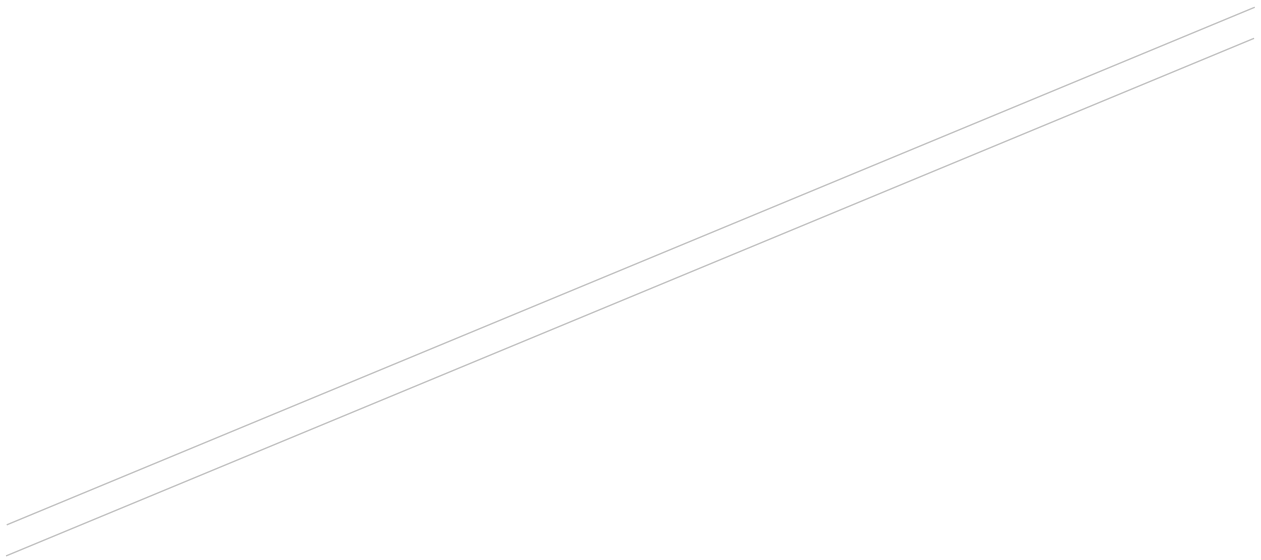
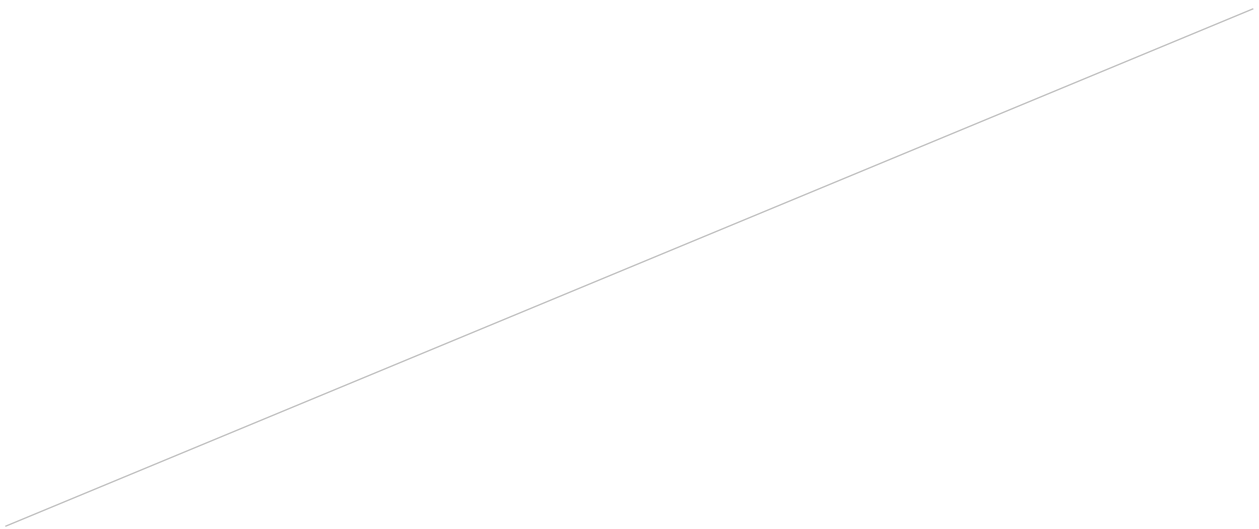




APPENDIX G
Aircraft Noise Analysis



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1.1 Noise Model

The methodology for assessing noise exposure includes preparing Day-Night Average Sound Level (DNL) contours using the Federal Aviation Administration's (FAA) Aviation Environmental Design Tool (AEDT), Version 3e.¹ The AEDT works by defining a network of grid points at ground level around an airport. It then selects the shortest distance from each grid point to each flight track and computes the noise exposure generated by each aircraft operation, along each flight track. Corrections are applied for atmospheric acoustical attenuation, acoustical shielding of the aircraft engines by the aircraft itself, and aircraft speed variations. The noise exposure levels for each aircraft are then summed at each grid location. The cumulative noise exposure levels at all grid points are then used to develop noise exposure contours for selected values (e.g., DNL 65, 70 and 75).

1.2 AEDT Input Data

In the development of DNL noise contours, the AEDT uses both default and airport-specific factors. The default factors include engine noise levels, thrust settings, aircraft arrival and departure flight profiles, and aircraft speed. The airport-specific factors include the number of aircraft operations, the type of aircraft, runway use, the assignment of aircraft operations to flight tracks, local meteorological conditions, and operational time (day/night) data. The following describes these airport-specific data.

1.2.1 Meteorological Data

The AEDT accounts for the influences of meteorological conditions on aircraft performance and atmospheric sound absorption. Meteorological conditions affect the transmission of aircraft noise through the air. The AEDT uses temperature and relative humidity to calculate atmospheric absorption coefficients, which in turn are used to adjust aircraft performance and sound propagation through the air. The 10-year average (2012 – 2021) meteorological conditions included in the AEDT for Harvey Field are:

- Temperature: 50.3° Fahrenheit
- Relative humidity: 77.4%

1.2.2 2021 Aircraft Operations

The aircraft operations² modeled for 2021 were obtained from the aviation activity forecast included in the 2018 Harvey Field Airport Master Plan using an applied growth rate. These data, by aircraft category, are provided in **Table 1**. As shown, the 2021 annual operations totaled 103,472, which is an average of approximately 283 operations per day.

¹ FAA AEDT Version 3e was the most current version of the model at the time this analysis was performed.

² An aircraft operation is defined as one arrival or one departure.

Table 1
2021 Annual Aircraft Operations

Year	Air Taxi	General Aviation Itinerant ³	General Aviation Local ⁴	Military	Total Operations
2021	1,531	48,897	52,844	200	103,472

Source: 2018 Harvey Field Airport Master Plan; RS&H, 2023

For the purposes of preparing DNL noise contours, operational data were segregated by aircraft type. The aircraft fleet was based on a sample of publicly available operational records from FlightAware. The data includes specific aircraft type, origin / destination, and the time the operation occurred. The data was reviewed, and each aircraft type was assigned the corresponding AEDT aircraft type. The sample data were then upgauged to develop the operations and fleet mix for the year 2021. The 2021 modeled aircraft operations and fleet are provided in **Table 2**.

Table 2
2021 Annual Aircraft Operations and Fleet

Category	Representative Aircraft Type (s)	AEDT Aircraft	2021 Operations	Percent of Fleet
Single Engine Piston	Cessna 170/172/175/177	CNA172	48,262	46.64%
Single Engine Piston	Cessna 152, Piper PA-18/PA-28, Cessna 140/150	GASEPF	34,420	33.27%
Single Engine Piston	Cessna 182/182R/185	CNA182	3,363	3.25%
Single Engine Piston	Cessna T210, Beech 35, Cessna 177RG, Piper PA-24	GASEPV	1,766	1.71%
Single Engine Piston	Cirrus SR-20/SR-22	COMSEP	152	0.15%
Multi-Engine Piston	Beech Baron 58, Beech Duchess 76, Cessna 421, Piper Aztec	BEC58P	1,548	1.50%
Turboprop	Cessna 208	CNA208	8,862	8.6%
Helicopter	Schweizer 300C	SC300C	4,501	4.35%
Helicopter	Robinson R-22	R22	164	0.16%
Helicopter	Bell UH-1	B212	117	0.11%
Helicopter	Eurocopter AS-350	SA355F	117	0.11%
Military	Sikorsky UH-60	S70	100	0.10%
Military	Chinook CH-47	CH47D	50	0.05%
Military	Cobra AH-1	SA356N	50	0.05%
			103,472	100.0%

³ An itinerant operation is defined as an aircraft departure where the aircraft leaves the airport vicinity and lands at another airport, or an aircraft landing where the aircraft arrives from another airport.

⁴ Local operations are those operations performed by aircraft that remain in the local traffic pattern, execute simulated instrument approaches or low passes at the airport, and the operations to or from the airport and a designated practice area within a 20-mile radius.

Note: Numbers may not sum due to rounding

Sources: 2018 Harvey Field Airport Master Plan; FlightAware; RS&H 2023

1.2.3 Time of Day

Aircraft operations modeled in the AEDT are assigned as occurring during daytime (7:00 a.m. to 9:59 p.m.) or nighttime (10:00 p.m. to 6:59 a.m.). The calculation of DNL includes an additional weight of 10 decibels (dB) for those operations occurring at night. Based on the sample FlightAware data, the civilian operations were modeled with 98% occurring during the day and 2% during the night. All military operations were modeled during the day.

1.2.4 Runway Use

Runway use refers to the frequency with which aircraft utilize each runway end for departures and arrivals. The more often a runway is used, the more noise is generated in areas located off each end of that runway. Wind direction and speed dictate the runway directional use (or flow) of airports. From a safety and operational standpoint, it is preferable for aircraft to arrive and depart into the wind. Based on historic wind data,⁵ for modeling purposes, it was assumed that the airport operates in south flow approximately 67% of the time and in north flow approximately 33% of the time.

The turf runway, Runway 33L/15R is generally open for six months of the year, from May 1 through October 31. During those six months, about 35% of the aircraft operate on that runway.

1.2.5 Modeled Aircraft Flight Tracks

Flight tracks refer to the route an aircraft follows when arriving to or departing from a runway. The location of flight tracks is an important factor in determining the geographic distribution of noise contours on the ground. The AEDT uses airport-specific ground tracks and vertical flight profiles to compute three-dimensional flight paths for each modeled aircraft operation. The “default” AEDT vertical profiles, which consist of altitude, speed, and thrust settings, are compiled from data provided by aircraft manufacturers.

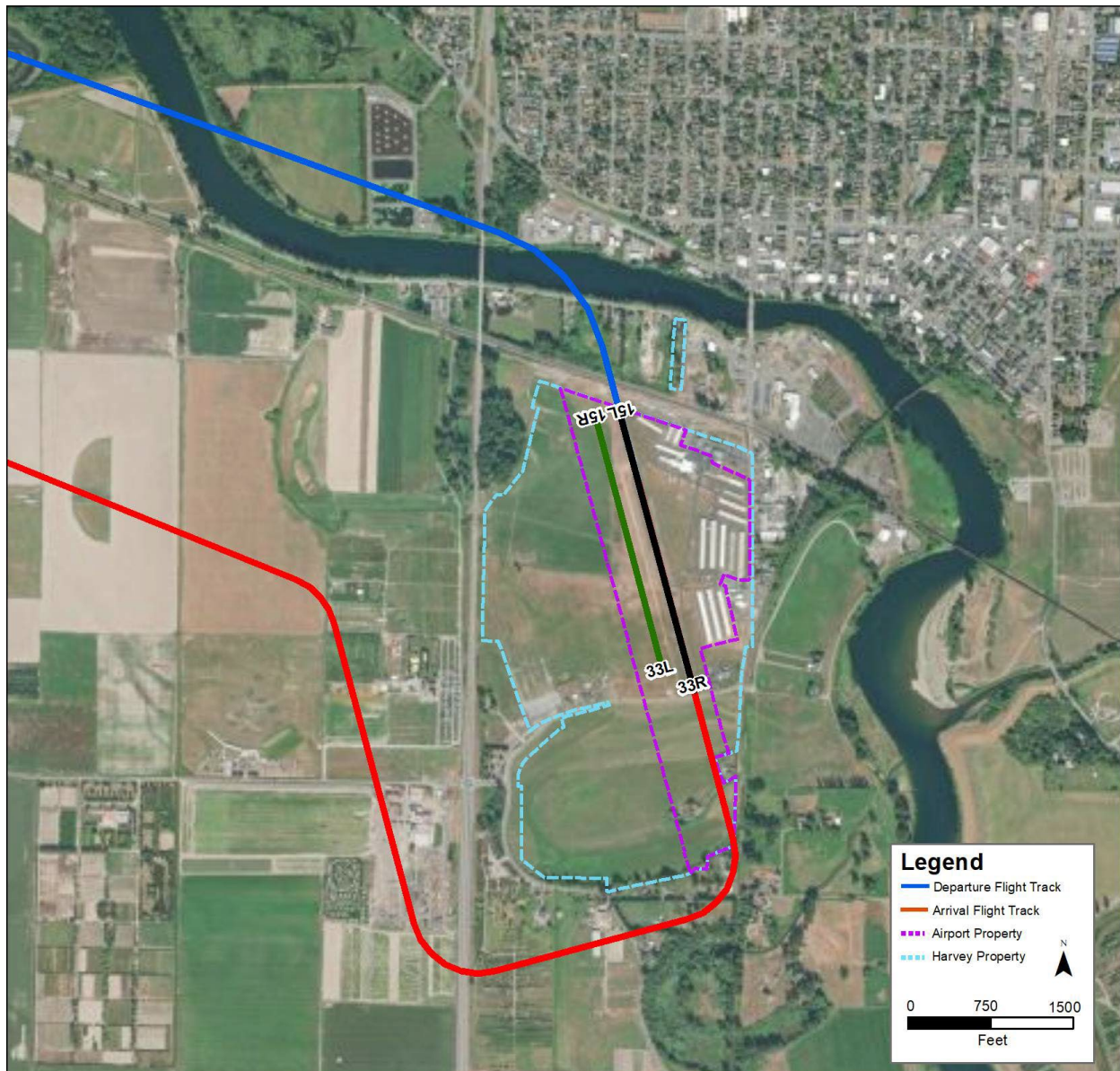
The modeled itinerant flight tracks for north flow and south flow are depicted on **Figures 1** and **2**, respectively. The aircraft departing to the north were modeled following the recommended noise abatement procedure. This procedure has aircraft turning to a 290-degree heading shortly after takeoff as safe operation permits. Flight tracks on Runway 15R/33L were modeled straight-in/straight-out in the immediate vicinity of the runway ends.

The local flight training pattern tracks are shown in **Figure 3**. The training tracks follow a left traffic pattern on Runway 33R and a right traffic pattern on Runway 15L.

The modeled helicopter flight tracks are shown in **Figure 4**. The local helicopter training track is shown occurring on the west side of the airport.

⁵ Wind data from All Weather Wind Rose in the 2018 Harvey Field Airport Master Plan.

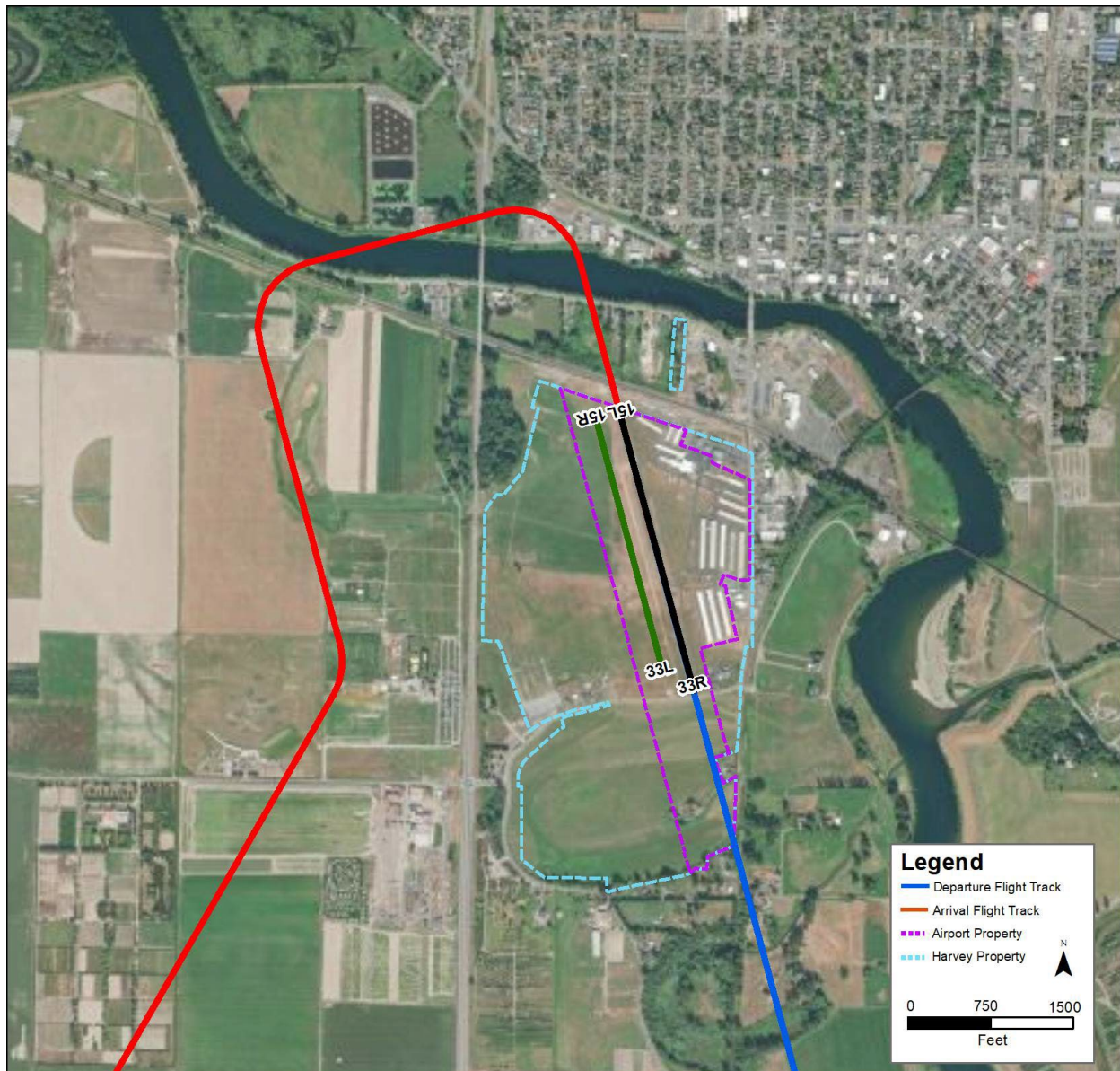
Figure 1
Modeled Aircraft Flight Tracks – North Flow



Source: RS&H 2023

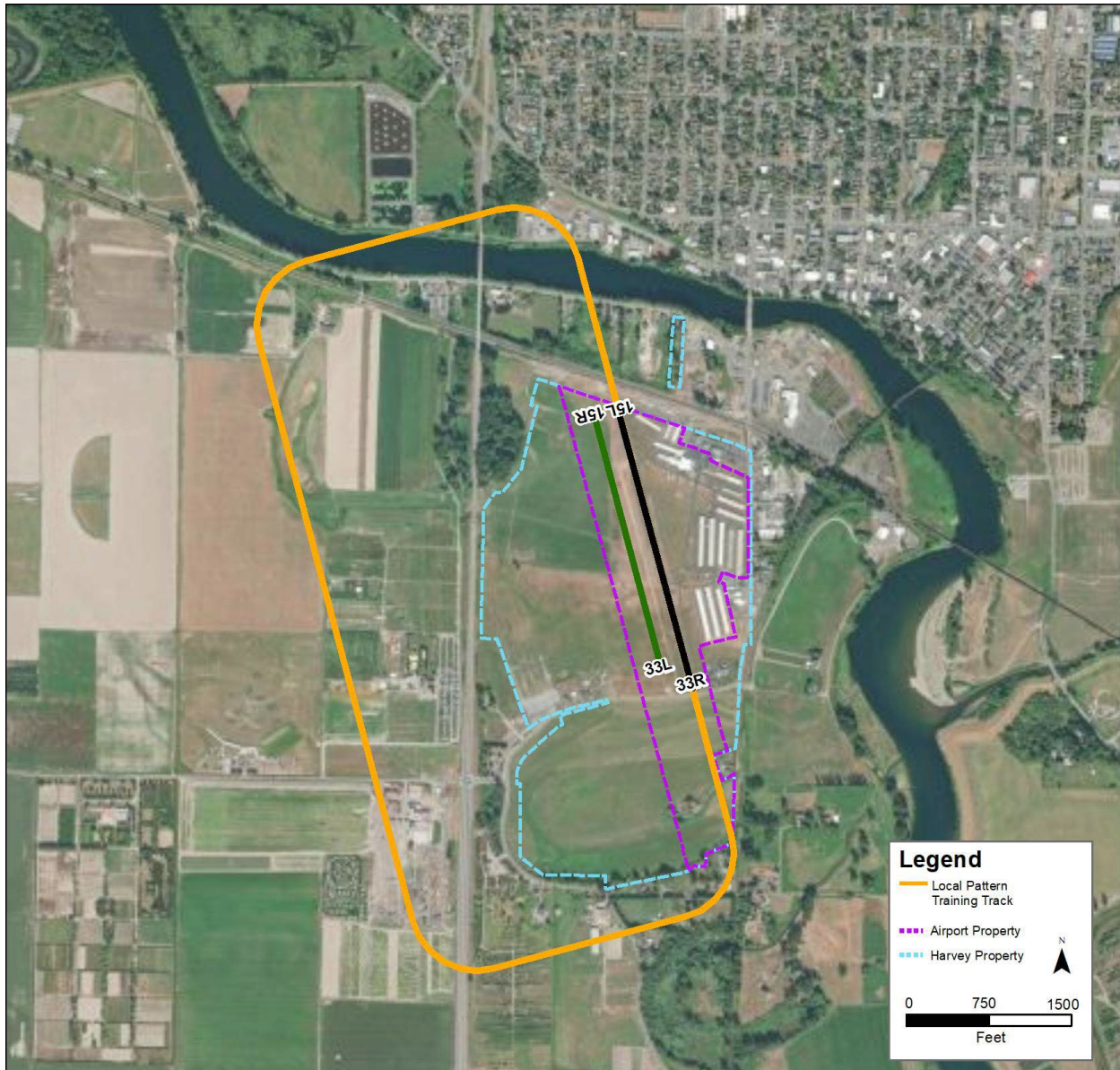
Appendix G – Aircraft Noise Analysis

Figure 2
Modeled Aircraft Flight Tracks – South Flow



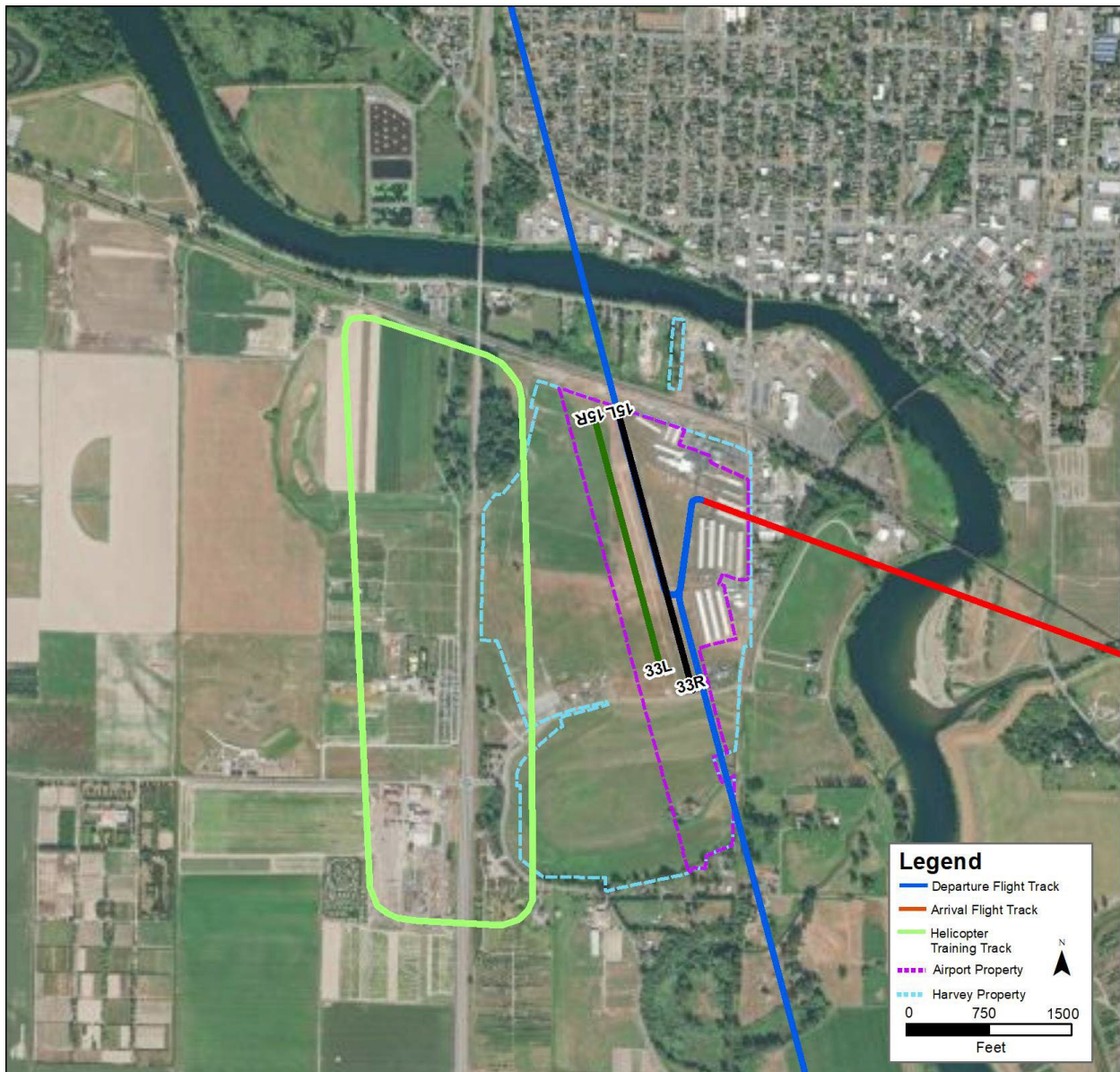
Source: RS&H 2023

Figure 3
Modeled Aircraft Flight Tracks – Local Training Pattern



Source: RS&H 2023

Figure 4
Modeled Helicopter Tracks



Source: RS&H 2023

1.3 2021 DNL Noise Contours

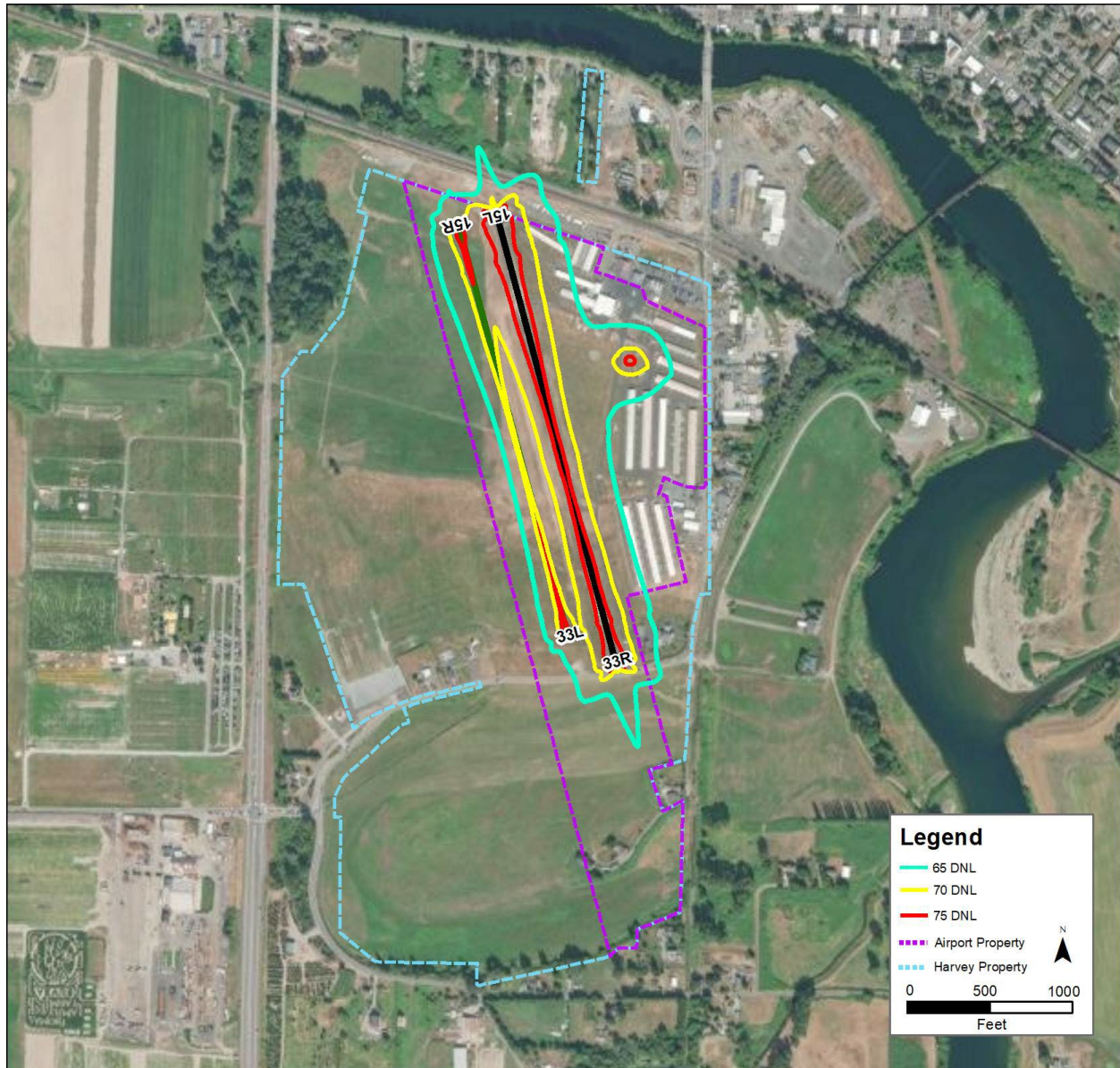
The 2021 65, 70 and 75 DNL noise contours are provided in **Figure 5. Table 3** identifies the areas within the DNL noise contour ranges. As shown in the table, the total area within the 65 and greater DNL noise contours is 48.1 acres. There is one residence within the 2021 65 DNL noise contour, which is the Airport Sponsor's residence. However, there are no other noise sensitive uses within the 2021 65 DNL and greater noise contours.

Table 3
2021 DNL Noise Contour Areas

DNL Range	Area (acres)
65 - 70	29.0
70 - 75	14.1
75+	5.0
Total	48.1

Source: RS&H, 2023

Figure 5
2021 DNL Noise Contours



Source: RS&H, 2023

1.4 Future Aircraft Operations

The aircraft operations modeled for 2028 and 2033 were obtained from the aviation activity forecast included in the 2018 Harvey Field Airport Master Plan using an applied growth rate. These data, by aircraft category, are provided in **Table 4**.

Table 4
2028 and 2033 Aircraft Operations

Year	Air Taxi	General Aviation Itinerant	General Aviation Local	Military	Total Operations
2028	1,571	50,291	54,173	200	106,235
2033	1,596	51,296	55,069	200	108,161

Source: 2018 Harvey Field Airport Master Plan

The 2028 and 2033 aircraft fleet mix were determined by multiplying the percentages by aircraft type that occurred in 2021 by the operations forecast to occur in 2028 and 2033. The time of day modeled for 2028 and 2033 were the same as the 2021 condition. The aircraft operations and fleet mix modeled for 2028 and 2033 are shown in **Table 5**.

Table 5
2028 2033 Annual Aircraft Operations and Fleet

Category	Representative Aircraft Type (s)	AEDT Aircraft	2028 Operations	2033 Operations
Single Engine Piston	Cessna 170/172/175/177	CNA172	49,557	50,459
Single Engine Piston	Cessna 152, Piper PA-18/PA-28, Cessna 140/150	GASEPF	35,339	35,980
Single Engine Piston	Cessna 182/182R/185	CNA182	3,453	3,515
Single Engine Piston	Cessna T210, Beech 35, Cessna 177RG, Piper PA-24	GASEPV	1,813	1,846
Single Engine Piston	Cirrus SR-20/SR-22	COMSEP	156	159
Multi-Engine Piston	Beech Baron 58, Beech Duchess 76, Cessna 421, Piper Aztec	BEC58P	1,589	1,618
Turboprop	Cessna 208	CNA208	9,099	9,264
Helicopter	Schweizer 300C	SC300C	4,621	4,705
Helicopter	Robinson R-22	R22	168	171
Helicopter	Bell UH-1	B212	120	122
Helicopter	Eurocopter AS-350	SA355F	120	122
Military	Sikorsky UH-60	S70	100	100
Military	Chinook CH-47	CH47D	50	50
Military	Cobra AH-1	SA356N	50	50
			106,235	108,161

Note: Numbers may not sum due to rounding

Sources: 2018 Harvey Field Airport Master Plan; FlightAware; RS&H 2023

The runway use and flight tracks modeled for the 2028 and 2033 No Action Alternatives were the same as the 2021 condition.

1.5 No Action Alternative

1.5.1 2028 No Action Alternative DNL Noise Contours

The 2028 No Action Alternative 65, 70 and 75 DNL noise contours are provided in **Figure 6**. **Table 6** identifies the areas within the DNL noise contour ranges. As shown in the table, the total area within the 65 and greater DNL noise contours is 48.2 acres. There is one residence in the 65 DNL noise contour, which is the Airport Sponsor's residence. There are no other noise sensitive uses within the 2028 No Action Alternative 65 and greater DNL noise contours.

Table 6
2028 No Action Alternative DNL Noise Contour Areas

DNL Range	Area (acres)
65 - 70	29.1
70 - 75	14.1
75+	5.00
Total	48.2

Source: RS&H, 2023

1.5.2 2033 No Action Alternative DNL Noise Contours

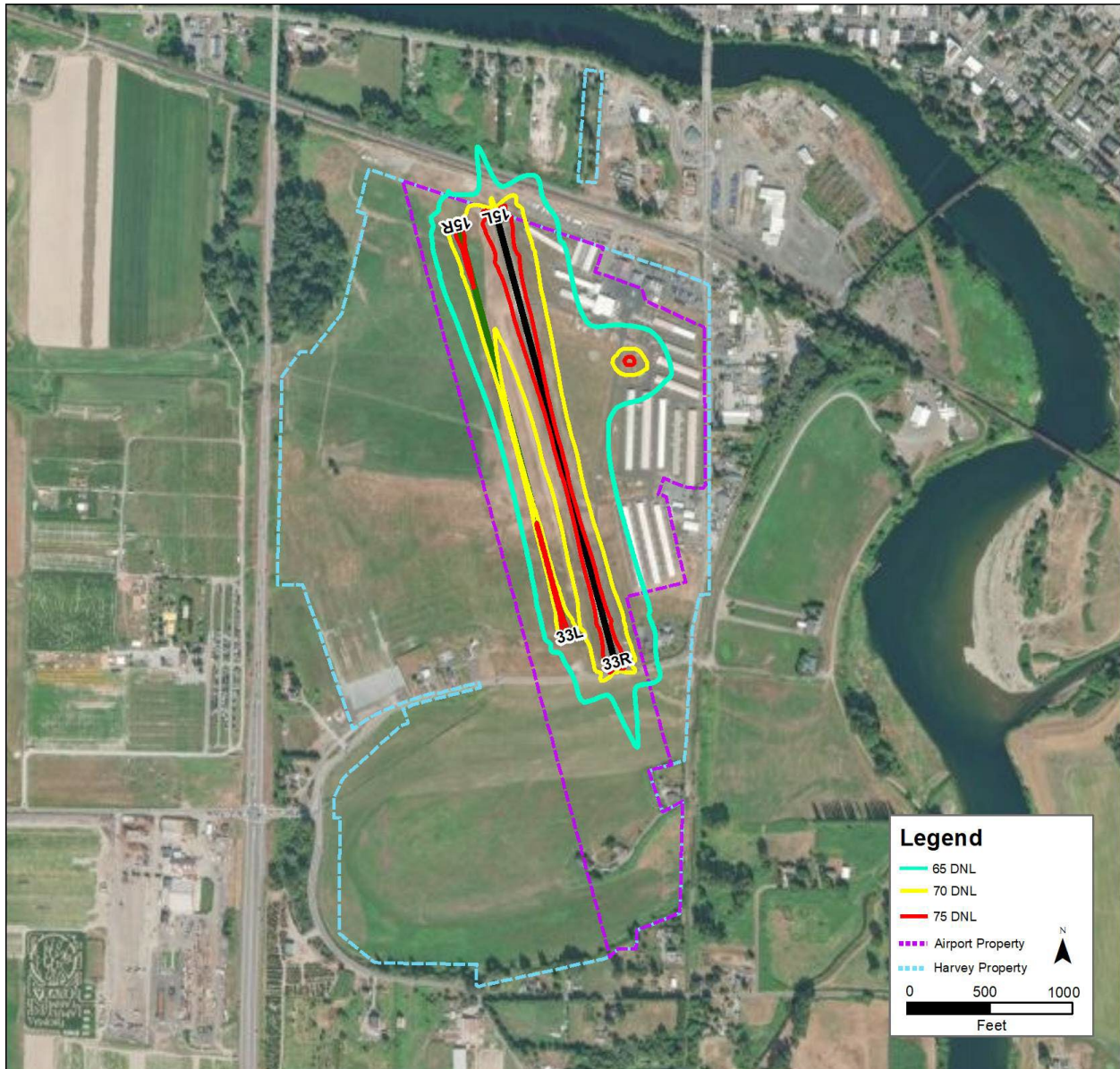
The 2033 No Action Alternative 65, 70 and 75 DNL noise contours are provided on **Figure 7**. **Table 7** identifies the areas within the DNL noise contour ranges. As shown in the table, the total area within the 65 and greater DNL contours is 48.8 acres. There are no residences or other noise sensitive uses within the 2033 No Action Alternative 65 and greater DNL noise contours.

Table 7
2033 No Action Alternative DNL Contour Areas

DNL Range	Area (acres)
65 - 70	29.3
70 - 75	14.4
75+	5.1
Total	48.8

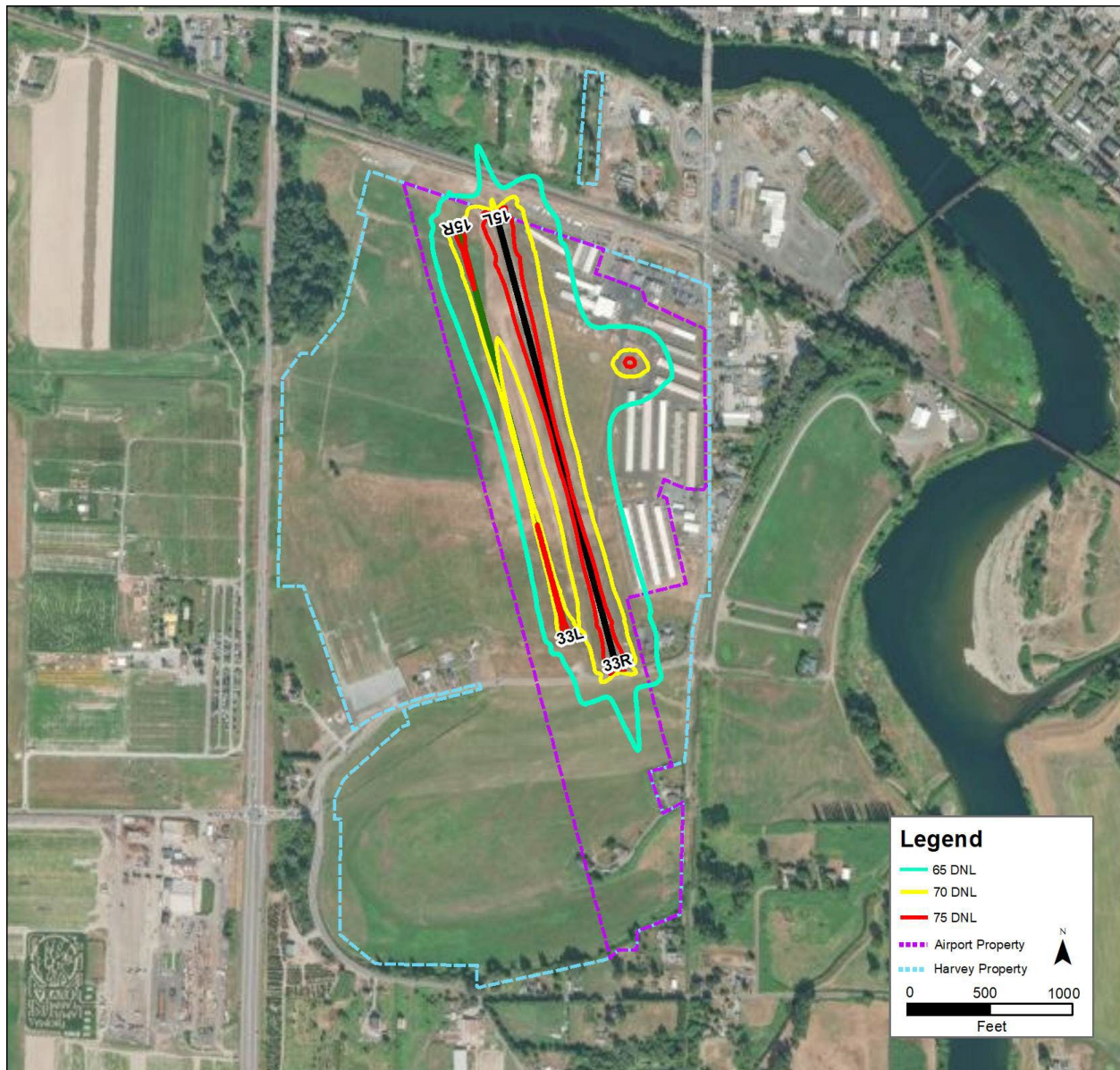
Source: RS&H, 2023

Figure 6
2028 No Action Alternative DNL Noise Contours



Source: RS&H, 2023

Figure 7
2033 No Action Alternative DNL Noise Contours



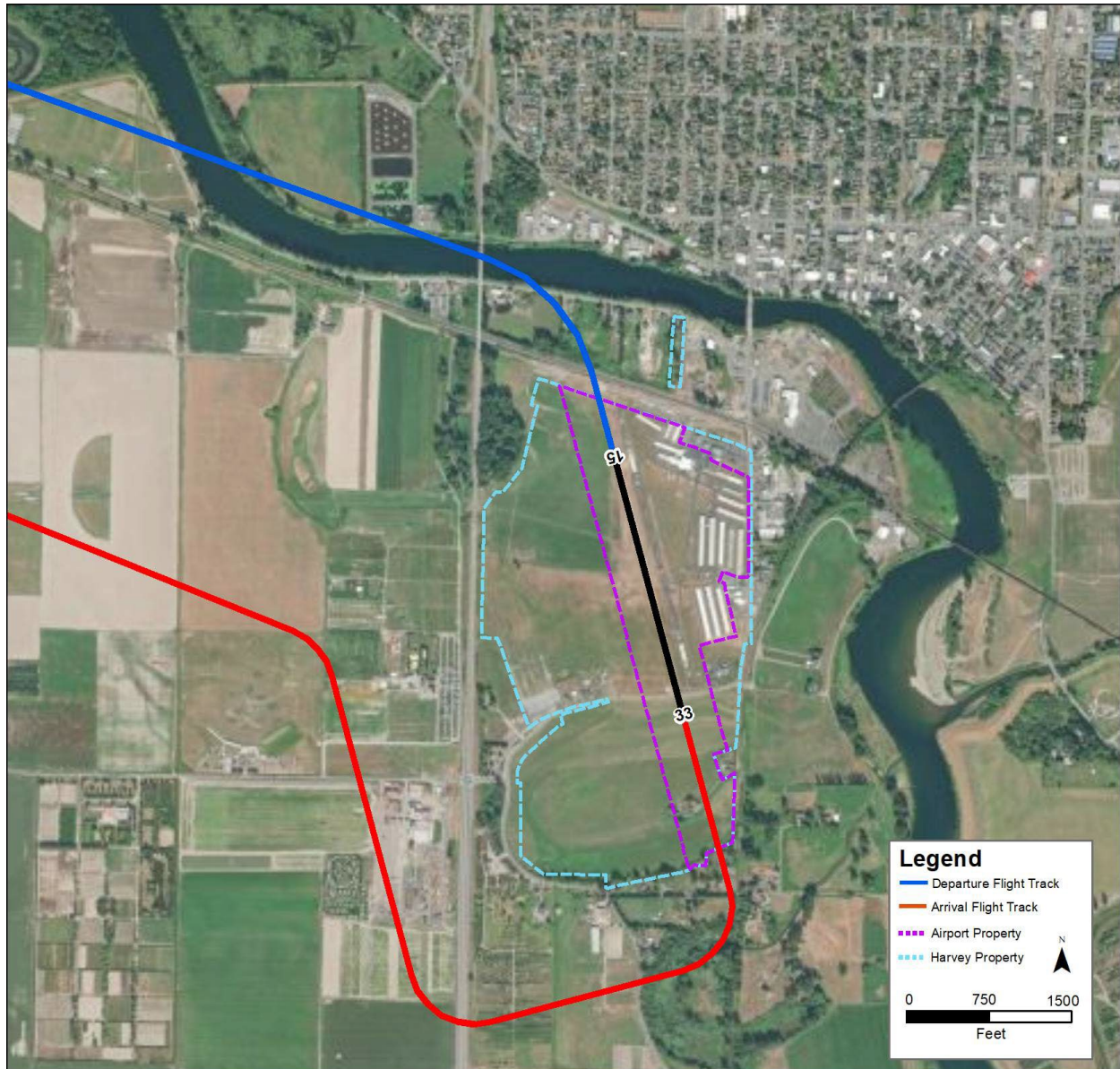
Source: RS&H, 2023

1.6 Proposed Action

The Proposed Action includes the construction of a new 2,400-foot runway west of the existing Runway 15L/33R and will be designated Runway 15/33. The current runways, 15R/33L and 15L/33R will be decommissioned as part of the Proposed Action. The Proposed Action would not expand the Airport nor extend the runway.

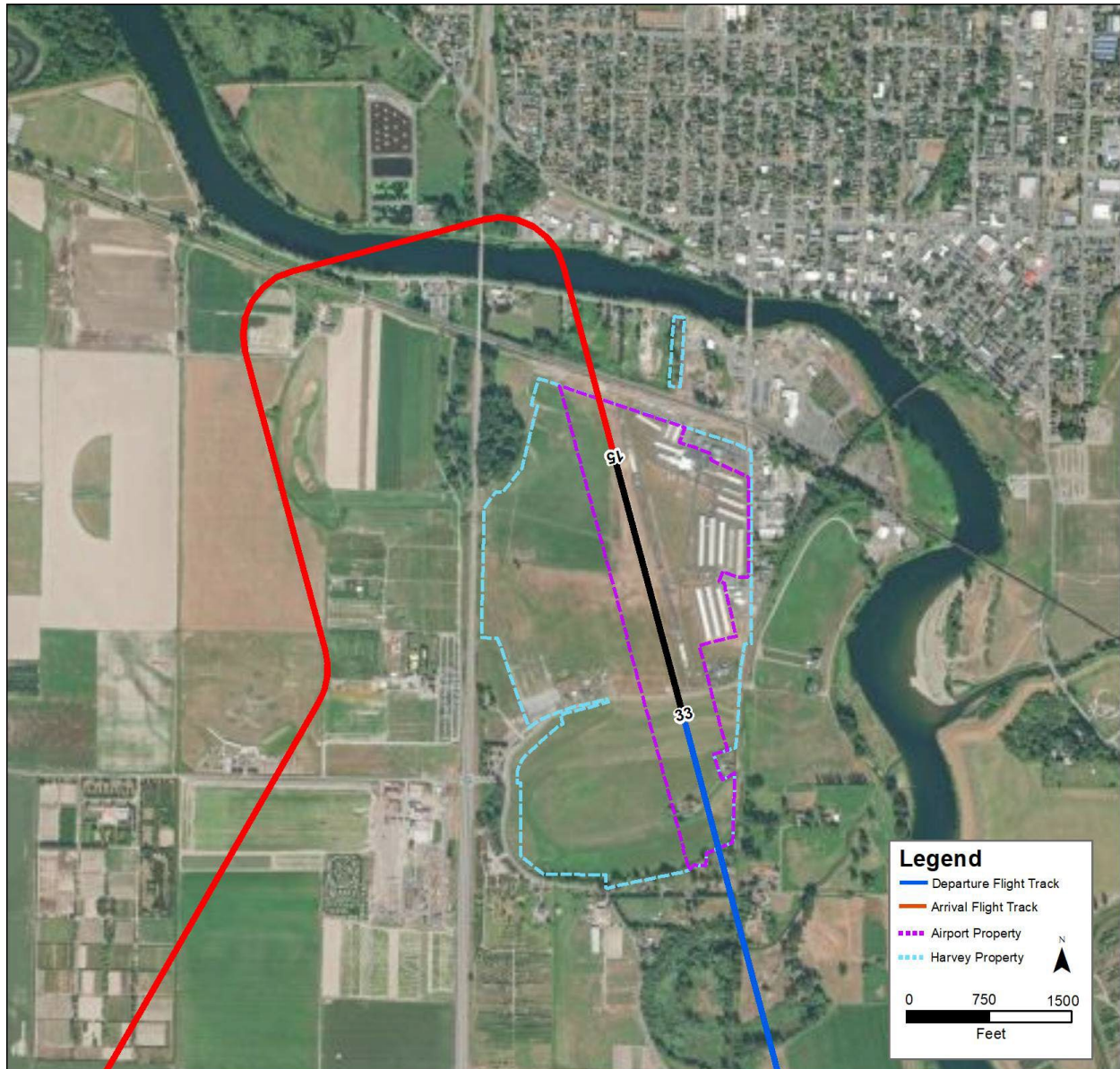
The aircraft departing to the north with the Proposed Action were modeled following the noise abatement turn to a 290-degree heading shortly after takeoff as safe operation permits. All other air traffic was modeled following a left traffic pattern on Runway 33 and a right traffic pattern on Runway 15. The modeled Proposed Action flight tracks are shown on **Figures 8** through **11**.

Figure 8
Proposed Action Modeled Aircraft Flight Tracks – North Flow



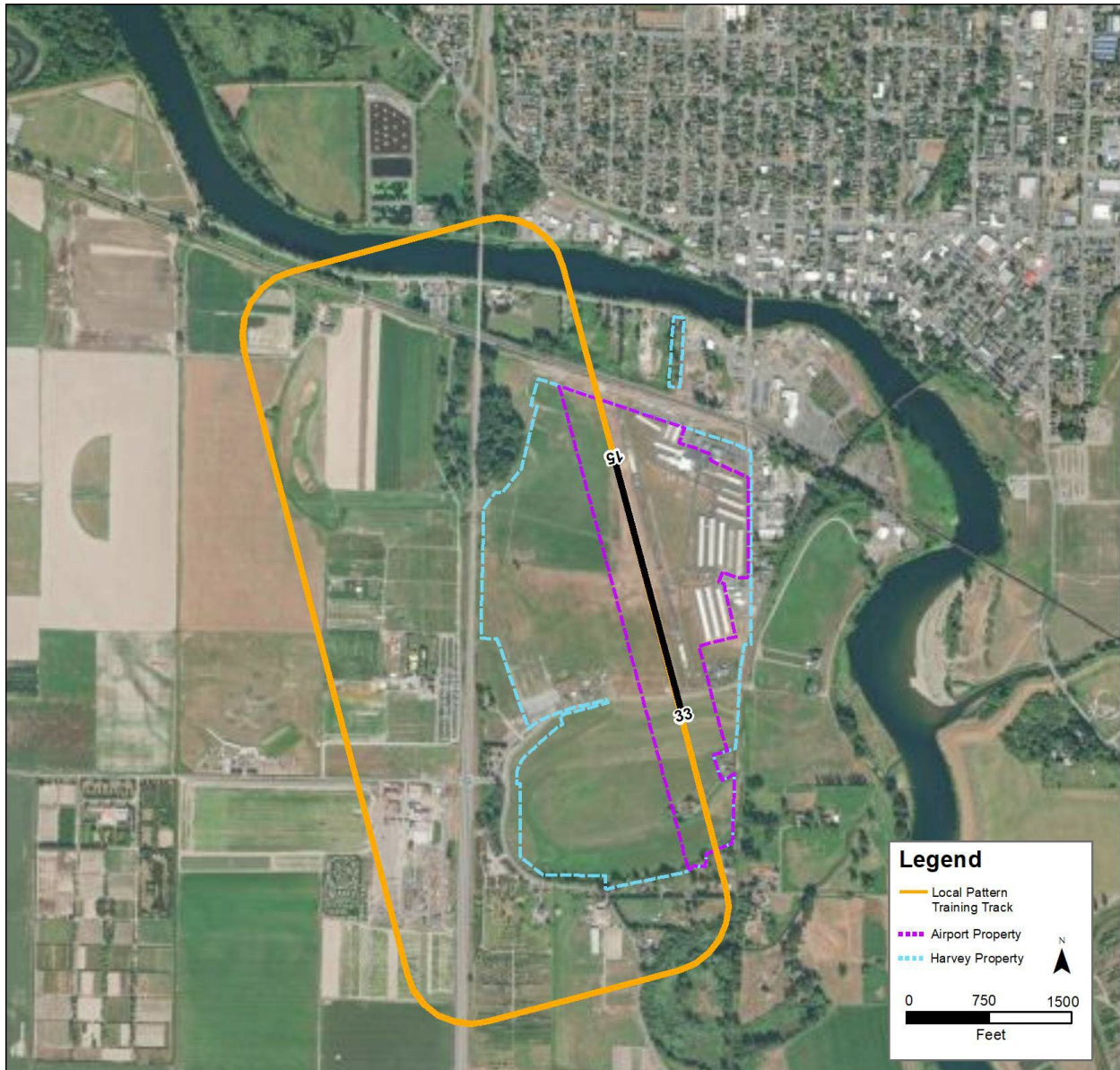
Source: RS&H 2023

Figure 9
Proposed Action Modeled Aircraft Flight Tracks – South Flow



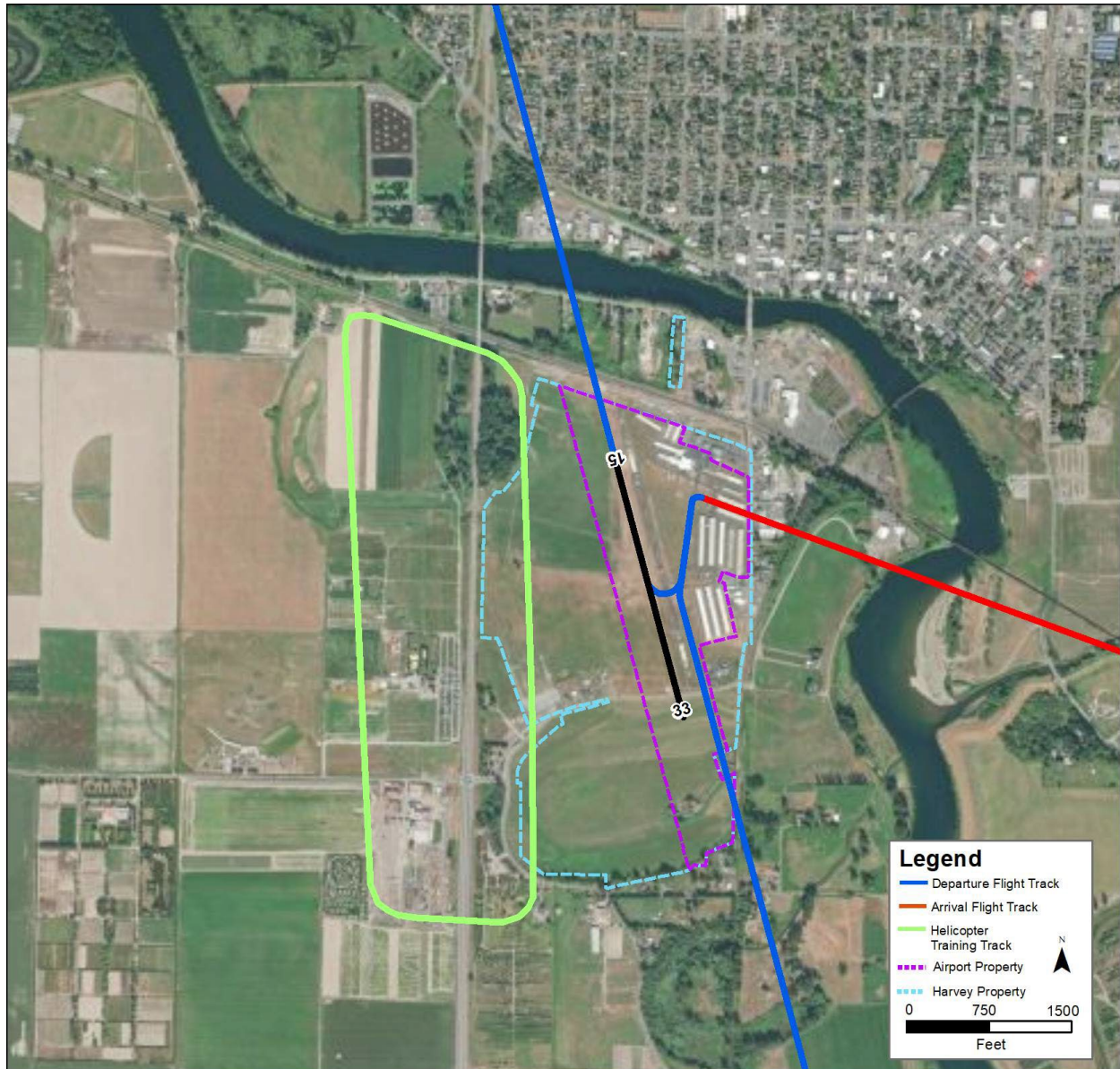
Source: RS&H 2023

Figure 10
Proposed Action Modeled Aircraft Flight Tracks – Local Training Pattern



Source: RS&H 2023

Figure 11
Proposed Action Modeled Helicopter Tracks



Source: RS&H 2023

1.6.1 2028 Proposed Action DNL Noise Contours

The 2028 Proposed Action 65, 70 and 75 DNL noise contours are provided in **Figure 12**. **Table 8** identifies the areas within the DNL noise contour ranges. As shown in the table, the total area within the 65 and greater DNL noise contours is 44.2 acres. There are no residences or other noise sensitive uses within the 2028 Proposed Action 65 and greater DNL noise contours.

Table 8
2028 Proposed Action DNL Contour Areas

DNL Range	Area (acres)
65 - 70	28.4
70 - 75	10.8
75+	5.0
Total	44.2

Source: RS&H, 2023

1.6.2 2033 Proposed Action DNL Noise Contours

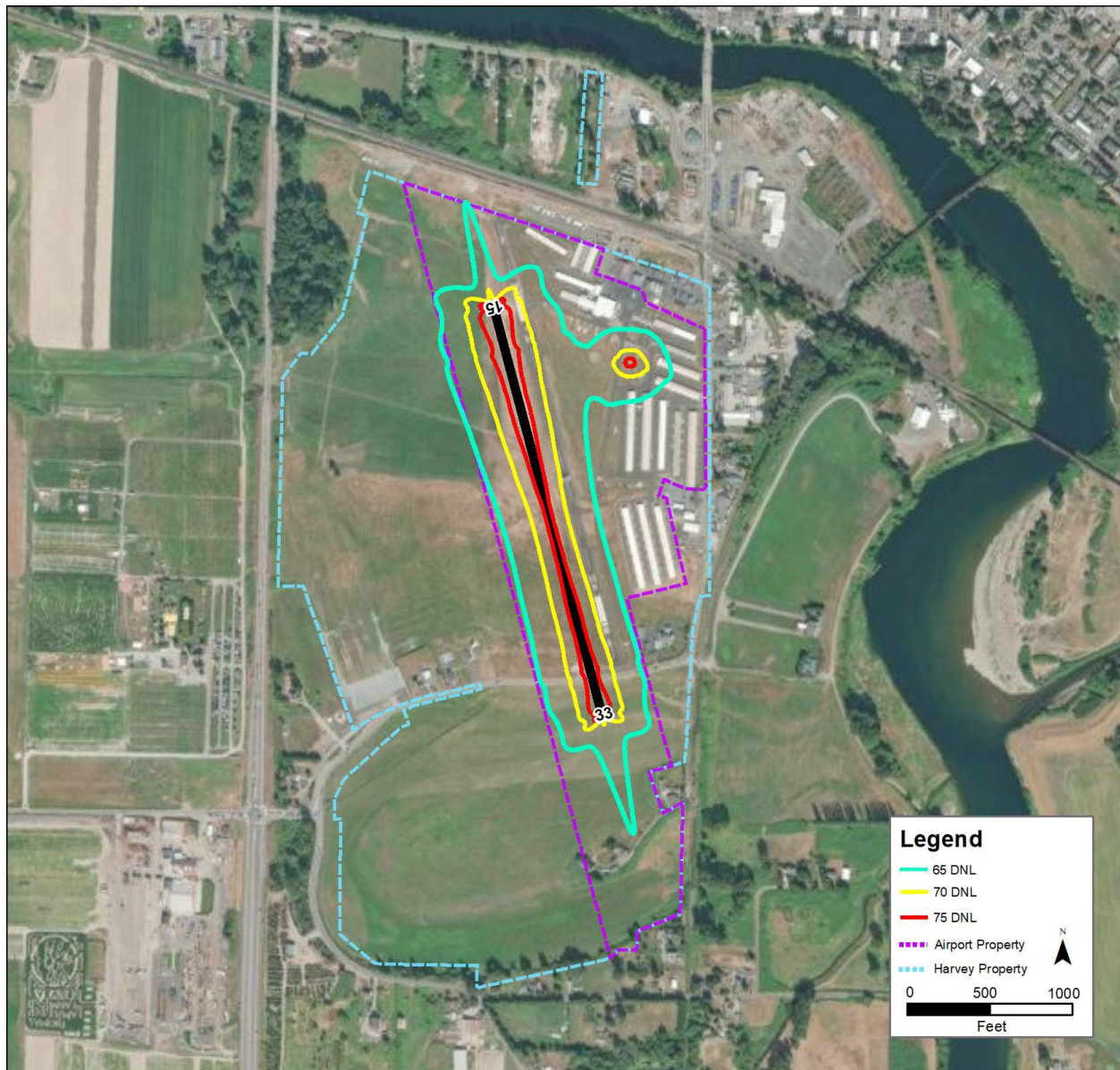
The 2033 Proposed Action 65, 70 and 75 DNL noise contours are provided on **Figure 13**. **Table 9** identifies the areas within the DNL noise contour ranges. As shown in the table, the total area within the 65 and greater DNL noise contours is 44.9 acres. There are no residences or other noise sensitive uses within the 2033 Proposed Action 65 and greater DNL noise contours.

Table 9
2033 Proposed Action DNL Contour Areas

DNL Range	Area (acres)
65 - 70	28.8
70 - 75	11.0
75+	5.1
Total	44.9

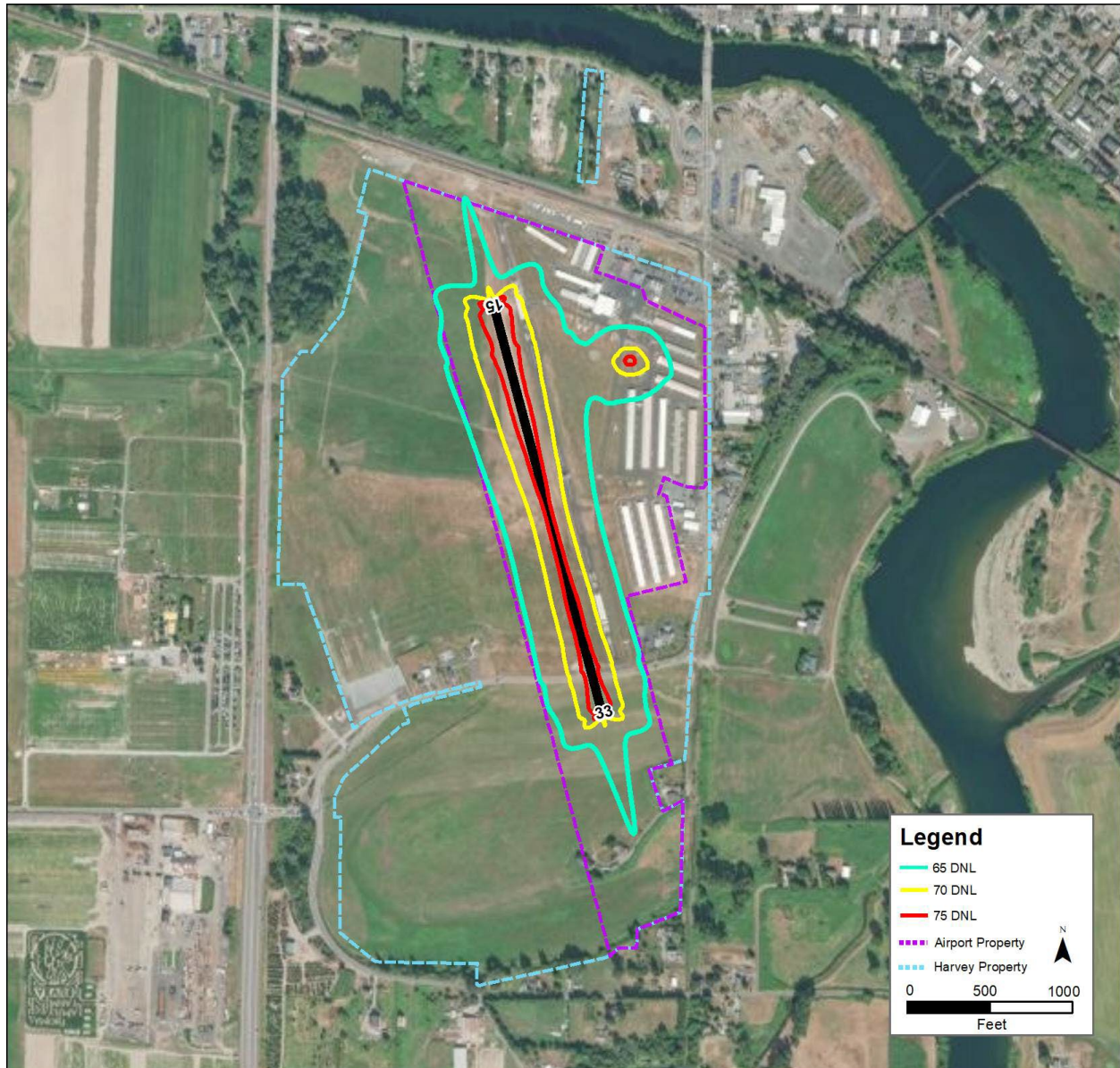
Source: RS&H, 2023

Figure 12
2028 Proposed Action DNL Noise Contours



Source: RS&H, 2023

Figure 13
2033 Proposed Action DNL Noise Contours



Source: RS&H, 2023

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