5.1 NOISE

This section presents the aircraft noise exposure to surrounding communities resulting from each of the alternatives identified to be carried forward for detailed analysis in Section 3.4 of Chapter Three, Alternatives. The noise effects of each of the runway extension alternatives are identified and compared to the No Action Alternative.

The number of aircraft operations at Gnoss Field Airport (DVO or Airport) is forecasted to reach 87,690 in the year 2035\(^1\). Federal Aviation Administration (FAA) guidance\(^2\) does not require a detailed noise analysis for proposed actions involving B-II aircraft operating at an airport that is not forecasted to exceed 90,000 annual propeller operations or 700 jet operations during the environmental analysis period covered by the SEIS because operations below such levels would not be expected to exceed established FAA thresholds for determining a significant environmental impact from increased aircraft noise. However, the FAA recognized the interest identified during public scoping regarding the potential noise impacts of the Proposed Action and elected out of an abundance of caution to undertake a detailed noise analysis in this SEIS.

The impact of airport-related noise levels upon the surrounding area is presented in terms of the number and type of noise-sensitive land uses located within the noise contours for the Sponsor’s Proposed Project and its alternatives. Noise contours are concentric bands of equal noise exposure that can be drawn over land use basemaps to indicate various levels of exposure. The existing and future land uses surrounding DVO are described in Chapter Four, Affected Environment. A detailed description of the methodology used to prepare the noise contours is provided in Appendix E-1, Noise Methodology.

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1. See Appendix C-1, Aviation Activity Forecast, Table 6-2, DVO Aircraft Operations Forecast of this Supplement to Final EIS
5.1.1 SIGNIFICANCE CRITERIA

FAA Order 1050.1F, Environmental Impacts: Policies and Procedures, states aircraft noise impacts are considered significant when an action would increase noise by Yearly Day-Night Average Sound Level (DNL) 1.5 decibel (dB) or more for a noise sensitive area that is exposed to noise at or above the DNL 65 dB noise exposure level, or that will be exposed at or above the DNL 65 dB level due to a DNL 1.5 dB or greater increase, when compared to the No Action Alternative for the same timeframe. In California, FAA Order 1050.1F, allows the use of the Community Noise Equivalent Level (CNEL) in lieu of DNL. CNEL includes a 4.77 dB adjustment added to noise events occurring during the evening from 7:00 PM to 10:00 PM. The FAA Aviation Environmental Design Tool (AEDT) version 2d was used for the noise model for evaluating noise exposure resulting from implementation of the various alternatives and comparison to the No Action Alternative. Timeframes selected are for the year of anticipated project implementation (2024) and 5 years after implementation (2029).

5.1.2 FUTURE CONDITIONS: 2024

This section provides a summary of the noise analysis of the 2024 conditions for each alternative. An analysis of the 2024 conditions describes potential impacts during the first full year of operation of the runway extension alternatives. The 2024 Alternative A (No Action) is compared to each of the three 2024 runway extension alternatives. General descriptions of the operational characteristics of each alternative are provided later in this section.

Alternative A: No Action

This section provides a summary of the AEDT input data, the resulting noise contour, and the disclosure of the potential noise impacts resulting from the operation of the Airport under Alternative A in 2024. The noise impact assessment prepared for the 2024 Alternative A provides a basis of comparison against which all other 2024 alternatives are evaluated.

Runway Definition: As noted in Chapter One, Background and Introduction, Gnoss Field consists of a single 3,300-foot long and 75 feet wide runway (designated 13/31) that is oriented in northwest to southeast direction. Exhibit 1-2, Existing Airport Layout in Chapter One graphically depicts the existing Airport layout. This runway definition was used for the modeling of the future Alternative A noise contour.
Activity Levels and Fleet Mix: The forecast analysis presented in Section 1.4, Aviation Activity, indicates that the operational levels at DVO are expected to grow approximately two percent from the 2018 level of 82,730 to the expected 2024 level of 84,404. The proportional mix of aircraft types expected to operate at DVO in 2024 is generally projected to remain constant over the forecast period and consistent with the proportions of the aircraft fleet mix currently at the Airport. However, the proportion of future jet aircraft operations at DVO is forecasted to decrease slightly as compared to other types of aircraft because the number of jet aircraft operations at DVO is forecasted to remain stable and not increase over time as shown in Appendix C-1, Table 6-5 and Appendix E-1, Table E-8. Detailed information on the future fleet mix and operational levels is presented in Appendix E-1.

Runway End Utilization: The average-annual runway end utilization for the 2024 Alternative A is expected to remain the same as the current condition. Traffic is expected to continue to follow the requested noise abatement runway use with departures on Runway 31 and arrivals on Runway 13. Approximately 90 percent of the departures would occur on Runway 31 with 10 percent on Runway 13. Conversely, about 90 percent of the arrivals are expected to use Runway 13 with only about 10 percent on Runway 31.

Flight Tracks: A flight track is the path over the ground as an aircraft flies to or from the Airport. As noted in Appendix E-1, radar data was gathered and evaluated to identify the current condition traffic routes. There are two components to flight tracks used for noise modeling: track definition and percentage of use. The flight tracks and proportional traffic distribution modeled for the 2024 future condition are expected to remain the same as those identified for the current conditions.

Noise Contour: The 2024 Alternative A noise contour for 65, 70, and 75 CNEL levels are graphically depicted on Exhibit 5.1-1, Community Noise Equivalent Level, Noise Contour Map: 2024 Alternative A (No Action).

The size and shape of the noise contours for DVO are a function of the combination of flight tracks and runway use. As noted above, it is expected that traffic would continue to follow the requested noise abatement runway use with departures on Runway 31 and arrivals on Runway 13. As a result, the future 2024 Alternative A noise contour is longer and wider to the north of the Airport than it is to the south.

To the north of the Airport, the noise contour extends approximately one-third of a mile north of the north end of the runway to a point just east of the railroad tracks. The shape of the contour is generally aligned with the runway and reflects the combination of takeoffs to the north and arrivals from the north, which occurs for approximately 90 percent of the activity at the Airport. The noise contour covers an area that is comprised of Airport property and other land uses that are not noise-sensitive. The higher noise levels of 70 and 75 CNEL cover a progressively smaller area of similar land uses to the north. The noise contour runs adjacent to the Airport runway with the contour lines generally parallel to the runway alignment.
To the south, the 65 CNEL noise contour extends 460 feet south of Airport property over both commercial and agricultural land uses. The higher noise levels of 70 and 75 CNEL contours remain largely over Airport property and their shape is associated with the start of takeoff roll noise associated within a high percentage of departures.

Overall, the noise contour is identical in shape and very similar in size to the Existing Conditions (2018) noise contour. The only difference is a very slight increase in the size of the Alternative A noise contour resulting from the two percent growth in total annual operations at DVO expected to occur between 2018 and 2024. **Table 5.1-1** provides the number and type of noise sensitive land uses within the 2024 Alternative A noise contours.

**Table 5.1-1**
NUMBER AND TYPE OF NOISE SENSITIVE LAND USES WITHIN THE 2024 ALTERNATIVE A NOISE CONTOURS

<table>
<thead>
<tr>
<th>Gnoss Field Airport</th>
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</table>

<table>
<thead>
<tr>
<th>CONTOUR RANGE</th>
<th>2024 ALTERNATIVE A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Non-residential Noise Sensitive Land Uses</td>
</tr>
<tr>
<td>65-70 CNEL</td>
<td>0</td>
</tr>
<tr>
<td>70-75 CNEL</td>
<td>0</td>
</tr>
<tr>
<td>75 + CNEL</td>
<td>0</td>
</tr>
<tr>
<td><strong>65 + CNEL</strong></td>
<td><strong>0</strong></td>
</tr>
</tbody>
</table>


**Land Use Impact Assessment:** No residential or other noise-sensitive land uses would be exposed to noise levels of 65 CNEL or greater by implementing Alternative A. Therefore, no significant noise impacts would result from implementation of Alternative A.
Community Noise Equivalent Level
Noise Contour Map: 2024 Alternative A (No Action)
Alternative B:
Extend Runway to the Northwest by 1,100 Feet (Sponsor’s Proposed Project)

This section provides a summary of the AEDT input data, the resulting noise contour, and the disclosure of the potential noise impacts resulting from the operation of the Airport under Alternative B in 2024.

Runway Definition: Alternative B includes a northwesterly extension of Runway 13/31 by 1,100 feet. The resulting runway would be 4,400 feet in length.

Activity Levels and Fleet Mix: The operating levels and fleet mix discussed for the 2024 Alternative A would remain the same for the 2024 Alternative B evaluation.

Runway End Utilization: The proposed extension of Runway 13/31 is not expected to affect runway use percentages from what was modeled for the Existing Conditions (2018) or 2024 Alternative A. Consequently, the runway use for this alternative would be identical to the 2024 Alternative A runway use previously described.

Flight Tracks: The proposed runway extension under Alternative B would have some modest effects on the flight tracks as related to takeoffs and landings to and from Runway 13. These changes are anticipated to be exclusively tied to the new location of the runway end as it relates to the proposed 1,100-foot northwesterly runway extension. Aircraft taking off to the south on Runway 13 would start their takeoff roll 1,100 feet further to the northwest than they currently do and thus be higher south of the Airport as they climb. Further, it is expected that the preferred noise abatement turns to the east would occur further to the northwest than they do now. Arrival tracks to Runway 13 would also be affected as the landing threshold would be moved 1,100 feet to the northwest. It is expected that this would result in aircraft turning onto their final approach slightly further to the northwest than is currently done and the aircraft would tend to be lower at a given point along the final approach north of the airfield. Flight tracks for departures on Runway 31 to the north and arrivals to Runway 31 from the south are not anticipated to change as a result of this alternative. Finally, the alternative would not affect the flight track utilization percentages shown in identified for the current conditions and the 2024 Alternative A scenarios. Appendix E-1 presents more detailed information regarding the flight tracks and distributions modeled for this alternative.

Noise Contour: The 2024 Alternative B noise contour for 65, 70, and 75 CNEL levels are graphically depicted on Exhibit 5.1-2, Community Noise Equivalent Level, Noise Contour Comparison: 2024 Alternative B vs 2024 Alternative A. For comparative purposes, the 2024 Alternative A noise contours are mapped in pink.
As the exhibit illustrates, the overall size and shape of the 2024 Alternative B noise contours for DVO are similar to those of the 2024 Alternative A noise pattern, as well as the 2018 Existing Conditions. To the north of the Airport, the Alternative B 65 CNEL noise contour is slightly larger and extends a bit farther north than the Alternative A no action and 2018 Existing Conditions noise contours. This is due to the runway extension and the corresponding shift in the landing threshold for Runway 13 and the start of takeoff roll for Runway 13. More evidence of this effect can be seen in the comparison of the slightly larger 70 db and 75 db CNEL noise level contours. As the exhibit shows, most of this change is located on, or immediately adjacent to Airport property.

To the south, the Alternative B 65 CNEL noise contour would shift to the northwest slightly as a result of the reduced influence in departure noise from Runway 13 departures. This reduction is due to the slightly higher altitudes for departures and the slight northwestern shift in the Runway 13 departure turn to the east. The slightly larger noise level contours of 70 and 75 CNEL are nearly the same as the Alternative A and the 2018 Existing Conditions noise contours as these contours are more influenced by noise from the start of takeoff roll from the high percentage of takeoffs on Runway 31. These takeoffs on Runway 31 do not change in Alternative B and thus the noise pattern at this runway end does not shift.

Table 5.1-2 provides the number and type of noise sensitive land uses within the 2024 Alternative B noise contours in comparison to that of the 2024 Alternative A, 2024 Alternative D, and 2024 Alternative E noise contours.

**Land Use Impact Assessment:** No residential or other noise-sensitive land uses would be exposed to noise levels of 65 CNEL or greater by implementing Alternative B. Therefore, no significant noise impacts would result from implementation of Alternative B.
Table 5.1-2
COMPARISON OF NUMBER AND TYPE OF NOISE SENSITIVE LAND USES WITHIN THE 2024 ALTERNATIVE A, B, D, AND E NOISE CONTOUR
Gnoss Field Airport

<table>
<thead>
<tr>
<th>CONTOUR RANGE</th>
<th>2024 ALTERNATIVE A</th>
<th>2024 ALTERNATIVE B</th>
<th>2024 ALTERNATIVE D</th>
<th>2024 ALTERNATIVE E</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Non-</td>
<td>Number of Non-</td>
<td>Number of Non-</td>
<td>Number of Non-</td>
</tr>
<tr>
<td></td>
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<td>residential Noise</td>
<td>residential Noise</td>
<td>residential Noise</td>
</tr>
<tr>
<td></td>
<td>Sensitive Land</td>
<td>Sensitive Land</td>
<td>Sensitive Land</td>
<td>Sensitive Land</td>
</tr>
<tr>
<td></td>
<td>Units</td>
<td>Units</td>
<td>Units</td>
<td>Units</td>
</tr>
<tr>
<td>65-70 CNEL</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>70-75 CNEL</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>75 + CNEL</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>65 + CNEL</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Acreage of noise-sensitive land uses within 65 + CNEL

|               | 0                  | 0                  | 0                  | 0                  |

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

This section provides a summary of the AEDT input data, the resulting noise contour, and the disclosure of the potential noise impacts resulting from the operation of the Airport under Alternative D in 2024.

Runway Definition: Alternative D includes a northwesterly extension of Runway 13/31 by 860 feet and a southeasterly extension of 240 feet. The resulting runway would be 4,400 feet in length.

Activity Levels and Fleet Mix: The operating levels and fleet mix discussed for the 2024 Alternative A would remain the same for the 2024 Alternative D.

Runway End Utilization: The proposed extension of Runway 13/31 is not expected to affect runway use percentages from what was modeled for the Existing Conditions (2018). Consequently, the runway use for this alternative would be identical to the 2024 Alternative A runway use.

Flight Tracks: The proposed runway extension under Alternative D would have some modest effects on the flight tracks at DVO. Like Alternative B, the expected flight track changes would be related to the shifts in takeoff and landing points as they relate to the runway extensions included in the alternative.

Aircraft taking off to the south on Runway 13 would start their takeoff roll 860 feet farther to the northwest than they currently do and thus be higher south of the Airport as they climb. Correspondingly, it is expected that the preferred noise abatement turns to the east would occur further to the northwest than they do now. Arrival tracks to Runway 13 would also be affected as the landing threshold would be moved 860 feet to the northwest. It is expected that this would result in aircraft turning onto their final approach slightly further to the northwest than is currently done and the aircraft would tend to be lower at a given point along the final approach north of the airfield.

Flight tracks for departures on Runway 31 to the north and arrivals to Runway 31 from the south would be expected to shift in a similar way but to a lesser degree as they relate to the 240-foot southeastward extension of the runway. Thus, the start of takeoff roll and the landing threshold are expected to move 240 feet to the southeast.

Finally, the alternative would not affect the flight track utilization percentages identified for the current conditions and the 2024 Alternative A scenarios. Appendix E-1 presents more detailed information regarding the flight tracks and distributions modeled for this alternative.
**Noise Contour**: The 2024 Alternative D noise contour for 65, 70, and 75 CNEL levels are graphically depicted on **Exhibit 5.1-3, Community Noise Equivalent Level, Noise Contour Comparison: 2024 Alternative D vs. 2024 Alternative A**. For comparative purposes, the 2024 Alternative A noise contours are mapped in pink.

As the map illustrates, the overall size and shape of the Alternative D noise contours for DVO are similar to those of the Alternative A noise contour. To the north of the Airport the Alternative D 65 CNEL noise contour is slightly wider but extends about the same distance north as the Alternative A noise contour. The increase in width is due to the northwesterly runway extension and the corresponding shift in the start of takeoff roll for Runway 13 departures. Although the landing threshold is shifted to the north also, that increase in noise to the north is offset by the reduction in departure noise due to takeoffs on Runway 31 being shifted 240 feet further to the southeast. This combined effect keeps the northern and southern extent of the 65 CNEL about the same as in Alternative A. As shown on Exhibit 5.1-3, the 70 and 75 CNEL contours change shape, but continue to closely follow the runway extension with most of this change in noise exposure located on, or immediately adjacent to, the Airport property.

To the south, the Alternative D 65 CNEL noise contour exhibits multiple shifts related to the combined effects of the two runway extensions. On the east and west side, the Alternative D 65 CNEL noise contour is similar to the no action contour due to the offsetting effects of the Runway 13 departure noise reduction from the northwest runway extension and the arrival and departure noise increases due to the southeast runway extension.

On the west side, the 70 and 75 CNEL noise contour shifts further to the south than Alternative A due to the southeast runway extension and associated shifting of the start of takeoff roll for Runway 31 departures. The higher noise level contours of 70 and 75 CNEL shift to the southeast, closely following the 240-foot runway extension.

Table 5.1-2 provides the number and type of noise sensitive land uses within the 2024 Alternative D noise contours in comparison to that of the 2024 Alternative A, 2024 Alternative B, and 2024 Alternative E noise contours.

**Land Use Impact Assessment**: No residential or other noise-sensitive land uses would be exposed to noise levels of 65 CNEL or greater by implementing Alternative D. Therefore, no significant noise impacts would result from implementation of Alternative D.
Alternative E: Extend Runway to the Northwest by 300 Feet

This section provides a summary of the AEDT input data, the resulting noise contour, and the disclosure of the potential noise impacts resulting from the operation of the Airport under Alternative E in 2024.

Runway Definition: Alternative E includes a shift of Runway 13/31 106 feet to the north and extend Runway 13/31 300 feet to the northwest. The resulting runway would be 3,600 feet in length.

Activity Levels and Fleet Mix: The operating levels and fleet mix discussed for the 2024 Alternative A would remain the same for the 2024 Alternative E evaluation.

Runway End Utilization: The proposed extension of Runway 13/31 is not expected to affect runway use percentages from what was modeled for the Existing Conditions (2018) or 2024 Alternative A. Consequently, the runway use for this alternative would be identical to the 2024 Alternative A runway use previously described.

Flight Tracks: The proposed runway extension under Alternative E would have some modest effects on the flight tracks as related to takeoffs and landings to and from Runway 13. These changes are anticipated to be exclusively tied to the new location of the runway end as it relates to the proposed 106-foot shift north and 300-foot runway extension to the northwest.

Aircraft taking off to the south on Runway 13 would start their takeoff roll 406 feet further to the northwest than they currently do and thus be higher south of the Airport as they climb. Further, it is expected that the preferred noise abatement turns to the east would occur further to the northwest than they do now. Arrival tracks to Runway 13 would also be affected as the landing threshold would be moved 406 feet to the northwest. It is expected that this would result in aircraft turning onto their final approach slightly further to the northwest than is currently done and the aircraft would tend to be lower at a given point along the final approach north of the airfield. Flight tracks for departures on Runway 31 to the north and arrivals to Runway 31 from the south are not anticipated to change as a result of this alternative.

Finally, the alternative would not affect the flight track utilization percentages shown in identified for the current conditions and the 2024 Alternative A scenarios. Appendix E-1 presents more detailed information regarding the flight tracks and distributions modeled for this alternative.

Noise Contour: The 2024 Alternative E noise contour for 65, 70, and 75 CNEL levels are graphically depicted on Exhibit 5.1-4, Community Noise Equivalent Level, Noise Contour Comparison: 2024 Alternative E vs 2024 Alternative A. For comparative purposes, the 2024 Alternative A noise contours are mapped in pink.
Noise Contour Comparison: 2024 Alternative D vs 2024 Alternative A

Land Use Data Sources:
- Novato General Plan, Adopted March 8, 1996.
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EXHIBIT: 5.1-4

Community Noise Equivalent Level
Noise Contour Comparison: 2024 Alternative E vs 2024 Alternative A

Land Use Data Sources:
- Novato General Plan, Adopted March 6, 1996.
As the map illustrates, the overall size and shape of the Alternative E noise contours for DVO are similar to those of the Alternative A noise contour. To the north of the Airport, the Alternative E 65 CNEL noise contour is slightly larger and extends a bit further north than the Alternative A noise contour. This is due to the runway extension and the corresponding shift in the landing threshold for Runway 13 and the start of takeoff roll for Runway 13. More evidence of this effect can be seen in the comparison of the higher noise level contours of 70 and 75 CNEL. As the map notes, most of this change is located on, or immediately adjacent to the Airport property, over land uses that are not noise-sensitive.

To the south, the Alternative E 65 CNEL noise contour would shift to the northwest slightly as a result of the reduced influence in departure noise from Runway 13 departures. This reduction is due to the slightly higher altitudes for departures and the slight northwestward shift in the Runway 13 departure turn to the east. The higher noise level contours of 70 and 75 CNEL are nearly the same as the Alternative A noise contours as these contours are more influenced by noise from the start of takeoff roll from the high percentage of takeoffs on Runway 31. These takeoffs do not change in Alternative E and thus the noise contour very close to the runway does not shift.

Table 5.1-2 provides the number and type of noise sensitive land uses within the 2024 Alternative E noise contours in comparison to that of the 2024 Alternative A, 2024 Alternative B, and 2024 Alternative D noise contours.

**Land Use Impact Assessment:** No residential or other noise-sensitive land uses would be exposed to noise levels of 65 CNEL or greater by implementing Alternative E. Therefore, no significant noise impacts would result from implementation of Alternative E.
5.1.3 FUTURE CONDITIONS: 2029

This section provides an evaluation of the potential increases in noise levels five years beyond the opening of the project (2029) for each alternative. The analysis focuses on the forecasted change in operating levels and fleet mix to determine the potential increase in noise for the community. FAA Order 1050.1F provides guidance for assessing conditions where there is a general overall increase in aircraft operations or changes in the type of aircraft occur. In cases where there are no changes in ground tracks or flight profiles, the analysis may be performed using the FAA’s Area Equivalent Method (AEM) computer model. If the AEM calculations indicate that the proposed action would result in less than a 17 percent (approximately a DNL 1 dB) increase in the CNEL 65 dB contour area, it may be concluded that there would be no significant impact over noise sensitive areas and that no further noise analysis is required. For each of the alternatives, a comparison of the conditions between 2024 and 2029 finds that the only difference would be operating levels and fleet mix. Therefore, an evaluation of the difference between the operating levels and fleet mix from 2024 to 2029 provides an indication of the relative increase in noise levels for any of the alternatives.

The results from the AEM modeling found that the CNEL 65 dB noise contour would increase in area by 1.5 percent (0.004 square miles), which is less than the 17 percent threshold increase specified in FAA Order 1050.1F. Therefore, it can be concluded that there would be no significant noise impact as a result of the forecasted operating levels and fleet mix and no further noise analysis is required.