3.7.3.2 North Field

North Field is a former World War II-era airfield. This airfield is the core of the North Field National Historic Landmark and is located in the northern portion of the Military Lease Area. There are no published approaches. This airfield is presently used for expeditionary airfield training events. The roads around North Field have been improved recently as part of an effort from the U.S. Air Force to clear and re-establish the runways, taxiways and surrounding roads.

3.7.3.3 Airspace

All airspace surrounding Tinian is within the FAA's Guam Combined Center/Radar Approach Control Flight Information Region. For Tinian and Saipan airports, Guam Combined Center/Radar Approach Control provides Air Traffic Control services at altitudes above 3,500 feet mean sea level. Saipan Air Traffic Control manages the local airspace between 2,000 and 3,500 feet mean sea level and international aircraft enroute to and from Saipan International Airport that is below 3,500 feet. Air Traffic Control services are not available below 2,000 feet mean sea level for aircraft flying in the local area or arriving at and departing from TNI.

Approaches, departures, and training events at North Field are all within Saipan International Airport's airspace, and military aircraft operating at North Field are required to maintain radio communication with Saipan Air Traffic Control and follow Air Traffic Control direction as needed to deconflict air traffic. The instrument landing systems approach for Saipan International Airport overlies North Field and the Multi-Purpose Maneuver Range.

3.8 Noise

An area's existing sound environment, referred to as an "ambient soundscape," includes everything that is normally audible, both natural (e.g., bird song, waves, wind in the trees) and human-made (e.g., vehicles on roads, aircraft, farm equipment). Tinian's ambient soundscape is typical to a small island in the Pacific, but with the addition of aircraft noise from TNI, and periodic military training events that use ground equipment and land aircraft at North Field. Thus, the ambient noise levels on Tinian vary by location, from very quiet, undeveloped natural areas with limited intrusions from human activity to moderately noisy or occasionally loud industrial noise environments where aircraft or heavy machinery operate regularly. The soundscape of the uninhabited inland area is dominated by natural sounds, such as wind rustling through the vegetation and trees, birds and wildlife, and livestock grazing. Areas near the island's coast are characterized by natural sounds of the waves, coastal winds, birds, and wildlife. Human-made noise in coastal areas is produced by people utilizing the beaches for gatherings and picnics. Recreational and commercial boating activity occurs at the Port of Tinian, located south of San Jose. Road noise is primarily generated by vehicles on Broadway and 8th Avenue that connect the residential areas of San Jose, Marpo Heights, and Carolinas Heights to the Military Lease Area north of TNI. Each roadway averages less than 2,220 trips per day (CNMI Department of Public Works 2022). Traffic volumes this low contribute very little to the noise environment.

Humans perceive sound based on its physical characteristics. The intensity of the sound is perceived as sound volume and is measured in decibels (written as the unit "dB"). Sound intensity varies widely, from a barely perceptible soft whisper to uncomfortable or painfully loud sounds. Human hearing ranges up to 120 decibels, at which point sound causes physical discomfort.

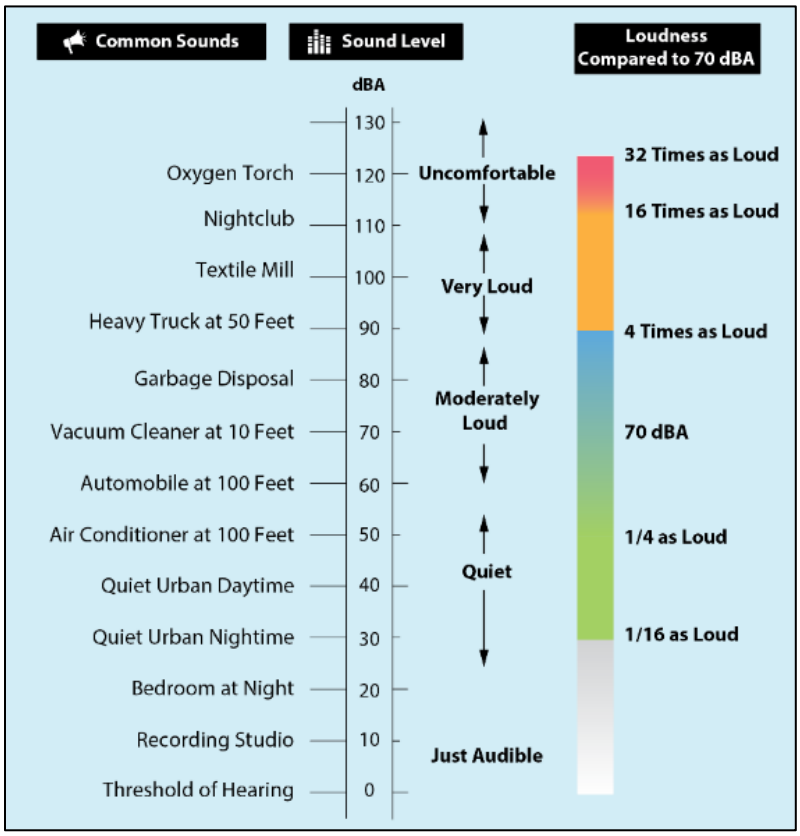
For context, Table 3.8-1 lists a range of typical outdoor ambient noise levels in decibels for different environments.

Table 3.8-1 Typical Outdoor Ambient Noise Levels

Day-Night Average Sound Level (dB)	*Location*
44	Field in a rural area
50	Residential area in a small town or quiet suburban area
55	Suburban residential area
60	Urban residential area
65	Noisy urban residential area
70	Very noisy urban residential area
80	3rd floor apartment in a major city next to a freeway

Legend: dB = decibel.
Source: U.S. EPA 1974.

The frequency of sound is perceived as a sound pitch. Low frequency sounds are heard as rumbles or roars, and high frequency sounds are heard as screeches. The duration or length of time the sound is produced also affects our perception of the sound–it may be intermittent or impulsive, starting and stopping at regular or irregular intervals, or continuous and steady. A relatively long, steady noise, like a passing train "feels" different from a rapid, loud striking noise. Figure 3.8-1 provides a chart of sound levels from common noise sources.



Source: Derived from Harris (1979) and Federal Interagency Committee on Aviation Noise (1997).

Figure 3.8-1 Sound Levels from Typical Sources

Some noise sources like an air conditioner or vacuum cleaner, generate continuous sounds that maintain a constant sound level for some period of time. Other sources represent a maximum sound that occurs during an event that varies over time, such as a vehicle passing by. Sounds are also present in the background or ambient environment (urban daytime or nighttime) and represent averages taken over extended periods of time.

On Tinian, outdoor ambient noise levels in most parts of the island vary from below 40 to 55 decibels in the residential areas. Major sources of human-made noise on Tinian include aircraft operations at TNI and intermittent military training events that occur within the Military Lease Area. Noise levels at a particular location on the island may vary based on a number of factors including climate, topography, proximity to the coast, vegetation or housing density, and proximity to noise producing activities such as roadways or TNI.

The locations of sensitive noise receptors on Tinian are shown on Figure 3.8-2. The receptors were selected based on the potential impacts that noise could have on those who frequent or inhabit such locations, their wellbeing, and their natural, cultural, or historical value. The ambient noise environments in the vicinity of TNI and the Military Lease Area are described in more detail in the following sections. Baseline noise levels from aircraft operating at TNI were estimated using the models and metrics described in Appendix J. A "noise metric" is a method for measuring sounds so they can be compared with each other.

The primary noise metric utilized in this analysis for noise impacts is the "day-night average sound level" (sometimes written as "DNL"), which is A-weighted applicable for subsonic aircraft operations. The day-night average sound level is a cumulative metric that includes all noise events occurring in a 24-hour period with a nighttime noise weighting applied to events occurring after 10 p.m. and before 7 a.m. The daytime period is defined as 7 a.m. to 10 p.m. An adjustment (weighting) of 10 decibels is added to events occurring during the nighttime period to account for the added intrusiveness while people are most likely to be relaxing at home or sleeping. Note that "daytime" and "nighttime" in calculation of day-night average sound level are sometimes referred to as "acoustic day" and "acoustic night" and always correspond to the times given above. This is often different than the "day" and "night" used commonly in military aviation, which are directly related to the times of sunrise and sunset applicable for military training in dark conditions which may vary by location and change throughout the year based on the season. DoD Noise Program Policy (DoD Instruction 4715.13, 28 January 2020) requires the use of the day-night average sound level noise metric to describe aircraft noise exposure levels at airfields based on an annual average day averaged over 365 days for purpose of long-term compatible land use planning.

While a cumulative metric, such as day-night average sound level is appropriate to predict the overall noise environment at airfields, additional description of noise impacts to noise sensitive locations requires additional metrics. DoD expands upon day-night average sound level with the "sound exposure level" (sometimes written as "SEL") as described in the DoD Noise Working Group guidelines (DoD Noise Working Group 2009a). The highest A-weighted sound level measured during a single event in which the sound changes with time is called the maximum A-weighted sound level (sometimes written as "L_{max}"), which occurs over one-eighth of a second and denoted as "fast" response on a sound level meter (American National Standards Institute 1988).

Figure 3.8-2 Sensitive Noise Receptors on Tinian and Saipan

Although useful in determining when a noise event may interfere with conversation, TV or radio listening, or other common activities, the maximum A-weighted sound level does not fully describe the noise because it does not account for how long the sound is heard.

3.8.1 Francisco Manglona Borja / Tinian International Airport

The only commercial passenger aircraft at TNI are air taxi flights, which primarily operate during the daytime and evening hours. Aircraft activity at the airport rarely occurs during night hours of 10 p.m. to 7 a.m. (U.S. Air Force 2016). The TNI Airport Master Record lists a total of 27,670 civilian flight operations for the 12-month reporting period ending in March 2022. The majority of civilian operations were air taxi flights (21,610), followed by General Aviation: Itinerant (5,154), and General Aviation: Local (2,365). Currently military aircraft utilize TNI for conventional operations resulting in arrivals and departures to the TNI runways and primarily comprised of C-130 and KC-135, but also include such aircraft as C-5, C-12, C-17, C-35, C-40, F-18E/F, and F-35A/B/C. Counts of annual operations at civil airfields often under report the numbers of military aircraft because military aircraft may fly as a group with multiple aircraft landing or departing in quick succession and only one of the aircraft utilize their transponder, which provides one of the primary sources for annual airfield counts. Also, in some cases, military aircraft may be captured in operations data as their civilian counterparts. The FAA data source for TNI airfield operations reported the identical 78 military operations for each of the past five years. This indicates it may be an outdated source for military operations that does not capture all activity. Therefore, this EIS collected baseline military operations data from operators and prior analyses. Table 3.8-2 summarizes current estimated annual military operations and civilian operations at TNI.

Approximately 95 percent of operations at TNI are composed of civilian aircraft and 27 percent of civilian operations occur at night. Civilian air taxi operations account for 78 percent of civilian operations. The majority of military operations (47 percent) are associated with KC-135 aircraft and 67 percent of military nighttime operations are associated with this aircraft. Fighter aircraft operating at TNI account for 10 percent of military aircraft operations.

Table 3.8-2 Baseline/No Action Alternative Flight Operations at TNI

Category	*Aircraft*[1]	*Departures*			*Arrivals*			*Totals*		
		Day	*Night*	*Total*	*Day*	*Night*	*Total*	*Day*	*Night*	*Total*
Civil	GA/AT	10,133	3,702	13,835	10,133	3,702	13,835	20,266	7,404	27,670
Military	C-130	98	12	110	98	12	110	196	24	220
	KC-135	240	120	360	240	120	360	480	240	720
	C-5	33	15	48	31	17	48	66	30	96
	C-12	73	7	80	73	7	80	146	14	160
	C-17	32	16	48	32	16	48	64	32	96
	C-35	24	-	24	24	-	24	48	-	48
	C-40	24	-	24	24	-	24	48	-	48
	F-18	34	3	37	34	3	37	68	6	74
	F-35	30	7	37	30	7	37	60	14	74
Military Total		*588*	*180*	*768*	*586*	*182*	*768*	*1,176*	*360*	*1,536*
Totals		**10,721**	**3,882**	**14,603**	**10,719**	**3,884**	**14,603**	**21,442**	**7,764**	**29,207**

Legend: % = percent; GA/AT = General Aviation and Air Taxi.
Note: [1] GA/AT modeled as Single Engine Fixed Pitch aircraft; aircraft variants include the F-18E/F and F-35A/B/C.

Figure 3.8-3 presents the modeled noise contours for the baseline/No Action Alternative for TNI. Calculated with noise modeling software, existing civil and military aircraft operations at TNI results in baseline noise levels at noise sensitive points of interest that range from less than 35 decibels day-night average sound level at S2: San Antonio Residential Area on Saipan up to 57 decibels day-night average sound level at T18: Old West Field. Because the baseline average day-night sound level calculations do not include other sources of noise (i.e., street traffic, wind, and recreational or domestic activities) the actual baseline level may be substantially greater once these non-aircraft sources are included. According to the U.S. EPA, the typical outdoor ambient noise level at a field in a rural area is 44 decibels and a suburban residential area is 55 decibels day-night average sound level (U.S. EPA 1974). Additional baseline noise results provided in Chapter J.2 of Appendix J.

3.8.2 Military Training in the Military Lease Area

The Military Lease Area on Tinian currently supports varied levels of training, from small unit-level training up to large field exercises and expeditionary warfare training. North Field is an unimproved expeditionary World War II-era airfield with four refurbished runways, where only one, Baker, is currently used for vertical and short-field landings and helicopters as part of existing military training. Other training activities at North Field and the surrounding area include force-on-force airfield defense and offensive training, helicopter insertion and extraction, paratroops training, C-130 cargo drops, night vision goggle training, airfield seizure/defense, forward area refueling, camping, command and control, air traffic control, logistics, armament, rapid runway repair, and other airfield-related requirements. The activities at North Field create noise, but they are sporadic and occur only a few times each year over a short period (e.g., two to four weeks at a time). Additionally North Field is located far north on Tinian and away from the sensitive noise receptors concentrated in the southern portion of the island and approximately 5-miles away from the island of Saipan. Sensitive receptors in closer proximity to North Field are composed of cultural, historic, and natural resources that are visited on a sporadic and infrequent basis. Consequently, there has not previously been a need to assess potential noise impacts by developing airfield noise maps showing noise level boundaries as contour lines (DON 2010, 2015, 2020). No supersonic operations are conducted over Tinian or in overwater airspace adjacent to the island (DON 2020).

Low-level military training flights passing over the Military Lease Area result in periodically elevated noise levels throughout the day. In addition to average day-night sound level, different metrics can be used to describe noise sources in motion, where the sound level changes over time (i.e., sound increases as the source moves closer and decreases as it moves further away). In these cases, the maximum sound level (sometimes written as "L_{max}") of a particular noise event, like an aircraft flying overhead, is the loudest sound level experienced for a moment during that event. However, the maximum sound level does not account for the duration of a noise event. Sound exposure level (sometimes written as "SEL") is a metric that represents both the intensity of a sound and its duration providing a measure of the net exposure of the entire acoustic event. During an aircraft flyover, the sound exposure level combines both the maximum sound level and the quieter sound levels produced during beginning and end of the overflight but does not directly represent the sound heard at any given time.

Figure 3.8-3 Baseline/No Action Alternative Modeled Noise Contours at TNI

Several TNI aircraft departure and arrival routes are proximate to the northern section of Tinian and contribute to noise levels over the northern portion of the island. There are nine single-engine and three multi-engine civilian aircraft based out of Saipan International Airport that contribute to the noise levels on the northern end of Tinian and, as with TNI, the majority of annual operations are inter-island air taxi flights (FAA 2024b). Under existing military training in the Military Lease Area, helicopters and tilt-rotor aircraft (MV-22, CH-53E, and AH-1/UH-1) operate at a variety of altitudes but generally below 2,000 feet and fixed-wing jet aircraft (F-35A/B/C variants, F-18E/F variants, and KC-130J) typically operate above 10,000 feet in the airspace around Tinian. However, to account for situations where lower flight activity by jet aircraft may occur, the sound exposure level and maximum sound level in decibels is provided at 5,000 and 2,000 feet. Table 3.8-3 presents single event noise levels experienced on the ground when different types of aircraft fly overhead at a certain speed and various altitudes to represent what the public would experience in the vicinity of North Field or elsewhere on Tinian while training is occurring under existing conditions. People would not be directly underneath an aircraft overflight for much of the time, so typical single event noise levels experienced are often substantially less than presented in the table. Sounds above 65 decibels to approximately 90 decibels would typically be considered moderately loud, very loud between 90 to 120 decibels, and begin to become uncomfortable above 120 decibels (refer to Figure 3.8-1).

Table 3.8-3 Single Event Noise Levels (Sound Exposure Level and Maximum Noise Level) at Ground Level Underneath Common Military Aircraft Operations

Altitude (ft AGL)	*MV-22 at 80 kts*		*CH-53 at 80 kts*		*AH-1/UH-1 at 80 kts*		*F-35A/B/C at 220 kts*		*F-18E/F at 220 kts*		*KC-130 at 220 kts*	
	SEL (dB)	*L_{max} (dB)*	*SEL (dB)*	*L_{max} (dB)*	*SEL (dB)*	*L_{max} (dB)*	*SEL (dB)*	*L_{max} (dB)*	*SEL (dB)*	*L_{max} (dB)*	*SEL (dB)*	*L_{max} (dB)*
300	98	91	97	91	96	88						
500	95	86	95	87	93	84						
2,000	89	75	87	73	87	73	110	102	111	104	85	77
5,000							100	90	101	93	76	66
10,000							90	80	91	82	67	56

Legend: ft AGL = feet above ground level; kts = knots; dB = decibels; Lmax = maximum sound level; SEL = sound exposure level.
Note: Modeled at a constant speed and altitude.

As shown in Table 3.8-3, the MV-22 and CH-53E produce approximately the same maximum sound level of 91 decibels. This sound level would be experienced on the ground directly underneath the aircraft operating at 300 feet above. The AH-1/UH-1, which is smaller and lighter, produces a maximum sound level of 88 decibels under the same conditions. The sound exposure level would range from 96 to 98 decibels for all three aircraft. Both the F-35 and F-18 produce similar noise levels, with a maximum sound level of 80 to 82 decibels when operating at 10,000 feet. When operating at 2,000 feet, which would occur during operations that use North Field, they produce a maximum sound level ranging from 102 to 104 decibels. For these aircraft the sound exposure level would range from 90 to 111 decibels under these conditions. The KC-130J generates a maximum sound level ranging from 56 to 77 decibels and a sound exposure level from 67 to 85 decibels.

Ground-based military training events in the Military Lease Area consist of urban terrain-type training, vehicle land navigation, convoy training, camping and other field activities. A limited amount of small arms training occurs within the Military Lease Area using either simulated munitions or sniper firing of ammunition into steel bullet traps within existing structures in the North Field area (DON 2010, 2015). In general, the sound level is quieter the farther away from the source, but environmental and weather conditions (e.g., terrain, vegetation cover, wind, humidity, temperature) affect how far sound travels. Under changing weather conditions, it is possible that a sound source can be barely detectable one day, but very loud and annoying the next (DoD Defense Noise Working Group 2018). As with aviation training, ground training occurs sporadically and for short durations throughout the year. Given the dense vegetation and varied terrain in the Military Lease Area along with the prevailing easterly trade winds, sounds from ground training events in the Military Lease Area are predominately imperceptible to populations south of the Military Lease Area.

3.9 Air Quality

In general, air quality is influenced by many factors, including the type and amounts of pollutants emitted into the atmosphere and local meteorological conditions. Most air pollutants originate from human-made sources, including mobile sources (e.g., vehicles), stationary sources (e.g., concrete batch plants, quarries, and power plants), indoor sources (e.g., certain building materials and cleaning solvents), and area sources (e.g., ground disturbance from construction and agricultural activities). Air pollutants are also released from natural sources such as volcanic eruptions and wildfires.

The Clean Air Act designates six pollutants as "criteria pollutants," for which the U.S. EPA has established National Ambient Air Quality Standards (Appendix E). These criteria pollutants are carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone, suspended particulate matter with a diameter less than or equal to 10 micrometers (PM_{10}), fine particulate matter less than or equal to 2.5 micrometers ($PM_{2.5}$), and lead (42 U.S.C. 7401, et seq.). The Northern Mariana Islands are classified as being in attainment of the National Ambient Air Quality Standards (40 C.F.R. 81.354), meaning the air quality complies with the standard for each criteria pollutant.

In addition to the "criteria pollutants," national emission standards exist for hazardous air pollutants (40 C.F.R. 61). Hazardous air pollutants include substances known or suspected to cause cancer or other adverse health effects at or above certain exposure levels. Unlike criteria pollutants, ambient air quality standards have not been established for hazardous air pollutants.

Greenhouse gases primarily consist of carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), and other fluorine-containing compounds. Greenhouse gas emissions resulting from human activities trap heat in the atmosphere, which can have global effects. Scientific evidence indicates a trend of increasing global temperature over the past century due to increased greenhouse gas emissions.

Tinian meets all federal air quality standards under the Clean Air Act. With a population of approximately 2,000 people, several factors contribute to this compliance, including its isolated location in the Pacific Ocean, prevailing east-to-west winds (Figure 3.9-1), a rural development pattern, and the absence of heavy industry.