6.1 SINGLE EVENT ANALYSIS

The noise analyses described in previous sections addressed cumulative noise impacts. This section describes individual noise impacts of 4 representative aircraft that operate at the Airport in terms of Sound Exposure Level (SEL, refer to section 2.4 for definition). The noise exposure is illustrated in terms of SEL contours that are compared to noise disturbance criteria for the purpose of assessing potential sleep disturbance.

Currently, there is conflicting research on how, why, and how often people awaken during the night. One predictor of awakening is the ~~"m~~meaning of sound" to the individual, such as a child crying, an alarm clock, or birds chirping. The Federal Interagency Committee on Aviation Noise (FICAN) sleep disturbance curve is based on interior rather than exterior noise levels. The difference between exterior and residential interior noise levels may vary due to the Noise Level Reduction (NLR) characteristics of building structural design (i,e. windows, doors, vents, walls). Typically, the NLR for a residence with acoustical treatment with closed windows will be about 30 dB, with closed standard windows and doors will be about 20 to 25 dB, and with windows open will be about 12 to 15 dB. To associate exterior noise levels and different residential structural characteristics to sleep disturbance, the FICAN recommended sleep disturbance curve (refer to section 2.5, Figure 2-7) is used to calculate the percentage of awakenings at different noise levels relative to sound exposure of 85 and 90 dB SEL.

Table 6-1 lists the maximum percentage of awakenings expected per exterior noise levels and residential characteristics. For example, for standard home construction and an outdoor SEL of 90 dB, you can expect 5.1% of the population to awaken due to that noise event. If the outdoor SEL is 85 dB, the percentage of population to awaken drops to 3.8%.

Table 6-1
MAXIMUM PERCENTAGE OF AWAKENINGS PER EXTERIOR SEL

RESIDENTIAL CHARACTERISTIC	NLR (dB)	EXTERIOR SEL OF 90 dB	EXTERIOR SEL OF 85 dB
Acoustical Treatment	30	3.8%	2.8%
Standard Construction	25	5.1%	3.8%
Windows Open	15	7.9%	6.4%

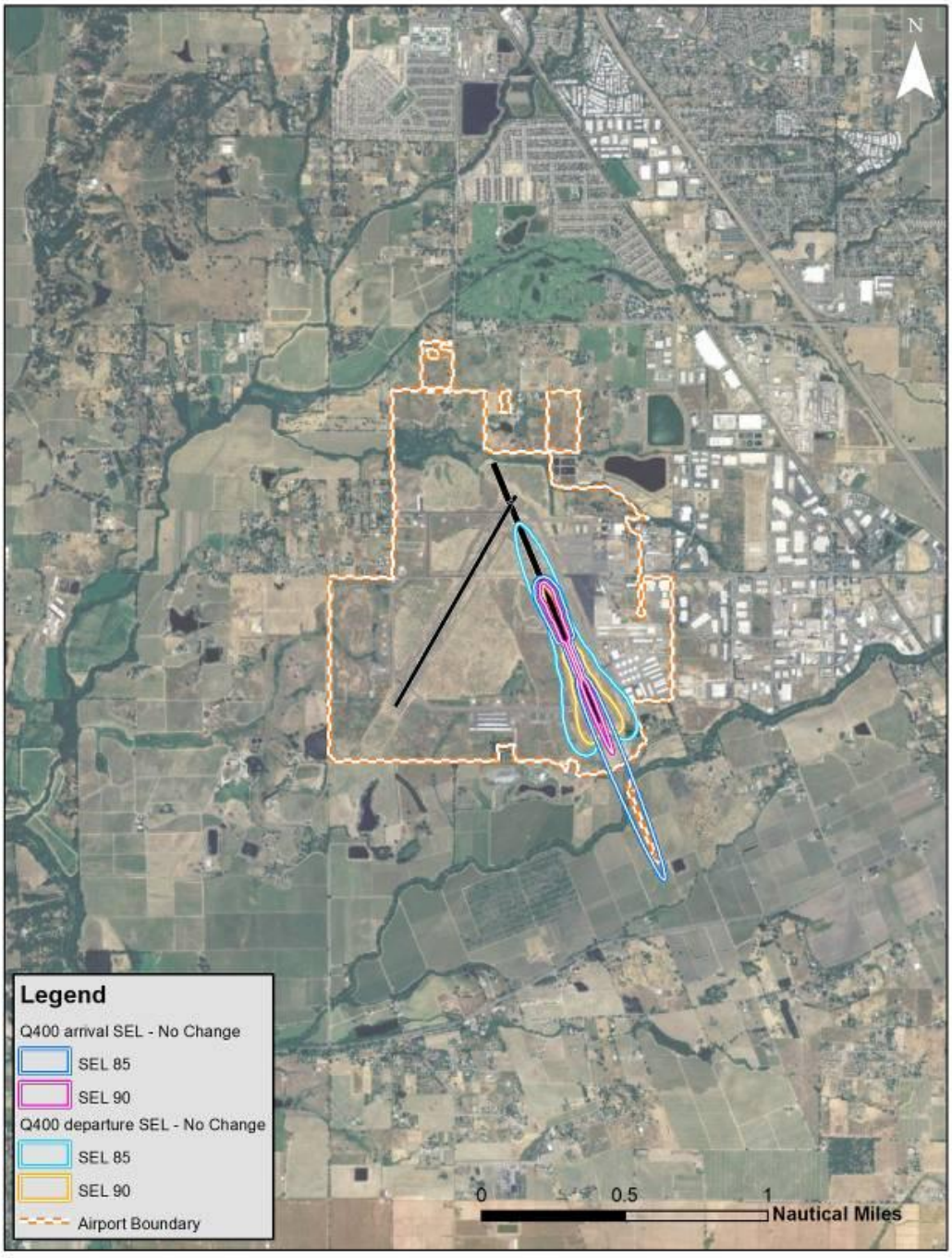
SOURCE: FICAN (1997), MGA/L&B (2011), Port of Oakland SEIR (2003)

6.1.1 Sound Exposure Level Contours

The SEL contours of 4 aircraft that typically operate at the Airport were modeled by using INM 7.0b to analyze impact on sleep disturbance. Figures sets 6-1 through 6-4 illustrate the 85 and 90 dB SEL contours of the Alaska Airlines Q400, the MU3001 (Beechjet 400, represents medium-size business jets) and the G-IV (Gulfstream IV represents large business jets), and the C172 (Cessna 172, a common General Aviation propeller aircraft) under the No Project and Proposed Projects (See photos of these aircraft on Figures 6-5 thru 6-8). Note that the noise contours from operations on Runways 01 and 32 do not change between the No Project and Proposed Projects because the beginning of take-off roll and the arrival touch down locations on these runways do not change. These locations on Runways 14 and 19 are expected to change with the implementation of the Proposed Project, and therefore, will shift the SEL contours as illustrated on the following figures:

Figure 6-1a

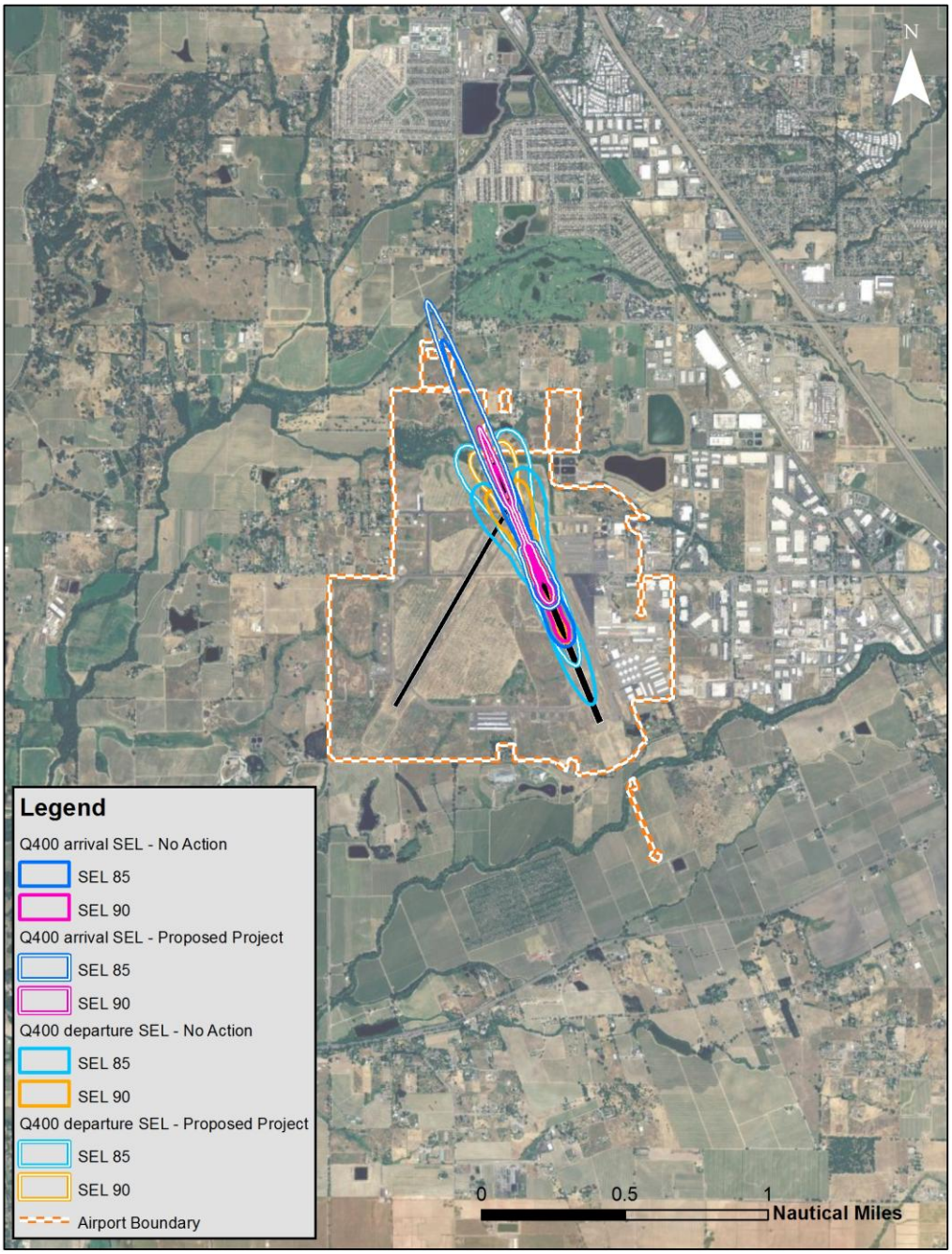
Q400 85 dB and 90 dB SEL CONTOURS – Runway 32



SOURCE: MGA/L&B (2011)

Figure 6-1b

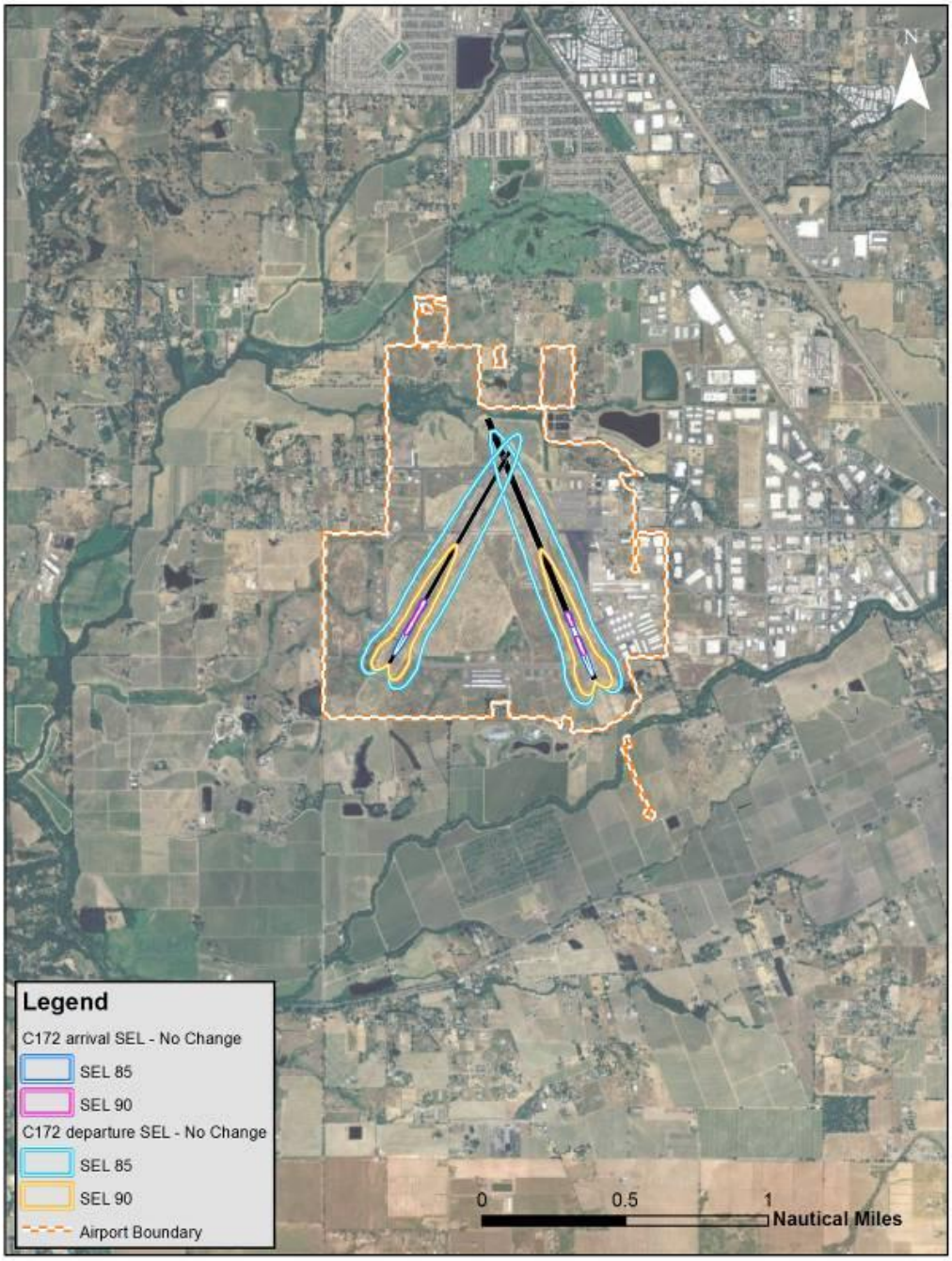
Q400 85 dB and 90 dB SEL CONTOURS – Runway 14



SOURCE: MGA/L&B (2011)

Figure 6-2a

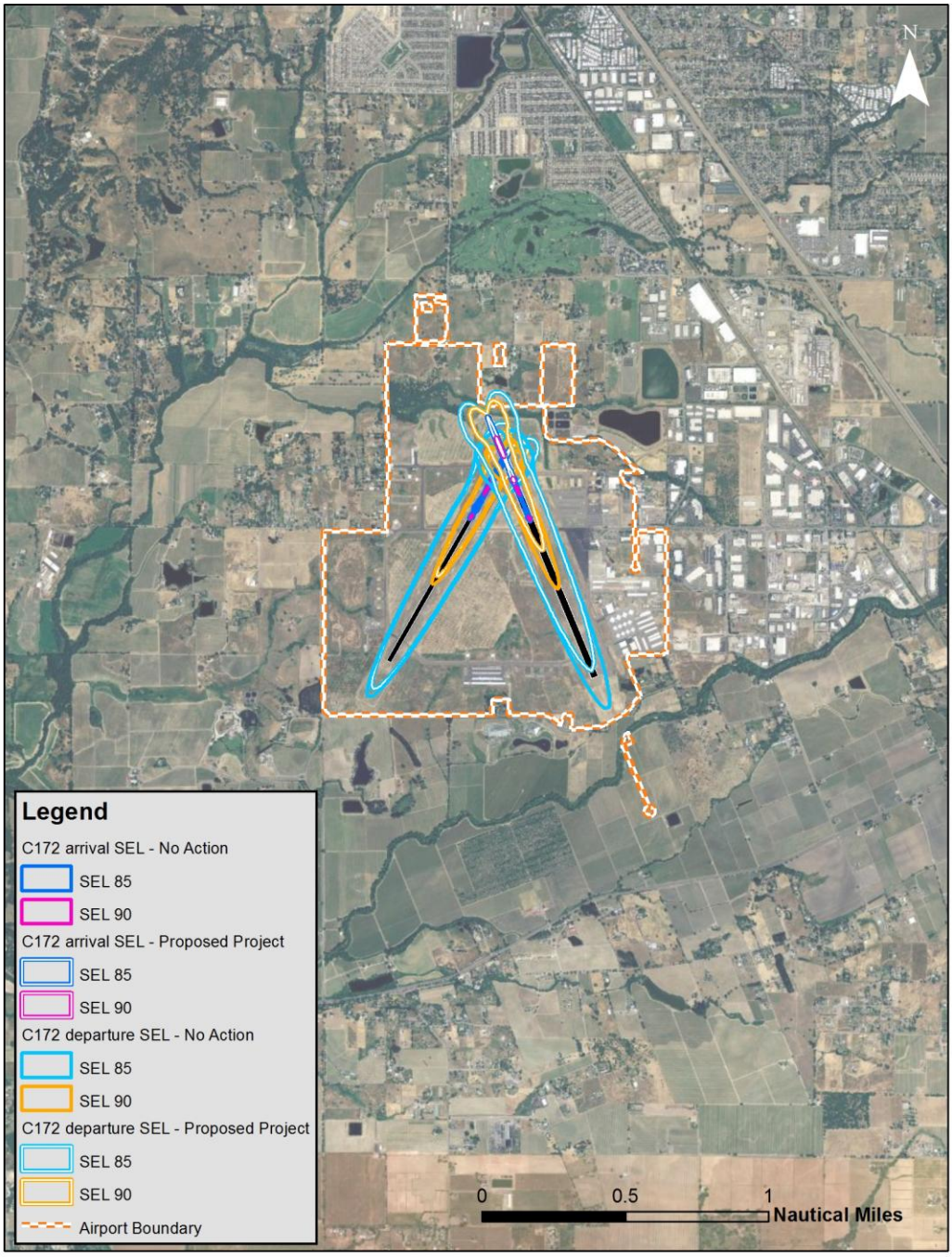
C172 85 dB and 90 dB SEL CONTOURS – Runways 1 and 32



SOURCE: MGA/L&B (2011)

Figure 6-2b

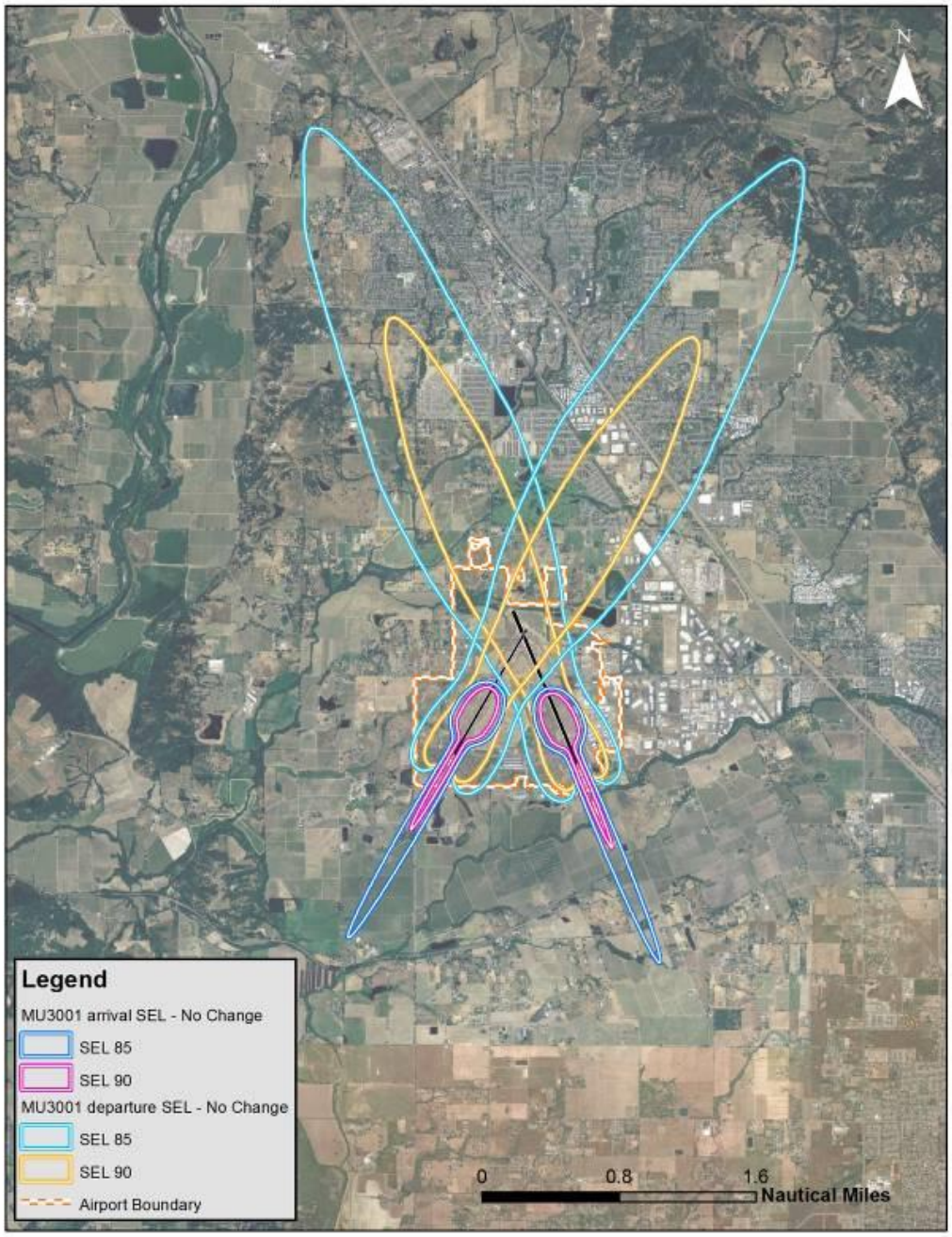
C172 85 dB and 90 dB SEL CONTOURS – Runways 14 and 19



SOURCE: MGA/L&B (2011)

Figure 6-3a

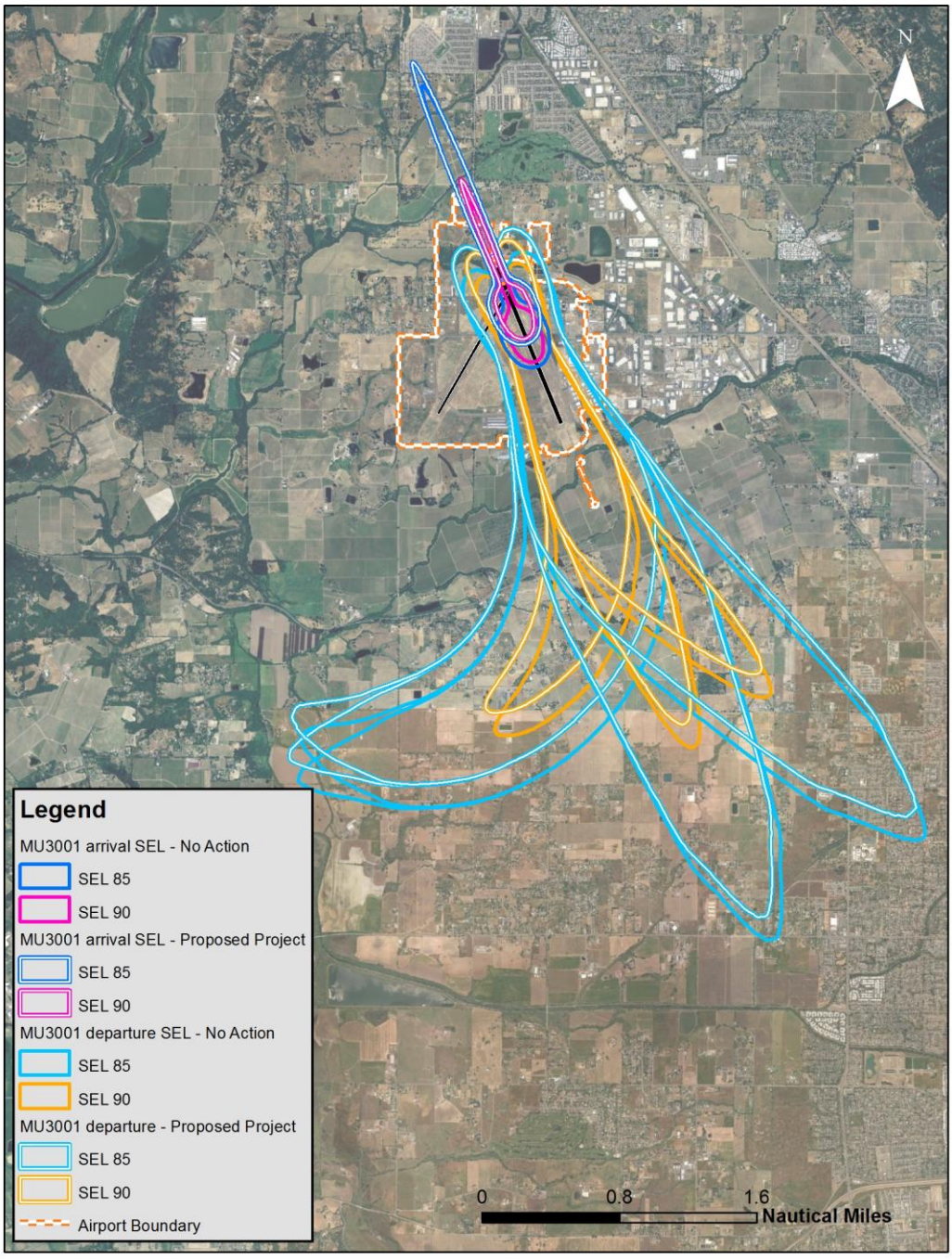
MU3001 85 dB and 90 dB SEL CONTOURS – Runways 1 and 32



SOURCE: MGA/L&B (2011)

Figure 6-3b

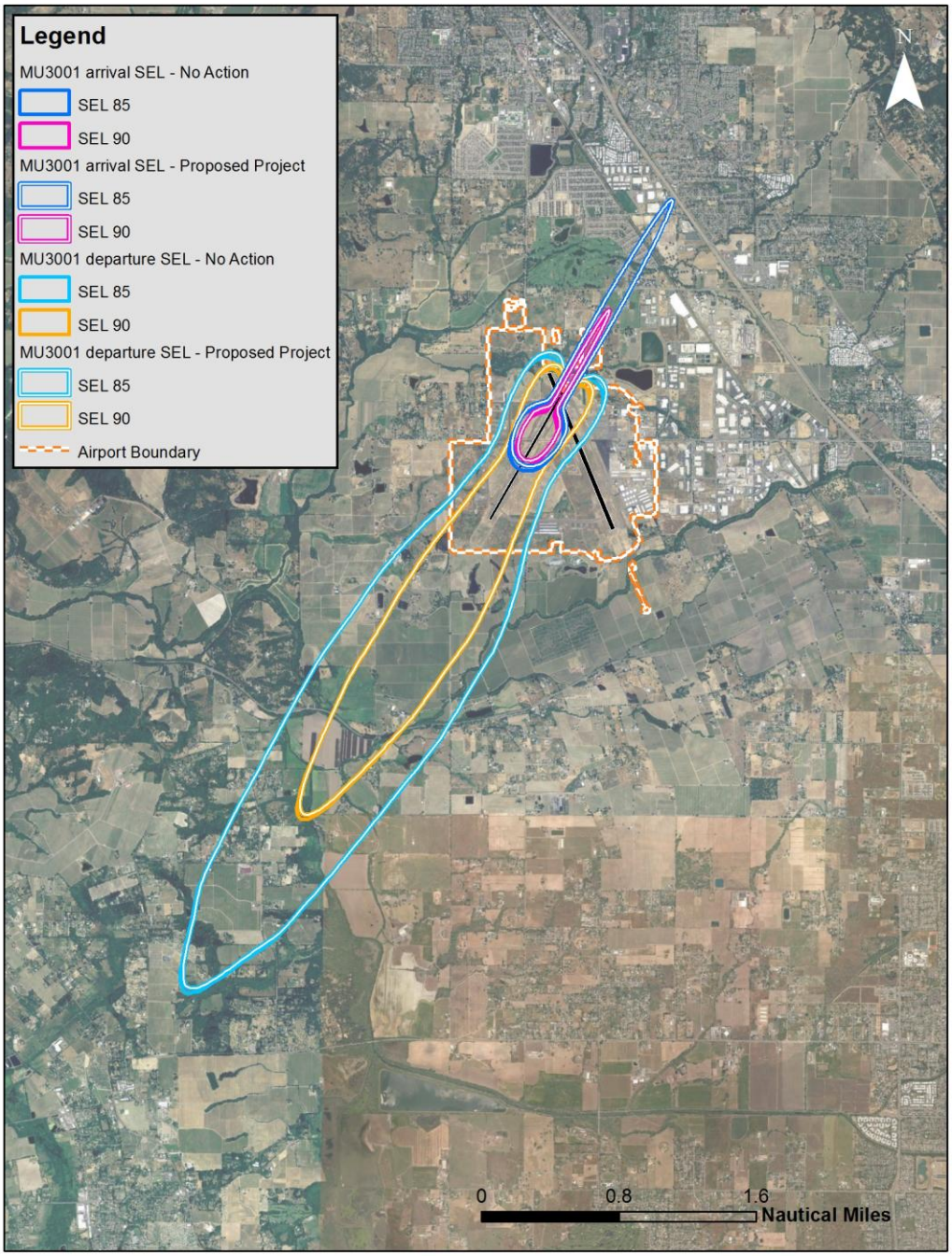
MU3001 85 dB and 90 dB SEL CONTOURS – Runway 14



SOURCE: MGA/L&B (2011)

Figure 6-3c

MU3001 85 dB and 90 dB SEL CONTOURS – Runway 19



SOURCE: MGA/L&B (2011)