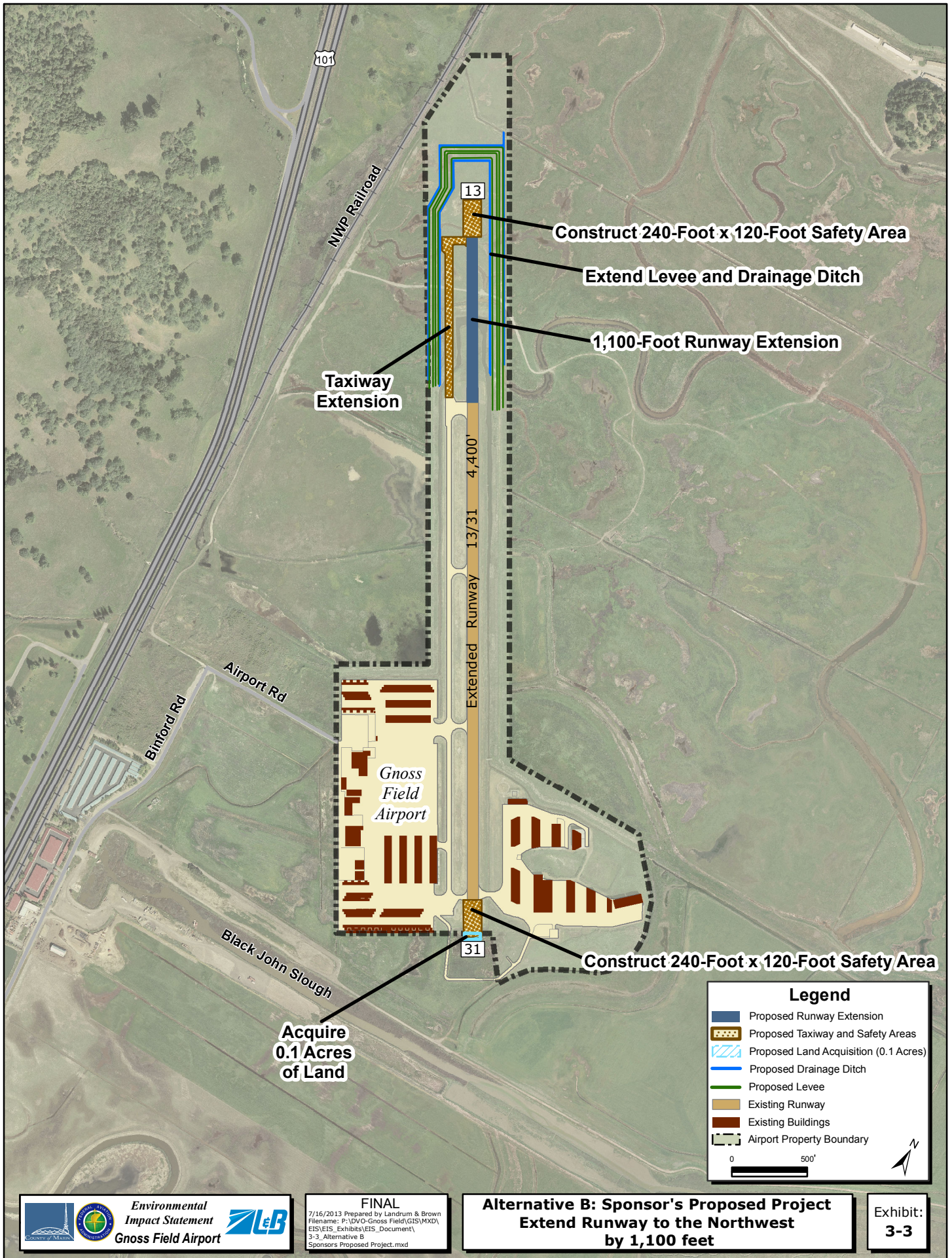
- Environmental:
 - Would require the relocation of the levee and drainage ditch around the runway.
 - The area where the runway extension and northern RSA would be located is almost entirely wetlands that would require filling.
 - There are potential cultural resources and habitat impacts due to the alternative.
 - Would result in aircraft shifting where the climb to altitude would occur when departing to the south. Aircraft would be at a higher altitude than is currently experienced with the existing runway before passing near the residential areas to the south of the Airport, which would potentially decrease aircraft departure noise levels in those communities.
- Operational:
 - The runway would be extended closer to the landfill northeast of the Airport, which is a potential bird-attractant. This alternative could be inconsistent with FAA bird-aircraft strike hazard minimization guidance.
 - Would require relocation of the Precision Approach Path Indicator (PAPI) and Visual Approach Slope Indicator (VASI) navigational aids that pilots use for approach to landing at the Airport to reflect the extended runway.
 - Would address the need for additional runway length.
- Cost:
 - Acquisition costs for the County to gain exclusive use of 0.1 acres of land to the south of the Airport that would be required for the associated RSA extension.

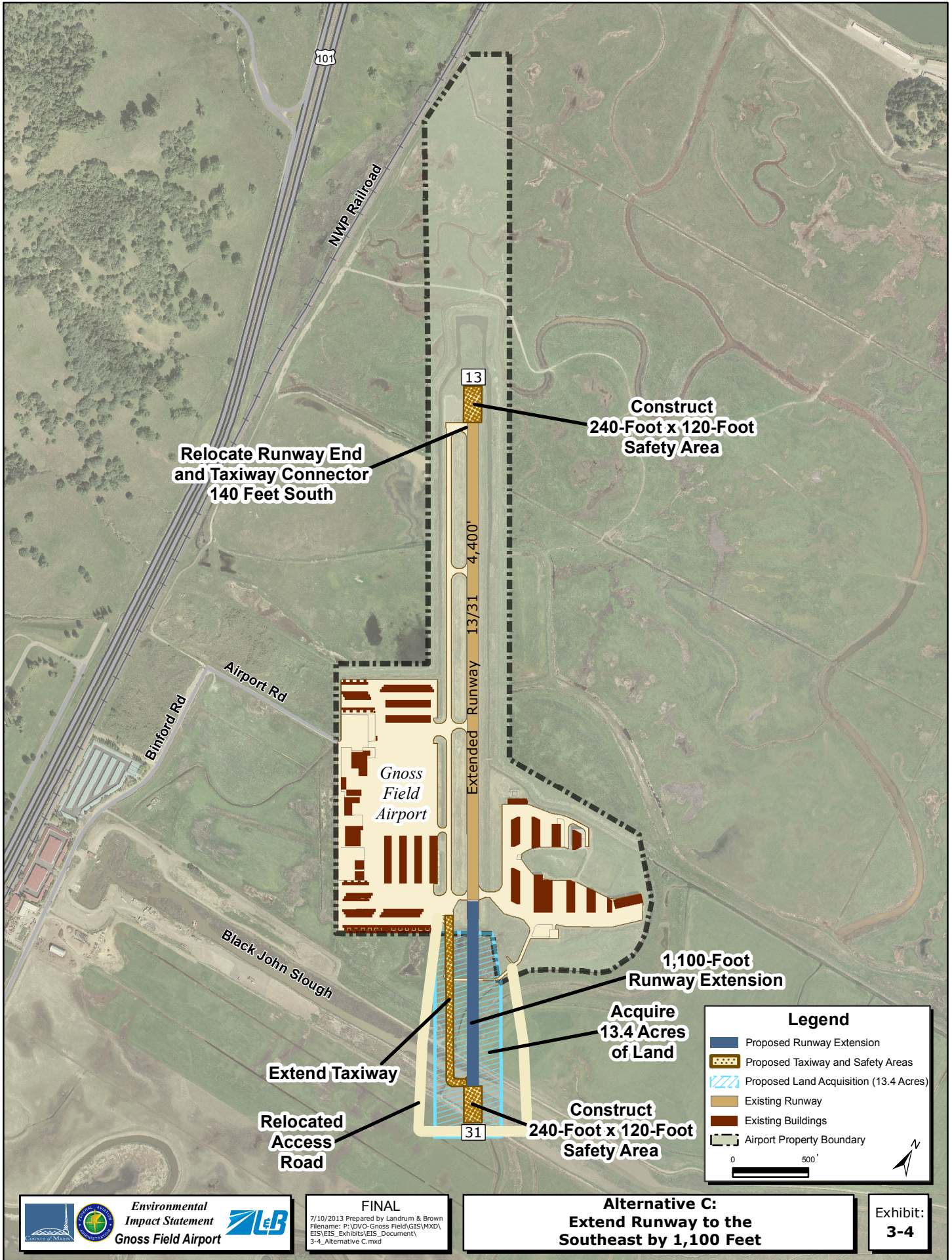
- Reasonable, Possible and Prudent Alternative Considerations:
 1. Does it meet the project's purpose and need? **Yes.**
 2. Does it cause extraordinary safety or operational problems? **No.**
 3. Are there unique problems or truly unusual factors present with the alternative? **No.**
 4. Does it cause unacceptable and severe adverse social, economic, or other environmental impacts? **No.**
 5. Does it cause extraordinary community disruption? **No.**
 6. Does it cause added construction, maintenance, or operational costs of an extraordinary magnitude? **No.**
 7. Does it result in an accumulation of factors that collectively, rather than individually, have adverse impacts that present unique problems or reach extraordinary magnitudes? **No.**
- Determination: This alternative meets the need for the project and is the Sponsor's Proposed Project. Therefore, this alternative will be carried forward for detailed analysis.

3.4.1.3 Alternative C: Extend Runway to the Southeast by 1,100 Feet

Alternative C includes an extension of Runway 13/31 to the southeast by 1,100 feet for a total runway length of 4,400 feet at the existing runway width of 75 feet. In addition, this alternative would include extension of the parallel taxiway to match the length of the runway; extension of the existing FAA standard 120-foot wide RSA centered on the runway centerline to match the length of the runway; inclusion of FAA standard 240-foot RSA at each end of the runway in addition to the 1,100 foot runway extension; corresponding realignment of drainage channels to drain the extended runway and taxiway; corresponding levee extension to protect the extended runway and taxiway from flooding; corresponding relocation of the access road south of the runway, which extends from the west side to the east side of the Airport, to keep the access road outside of the RSA; and relocation of the navigational aids that pilots use to land at the Airport to reflect the extended runway. **Exhibit 3-4, Alternative C: Extend Runway to the Southeast by 1,100 Feet**, presents a graphic depiction of Alternative C. Preliminary evaluation of Alternative C is as follows:

- Environmental:
 - Would result in extensive impacts to the water resources to the south of the Airport (Black John Slough) and wetlands. Also to consider is the fact that, relative to the *Clean Water Act* Section 404 (b)(1) guidelines, the USACOE would only permit the least damaging practicable alternative.
 - There are potential cultural resources and habitat impacts due to the alternative.
 - Would move the runway closer to protected wildlife areas to the southeast of the Airport.





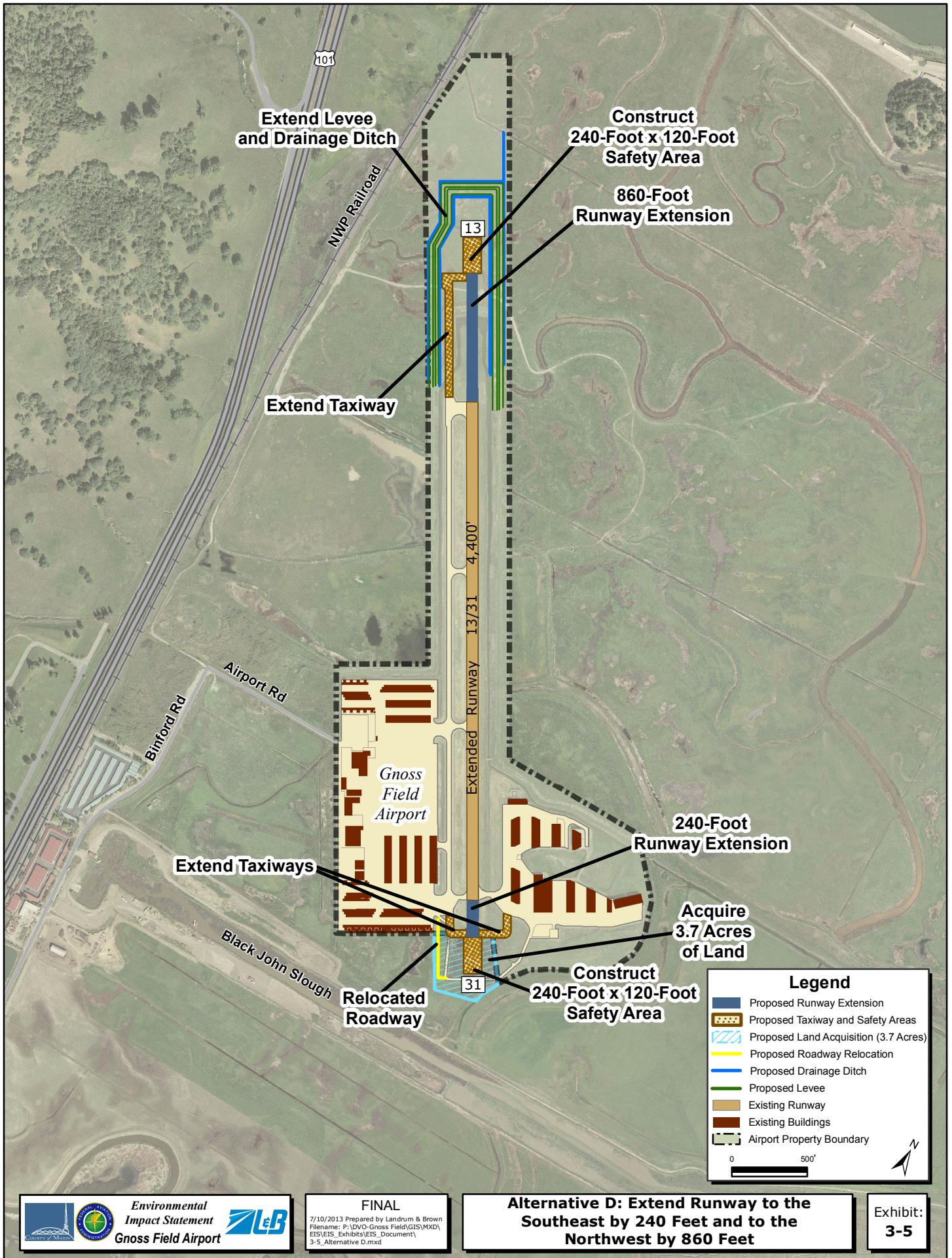
- Because the landing threshold for Runway 13 would be closer to the residential areas to the south of the Airport, aircraft approaching to land at DVO from the south would be at a lower altitude on approach than is experienced with the existing runway when passing near the residential areas to the south of the Airport; this could potentially increase aircraft approach noise levels in those communities.
- Operational:
 - Would result in the runway being located more centrally to the aircraft hangars.
 - Would address both the non-standard RSA and the need for additional runway length.
 - The PAPI and VASI navigational aids, which provide visual approach guidance for aircraft landing at the Airport, would be relocated with the extended runway closer to the residential areas to the south of the Airport. This would require a steeper angle of approach than is experienced with the existing runway threshold, which is already set at 4.0 degrees (3.0 degrees is the standard). If the approach angle is steepened, aircraft could potentially approach at faster speeds, particularly when crosswinds are present. This condition exacerbates the need for additional runway length by potentially needing more than 4,400 feet.
- Cost:
 - Would be the most expensive alternative due to the need to acquire approximately 13 acres of land (currently privately owned) and additional environmental mitigation costs.
- Reasonable, Possible and Prudent Alternative Considerations:
 1. Does it meet the project's purpose and need? **Yes.**
 2. Does it cause extraordinary safety or operational problems? **No.**
 3. Are there unique problems or truly unusual factors present with the alternative? **No.**
 4. Does it cause unacceptable and severe adverse social, economic, or other environmental impacts? **Yes.** Wetland impacts are more severe than under other alternatives, and therefore unlikely to receive a Clean Water Act, Section 404 permit as other, less environmentally damaging, practicable alternatives, are available.
 5. Does it cause extraordinary community disruption? **No.**
 6. Does it cause added construction, maintenance, or operational costs of an extraordinary magnitude? **No.**
 7. Does it result in an accumulation of factors that collectively, rather than individually, have adverse impacts that present unique problems or reach extraordinary magnitudes? **Yes.** This alternative is not prudent given that other alternatives are less costly and more protective of the environment.

- Determination: This alternative meets the need of the project. This alternative requires greater amounts of fill of waters and wetlands when compared to Alternative B, including the necessity to fill portions of the waters of Black John Slough. This alternative also requires land acquisition for construction and would require more aquatic mitigation than Alternative B. The Clean Water Act, Section 404, (b)(1) guidelines only allow the USACOE to permit the least environmentally damaging practicable alternative. As the same project purpose can be accomplished by implementation of Alternative B or Alternative D (described below) it is unlikely that the USACOE would issue Marin County a Clean Water Act, Section 404 permit to construct Alternative C, when Alternatives B and D have been identified as practicable. Therefore, this alternative will not be carried forward for detailed analysis.

3.4.1.4 Alternative D: Extend Runway to the Southeast by 240 Feet and To the Northwest by 860 Feet

Alternative D includes an extension of Runway 13/31 to the southeast by 240 feet and to the northwest by 860 feet for a total runway length of 4,400 feet at the existing runway width of 75 feet. In addition, this alternative would include extension of the parallel taxiway to match the length of the runway; extension of the existing FAA standard 120-foot wide RSA centered on the runway centerline to match the length of the runway; inclusion of FAA standard 240-foot RSA at each end of the runway in addition to the 1,100 foot runway extension; corresponding relocation of the south access road from the west to the east of the Airport to maintain separation of ground vehicle traffic from aircraft traffic; corresponding realignment of drainage channels to drain the extended runway and taxiway; corresponding levee extension to protect the extended runway and taxiway from flooding; and relocation of the navigational aids that pilots use to land at the Airport to reflect the extended runway.

Exhibit 3-5, *Alternative D: Extend Runway to the Southeast by 240 Feet and to the Northwest by 860 Feet*, presents a graphic depiction of Alternative D. Several variations of Alternative D were considered that relocated the access road for Alternative D farther south than shown on Exhibit 3-5. These variations were not evaluated in detail because compared to Alternative D, they increased the amount of time required for ground vehicles to traverse the runway protection zone; increased wetland fill and mitigation requirements over Alternative D; and increased costs. Preliminary evaluation of Alternative D is as follows:



Extend Levee and Drainage Ditch

Construct 240-Foot x 120-Foot Safety Area

860-Foot Runway Extension

Extend Taxiway

Extend Taxiways

240-Foot Runway Extension

Acquire 3.7 Acres of Land

Relocated Roadway

Construct 240-Foot x 120-Foot Safety Area

Legend

- Proposed Runway Extension
- Proposed Taxiway and Safety Areas
- Proposed Land Acquisition (3.7 Acres)
- Proposed Roadway Relocation
- Proposed Drainage Ditch
- Proposed Levee
- Existing Runway
- Existing Buildings
- Airport Property Boundary

0 500'

- Environmental:
 - Would require the relocation of the levee and drainage ditch around the runway.
 - The area where the runway extension would be located is almost entirely wetlands that would require filling.
 - Would require relocation of a portion of the access road between west and east areas of the Airport at the south end of Runway 31.
 - There are potential cultural resources and habitat impacts due to the alternative.
 - Would move the runway closer to protected wildlife areas to the southeast of the Airport.
 - Because the landing threshold for Runway 13 would be closer to the residential areas to the south of the Airport, aircraft approaching to land at DVO from the south, would be at a lower altitude on approach than is experienced with the existing runway when passing near the residential areas to the south of the Airport; this could potentially increase aircraft approach noise levels in those communities.
- Operational:
 - Would move the runway closer to the landfill northeast of the Airport, but not as much as Alternative B.
 - Would address the need for additional runway length.
 - The PAPI and VASI navigational aids, which provide visual approach guidance for aircraft landing at the Airport, would be relocated with the extended runway closer to the residential areas to the south of the Airport. This would require a steeper angle of approach than is experienced with the existing runway threshold, which is already set at 4.0 degrees (3.0 degrees is the standard). If the approach angle is steepened, aircraft could potentially approach at faster speeds, particularly when crosswinds are present. This condition exacerbates the need for additional runway length by potentially needing more than 4,400 feet.
- Cost:
 - Would require additional costs for acquisition of 3.72 acres of land (currently privately owned).
- Reasonable, Possible and Prudent Alternative Considerations:
 1. Does it meet the project's purpose and need? **Yes.**
 2. Does it cause extraordinary safety or operational problems? **No.**
 3. Are there unique problems or truly unusual factors present with the alternative? **No.**
 4. Does it cause unacceptable and severe adverse social, economic, or other environmental impacts? **No.**

5. Does it cause extraordinary community disruption? **No**.
 6. Does it cause added construction, maintenance, or operational costs of an extraordinary magnitude? **No**.
 7. Does it result in an accumulation of factors that collectively, rather than individually, have adverse impacts that present unique problems or reach extraordinary magnitudes? **No**.
- Determination: This alternative meets the need of the project and includes similar environmental impacts as the Sponsor's Proposed Project. Therefore, this alternative will be carried forward for detailed analysis.

3.4.2 RUNWAY ALTERNATIVE SCREENING SUMMARY

Based on the analysis presented above and summarized in **Table 3-2**, the following alternatives are carried forward for further evaluation:

1. Alternative A: No Action;
2. Alternative B: Extend Runway to the Northwest by 1,100 Feet (Sponsor's Proposed Project); and
3. Alternative D: Extend Runway to the Southeast by 240 Feet and to the Northwest by 860 Feet.

3.4.3 FAA PREFERRED ALTERNATIVE

Alternative B, extend Runway 13/31 to the north by 1,100 feet, is the FAA's Preferred Alternative. Extending Runway 13/31 to the north by 1,100 feet would meet the Sponsor's purpose and need for the proposed project 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, without derogating the safety of aircraft and airport operations and with fewer adverse environmental impacts than Alternative D.

3.4.4 ENVIRONMENTALLY PREFERRED ALTERNATIVE

Of all alternatives considered, the No Action Alternative has the fewest environmental impacts and is considered the Environmentally Preferable Alternative. However, the No Action Alternative does not meet the project purpose and need. Of the project alternatives that do meet the project purpose and need, Alternative B, extend Runway 13/31 to the north by 1,100 feet, would be the Environmentally Preferred Alternative because it has fewer environmental impacts than Alternative D, extend Runway 13/31 southeast by 240 feet and northwest by 860 feet. Alternative B is the least environmental damaging practicable alternative that meets the purpose and need of the proposed project.

**Table 3-2
RUNWAY DEVELOPMENT ALTERNATIVES EVALUATION MATRIX
Gross Field Airport**

Alternative	Description	Step 1: Does it Meet the Airport's Need to provide sufficient runway length?	Step 2: Additional Considerations			Preliminary Determination
			Environmental	Operational	Cost	
A	No Action	no	<ul style="list-style-type: none"> Results in no physical environmental impacts (wetlands or cultural resources) 	<ul style="list-style-type: none"> Would continue the use of non-standard Runway Safety Areas and would not address the need for more runway length to accommodate current aircraft operators. 	<ul style="list-style-type: none"> No direct costs. Indirect costs would occur as a result of not meeting FAA standards and not providing the runway length to accommodate the current aircraft. Indirect costs include the loss of revenue to the Airport due to the fact that some pilots would choose not to use DVO, therefore depriving the County of revenues associated with the sale of fuel to these aircraft. 	Alternative does not meet the Purpose and Need for the project. 40 CFR § 1502.14(d) guidelines require a No Action Alternative be included in the evaluation of environmental consequences, therefore this alternative will be carried forward for detailed analysis.
B	Extend Runway to the Northwest by 1,100 Feet (Sponsor's Proposed Project)	yes	<ul style="list-style-type: none"> Would require the relocation of the levee and drainage ditch around the northern portion of the runway resulting in the permanent removal of wetland habitat. Would require the temporary and permanent removal of endangered species habitat. Although there is no known cultural resources impact from this Alternative, there are potential cultural resource impacts and monitoring would be required. Would result in aircraft shifting where the climb to altitude would occur when departing to the south. Aircraft would be at a higher altitude than is currently experienced with the existing runway before passing near the residential areas to the south of the Airport, which would potentially decrease aircraft departure noise levels in those communities. Would require construction in the 100-year floodplain. 	<ul style="list-style-type: none"> Addresses both the non-standard Runway Safety Area and the need for additional runway length. The runway would be extended closer to the landfill northeast of the Airport, which is a potential bird-attractant. This alternative could be inconsistent with FAA bird-aircraft strike hazard guidance. Would require relocation of the PAPI/VASI navigational aids that pilots use for approach to landing at the Airport to reflect the extended runway. 	<ul style="list-style-type: none"> Acquisition costs for the County to gain exclusive use of 0.1 acres of land to the south of the Airport that would be required for the associated RSA extension. 	Alternative meets the need of the project and is the Sponsor's Proposed Project. Therefore this alternative will be carried forward for detailed analysis.
C	Extend Runway to the Southeast by 1,100 Feet	yes	<ul style="list-style-type: none"> Would require the extension of the levee and drainage ditch to the south of the existing runway resulting in more extensive permanent removal of wetland habitat than either Alternative B or Alternative D, including a portion of Black John Slough. Would require more extensive temporary and permanent removal of endangered species habitat than Alternative B or Alternative D. Although there is no known cultural resources impact from this Alternative, there are potential cultural resource impacts and monitoring would be required. Because the landing threshold for Runway 13 would be closer to the residential areas to the south of the Airport, aircraft approaching to land at DVO from the south, would be at a lower altitude on approach than is experienced with the existing runway when passing near the residential areas to the south of the Airport; this could potentially increase aircraft noise levels in those communities. Would require construction in the 100-year floodplain. 	<ul style="list-style-type: none"> Addresses both the non-standard Runway Safety Area and the need for additional runway length. Results in the runway being located more centrally to the hangars. The PAPI and VASI, which provide visual approach guidance for aircraft landing at the Airport, would be relocated with the extended runway closer to the residential areas to the south of the Airport. This would require a steeper angle of approach than is experienced with the existing runway threshold, which is already set at 4.0 degrees (3.0 degrees is the standard). If the approach angle is steepened, aircraft could potentially approach at faster speeds, particularly when crosswinds are present. This condition exacerbates the need for additional runway length by potentially needing more than 4,400 feet. 	<ul style="list-style-type: none"> Would be the most expensive alternative due to the need to acquire approximately 13 acres of land (currently privately owned) and additional mitigation costs. 	Alternative meets the need of the project. However, the additional environmental impacts, associated costs, and the need to purchase large amounts of land are considered impractical. Therefore, this alternative will not be carried forward for detailed analysis.
D	Extend Runway to the Southeast by 240 Feet and to the Northwest by 860 Feet	yes	<ul style="list-style-type: none"> Would require the relocation of the levee and drainage ditch around north and south portions of the runway resulting in permanent removal of wetland habitat similar, but slightly larger, than Alternative B. Would require the temporary and permanent removal of endangered species habitat similar to, but slightly higher than, Alternative B. Although there is no known cultural resources impact from this Alternative, there are potential cultural resource impacts and monitoring would be required. Would result in aircraft shifting where the climb to altitude would occur when departing to the south. Aircraft would be at a higher altitude than is currently experienced with the existing runway before passing near the residential areas to the south of the Airport, but not as high as Alternative B, which would potentially decrease aircraft departure noise levels in those communities. Would require construction in the 100-year floodplain. 	<ul style="list-style-type: none"> Addresses both the non-standard Runway Safety Area and the need for additional runway length. The runway would be extended closer to the landfill northeast of the Airport, which is a potential bird-attractant. This alternative could be inconsistent with FAA bird-aircraft strike hazard guidance. The PAPI and VASI navigational aids, which provide visual approach guidance for aircraft landing at the Airport, would be relocated with the extended runway closer to the residential areas to the south of the Airport. This would require a steeper angle of approach than is experienced with the existing runway threshold, which is already set at 4.0 degrees (3.0 degrees is the standard). If the approach angle is steepened, aircraft could potentially approach at faster speeds, particularly when crosswinds are present. This condition exacerbates the need for additional runway length by potentially needing more than 4,400 feet. 	<ul style="list-style-type: none"> Would require additional costs for acquisition of 3.72 acres of land (currently privately owned). 	Alternative meets the need of the project. Therefore this alternative will be carried forward for detailed analysis.

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