

Minot International Airport

Land Use Compatibility Plan

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Minot
International Airport

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Chapter I

Introduction

Plan Purpose

The purpose of this plan is to achieve compatible uses of lands surrounding Minot International Airport (MOT) that are within the planning jurisdiction of the city of Minot. Use of this plan will help the city of Minot fulfill its contractual obligations to prevent and remove airport hazards and incompatible land uses as established in airport improvement grants it has received from the Federal Aviation Administration (FAA).

North Dakota Century Code enables governmental jurisdictions to create zoning and other controls for purposes of achieving and maintaining airport land use compatibility. Further, the Century Code declares that incompatible land uses which obstruct the airspace required for the flight of aircraft in landing or taking off at any airport are airport hazards and a public nuisance and an injury to the community served by the airport. **Appendix A contains FAA Sponsor Assurances, Paragraphs 20 and 21, and North Dakota Century Code, Airport Zoning.**

This land use compatibility plan was prepared coincidentally to an airport master plan for MOT. The 20 year outlook of the master plan in terms of aviation demand and airport development plan was used to develop the criteria contained in this land use compatibility plan and make it suitable to long-term application. City of Minot planning documents were also considered in the development of the airport master plan and this land use compatibility plan in order to help bring about a mutually compatible plan for MOT and development of surrounding lands.

Airport Compatibility and Hazard Issues

Four types of airport compatibility and hazard issues need be considered in order to achieve land use compatibility:

- Airspace
- Safety
- Wildlife
- Noise

A brief and general description of each of these issues is provided below based primarily on criteria developed by FAA and ND Aeronautics Commission. Each issue is explained in terms of the basic objective to be met, the measurement of risk, and criteria that can be used to establish land use compatibility policies. Chapter 3 contains the specific assessment of MOT in light of the four land use compatibility issues.

Airspace

The airspace objective is to avoid any development that increases risks of aircraft accidents or measurably reduces the operational utility of the airport. Types of development that may impair the airport from meeting this objective include tall structures such as radio towers and wind power towers, and visual or electronic interference such as bright lights near runways or airborne emissions from industrial plants. The risk of accidents involving airspace obstructions is low due to the efforts of the FAA to evaluate and manage airspace and communities' control of the creation of obstructing structures. This level of risk can be maintained through a continuation of these proactive efforts.

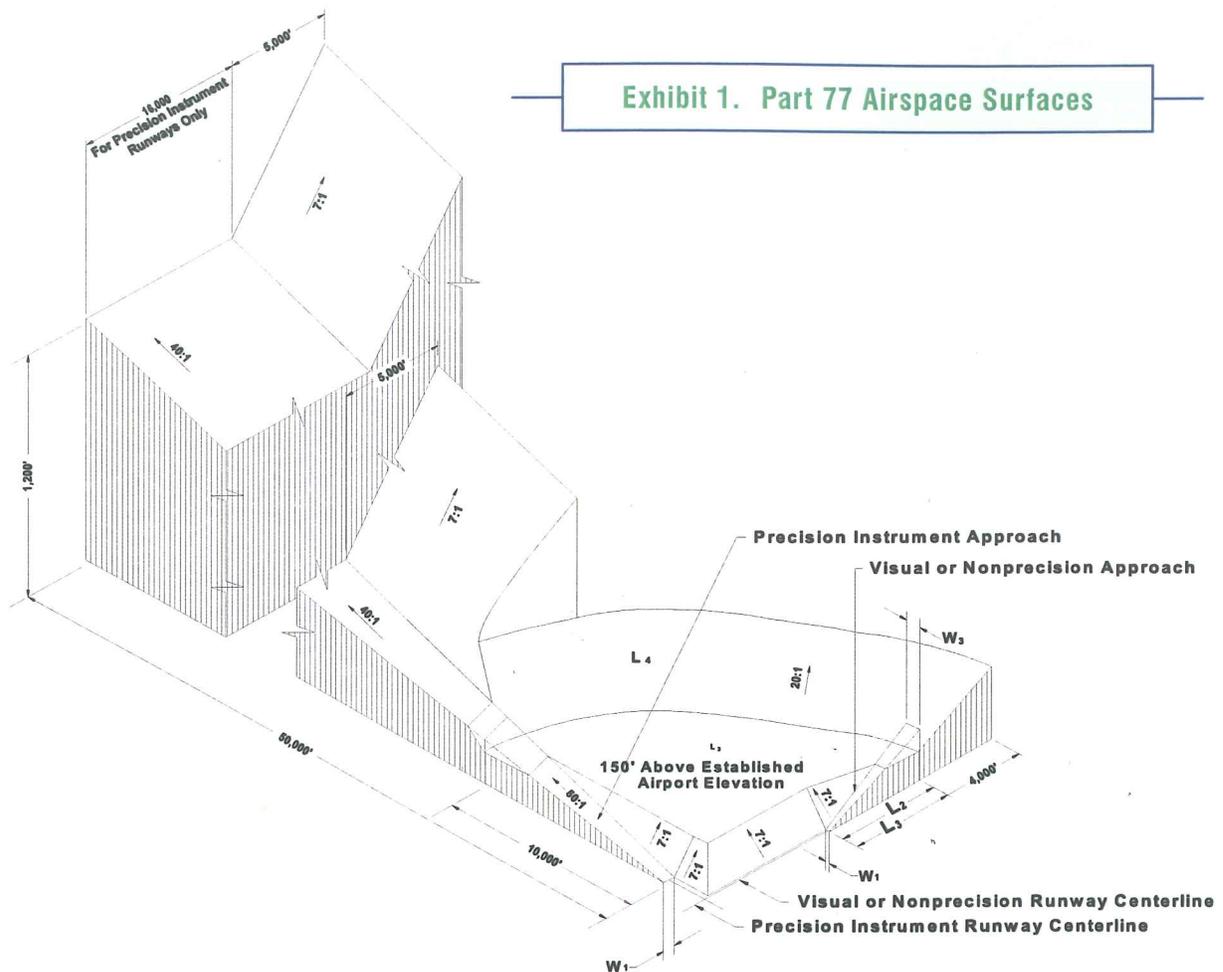
The definition of airspace is primarily accomplished through standards established by the FAA in Federal Aviation Regulation (FAR) Part 77 - Objects Affecting Navigable Airspace. FAR Part 77 is used to identify structures which may be obstructions to airspace. The standards relate to the size of the largest aircraft using the runway and the approach type and visibility minimum under which the runway is operated. Proponents of structures proposed near airports are required to file FAA Form 7460-1 with the FAA for evaluation. **Part 77 standards appear in the form of three dimensional surfaces as illustrated in** [Exhibit 1](#).

If a proposed structure penetrates Part 77 surfaces, FAA further evaluates it to determine whether it would create an airspace obstruction that is a hazard to air navigation that may increase risks of aircraft accidents or reduce the operational utility of the airport. This further evaluation relies on standards contained in FAA Order 8260.3B TERPS. Once FAA has completed its evaluation of a proposed structure it issues one of three typical responses:

- ① **No Objection** - The subject construction did not exceed obstruction standards and marking/lighting is not required.
- ② **Conditional Determination** - The proposed construction/alteration



Exhibit 1. Part 77 Airspace Surfaces



would be acceptable contingent upon implementing mitigating measures (Marking & Lighting, etc.)

- ③ **Objectionable** - The proposed construction/alteration is determined to be a hazard and is thus objectionable. The reasons for this determination are outlined to the proponent.

It is important to acknowledge that FAA's role is limited to evaluating the aeronautical effects of proposed structures and it has no legal authority to stop the construction of any proposed structure. That is the responsibility of local authorities with jurisdiction to plan and control development. Notwithstanding, FAA does not relieve airport sponsors of their contractual obligation to prevent and remove hazards to air navigation.

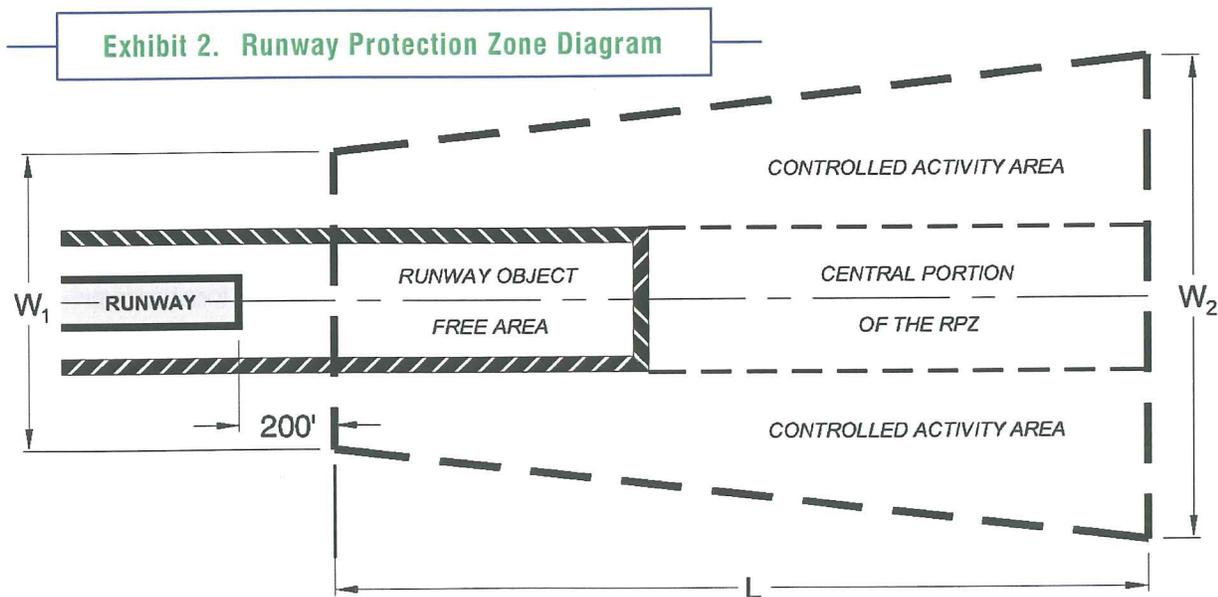
Communities typically implement height and hazard control policies in the form of overlay zoning to control the construction of structures that are airspace hazards that increase the risks of aircraft accidents or impairing the operational utility of the airport. North Dakota Century Code empowers communities to adopt zoning for airport hazards.

Safety

The safety objective is to minimize risks to persons on the ground and aircraft occupants that may be associated with aircraft accidents. Assessing the risks of aircraft accidents and creating policies to address those risks is challenging because aircraft accidents are rare and the specific circumstances of an accident are nearly impossible to predict.

National Transportation Safety Board (NTSB) data gathered between 1990 and 2000 indicate that approximately 95 percent of all aircraft accidents happen either on or near airports. This data also shows that most aircraft accidents occur during the approach or departure phases of flight. Approach accidents for multi-engine aircraft including jets occur within approximately 500 feet of both sides of the runway centerline and as much 2,200 feet from the runway threshold. Departure accidents are usually widely scattered in the vicinity of the runway.

Communities typically use FAA airport design standards and safety compatibility guidelines developed by state aeronautical agencies to formulate safety policies. FAA airport design standards, as contained in advisory circular 150/5300-13, define the dimensions for runway protection zones (RPZ) and provide land use policy for RPZs. According to this advisory circular, RPZs form the inner approach area near the runway threshold and according to the FAA, the property they encompass should be controlled by the airport sponsor such that no residences or places of public assembly exist in RPZs. Places of public assembly include churches, hospitals, schools, office buildings, shopping malls, and other uses with similar concentrations of people. FAA recommends that airport sponsors acquire all the land within RPZs. [Exhibit 2](#) and [Table 1](#) provide a diagram and dimensional requirements for RPZs.



Source: FAA AC 150/5300-13 Change 14, Airport Design Standards

Table 1. Runway Protection Zone Dimensional Requirements

Approach Visibility Minimums ¹	Facilities Expected to Serve	Dimensions			
		Length <i>L</i> , feet (meters)	Inner Width <i>W₁</i> , feet (meters)	Outer Width <i>W₂</i> , feet (meters)	RPZ acres
Visual and not lower than 1 mile (1,600 m)	Small aircraft exclusively	1,000 (300)	250 (75)	450 (135)	8.035
	Aircraft Approach Categories A & B	1,000 (300)	500 (150)	700 (210)	13.770
	Aircraft Approach Categories C & D	1,700 (510)	500 (150)	1,010 (303)	29.465
Not lower than ¾-mile (1,200 m)	All aircraft	1,700 (510)	1,000 (300)	1,510 (453)	48.978
Lower than ¾-mile (1,200 m)	All aircraft	2,500 (750)	1,000 (300)	1,750 (525)	78.914

¹ The RPZ dimensional standards are for the runway end with the specified approach visibility minimums. The departure RPZ dimensional standards are equal to or less than the approach RPZ dimensional standards. When an RPZ begins other than 200 feet (60m) beyond the runway end, separate approach and departure RPZs should be provided. Refer to FAA AC 150/5300-13 Change II, Appendix I4 for approach and departure RPZs.

Source: FAA AC 150/5300-13 Change I4, Airport Design Standards

A good source for safety compatibility guidelines is the California Airport Land Use Planning Handbook. The guidelines in this document have been used as the foundation for the land use compatibility planning at many communities in the western states and several state aeronautical agencies have adapted it for use in developing their own airport land use planning handbooks. The method used in these handbooks involves the creation of upward of six safety compatibility zones that encompass airport owned property and lands surrounding the airport. Each safety compatibility zone is assigned compatible development criteria involving acceptable and prohibited land uses and acceptable maximum development densities. Each zone and its criteria approximately relate the risk of aircraft accidents and noise with each zone. Communities adopting safety compatibility zones incorporate the information in their comprehensive plans and zoning ordinances.

Wildlife

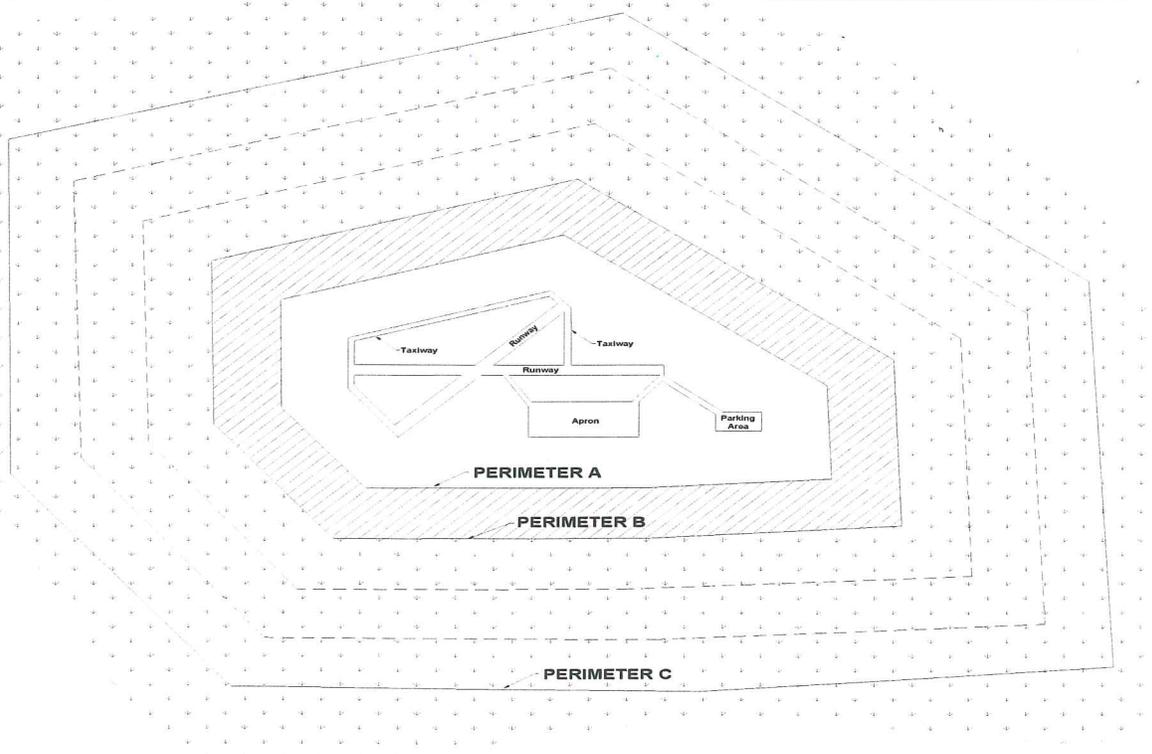
The wildlife objective is to minimize risks associated with wildlife activities, particularly birds, in the vicinity of an airport. Minimizing wildlife risks helps reduce aircraft damage costs and increases safety for aircraft occupants and persons on the ground. FAA statistics indicate that the number of aircraft bird strikes reported in the U.S. quadrupled from 1990 to 2007, rising from 1,738 per year to 7,439. These strikes caused 3,094 precautionary landings, 1,442 aborted takeoffs, 312 engine shutdowns and 1,162 minor negative effects, it said. Approximately, 80% of all strikes occur while aircraft are operating at altitudes

less than 1,000 feet above ground level which is typical for aircraft operating within an airport traffic pattern.

FAA AC 150/5200-33B, Hazardous Wildlife Attractants On or Near Airports, recommends that wildlife attractants be located at least 10,000 feet away from the airport operations area (AOA) for turbine-powered aircraft and at least five miles from the AOA for hazards that could cause wildlife to cross the approach/departure airspace. **Exhibit 3** provides an illustration of recommended separation distances for wildlife attractants.

FAA recommends that public-use airport sponsors implement the standards and practices contained in AC 150/5200-33B, Hazardous Wildlife Attractants On or Near Airports. Holders of Airport Operating Certificates issued under Title 14, Code of Federal Regulations (CFR), Part 139, Certification of Airports, Subpart

Exhibit 3. Separation distances within which hazardous wildlife attractants should be avoided, eliminated, or mitigated.



PERIMETER A: For airports serving piston-powered aircraft, hazardous wildlife attractants must be 5,000 feet from the nearest air operations area.

PERIMETER B: For airports serving turbine-powered aircraft, hazardous wildlife attractants must be 10,000 feet from the nearest air operations area.

PERIMETER C: 5-mile range to protect approach, departure and circling airspace.

Source: AC 150/5200-33B, Hazardous Wildlife Attractants

D (Part 139), may use the standards, practices, and recommendations contained in this AC to comply with the wildlife hazard management requirements of Part 139. Airports that have received federal grant-in-aid assistance must use these standards. The FAA also recommends the guidance in this AC for land-use planners, operators of non-certificated airports, and developers of projects, facilities, and activities on or near airports.

Noise

The noise objective is to minimize the number of people exposed to frequent high levels of aircraft noise capable of disrupting noise-sensitive activities. Noise emitted from aircraft can affect the well-being of persons living or working near an airport. While there are several effects of aircraft noise upon people, the most common is annoyance. Annoyance can be defined as the overall adverse reaction of people to noise. Other effects of aircraft noise include sleep disturbance and speech interference.

Noise analysis for airports is typically conducted using INM (Integrated Noise Model) software. The noise measurement recommended by FAA for use in the analysis of aircraft noise is the DNL (Day-Night Average Sound Level).

The DNL is defined as the average annual weighted sound level produced by aircraft at a location during a 24-hour period. A 10 dB (decibel) weight is applied to aircraft noise occurring between 10 p.m. and 7 a.m., when aircraft noise is more likely to create an annoyance. The FAA has determined that a significant noise impact would occur if a detailed noise analysis indicates an action which would result in an increase of 1.5 decibels or greater within the 65 dB DNL contour over a noise sensitive area. **Exhibit 4** provides examples of many common sounds and graphs their associated decibel levels.

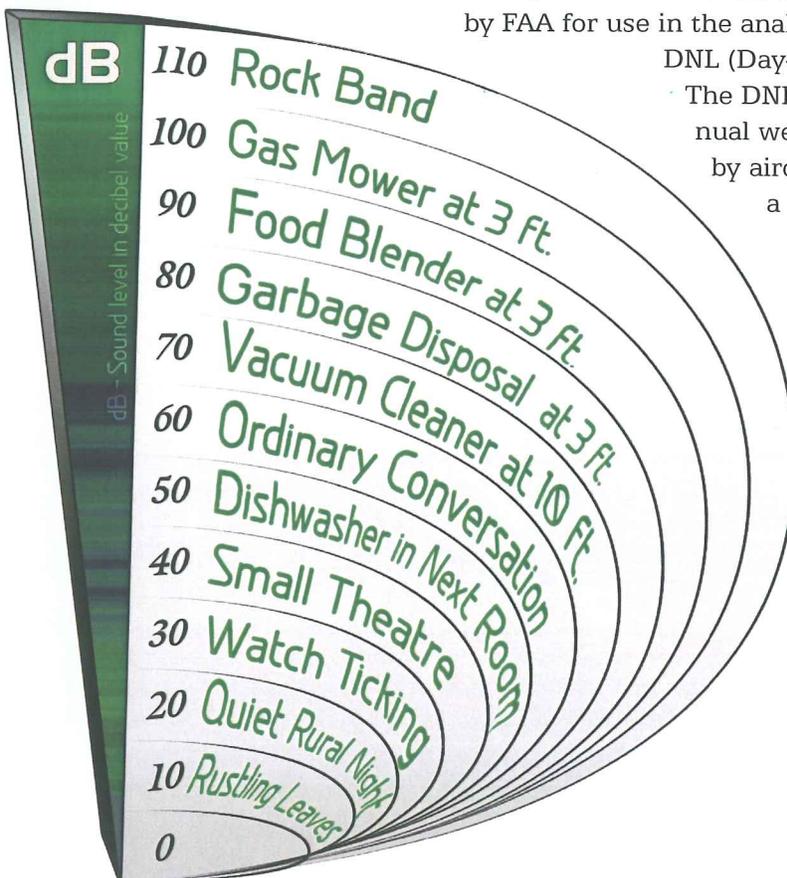


Exhibit 4. Common Sounds and Their Associated Decibel Levels

FAA has generally accepted a maximum of 65 DNL as the threshold of concern for noise impacts over residential areas. However, there have been a number of instances where FAA has supported local policies to restrict new residential development to not exceed 60 DNL, particularly in rural or less developed areas that are not already subjected to high levels of urban noise, e.g., vehicle traffic or industrial activity. Note that local noise policies commonly define separate thresholds for various types of land uses, e.g., schools, hospitals, industrial complexes, etc.) **Table 2** provides predicted community effects and reactions to noise at various DNL thresholds.

Table 2. Community Effects and Reactions to Noise

Day-Night Average Sound Level (Decibels)	Effects ¹			
	Hearing Loss (Qualitative Description)	Annoyance ² (Percentage of Population Highly Annoyed) ³	Average Community Reaction ⁴	General Community Attitude Toward Area
≥ 75	May begin to occur	37%	Very Severe	Noise is likely to be the most important of all adverse aspects of the community environment.
70	Will not likely occur	22%	Severe	Noise is one of the most important aspects of the community environment.
65	Will not occur	12%	Significant	Noise is one of the most important aspects of the community environment.
60	Will not occur	7%	Moderate to Slight	Noise may be considered an adverse aspect of the community environment.
≤ 55	Will not occur	3%		Noise considered no more important than various other environmental factors.

¹All data is drawn from National Academy of Science 1977 report *Guidelines for Preparing Environmental Impact Statements on Noise*, Report of Working Group 69 on Evaluation of Environmental Impact of Noise.

²A summary measure of the general adverse reaction of people to living in noisy environments that cause speech interference; sleep disturbance; desire for tranquil environment; and the inability to use the telephone, radio, or television satisfactorily.

³The percentage of people reporting annoyance to lesser extents are higher in each case. An unknown small percentage of people will report being "highly annoyed" even in the quietest surroundings. One reason is the difficulty all people have in integrating annoyance over a very long time. USAF Update with 400 points (Finegold et al. 1992)

⁴Attitudes or other non-acoustic factors can modify this. Noise at low levels can still be an important problem, particularly when it intrudes into a quiet environment.

NOTE:

Research implicates noise as a factor producing stress-related health effects such as heart disease, high blood pressure and stroke, ulcers and other digestive disorders. The relationships between noise and these effects, however, have not as yet been conclusively demonstrated. (Thompson 1981; Thompson et al. 1989; CHABA 1981; CHABA 1982; Hattis et al. 1980; and U.S. EPA 1981)

Chapter 2

Airport Conditions

Existing Conditions

Exhibit 5 shows the layout of the two runways and other facilities at MOT. The majority of operations conducted by the commercial airline and other operators of large jet aircraft use Runway 13-31 due to its longer length and precision instrument approach capability. Runway 8-26 is used predominately by small aircraft and large aircraft when crosswinds make it undesirable to use Runway

Exhibit 5. MOT Airport



13-31. The only significant change anticipated by the airport master plan within the foreseeable future is relocation of Runway 8-26 approximately 870 feet to the east. This change will have the positive effect of moving the entire runway and the RPZ on the 8 end of the runway farther from commercial and residential land uses located immediately west of Highway 83. Implementing this change will avoid the acquisition of businesses and residences located west of Highway 83.

Airport Operations

Minot International Airport currently receives scheduled passenger service from Delta Airlines utilizing the Embraer EMB175 aircraft for its Minot-Minneapolis route. The Embraer EMB175 has a passenger configuration of up to 76 seats.



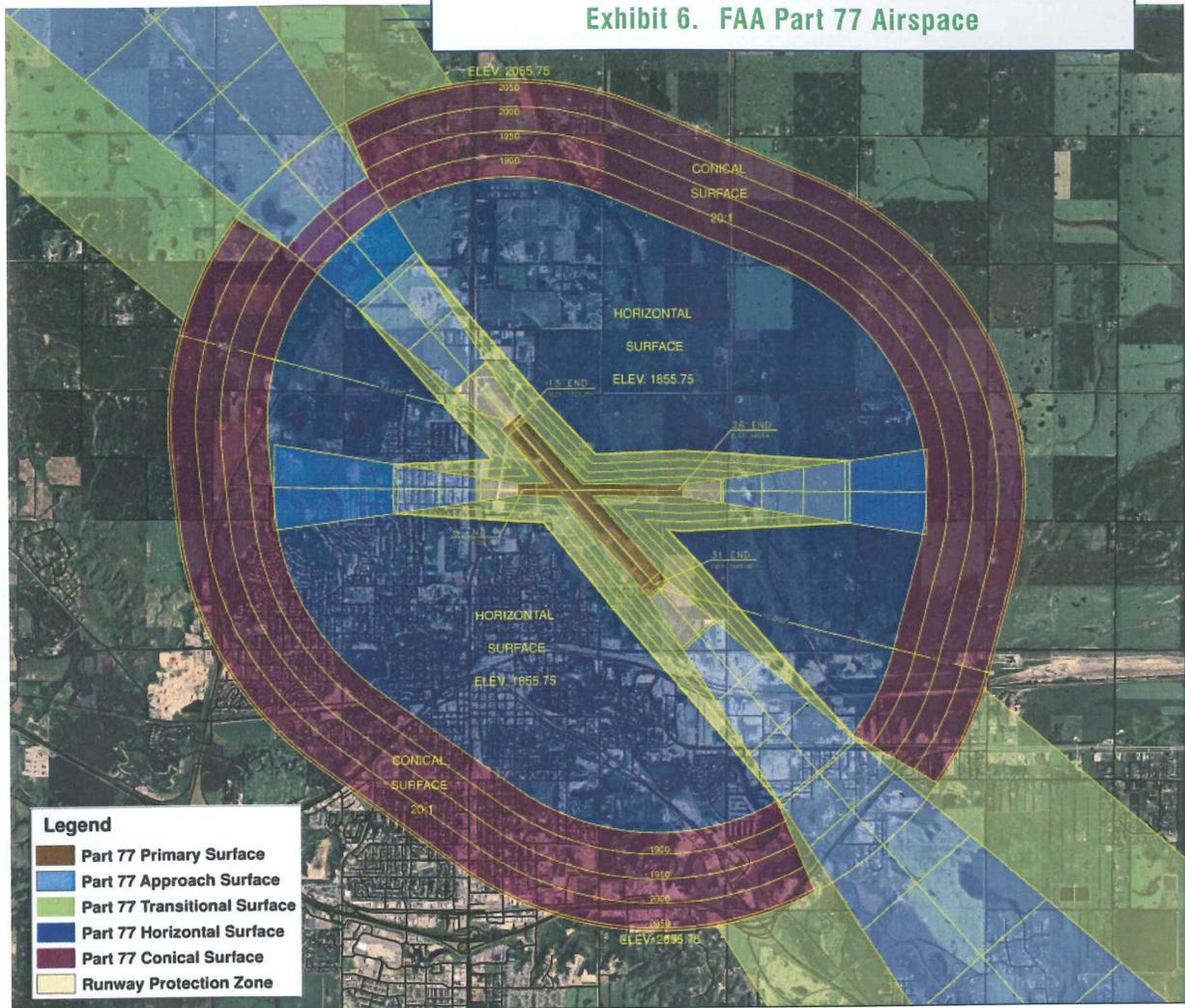
The current annual number of airline operations at MOT is 2,190 operations. Additional airline service is possible and if implemented

would increase the number of airline operations. Total current annual operations is approximately 45,000, and is expected to increase to approximately 75,000 over the next 20 years.

Airspace Structure

FAR Part 77 airspace surfaces taken from the airport master plan are shown in Exhibit 6. An airport layout plan will be prepared as part of the airport master plan and submitted to FAA for a formal airspace analysis and official approval. The exhibit includes the proposed relocation of Runway 8-26 which moves the runway protection zone onto airport property, avoiding acquisition of businesses, residences and public facilities located west of Highway 83. This proposed change to Runway 8-26 is subject to additional environmental analysis and documentation before it may be implemented.

Exhibit 6. FAA Part 77 Airspace



Noise Contours

Noise contours were prepared using FAA's Integrated Noise Model 7.0 based on the operations forecasts in the airport master plan, airline flight schedule, and information on flight tracks and traffic distribution to runway ends from the MOT FAA Air Traffic Control Tower. **Anticipated increased activity at MOT was taken into consideration and Exhibit 7, Exhibit 8, and Exhibit 9 show current and anticipated noise contours for years 2008, 2018, and 2028, respectively.**

As shown on the exhibits, the total area included within the noise contours is expected to decrease over time. This positive change is the result of the introduction of quieter, more technologically advanced aircraft that replace older aircraft now in use by the airline. This is a positive step toward improving the compatibility of the airport with its environs.

Exhibit 7. Year 2008 Noise Contours

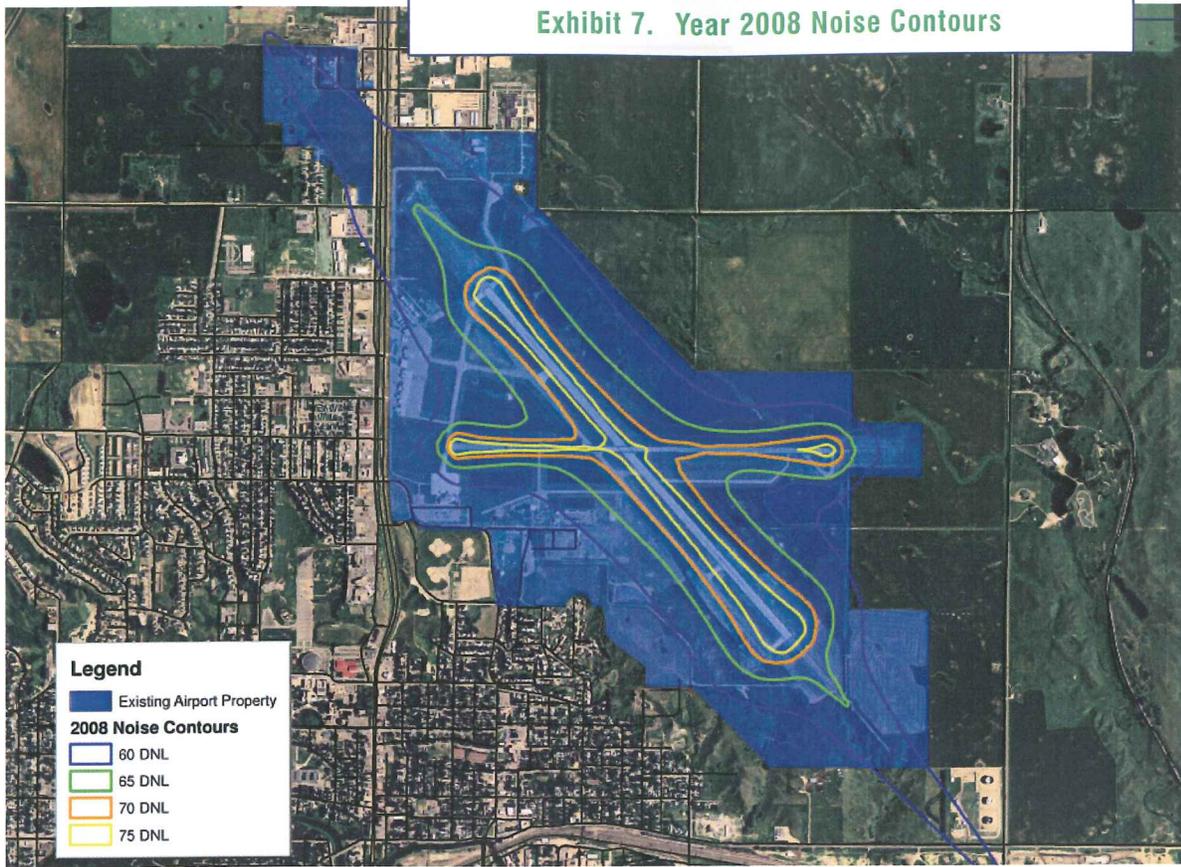
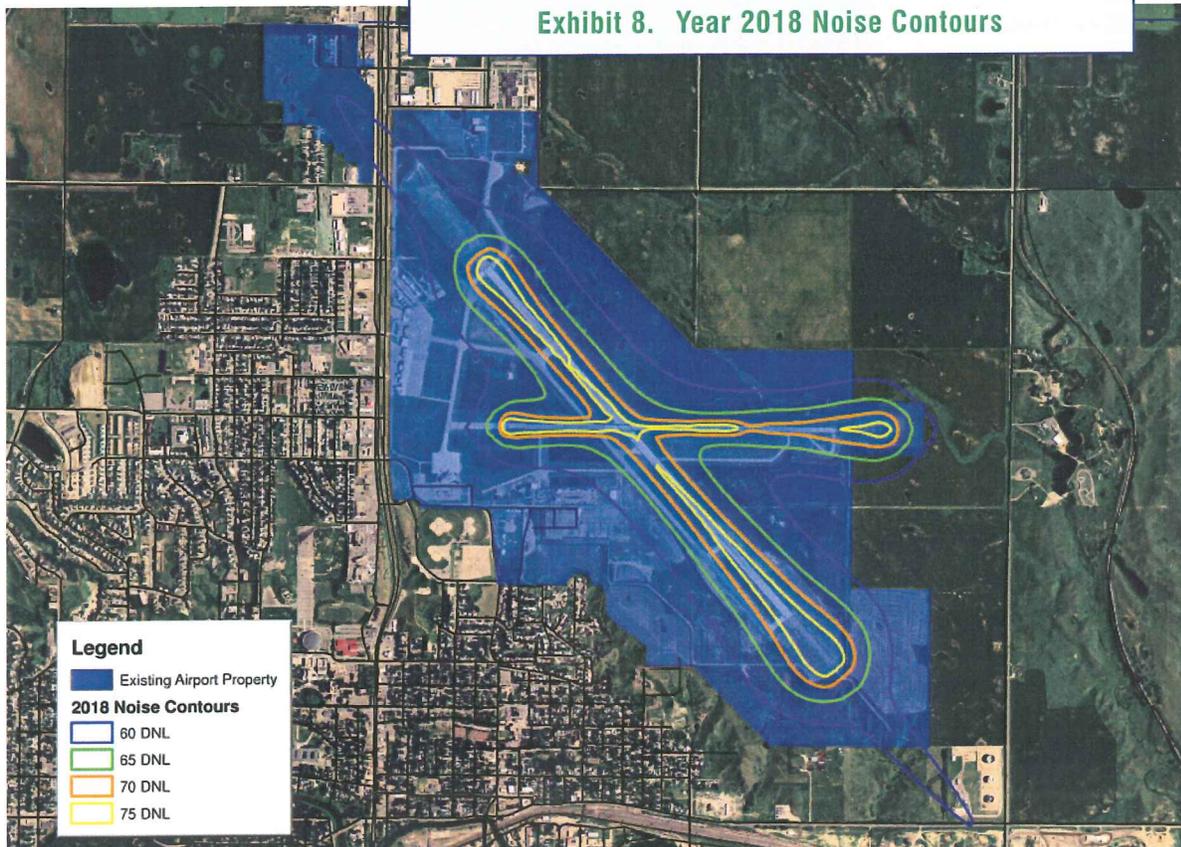
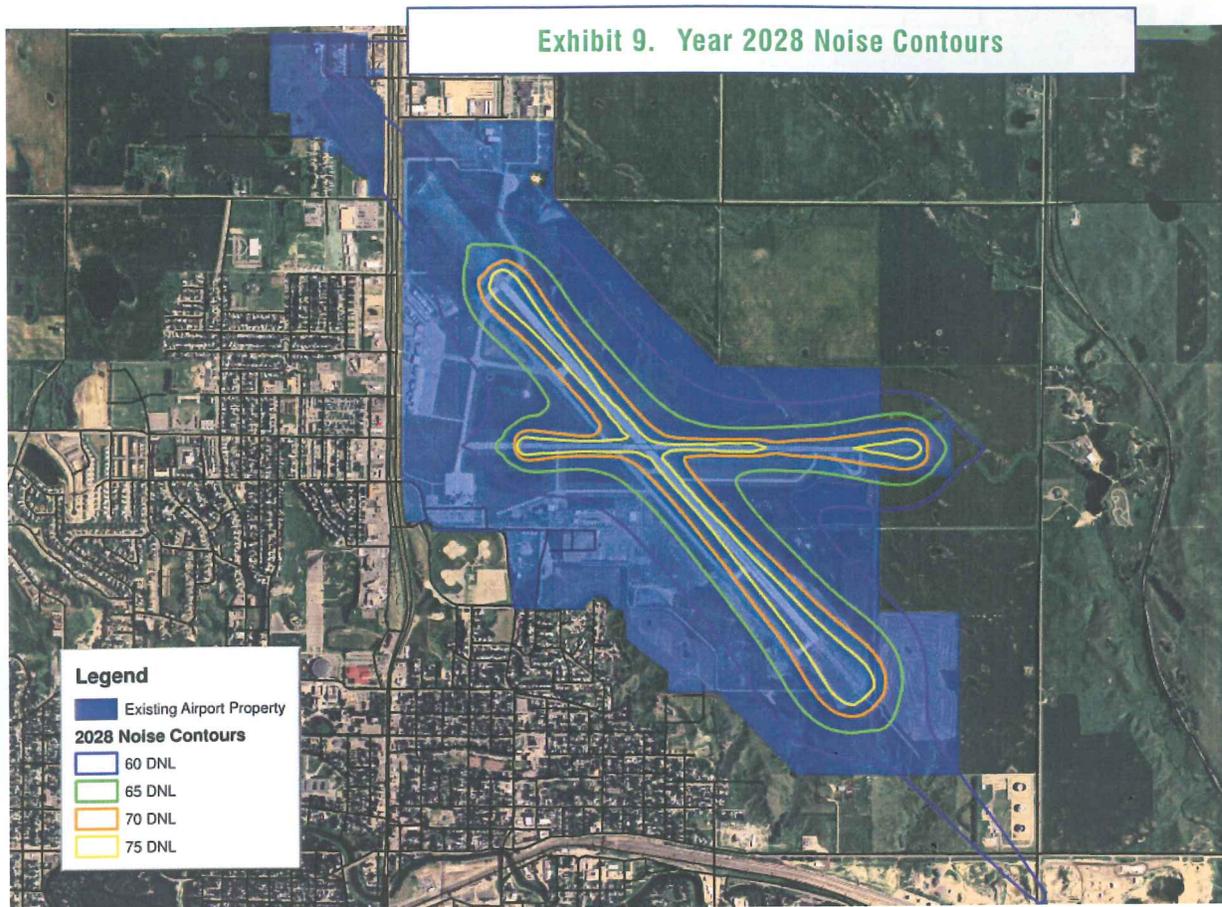


Exhibit 8. Year 2018 Noise Contours



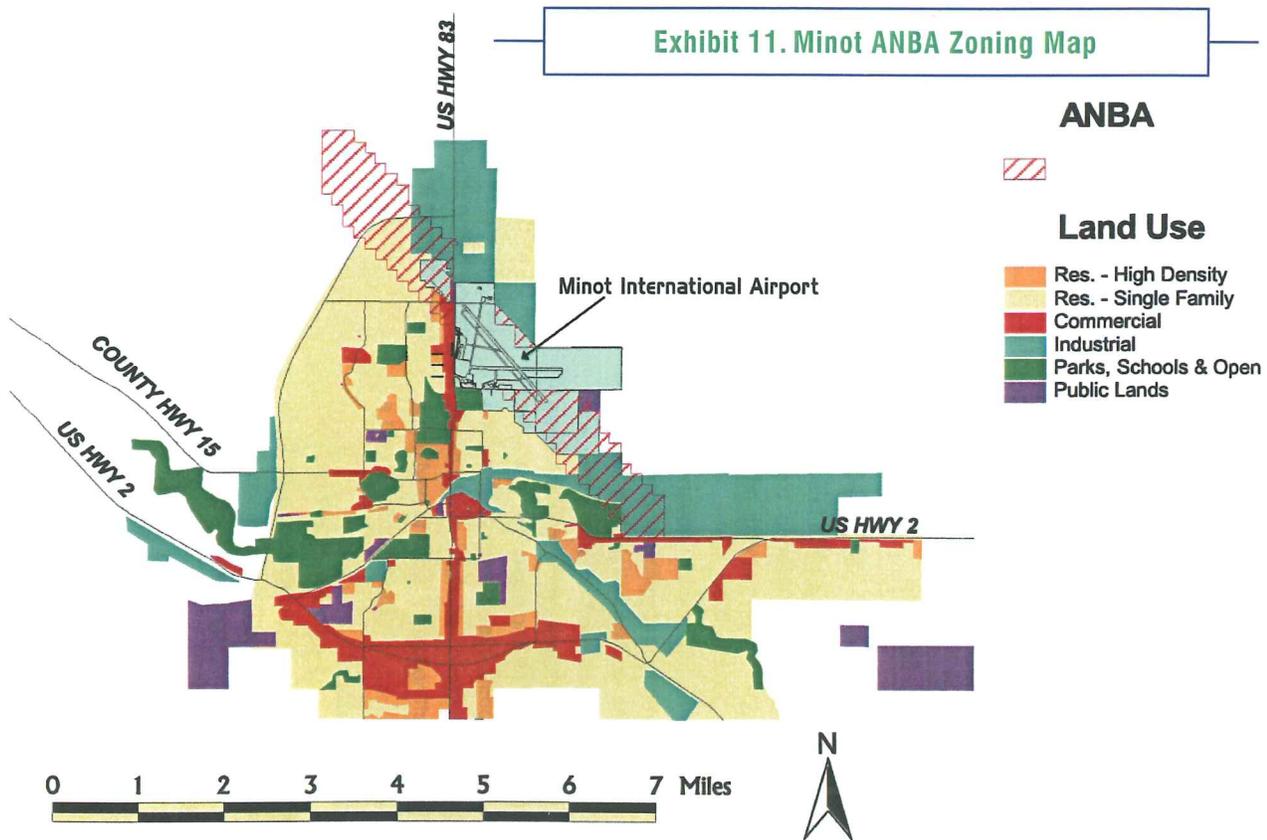
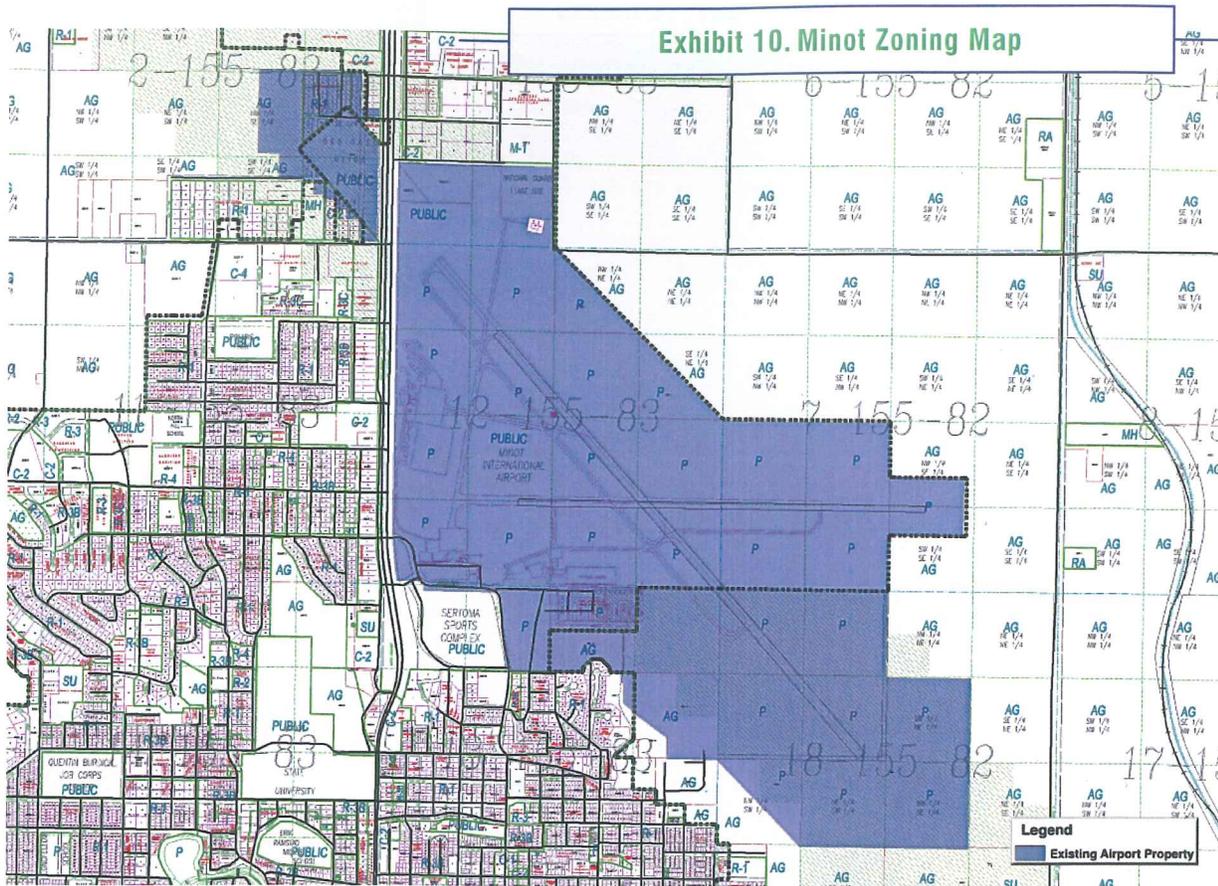


Existing Zoning

The city of Minot last updated its zoning ordinance on May 14, 2004. This was a minor update. **The city's zoning map appears in Exhibit 10.** The zoning ordinance defines an Airport Noise Buffer Area (ANBA) along the extended centerlines of Runway 13-31. Within the ANBA the following uses are prohibited: mobile home parks, outdoor music shows, amphitheaters, nature exhibits and zoos. Noise level reductions (NLR) for occupied buildings are also required as follows:

- **NLR of 25:** governmental services, transportation, parking, business and professional offices, the wholesale and the retailing of building materials, hardware and farm equipment, general retail trade; utilities, communications, general manufacturing, photographic and optical manufacturing, golf courses, riding stables, and water recreation.
- **NLR of 30:** residential other than mobile homes, transient lodgings, schools, hospitals, nursing homes, churches, auditoriums, and concert halls.

A representation of the ANBA is provided by **Exhibit 11.**



Chapter 3

Compatibility Guidelines

Introduction

This chapter contains guidelines the city of Minot may use to establish additional policies governing the planning and development of lands surrounding MOT. The approach used in this effort is to identify a best scenario to airport land use compatibility and then balance that best scenario with existing and planned land uses surrounding MOT. A comparison to existing zoning ordinances and recommended changes to those ordinances is also presented. The two mile extraterritorial jurisdiction held by the city of Minot for planning and zoning purposes and close proximity of MOT to the city center places policy decisions with the city of Minot. The recommended guidelines in this report are consistent with North Dakota Century Code requirements for airport zoning.

There are a number of proactive steps that airport sponsors can take to facilitate airport land use compatibility. Below are suggestions taken from the ND Airport Managers Manual.

- Ensure land use restrictions for all surrounding jurisdictions are in place and reflect current operational levels by aircraft type.
- Assist surrounding jurisdictions in understanding how the airport operates, the airport's flight patterns and the type of aircraft operating at the airport. Also assist surrounding jurisdictions in understanding how the airport benefits the local economy and community's health, welfare, and safety.
- Stay involved because land use is fluid and subject to a public process that is constantly changing. By staying involved, the airport manager/sponsor can influence the compatibility of land use surrounding the airport.
- Maintain awareness of land use actions proposed by the local county or municipality and all adjacent jurisdictions in the airport environs.
- Stay apprised of the existing zoning or land use, how it is being enforced, and changing airport operations and associated needs and impacts on areas adjacent to the airport.

- Assist local jurisdictions in understanding Federal Aviation Regulations Part 77 notification requirements and the special needs for protecting the safety and efficiency of aircraft operations.
- Provide copies of the Airport Layout Plan (ALP) to the local planning commission.
- Attend planning meetings on land use decisions in the vicinity of the airport.
- Be sensitive to operations at the airport and the impact they have on neighboring land uses.
- Invite local government officials and planners to be part of airport advisory committee meetings to keep them informed of the airport's plans and needs.

These guidelines offer the airport sponsor an opportunity to establish or strengthen their relationship with their local community officials, to show them the issues associated with airport land use compatibility and to explain how the airport and the community can most rationally be protected. By staying involved in local land use issues and the formulation and updating of their local growth management plan, airport managers and sponsors can ensure that their airport's needs are brought to the attention of the local government who can help control the surrounding land use designations through zoning or other appropriate controls.

Land Use Compatibility Categories

The land use compatibility issues introduced in this report are treated as separate categories with individual policy recommendations for each issue. The land use compatibility categories for which criteria have been developed are airspace, safety and wildlife. The issue of noise was not addressed because the city of Minot has already adopted Airport Noise Buffer Area zoning for this purpose.

The developed nature of much of the areas bordering MOT makes an individualized approach to each land use compatibility issue the most effective method. The city of Minot has also adopted zoning ordinances that at least partially satisfy land use compatibility concerns and an individualized approach allows a more specific analysis of the suitability of existing zoning with the intent of minimizing the number of recommended zoning changes.

Airspace Category

Airspace definition is well established through FAR Part 77 as explained earlier in this document and there is no need to improve upon the current arrangement of airspace surfaces as shown in the FAA approved airport layout plan. See [Exhibit 6 for MOT's approved airspace surfaces](#).

FAR Part 77 requires proponents of tall structures to give notice to FAA of their intent to construct structures near airports. Chapter 1 provides an overview of this procedure. It is important to acknowledge that FAA's role in concerning

proposed tall structures is limited to evaluating the resulting aeronautical effects of proposed structures and has no legal authority to stop the construction of any structure.

Responsibility for planning and controlling the placement of tall structures obstructing MOT's airspace rests solely with the city of Minot. FAA places this responsibility on the city through sponsor assurances on federal grants the city has received for airport improvements. Noncompliance with sponsor assurances could result in demands for repayment of grants,



revocation of the FAA Airport Operating Certificate required by FAR Part 139 for commercial airline service, or a significant diminishment of the airport's capability to serve all aircraft operations resulting from the obstruction of airspace caused by construction of a tall structure.

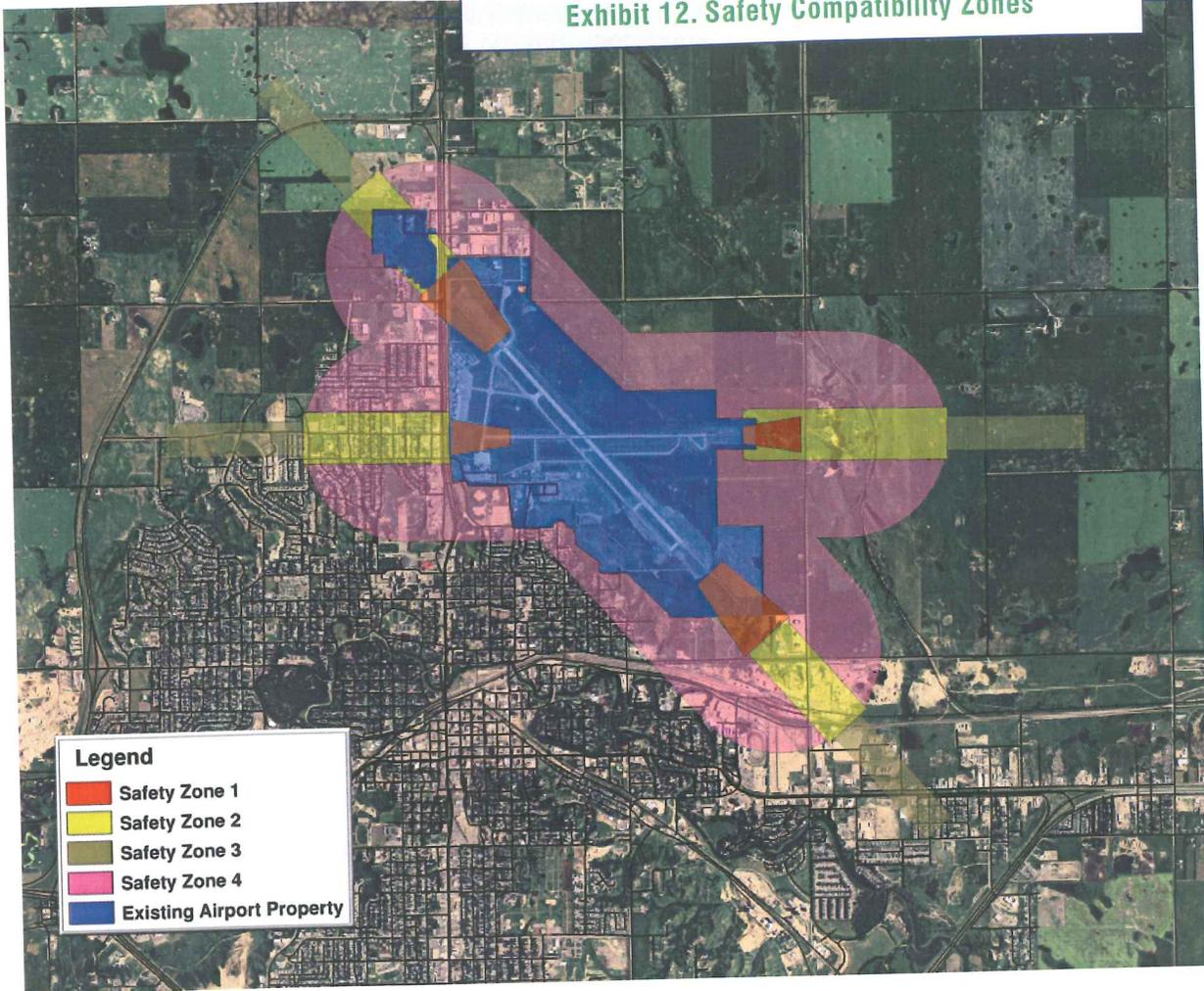
The city of Minot recognizes its role in controlling airspace but has not formerly adopted zoning that specifically protects airspace required for the safe and effective operation of MOT. The commonly accepted method of implementing height and hazard control policies is through adoption of overlay zoning. North Dakota Century Code empowers the city to adopt zoning for airport hazards.

Appendix B contains a sample airport overlay zoning ordinance from the North Dakota Airport Managers Manual. Overlay zoning specifically for airspace adds height and hazard controls to the existing zoning ordinance without otherwise superseding the existing zoning ordinance. This sample ordinance could be adapted for Minot's use in developing a suitable zoning ordinance as part of a comprehensive airport land use compatibility review process.

Safety Category

A safety compatibility map was derived for MOT that includes four compatibility zones. Each safety compatibility zone is assigned development criteria involving acceptable and prohibited land uses and maximum development densities where structures are acceptable. **Exhibit 12 provides an illustration of the safety compatibility zones and Table 3 outlines the development criteria for each zone.** Each zone and its criteria approximately relate to the degree risk of aircraft accidents within each zone. As compared to the California Airport Land Use Planning Handbook, the proposed safety compatibility map for MOT uses fewer

Exhibit 12. Safety Compatibility Zones



zones and less intense development criteria. This change was made to reflect the actual development character of the city of Minot. Communities adopting safety compatibility zones incorporate the information into their comprehensive plans and zoning ordinances.

A description of each of the MOT safety compatibility zones is detailed in the following paragraphs. Note that the land designated as airport property is not included in the safety compatibility zones because it is already designated solely for airport compatible uses. Existing developed land uses would not be affected by the proposed safety compatibility criteria.

Table 3. Safety Compatibility Zones

Safety Zone Locations	Standards			Additional Criteria	
	Minimum Parcel Size	Other Uses		Unacceptable Uses ³	Other Development Conditions
		maximum people / ac ²			
		Average ⁴	Single Acre ⁵		
1 Within Runway Protection Zone ⁶	No Buildings Allowed	0	0	<ul style="list-style-type: none"> ■ All structures except ones with location set by aeronautical function ■ Assemblages of people ■ Storage of hazardous materials ■ Hazards to flight⁷ 	<ul style="list-style-type: none"> ■ Avigation easement dedication⁸
2 Inner Approach/Departure Zone	No New Dwellings Allowed Except on Existing Legal Lot ¹	40	100	<ul style="list-style-type: none"> ■ Children's schools, day care centers, libraries ■ Hospitals, nursing homes; places of worship ■ Buildings with >2 above ground habitable floors. ■ Above ground bulk storage of hazardous materials⁹ ■ Highly noise-sensitive outdoor nonresidential uses¹⁰ ■ Hazards to flight⁷ 	<ul style="list-style-type: none"> ■ Locate structures maximum distance from extended runway centerline ■ Critical community infrastructure facilities generally unacceptable^{11, 12} ■ Avigation easement dedication⁸

continued on page 20

1. Single-family dwellings on legal lots or record are permissible. Clustering of units is encouraged. Densities are to be calculated in terms of site size. Noise level reduction and avigation easement requirements for the compatibility zone in which the dwellings are to be located are to be applied.
2. Usage intensity calculations shall include all people (e.g., employees, customers/visitors, etc.) who may be on the property at a single point in time, whether indoors or outside.
3. The uses listed here are ones that are explicitly unacceptable regardless of whether they meet the intensity criteria. In addition to these explicitly unacceptable uses, other uses will not be permitted in the respective compatibility zones because they do not meet the usage intensity criteria.
4. The total number of people permitted on a project site at any time, except rare special events, must not exceed the indicated usage intensity times the gross acreage of the site. Rare special events are ones (such as an air show at the airport) for which a facility is not designed and normally not used and for which extra safety precautions can be taken as appropriate.
5. Clustering of nonresidential development is permitted. However, no single acre of a project site shall exceed the indicated number of people per acre.
6. Runway protection zone (RPZ) that delineate Zone 1 are derived from locations indicated on the airport layout plan. Zone 1 is typically on airport property or otherwise under airport control.
7. Hazards to flight include physical (e.g., tall objects), visual, and electronic forms of interference with the safety of aircraft operations. Land use development that may cause the attraction of birds to increase is also unacceptable.
8. As part of certain real estate transactions involving residential property within any compatibility zone (that is, anywhere within an airport influence area), information regarding airport proximity and the existence of airport overflights should be disclosed. Easement dedication and deed notice requirements indicated for specific compatibility zones would apply only to new development and to reuse if discretionary approval is required.
9. Storage of aviation fuel and other aviation-related flammable materials on the airport is exempted from this criterion. Storage of up to 6,000 gallons of nonaviation flammable or other hazardous materials is also exempted.
10. Examples of highly noise-sensitive outdoor nonresidential uses that are unacceptable include amphitheatres and drive-in theaters. Caution should be exercised with respect to uses such as poultry farms and nature preserves.
11. Critical community facilities include power plants, electrical substations, and public communications facilities.
12. Generally unacceptable uses are those that are incompatible with airport operations. These uses should not be permitted unless no feasible alternative is available.
13. Although no explicit upper limit on usage intensity is defined for Zone 4, land uses of the types listed—uses that attract very high concentrations of people in confined areas—are generally unacceptable in locations below or near the principle arrival and departure flight tracks.

Safety Zone Locations	Standards			Additional Criteria	
	Minimum Parcel Size	Other Uses <i>maximum people / ac²</i>		Unacceptable Uses ³	Other Development Conditions
		Average ⁴	Single Acre ⁵		
3 Flight Corridor Zone	≤ 40.0 ac ¹	100	250	<ul style="list-style-type: none"> ■ Children's schools, day care centers, libraries ■ Hospitals, nursing homes ■ Buildings with >3 above ground habitable floors. ■ Highly noise-sensitive outdoor nonresidential uses¹⁰ ■ Hazards to flight⁷ 	<ul style="list-style-type: none"> ■ Above ground bulk storage of hazardous materials generally unacceptable⁹ ■ Deed notice required⁸
4 Traffic Pattern Protection Zone	No Restriction ¹³			<ul style="list-style-type: none"> ■ Highly noise-sensitive outdoor nonresidential uses¹⁰ ■ Hazards to flight⁷ 	<ul style="list-style-type: none"> ■ Children's schools, hospitals, nursing homes generally unacceptable¹² ■ Major spectator-oriented sports stadiums, amphitheaters, concert halls generally unacceptable ■ Deed notice required⁸

1. Single-family dwellings on legal lots or record are permissible. Clustering of units is encouraged. Densities are to be calculated in terms of site size. Noise level reduction and aviation easement requirements for the compatibility zone in which the dwellings are to be located are to be applied.
2. Usage intensity calculations shall include all people (e.g., employees, customers/visitors, etc.) who may be on the property at a single point in time, whether indoors or outside.
3. The uses listed here are ones that are explicitly unacceptable regardless of whether they meet the intensity criteria. In addition to these explicitly unacceptable uses, other uses will not be permitted in the respective compatibility zones because they do not meet the usage intensity criteria.
4. The total number of people permitted on a project site at any time, except rare special events, must not exceed the indicated usage intensity times the gross acreage of the site. Rare special events are ones (such as an air show at the airport) for which a facility is not designed and normally not used and for which extra safety precautions can be taken as appropriate.
5. Clustering of nonresidential development is permitted. However, no single acre of a project site shall exceed the indicated number of people per acre.
6. Runway protection zone (RPZ) that delineate *Zone I* are derived from locations indicated on the airport layout plan. *Zone I* is typically on airport property or otherwise under airport control.
7. Hazards to flight include physical (e.g., tall objects), visual, and electronic forms of interference with the safety of aircraft operations. Land use development that may cause the attraction of birds to increase is also unacceptable.
8. As part of certain real estate transactions involving residential property within any compatibility zone (that is, anywhere within an airport influence area), information regarding airport proximity and the existence of airport overflights should be disclosed. Easement dedication and deed notice requirements indicated for specific compatibility zones would apply only to new development and to reuse if discretionary approval is required.
9. Storage of aviation fuel and other aviation-related flammable materials on the airport is exempted from this criterion. Storage of up to 6,000 gallons of nonaviation flammable or other hazardous materials is also exempted.
10. Examples of highly noise-sensitive outdoor nonresidential uses that are unacceptable include amphitheaters and drive-in theaters. Caution should be exercised with respect to uses such as poultry farms and nature preserves.
11. Critical community facilities include power plants, electrical substations, and public communications facilities.
12. Generally unacceptable uses are those that are incompatible with airport operations. These uses should not be permitted unless no feasible alternative is available.
13. Although no explicit upper limit on usage intensity is defined for Zone 4, land uses of the types listed—uses that attract very high concentrations of people in confined areas—are generally unacceptable in locations below or near the principle arrival and departure flight tracks.

Zone 1 – Runway Protection Zones. This zone consists of the runway protection zone (RPZ) located within the inner approach area at each runway end. The total area, shape and development criteria used for Zone 1 are consistent with the ultimate RPZ's shown on the FAA approved ALP and comply with the RPZ design standards in FAA AC 150/53000-13.

Zone 1 prohibits all development that is not necessary for aeronautical purposes. All land within this zone should be owned by the airport in order to provide the level of control commensurate with the high level of accident risk the area is subject to. The high level of aircraft noise experienced in this area also makes nearly all forms of development incompatible. When airport ownership is not possible, aviation easements should be secured. Aviation easements convey rights of aircraft overflight, creation of noise and vibrations, limitations on the heights of structures and trees, and prohibit uses that involve congregations of people.

Zone 2 – Inner Approach & Departure Zone. This zone includes the portion of the inner, final approach located immediately outside of the RPZ's (Zone 1). Zone 2 is the area normally residing outside of airport property that is exposed to the highest noise levels and greatest risk of an aircraft accident. Aircraft in this zone operate at very low altitudes and during takeoffs, under full thrust power. This combination of aircraft operation factors creates the moderate levels of noise and increased risk of accidents. Crosswind Runway 8-26 is seeing an increase in use as the airline transitions to smaller aircraft. For that reason, the safety compatibility zones are the same dimensions as those proposed for Runway 13-31.

Zone 2 prohibits all new residential buildings except on existing legal lots. Ownership of residential development rights for this area is recommended if the area is subject to residential development. When airport ownership is not possible, aviation easements should be secured. Commercial and industrial development is acceptable for uses involving low densities of people per acre (average of no more than 40 people per acre). Schools, hospitals, churches and similar uses are not acceptable uses. Above ground storage of fuel or other hazardous materials should be avoided. When airport ownership is not possible, aviation easements should be secured. Aviation easements convey rights of aircraft overflight, creation of noise and vibrations, limitations on the heights of structures and trees, and prohibit uses that involve concentrations of people.

Zone 3 – Flight Corridor Zone. This zone includes the outer portion of the final approach and departure corridor. Aircraft operate within this zone at altitudes of approximately 800 to 1,500 feet above airport elevation. Development in this area is exposed to moderate levels of aircraft noise and moderate risk of aircraft accidents by virtue of its location on the extended centerline of the runway. The outer boundary of Zone 3 extends approximately 10,000 feet from the runway end to which it is associated.

Zone 3 should be avoided for residential development in order to minimize the number of persons living near the flight corridor. Where residential development is allowed, rural residential densities should be maintained. Deed notices should be required for all residential development, and notice should also be required in residential rental agreements. Schools, hospitals, churches and similar uses are not acceptable uses. Above ground storage of fuel or other hazardous materials should be avoided. Commercial and industrial development is acceptable for uses involving moderate densities of people per acre (average of no more than 100 people per acre).

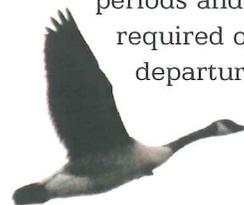
Zone 4 – Traffic Pattern Protection Zone. This zone is representative of the traffic pattern flown by small aircraft the use MOT. Whereas large aircraft typically operate straight in/out runway operations, small aircraft typically fly a traffic pattern that parallels the runways as part of takeoff or landing maneuvers. Small aircraft generally fly the traffic pattern at an altitude that is approximately 1,000 feet above the airport and remain within no more than one-half mile from the runway centerline. Zone 4 extends approximately one-half mile from each runway in order to encompass the traffic pattern flown by small aircraft. Zone 4 is subject to low levels of noise occurring during individual events as an airplane flies overhead. The risk of an accident is also low within this zone.

Zone 4 requires no specific restrictions on residential or other forms of development. Schools, hospitals, churches and similar uses are not acceptable uses. Deed notices should be required for all residential development, and notice should also be required in residential rental agreements. Major spectator oriented facilities should be avoided due to the concentrations of people they produce and exposure to aircraft noise interference.

Implementation of the above safety compatibility zones by the city of Minot requires further analysis to determine whether the existing zoning ordinance can be modified to incorporate the intent of the zones as presented, or whether new zoning in the form of overlay zoning should be adopted. Preliminarily, it appears that the existing zoning ordinance is largely compatible with the existing zoning ordinance, and perhaps it may be most effective to modify the existing ordinance to address the few differences that there are between the ordinance and the safety compatibility zones.

Wildlife

Wildlife, particularly birds, are of concern for aircraft operating within the central migration flyway in which MOT is located. Activity by migrating birds is particularly intense during spring and fall migration periods and extra vigilance to monitor bird numbers and movements is required of pilots, the MOT FAA Air Traffic Control Tower and approach/departure radar operators located Minot Air Force Base.

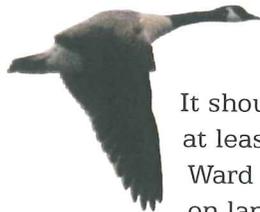


MOT is operated according to the requirements of an FAA approved Wildlife Hazard Management Plan. This plan was prepared using data on actual wildlife activity recorded in a Wildlife Hazard Assessment prepared by the USDA Wildlife Services. It is important to note that the Wildlife Hazard Assessment and Wildlife Hazard Management Plan focused on wildlife activity within airport property whereas land use compatibility that is the subject of the present effort deals primarily with land surrounding the airport. Where land use compatibility is addressed in the Wildlife Hazard Management Plan, the arrangement specified is that the airport director would be vigilant of development proposals that may cause the attraction of wildlife activity near the airport. This is the manner in which potential wildlife attractants are presently addressed in Minot and has been an effective means to date.

MOT has received federal grant-in-aid assistance and must use the standards and practices contained in AC 150/5200-33B, Hazardous Wildlife Attractants On or Near Airports. MOT services commercial airline operations under the authority of an Airport Operating Certificate issued under Title 14, Code of Federal Regulations (CFR), Part 139, Certification of Airports, Subpart D (Part 139). FAR Part 139 requires holders of an Airport Operating Certificate to comply with the wildlife hazard management requirements of Part 139. Compliance would normally be satisfied through implementation of the standards and practices contained in AC 150/5200-33B.

Exhibit 13 was prepared for MOT and the city of Minot to illustrate the zones surrounding the airport where land use compatibility controls must be implemented to help minimize wildlife attractants. **Table 4** lists from AC 150/5200-33B the types of facilities and activities that are not considered compatible with airport operations because they typically attract wildlife of concern to aircraft safety.

Implementation of these land use compatibility standards for wildlife attractants may be effected through comprehensive planning and a plan review and permitting process. The nature of many of these types of activities and facilities makes zoning a less effective method of producing an effective outcome for all participants. For example, storm water management facilities are on the list of facilities to be avoided but may be designed to greatly minimize the attractiveness of the facility to wildlife. The best method of implementing the land use compatibility related to wildlife attractants will be determined by the city of Minot.



It should be noted that the Wildlife General Zone which extends at least five miles from the airport encompasses portions of Ward County and the cooperation of the county will be required on lands located northeast of MOT.

Exhibit 13. Wildlife Attractant Zones

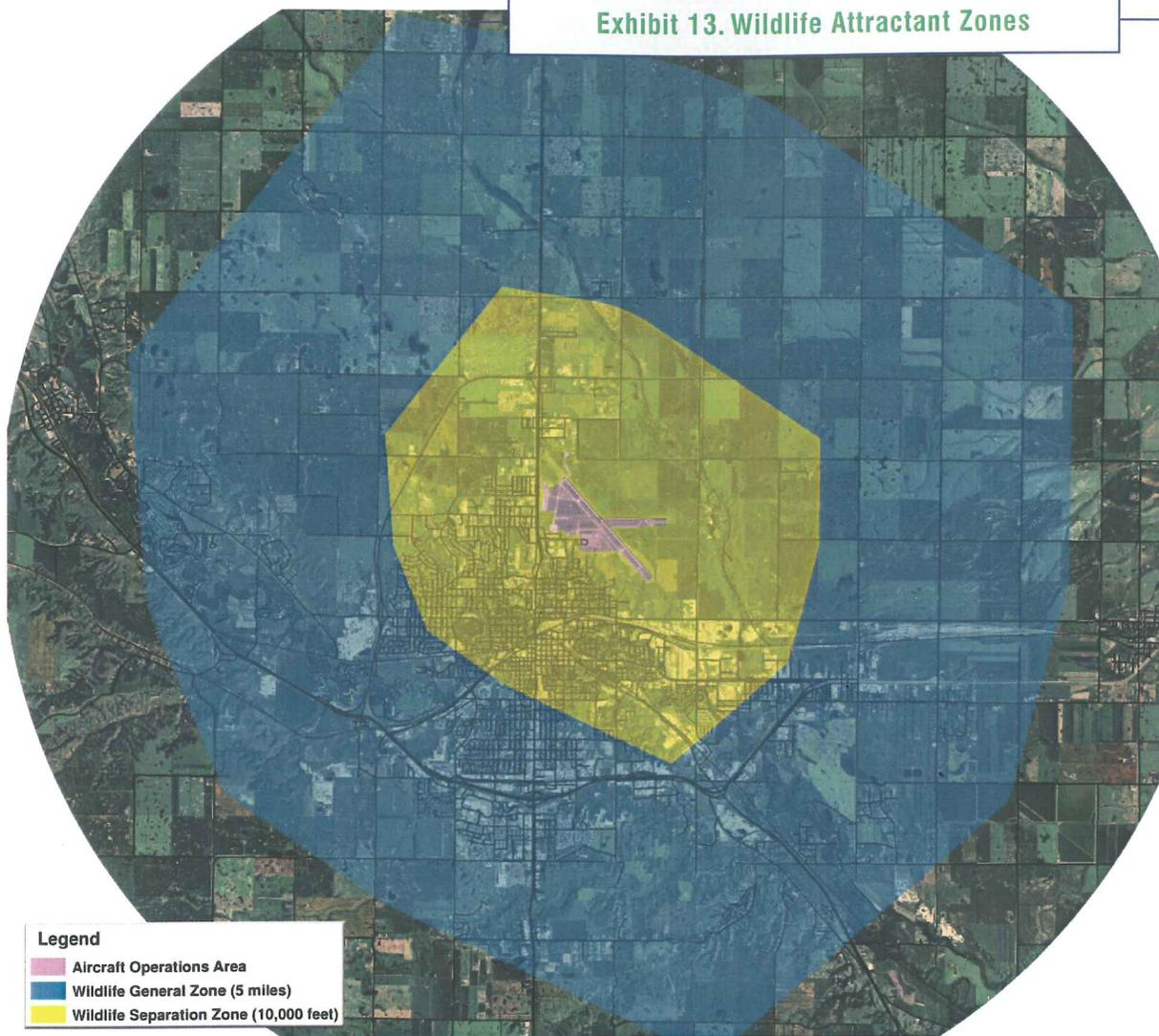


Table 4. FAA AC 150/5200-33B, "Hazardous Wildlife Attractants On or Near Airports"

Land Use Guidance as Related to Wildlife Attractants	
Typically not recommended within 10,000 feet of airports using turbine-powered aircraft	
1.	New Landfills (prohibited within 6 statute miles of airports)
2.	Existing waste disposal facilities (unless they can show it does not pose a bird hazard)
3.	Underwater waste discharges
4.	Existing storm water management facilities (unless modified so as to minimize attractiveness to wildlife)
5.	New storm water management facilities (unless designed so as to minimize attractiveness to wildlife)
6.	Existing wastewater treatment facilities
7.	Artificial marshes, stock ponds and recreational lakes
8.	Wastewater discharge and sludge disposal
9.	Wetlands that attract wildlife
10.	Dredge spoil containment areas (if they contain materials that would attract wildlife)
11.	Agricultural crops (may be grown w/in 10,000 feet-follow separation distances in "Minimum Distances Between Certain Airport Features and Any On Airport Agricultural Crops")
12.	Confined livestock operations (feedlots, dairy operations, hog/chicken production facilities, etc)
13.	Aquaculture (unless they can show it does not pose a bird hazard)
14.	Golf courses (allowed if they develop a program to reduce wildlife attractiveness)
Typically not recommended within 5 mile radius of airport:	
1.	New Landfills: prohibited within 6 statute miles of airports
2.	New wastewater treatment facilities
3.	New golf courses
4.	Any items listed above if they would cause wildlife movement across approach/departure surface
Typically compatible with airports:	
1.	Enclosed trash transfer stations
2.	Composting operations (yard waste; does not include food/municipal solid waste)
3.	Recycling centers
4.	Construction and demolition debris facilities
5.	Fly ash disposal

Conclusion

The implementation of the recommended measures in this chapter will help bring about compatibility between the uses of land surrounding the airport and airport operations. Implementation will also help ensure that MOT remains in compliance with applicable FAA and state requirements for airport land use compatibility and flight hazards. Additional work on the part of the city will be required to arrive at the best methods of transforming these recommendations into active land use policies.

Adjustments to some of the zone boundaries and development criteria may be necessary to arrive at the best solution. These adjustments may be made to best fit zone boundaries to area topographic and geographic features. Consideration should be given to existing urban development, or lack of development, in order to arrive at the final zone boundaries and development criteria. Further, land use is a dynamic process and periodic updates to map boundaries, development criteria and overall policies will be necessary.

This draft plan was reviewed and discussed with the Airport Director and City Planner. Their comments were incorporated into the plan. It was determined that the best course of action to implement the airport land use compatibility plan is to incorporate it into a forthcoming planning process that will result in an update to the city's comprehensive plan. According to North Dakota law (40-47-03), zoning regulations shall be consistent with the community's comprehensive plan. Approaching implementation in this manner ensures an effective planning process, meets state laws, and provides public involvement opportunities.

Some important things to keep in mind in drafting final airport land use policies are listed below:

- The approach/departure corridors at each runway end are critical for the safe passage of aircraft and protection of persons and property on the ground. Runway protection zones should be owned and controlled by the airport, and low density land uses that are compatible with aircraft noise and vibrations should be developed within the remaining portions of the approach/departure corridors.
- The aircraft used by Delta Airlines recently transitioned from DC-9 to EMB-175. The EMB-175 is a smaller aircraft and is suited to regular operations on Runway 8-26. The ATC tower reported that between the middle of June 2009 and end of September 2009, approximately 18 percent of jet takeoffs and landings occurred on Runway 8-26. The majority of these operations were conducted by airline aircraft. This change in the airline fleet indicates that future uses for undeveloped land within Runway 8-26 approach/departure corridors should be formulated similar to Runway 13-31.
- Additionally, coordination between the airport, ATC control tower, airline and other jet operators should occur with emphasis on avoiding jet

takeoffs on Runway 26 and jet landings on Runway 8. Information from ATC tower shows that approximately five percent of all jet operations involve takeoffs on Runway 26 and landings on Runway 8. Both types of operations should be avoided when wind conditions allow. This step would reduce impacts to residential and other incompatible land uses in the area immediately west of the airport. Note that future proposed plans to relocate the Runway 8 threshold farther east will improve this situation but will not entirely mitigate impacts.