



3.1 Height Obstructions

3.1.1 Airspace Area Controlled for Height Restrictions

Airspace area controlled for height restrictions results from the application of criteria for height and obstruction clearance given in 14 Code of Federal Regulations (CFR), Part 77, *Objects Affecting Navigable Airspace*, and in USAF design standards. 14 CFR Part 77 establishes standards for determining obstructions in navigable airspace that apply to existing and proposed man-made objects, objects of natural growth, and terrain. The standards in 14 CFR Part 77 are provided for both civilian and military airports. 14 CFR Part 77 states that the area surrounding a runway must be kept clear of objects that might damage an aircraft and therefore is bounded by imaginary airspace control surfaces that are defined in detail in **Appendix D**. 14 CFR Part 77 classifies an object as an obstruction to air navigation if the object is more than 500 feet above ground level at the site of the object, or exceeds the height of the imaginary airspace control surfaces. The purpose of these imaginary airspace control surfaces is to provide a planning tool to graphically depict airspace management in a way that will help enhance the safety and efficiency of aircraft operations. These regulations require notification to the FAA, who after discussions with stakeholders, issues a determination as to whether a proposed structure presents a hazard to air navigation. The imaginary airspace control surfaces are established in relation to the established elevation of the airfield, which for Dyess AFB is 1,789 feet above mean sea level (MSL). Imaginary airspace control surfaces for Dyess AFB are shown in **Figure 3-2**. These imaginary surfaces include the following:

- **Primary Surface:** Defines the limits of the obstruction clearance requirements for the immediate vicinity of the landing area.
- **CZ Surface:** This surface is located on the ground or water at each end of the primary surface, with a length of 1,000 feet and the same width as the primary surface.
- **Approach-Departure Clearance Surface:** This surface is symmetrical around the centerline of the runway and begins as an inclined plane 200 feet beyond, and at the centerline elevation of, the end of the runway and extends at a slope of 50:1 to an elevation of 500 feet above the established runway elevation. The surface continues horizontally at this elevation to a point 50,000 feet beyond the end of the runway. The surface is 2,000 feet wide at the end of the runway and flares uniformly to a width of 16,000 feet at 50,000 feet from the end of the runway.
- **Inner Horizontal Surface:** An oval-shaped plane with a height of 150 feet above the established airfield elevation.
- **Conical Surface:** Extends from the inner horizontal surface for a horizontal distance of 7,000 feet to a height of 500 feet above the established airfield elevation.

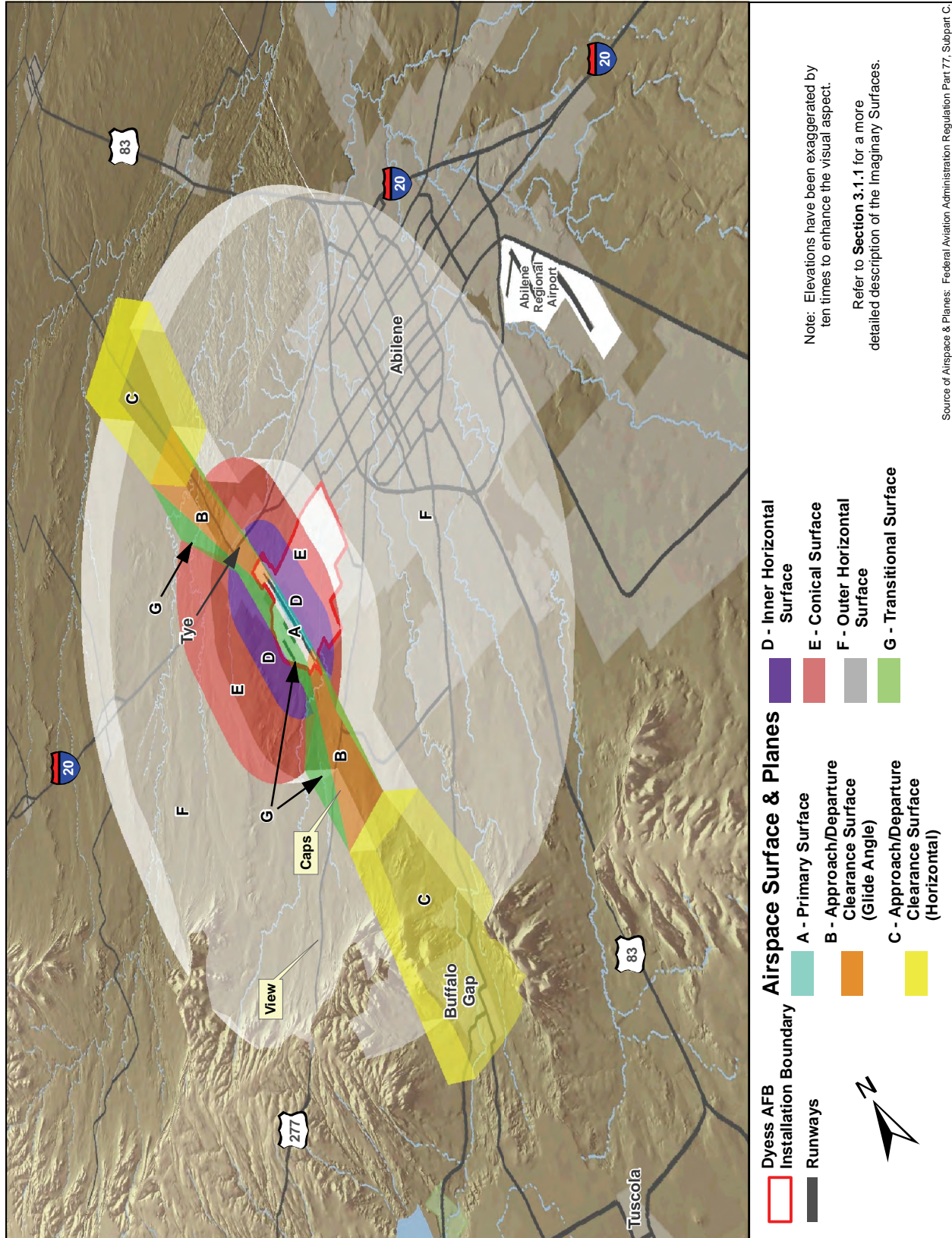


Figure 3-2. Imaginary Surfaces for Dyess AFB



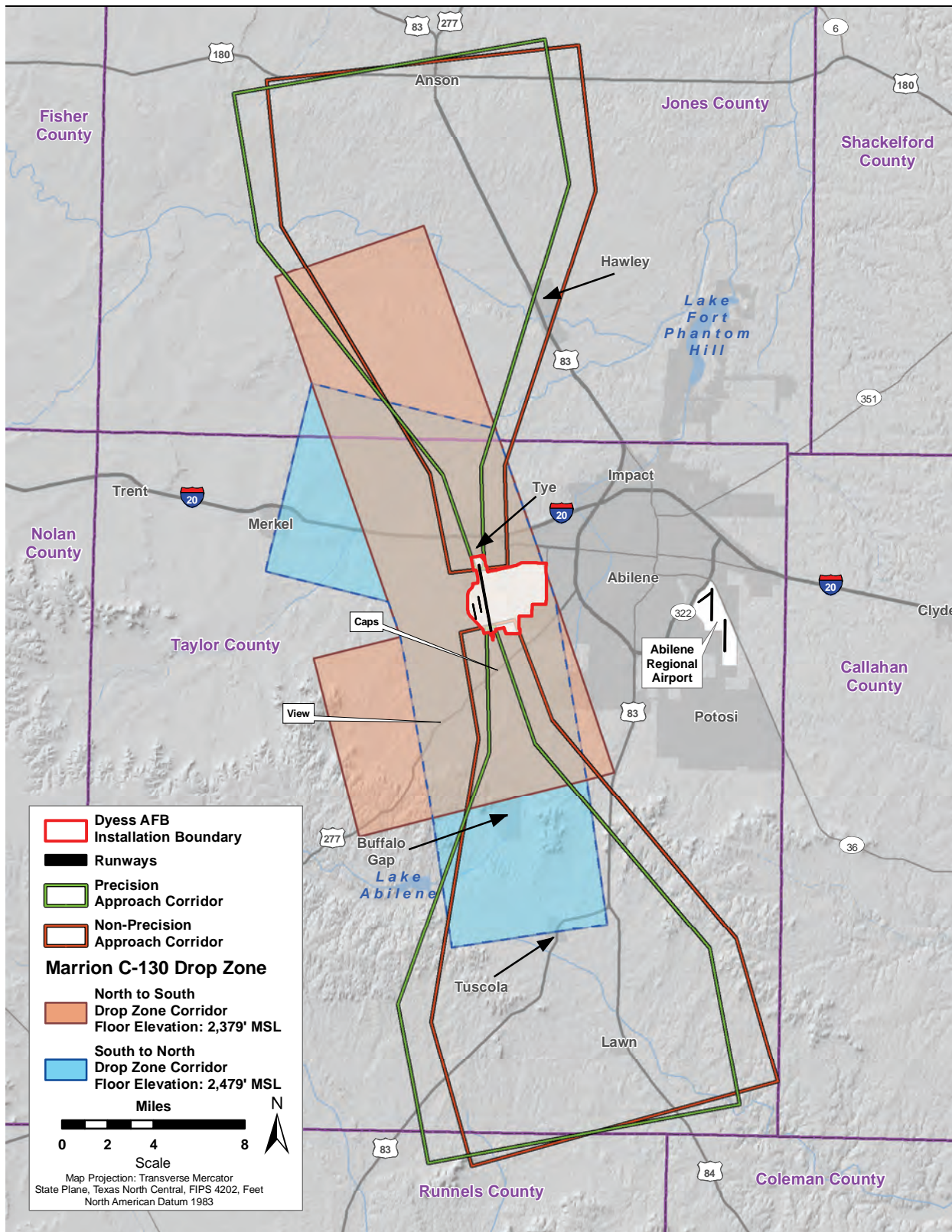
- **Outer Horizontal Surface:** A plane 500 feet above the established airfield elevation and extends for 30,000 feet from the conical surface. The Outer Horizontal Surface is unique to military airfields and predicated on the fact that the primary mission of military airfields are training and maintaining proficiency. This surface supports maintenance of sufficient local airspace to safely conduct such training.
- **Transitional Surfaces:** These surfaces connect the primary surfaces, the first 200 feet of the clear zone surfaces, and the approach clearance surfaces to the inner horizontal surface, conical surface, outer horizontal surface or other transitional surfaces. The slope of the transitional surface is 7 to 1 outward and upward at right angles to the runway centerline.

Although the FAA establishes criteria for the height of structures around airports, the FAA does not have the authority to limit their actual construction. Therefore, in order to protect the health, safety, and welfare of populations around airfields, local communities must enforce the height restriction guidelines established by the FAA. This is particularly important for DOD airfields. The FAA can influence civilian airports through funding matters. However, the FAA does not provide funds to DOD airfields; consequently, it is imperative that local communities around DOD airfields enforce the restrictions set for airspace heights.

In addition to the imaginary surfaces found in 14 CFR Part 77, specific criteria are established when airdrops of personnel or equipment are performed at a USAF installation. AFI 13-217 *Drop Zone and Landing Zone Operations* outlines the minimum size of a drop zone, marking criteria, aerial delivery methods, and parameters for aircraft conducting airdrops. A specific minimum elevation, or floor, is established for the drop zone approach and departure corridors (**Figure 3-1**). Vertical penetrations into the floor of these corridors would severely limit the viability of airlift training conducted by the C-130 squadrons.

The north-to-south and south-to-north Marrion Drop Zone corridors at Dyess AFB are shown on **Figure 3-1**. The drop zone corridors are used by C-130 aircraft when conducting practice drops on the Marrion Drop Zone located west of the Dyess AFB primary runway. The height of the drop zone corridors extend to 2,000 feet about the drop zone itself and is determined by the ability of the last aircraft, which is flying in a “stacked” formation, to hit the target.

Of particular interest in the vicinity of Dyess AFB is the gradient of the terrain to the south and southwest of the installation. The slope of the land rises fairly rapidly about 5 miles south and west of the airfield, and actually penetrates the Outer Horizontal Surface. This rising terrain makes the construction of tall structures in most of this area particularly problematic since it is not only in the Outer Horizontal Surface, but it is also under the approach and departure corridors for the Marrion Drop Zone, as shown in **Figure 3-3**.



Source of Drop Zones and Approach Corridors: Dyess AFB 2007 and 2008

Figure 3-3. Local Airspace, Drop Zones, and Approach Corridors for Dyess AFB



The rising terrain to the south is also problematic for the precision and non-precision approach corridors to the primary runway (Runway 16/34). **Figure 3-3** outlines the footprint of these corridors, but in fact they are complex three dimensional shapes that cannot be readily depicted. In some cases the floor elevation is actually lower at distances farther from the airfield. It is prudent for anyone contemplating construction of vertical structures in these areas to know that it is important to initiate coordination with the FAA and Dyess AFB.

Dyess AFB personnel also conduct parachute drop training on the Tennyson Drop Zone, southwest of Dyess AFB in Coke and Runnels counties. Floor elevations for the approach and departure corridors for the Tennyson Drop Zone are addressed in **Section D.3** of **Appendix D**.

LZ Approach-Departure Clearance Surface. The LZ Approach-Departure Clearance Surface is an imaginary surface with an inclined plane that is arranged symmetrically along the extended centerline of the runway. Objects that penetrate this surface are considered obstructions to navigable airspace and should be removed. If removal is not possible, these objects must be mapped, marked, and lighted as obstructions. The LZ Approach-Departure Clearance Surfaces for C-130 aircraft are 10,500 feet long and begin with a width of 500 feet, flaring uniformly at a 35:1 slope, to a width of 2,500 feet 300 feet above end of runway elevation. The northern and southern LZ Approach-Departure Clearance Surfaces for both LZs extend outside the installation boundary (see **Section 3.3** for additional information on the LZs at Dyess AFB).

3.1.2 Dyess AFB Obstructions to Navigable Airspace

Obstructions to navigable airspace are an issue at Dyess AFB. The bluffs to the south of the installation are very attractive to wind turbine development due to an ideal combination of topography, wind, and proximity to the electrical distribution grid. Wind turbines have been an obstruction issue since 2002. This development has the potential to adversely affect the current and future mission capability of Dyess AFB. In accordance with 14 CFR Part 77, an object is considered an obstruction if it penetrates or rises above one of the imaginary surfaces described above and depicted in **Figure 3-2**. For example, the height of the Outer Horizontal Surface is 2,289 feet above MSL, which equals to the Dyess AFB established airfield elevation (1,789 feet above MSL) plus the height of the surface itself (500 feet). An object is also considered an obstruction to the current mission of Dyess AFB if it penetrates the floor elevation of the local airspace drop zones depicted in **Figure 3-3**. What complicates the obstruction issue at Dyess AFB is the rising elevation to the southwest of the installation. The terrain itself penetrates the Outer Horizontal Surface in multiple locations (as shown in **Appendix D**, see **Figure D-4**); therefore, any objects constructed on this terrain would be an obstruction to navigable airspace. For example, a 400-foot tall wind turbine to the southwest of Dyess AFB, the top of which is at an elevation of 2,789 above MSL, is 1,000 feet tall in relation to the established airfield elevation for Dyess AFB (1,789 feet above MSL). Since the Outer Horizontal Surface is 2,289 above MSL, the combination of the

The airspace around Dyess AFB is generally free of obstructions, with the exception of three wind turbines southwest of the installation.



terrain and the wind turbine would be an obstruction into navigable airspace by 500 feet for Dyess AFB.

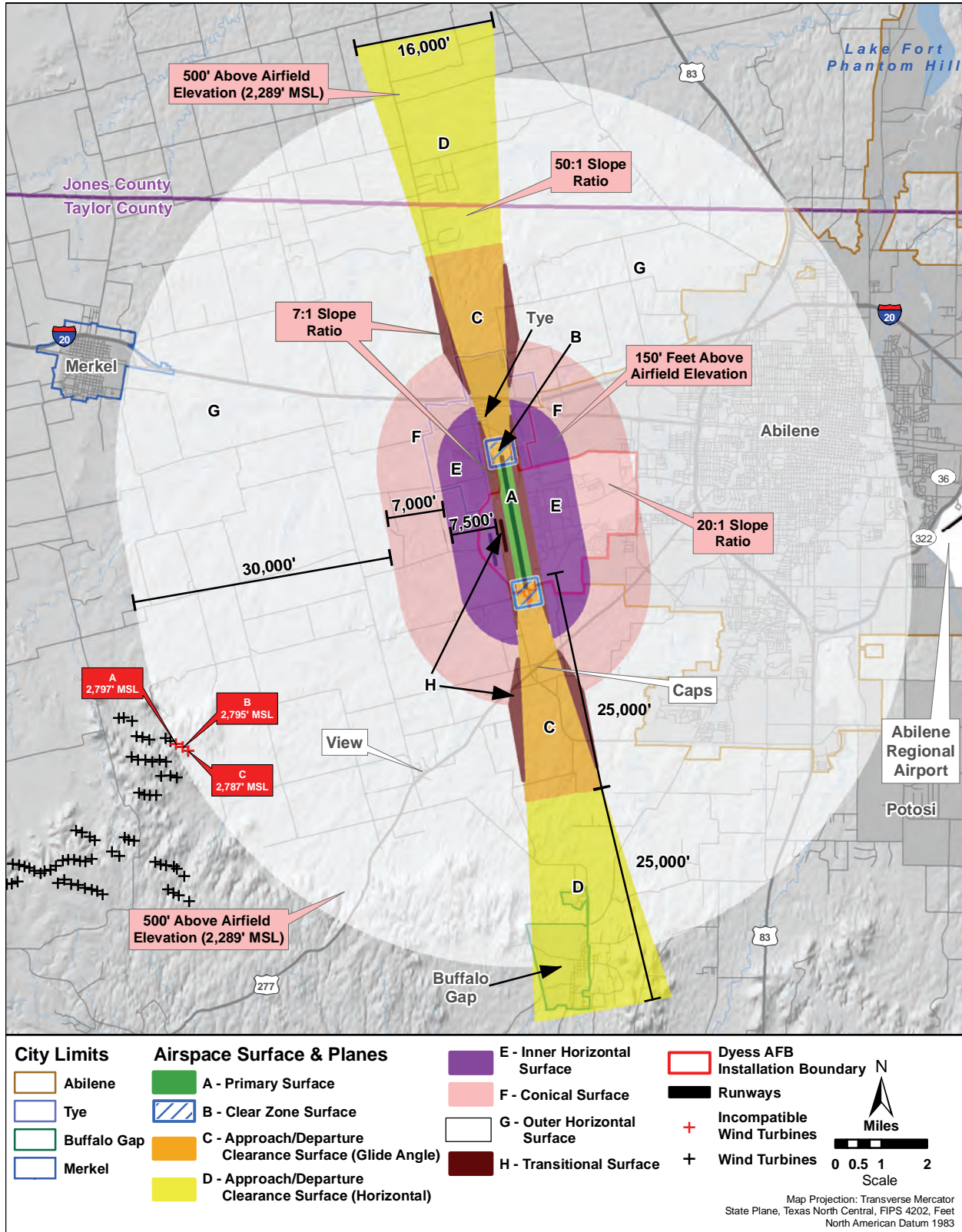
There are three wind turbines that are obstructions to Dyess AFB navigable airspace. The location of these objects is shown on **Figure 3-4**. A map of the imaginary surfaces has been overlaid onto the area to provide a determination of compatibility based on height. As shown on **Figure 3-4**, the three wind turbines are southwest of Dyess AFB within the Outer Horizontal Surface. For the purposes of this Study, the wind turbines have been labeled A, B, and C.

The airspace around Dyess AFB is generally free of obstructions. With the exception of the cluster of three wind turbines on the western edge of the Outer Horizontal Surface as previously mentioned, the FAA Imaginary Surfaces are free of man-made obstructions outside the installation boundaries (see **Figure 3-4**). However, several major wind energy development companies have investigated areas in the southwestern quadrant of the Outer Horizontal Surface directly under the C-130 drop zone corridors. In addition, a major development was planned under the southern precision and non-precision primary runway approach corridors. To date, all initiatives that would have encroached on Dyess AFB navigable airspace have been abandoned after the proponents were informed of the impact they would have on the Dyess AFB mission.

The FAA has served as an excellent partner with Dyess AFB in keeping the installation informed of any potential developments and giving the installation an opportunity to contact the proponent and provide input to the FAA response. However, the FAA lacks land use control authority. While it has the responsibility to evaluate structures and determine whether they present hazards to air navigation, the FAA's only remedies are marking, lighting, and communicating the hazard to the flying community. It does not have the authority to actually prohibit construction of a structure that presents a hazard. This authority is reserved for state and local governments.

More comprehensive protection for the airspace surrounding Dyess AFB should come from the state or Federal level. Proposals that would provide protection include the following:

- State level airport zoning of sufficient scope to allow protection of training airspace around military airfields. The City of Abilene has implemented an airport zoning ordinance that addresses development within Dyess AFB environs.
- Restrictions on Federal tax subsidies to developments that would encroach on Federal airfields.
- Establishing a national database showing acceptable height and distance for wind turbines in relation to civilian and military airfields. (Congressman Neugebauer has initiated a bill to investigate the feasibility of such a database.)



Source of Airspace & Planes: Federal Aviation Administration Regulation Part 77, Subpart C. Source of Wind Turbines: NGA

Figure 3-4. FAA Imaginary Surfaces



Dyess AFB personnel continue to make a concerted effort to reach out to the wind turbine industry. This effort is being made through the publication of this AICUZ Study and other forums (such as the West Texas Wind Consortium) to make developers aware of the installation's concerns before a substantial investment is made in a potentially conflicting development.

3.2 Noise Zones

3.2.1 Understanding the Historical Noise Environment

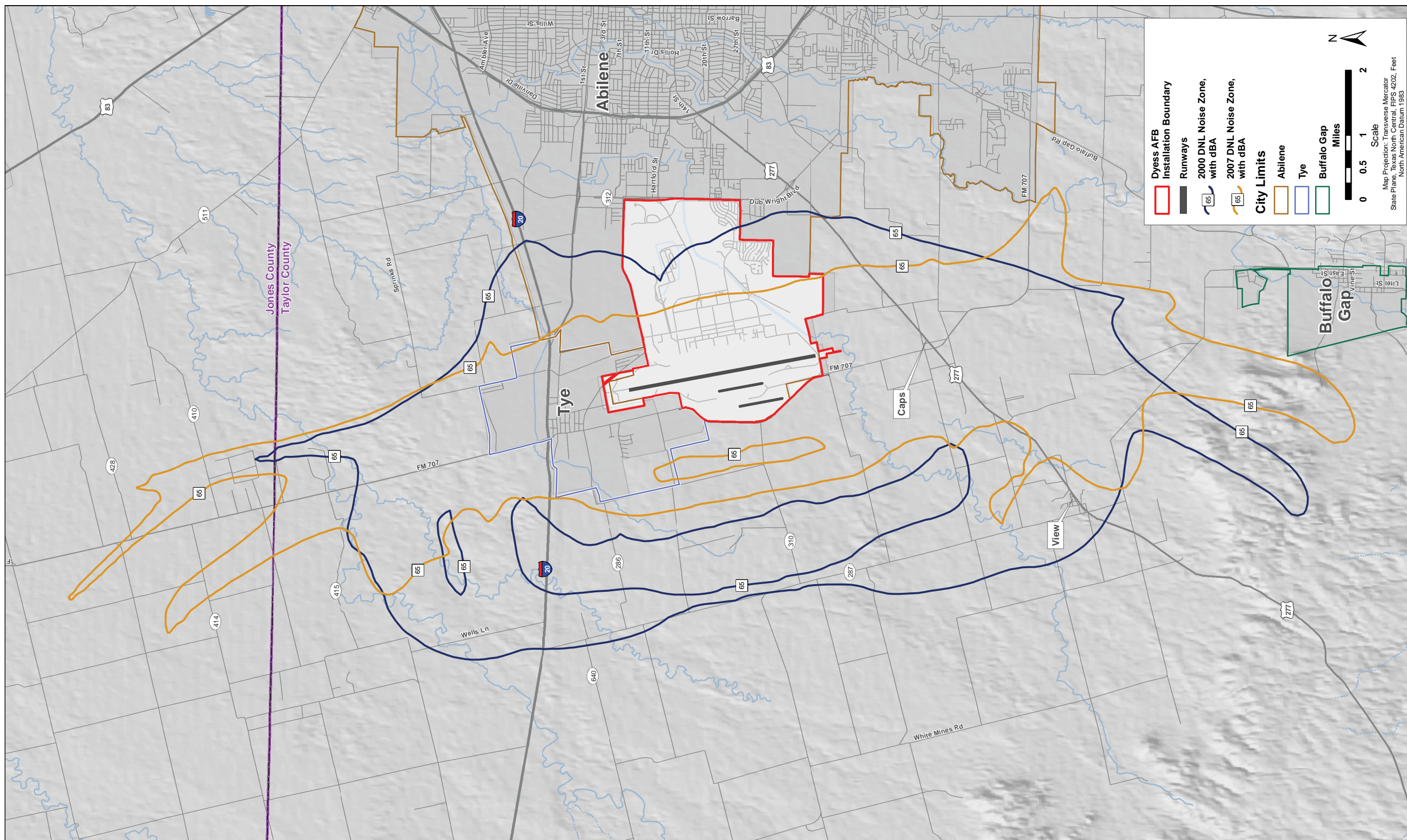
The historical noise zones associated with Dyess AFB are presented to show how noise exposure has fluctuated over time from varying aircraft-related factors (i.e., aircraft type, number of operations, and flight tracks). This AICUZ Study presents historical noise zones from the 2000 AICUZ Study to show previously published noise zones for the installation. Noise zones were developed for the 2000 AICUZ Study to reflect the changes in flight operations and assigned aircraft types since the previous AICUZ Study, which was completed in 1978 and amended in 1992 (DAFB 2000).

Noise zones from the 2000 AICUZ are shown to demonstrate the historic fluctuations in the noise environment around the installation.

The 2000 and 2007 noise zones for the DNL of 65 dBA were plotted on an aerial map and are shown in **Figure 3-5**. 65 dBA is considered the level where land use planning recommendations begin. As shown, the 65 dBA noise zones have encompassed different areas over the years. The 2000 65 dBA noise zone encompasses a larger area west and east of the installation, but does not extend as far north or south as the 2007 65 dBA noise zone. The area encompassed by the 2007 65 dBA noise zone is considerably smaller than the area encompassed by the 2000 65 dBA noise zone due to changes in assigned aircraft and flight operations. As shown in **Table 3-1**, from 2000 to 2007 there has been a decrease of 48 aircraft operations per day for the 7 BW at Dyess AFB as a result of the loss of one B-1 squadron. In addition, the 7 BW and 317 AG flew fewer arrivals and departures in 2007; however more C-130 closed-pattern operations were flown in 2007 than in 2000. There are fewer B-1 closed-pattern operations since 2000 because pilots are utilizing a simulator to conduct this training. In addition, the B-1 pilots are spending more time on the training ranges surrounding the installation rather than flying training exercises over local airspace. Refinements in noise modeling technology have also occurred since the 2000 noise zones were produced.

3.2.2 2007 Noise Zones

Current noise zones, based on 2007 data, extend north and south from the primary runway centerline, as shown on **Figure 3-6**. The noise zones extend away from the installation to the northwest and south. The 65–69 dBA noise zone is also present west of the airfield and extends northwest into Jones County. The 80+ dBA noise zone extends south through the Caps community and north through the City of Tye. The 2007 noise zones extend into the northwest corner of the City of Abilene.



Source of Zones: eM, Inc 2008 and Dyess AFB 2000

Figure 3-5. Historical DNL Noise Zones at Dyess AFB



Table 3-1. Comparison of 2000 Aircraft Operations and 2007 Aircraft Operations at Dyess AFB

		2000			2007		
		Day (7 a.m. to 10 p.m.)	Night (10 p.m. to 7 a.m.)	Total	Day (7 a.m. to 10 p.m.)	Night (10 p.m. to 7 a.m.)	Total
7 BW	Arrivals	9.00	3.00	12.00	5.53	4.47	10.00
	Departures	9.60	2.40	12.00	10.00	0	10.00
	Closed Patterns	43.34	4.46	47.80	16.73	9.04	25.77
	Total	105.28	14.32	119.60	48.99	22.55	71.54
317 AG	Arrivals	22.00	3.80	25.80	7.43	4.57	12.00
	Departures	25.80	0	25.80	11.24	0.76	12.00
	Closed Patterns	53.00	16.00	69.00	70.72	46.21	116.93
	Total	153.80	35.80	189.60	160.11	97.75	257.86
Total		259.08	50.12	309.20	209.10	120.30	329.40

Note: Total daily operations = arrivals + departures + (2 x closed patterns). Day and night arrivals for 2007 for the 317 AG include arrivals to the drop zones and arrivals not to the drop zones.

3.2.3 Hypothetical Noise Zones

A hypothetical operational increase was developed for this AICUZ Study to estimate the noise impacts of possible future missions at Dyess AFB. The hypothetical noise zones were created by doubling the number of 2007 Dyess AFB aircraft operations within the established flight tracks. Hypothetical noise zones are provided for planning purposes and are meant to reinforce the notion that noise zones are not static, but are dependent on aircraft type, number, engine type, performance, and flight path. Noise zones also change as a result of mission changes or operations tempo. The USAF anticipates shrinking budgets in the future. In order to live within these smaller budgets, USAF installations will need to reduce their physical plant. The most effective means for accomplishing this is consolidation of missions at fewer installations. Such a consolidation could increase the number of aircraft assigned to Dyess AFB. Although no additional aircraft are scheduled or anticipated at this time, these noise zones are presented for planning purposes should aircraft operations at Dyess AFB change in the future.

No increase in the number of aircraft assigned to units at Dyess AFB is projected at this time.

As shown on **Figure 3-7**, the hypothetical noise zones would encompass a greater number of acres in every direction as compared to the 2007 noise zones. All of the noise zones would expand to encompass land to the south, which is not heavily populated with the exception of the Caps community, and to the north, which is not heavily populated except for the City of Tye. The 65–69 dBA and the 70–74 dBA noise zones extend north into Jones County. The hypothetical noise zones also encompass additional land farther west of the installation as compared to the 2007 noise zones.

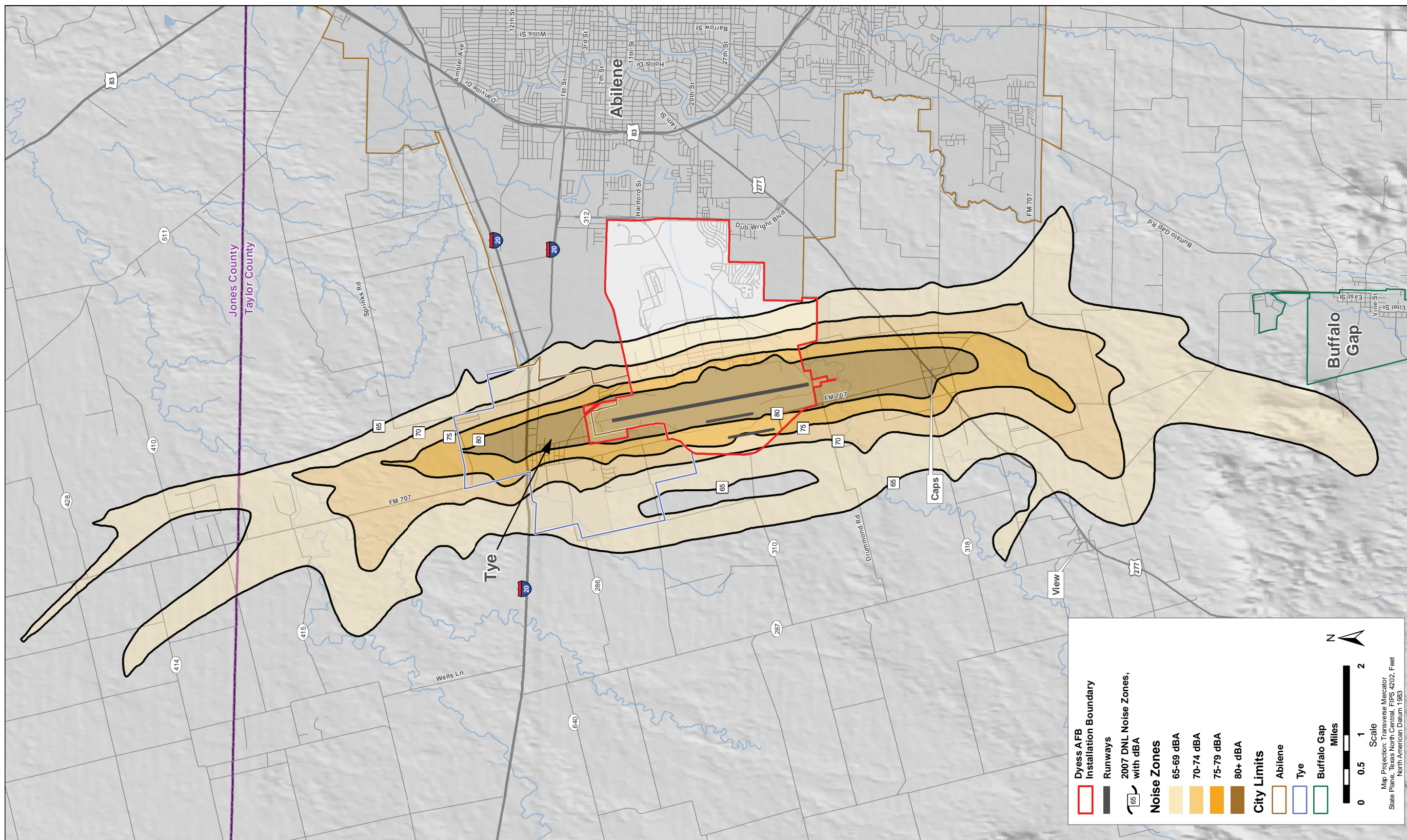


Figure 3-6. 2007 DNL Noise Zones at Dyess AFB

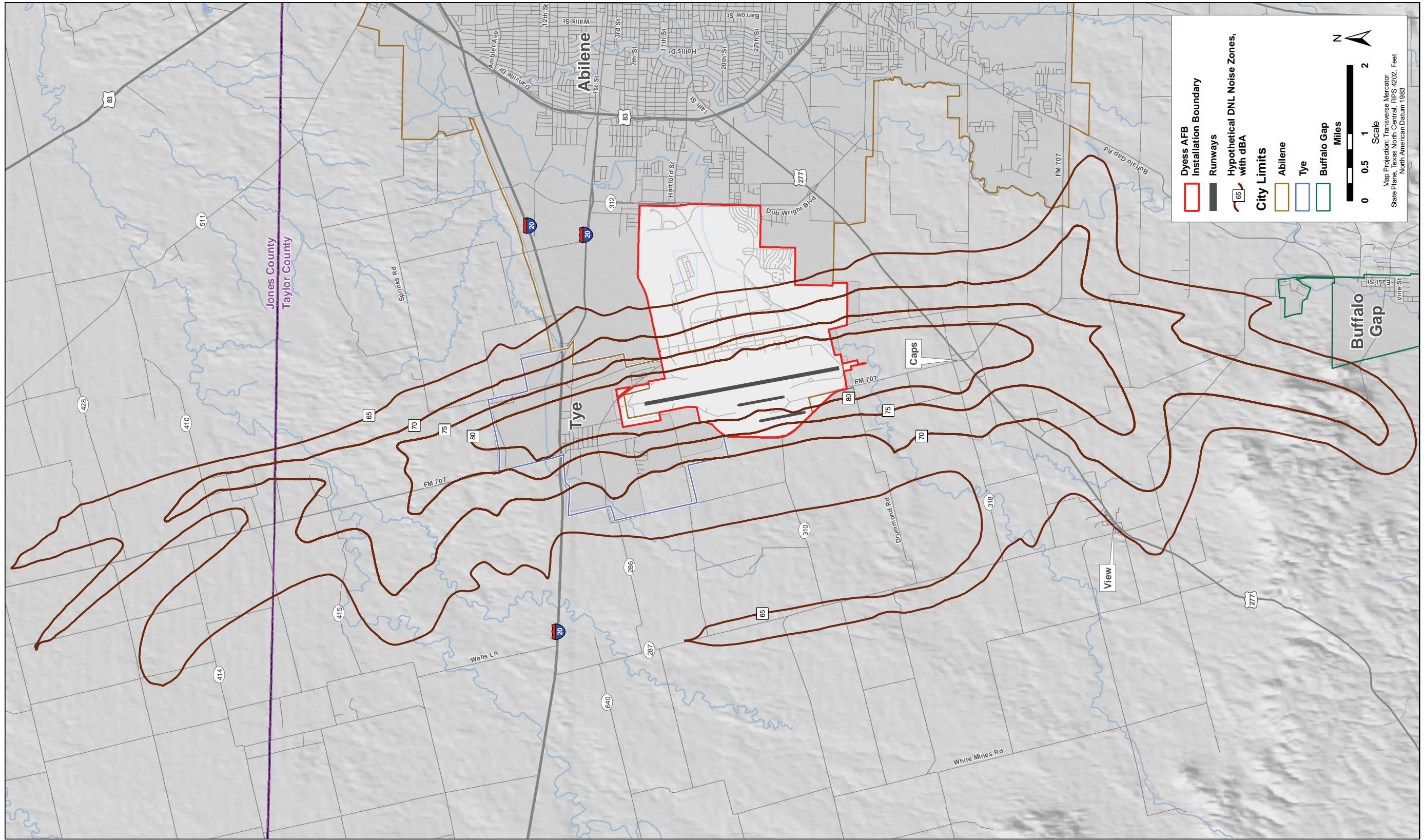


3.3 Accident Potential Zones

DOD analyses have determined that the areas immediately beyond the ends of runways and along the approach and departure flight paths have significant potential for aircraft accidents. Based on this, DOD developed three zones that have high relative potential for accidents. The CZ, the area closest to the runway end, is the most hazardous. The overall risk is high enough that DOD generally acquires the land through purchase or easement to prevent development. The northern CZ at Dyess AFB is within the installation boundaries, however approximately half of the land in the southern CZ is privately owned. APZ I is an area beyond the CZ that has significant potential for accidents. APZ II is an area beyond APZ I with a lesser, but still significant, potential for accidents. While aircraft accident potential in APZs I and II does not warrant acquisition by the USAF, land use planning and controls are strongly encouraged in these areas for the protection of the public. Dyess AFB's CZs encompass areas 3,000 feet wide by 3,000 feet long. APZ I is 3,000 feet wide by 5,000 feet long, and APZ II is 3,000 feet wide by 7,000 feet long. CZs and APZs are established for each runway, and are shown in **Figure 3-8**. Additional information on accident potential is presented in **Appendix B** of this report.

In addition to the CZ and APZs for the primary runway (Runway 16/34), there are CZs and APZs for LZs at Dyess AFB, as shown on **Figure 3-8**. The paved LZ is Runway 16b/34b; the unpaved LZ is Runway 16a/34a. As discussed in **Section 2.5.1.2**, the LZs are used exclusively by C-130 aircraft at Dyess AFB.

The USAF Engineering Technical Letter 04-7 *C-130 and C-17 Landing Zone Dimensional, Marking, and Lighting Criteria* (USAF 2004) defines the LZ CZ as "a surface on the ground or water, beginning at the runway threshold and symmetrical about the extended runway centerline, graded to protect aircraft operations and in which only properly sited navigational aids are allowed." The LZ CZs for C-130 aircraft are 500 feet long and flare to a width of 500 feet. As shown on **Figure 3-8**, the CZs for the LZs are entirely within the installation boundary. The definition for the LZ APZs provided in Engineering Technical Letter 04-07 is "a land use control area beyond the CZ of an LZ that possesses a significant potential for accidents" (USAF 2004). The LZ APZs for C-130 aircraft are 2,500 feet long and 500 feet wide. As shown on **Figure 3-8**, only the southern APZ for Runway 16b/34b (paved LZ) extends outside the installation boundary. **Figure 3-8** also shows the Approach-Departure Clearance Surfaces discussed in **Section 3.1.1**.



Source of Noise Zones: eRM, Inc 2008

Figure 3-7. Hypothetical DNL Noise Zones for Dyess AFB

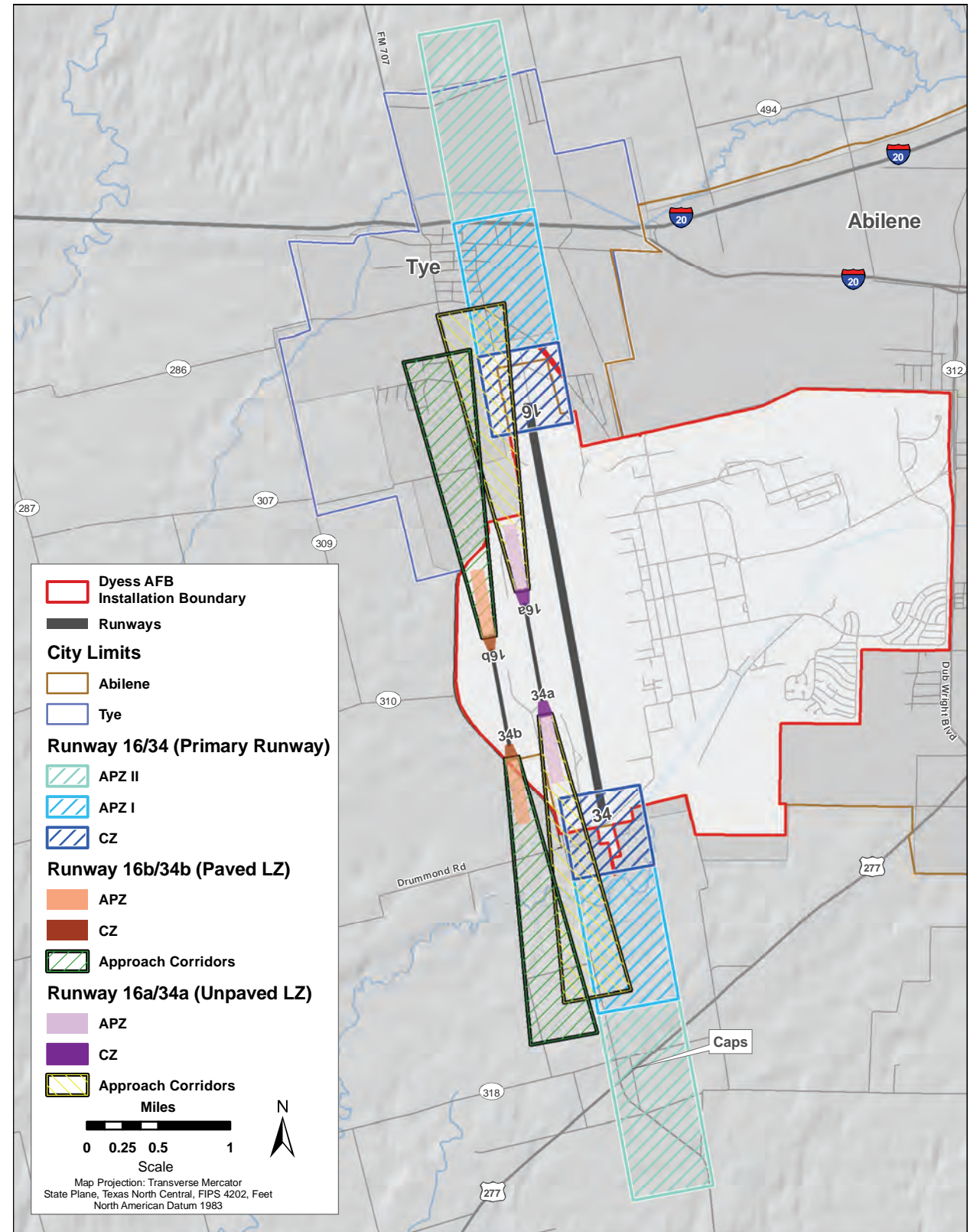


Figure 3-8. Clear Zones and Accident Potential Zones for Dyess AFB



3.4 Land Use Compatibility Guidelines

This AICUZ Study contains general land use guidelines related to safety and noise associated with aircraft operations as well as ambient sound levels guidelines that are described below (see **Table 3-2**). **Table 3-3** lists the USAF-recommended land use compatibility guidelines in relation to noise zones and APZs. The information presented in the table is essentially the same as the information published in the June 1980 publication by the Federal Interagency Committee on Urban Noise (FICUN) entitled *Guidelines for Considering Noise in Land Use Planning Control* (FICUN 1980) and in the *Standard Land Use Coding Manual (SLUCM)* (USURA 1965) published by the U.S. Urban Renewal Administration. The key and notes at the end of this table define and qualify recommended land use criteria. For example, in SLUCM row No. 11.11, Single units: detached, Y¹ (in APZ II) means land use and related structures are compatible without restriction at a suggested maximum density of one to two dwelling units per acre, possibly increased under a Planned Unit Development where maximum lot coverage is less than 20 percent. However, if Single units: detached, are proposed or currently located in APZ II and 75 dBA noise zone or higher, since the land use and related structures are not compatible in 75 dBA noise zone or higher, this land use should be prohibited.

Appendix A discusses land use compatibility with respect to noise zones and APZs.

Ambient Sound Levels. The ambient noise level in a quiet suburban residential area in the daytime is about DNL of 50 dBA, which increases to 60 dBA for an urban residential area, and 80 dBA for the downtown area of a major city in the daytime (USEPA 1974). Studies of community annoyance in response to numerous types of environmental noise show that DNL correlates well with human annoyance. Most people are exposed to DNL sound levels of 50 to 55 dBA or higher on a daily basis. **Table 3-2** presents the percentages of people that would be projected to be “highly annoyed” when exposed to various levels of noise measured in DNL. This table presents the results of more than a dozen studies of the relationship between noise and annoyance levels. The data shown provide a perspective on the level of annoyance that might be anticipated. For example, 12 to 22 percent of persons exposed on a long-term basis to a DNL of 65–69 dBA are expected to be highly annoyed by noise events.

Table 3-2. Percentage of Population Highly Annoyed by Noise Zones

DNL Noise Zones	Percentage of Persons Highly Annoyed	
	Low	High
65–69 dBA	12	22
70–74 dBA	22	36
75–79 dBA	36	54
80+ dBA	>54	

Source: Finegold et al. 1994



3.5 Participation in the Planning Process

As local communities prepare their land use plans, the USAF must be ready to provide additional data and information. The Base Community Planner has been designated as the official liaison with the local community on all planning matters. This officer is prepared to participate in the continuing discussion of zoning and other land use matters as they might affect, or might be affected by, Dyess AFB.

Please visit <http://www.dyess.af.mil/> for information on how to contact personnel at the installation.



Table 3-3. USAF Recommended Land Use Compatibility Guidelines in Relation to APZs and Noise Zones

Land Use		APZs			Noise Zones			
SLUCM No.	Name	CZ	APZ I	APZ II	65–69 dBA	70–74 dBA	75–79 dBA	80+ dBA
10	Residential							
11	Household units							
11.11	Single units: detached	N	N	Y ¹	A ¹¹	B ¹¹	N	N
11.12	Single units: semidetached	N	N	N	A ¹¹	B ¹¹	N	N
11.13	Single units: attached row	N	N	N	A ¹¹	B ¹¹	N	N
11.21	Two units: side-by-side	N	N	N	A ¹¹	B ¹¹	N	N
11.22	Two units: one above the other	N	N	N	A ¹¹	B ¹¹	N	N
11.31	Apartments: walk-up	N	N	N	A ¹¹	B ¹¹	N	N
11.32	Apartments: elevator	N	N	N	A ¹¹	B ¹¹	N	N
12	Group quarters	N	N	N	A ¹¹	B ¹¹	N	N
13	Residential hotels	N	N	N	A ¹¹	B ¹¹	N	N
14	Mobile home parks or courts	N	N	N	N	N	N	N
15	Transient lodgings	N	N	N	A ¹¹	B ¹¹	C ¹¹	N
16	Other residential	N	N	N ¹	A ¹¹	B ¹¹	N	N
20-30	Manufacturing							
21	Food and kindred products: manufacturing	N	N ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
22	Textile mill products: manufacturing	N	N ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
23	Apparel and other finished products made from fabrics, leather, and similar materials: manufacturing	N	N	N ²	Y	Y ¹²	Y ¹³	Y ¹⁴
24	Lumber and wood products (except furniture): manufacturing	N	Y ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
25	Furniture and fixtures: manufacturing	N	Y ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
26	Paper and allied products: manufacturing	N	Y ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
27	Printing, publishing, and allied industries	N	Y ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴



Land Use		APZs			Noise Zones			
SLUCM No.	Name	CZ	APZ I	APZ II	65–69 dBA	70–74 dBA	75–79 dBA	80+ dBA
20-30	Manufacturing (continued)							
28	Chemicals and allied products: manufacturing	N	N	N ²	Y	Y ¹²	Y ¹³	Y ¹⁴
29	Petroleum refining and related industries	N	N	N	Y	Y ¹²	Y ¹³	Y ¹⁴
31	Rubber and misc. plastic products: manufacturing	N	N ²	N ²	Y	Y ¹²	Y ¹³	Y ¹⁴
32	Stone, clay, and glass products manufacturing	N	N ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
33	Primary metal industries	N	N ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
34	Fabricated metal products: manufacturing	N	N ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
35	Professional, scientific, and controlling instruments; photographic and optical goods; watches and clocks: manufacturing	N	N	N ²	Y	A	B	N
39	Miscellaneous manufacturing	N	Y ²	Y ²	Y	Y ¹²	Y ¹³	Y ¹⁴
40	Transportation, communications, and utilities							
41	Railroad, rapid rail transit, and street railroad transportation	N ³	Y ⁴	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
42	Motor vehicle transportation	N ³	Y	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
43	Aircraft transportation	N ³	Y ⁴	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
44	Marine craft transportation	N ³	Y ⁴	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
45	Highway and street right-of-way	N ³	Y	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
46	Automobile parking	N ³	Y ⁴	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
47	Communications	N ³	Y ⁴	Y	Y	A ¹⁵	B ¹⁵	N
48	Utilities	N ³	Y ⁴	Y	Y	Y	Y ¹²	Y ¹³
49	Other transportation communications and utilities	N ³	Y ⁴	Y	Y	A ¹⁵	B ¹⁵	N
50	Trade							
51	Wholesale trade	N	Y ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
52	Retail trade: building materials, hardware, and farm equipment	N	Y ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴



Land Use		APZs			Noise Zones			
SLUCM No.	Name	CZ	APZ I	APZ II	65–69 dBA	70–74 dBA	75–79 dBA	80+ dBA
50	Trade (continued)							
53	Retail trade: general merchandise	N	N ²	Y ²	Y	A	B	N
54	Retail trade: food	N	N ²	Y ²	Y	A	B	N
55	Retail trade: automotive, marine craft, aircraft, and accessories	N	Y ²	Y ²	Y	A	B	N
56	Retail trade: apparel and accessories	N	N ²	Y ²	Y	A	B	N
57	Retail trade: furniture, home furnishings, and equipment	N	N ²	Y ²	Y	A	B	N
58	Retail trade: eating and drinking establishments	N	N	N ²	Y	A	B	N
59	Other retail trade	N	N ²	Y ²	Y	A	B	N
60	Services							
61	Finance, insurance, and real estate services	N	N	Y ⁶	Y	A	B	N
62	Personal services	N	N	Y ⁶	Y	A	B	N
62.4	Cemeteries	N	Y ⁷	Y ⁷	Y	Y ¹²	Y ¹³	Y ^{14,21}
63	Business services	N	Y ⁸	Y ⁸	Y	A	B	N
64	Repair services	N	Y ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
65	Professional services	N	N	Y ⁶	Y	A	B	N
65.1	Hospitals, nursing homes	N	N	N	A*	B*	N	N
65.1	Other medical facilities	N	N	N	Y	A	B	N
66	Contract construction services	N	Y ⁶	Y	Y	A	B	N
67	Governmental services	N	N	Y ⁶	Y*	A*	B*	N
68	Educational services	N	N	N	A*	B*	N	N
69	Miscellaneous services	N	N ²	Y ²	Y	A	B	N
70	Cultural, entertainment, and recreational services							
71	Cultural activities (including churches)	N	N	N ²	A*	B*	N	N
71.2	Nature exhibits	N	Y ²	Y	Y*	N	N	N
72	Public assembly	N	N	N	Y	N	N	N



Land Use		APZs			Noise Zones			
SLUCM No.	Name	CZ	APZ I	APZ II	65–69 dBA	70–74 dBA	75–79 dBA	80+ dBA
70	Cultural, entertainment, and recreational services (continued)							
72.1	Auditoriums, concert halls	N	N	N	A	B	N	N
72.11	Outdoor music shell, amphitheaters	N	N	N	N	N	N	N
72.2	Outdoor sports arenas, spectator sports	N	N	N	Y ¹⁷	Y ¹⁷	N	N
73	Amusements	N	N	Y ⁸	Y	Y	N	N
74	Recreational activities (including golf courses, riding stables, water recreation)	N	Y ^{8,9,10}	Y	Y [*]	A [*]	B [*]	N
75	Resorts and group camps	N	N	N	Y [*]	Y [*]	N	N
76	Parks	N	Y ⁸	Y ⁸	Y [*]	Y [*]	N	N
79	Other cultural, entertainment, and recreational activities	N	Y ⁹	Y ⁹	Y [*]	Y [*]	N	N
80	Resources production and extraction							
81	Agriculture (except livestock)	Y ¹⁶	Y	Y	Y ¹⁸	Y ¹⁹	Y ²⁰	Y ^{20,21}
81.5 to 81.7	Livestock farming and animal breeding	N	Y	Y	Y ¹⁸	Y ¹⁹	Y ²⁰	Y ^{20,21}
82	Agriculture-related activities	N	Y ⁵	Y	Y ¹⁸	Y ¹⁹	N	N
83	Forestry activities and related services	N ⁵	Y	Y	Y ¹⁸	Y ¹⁹	Y ²⁰	Y ^{20,21}
84	Fishing activities and related services	N ⁵	Y ⁵	Y	Y	Y	Y	Y
85	Mining activities and related services	N	Y ⁵	Y	Y	Y	Y	Y
89	Other resources production and extraction	N	Y ⁵	Y	Y	Y	Y	Y

Source: DODI 1977, FICUN 1980, and USURA 1965

Key:

SLUCM = Standard Land Use Coding Manual, USURA.

Y = Yes – Land uses and related structures are compatible without restriction.

N = No – Land use and related structures are not compatible and should be prohibited.

Y^x = Yes with restrictions – Land use and related structures generally compatible; see notes indicated by the superscript.

N^x = No with exceptions – See notes indicated by the superscript.

NLR = Noise Level Reduction (NLR) (outdoor to indoor) to be achieved through incorporation of noise attenuation measures into the design and construction of the structures.



Key (continued):

A, B, or C = Land use and related structures generally compatible; measures to achieve NLR for A (DNL of 65–69 dBA), B (DNL of 70–74 dBA), C (DNL of 75–79 dBA) need to be incorporated into the design and construction of structures.

* , * , and * = Land use generally compatible with NLR; however, measures to achieve an overall noise level reduction do not necessarily solve noise difficulties and additional evaluation is warranted. See appropriate notes below.

* = The designation of these uses as “compatible” in this zone reflects individual Federal agencies and program considerations of general cost and feasibility factors, as well as past community experiences and program objectives. Localities, when evaluating the application of these guidelines to specific situations, might have different concerns or goals to consider.

Notes:

1. Suggested maximum density of 1 to 2 dwelling units per acre, possibly increased under a Planned Unit Development where maximum lot coverage is less than 20 percent.
2. Within each land use category, uses exist where further deliberating by local authorities might be needed due to the variation of densities in people and structures. Shopping malls and shopping centers are considered incompatible use in any accident potential zone (CZ, APZ I, or APZ II).
3. The placement of structures, buildings, or aboveground utility lines in the CZ is subject to severe restrictions. In a majority of the CZs, these items are prohibited. See AFI 32-7060, *Interagency and Intergovernmental Coordination for Environmental Planning* (USAF 1994), and Unified Facilities Criteria (UFC) 3-260-01, *Airfield and Heliport Planning and Design* (DOD 2001), for specific guidance.
4. No passenger terminals and no major aboveground transmission lines in APZ I.
5. Factors to be considered: labor intensity, structural coverage, explosive characteristics, and air pollution.
6. Low-intensity office uses only. Meeting places, auditoriums, and the like are not recommended.
7. Excludes chapels.
8. Facilities must be low-intensity.
9. Clubhouse not recommended.
10. Areas for gatherings of people are not recommended.
11. (a) Although local conditions might require residential use, it is discouraged in DNL of 65–69 dBA noise zone and strongly discouraged in DNL of 70–74 dBA noise zone. The absence of viable alternative development options should be determined and an evaluation should be conducted prior to approvals indicating a demonstrated community need for residential use would not be met if development were prohibited in these zones.
(b) Where the community determines the residential uses must be allowed, measures to achieve outdoor to indoor NLR for the DNL of 65–69 dBA noise zone and the DNL of 70–74 dBA noise zone should be incorporated into building codes and considered in individual approvals.
(c) NLR criteria will not eliminate outdoor noise problems. However, building location and site planning, and design and use of berms and barriers can help mitigate outdoor exposure, particularly from near ground level sources. Measures that reduce outdoor noise should be used whenever practical in preference to measures that only protect interior spaces.
12. Measures to achieve the same NLR as required for facilities in the DNL of 65–69 dBA noise zone must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
13. Measures to achieve the same NLR as required for facilities in the DNL of 70–74 dBA noise zone must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
14. Measures to achieve the same NLR as required for facilities in the DNL of 75–79 dBA noise zone must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
15. If noise-sensitive, use indicated NLR; if not, the use is compatible.
16. No buildings.
17. Land use is compatible provided special sound reinforcement systems are installed.
18. Residential buildings require the same NLR as required for facilities in the DNL of 65–69 dBA noise zone.
19. Residential buildings require the same NLR as required for facilities in the DNL of 70–74 dBA noise zone.
20. Residential buildings are not permitted.
21. Land use is not recommended. If the community decides the use is necessary, personnel should wear hearing protection devices.



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