

**Appendix A**

**OAR 660 Division 13**

**EXHIBITS**

**These attachments, as they apply to public use airports, are intended to reflect Federal Aviation (FAA ) Regulations (FARS) and Design Standards, as amended. These attachments, as they apply to privately owned, private use airports, reflect State Standards.**

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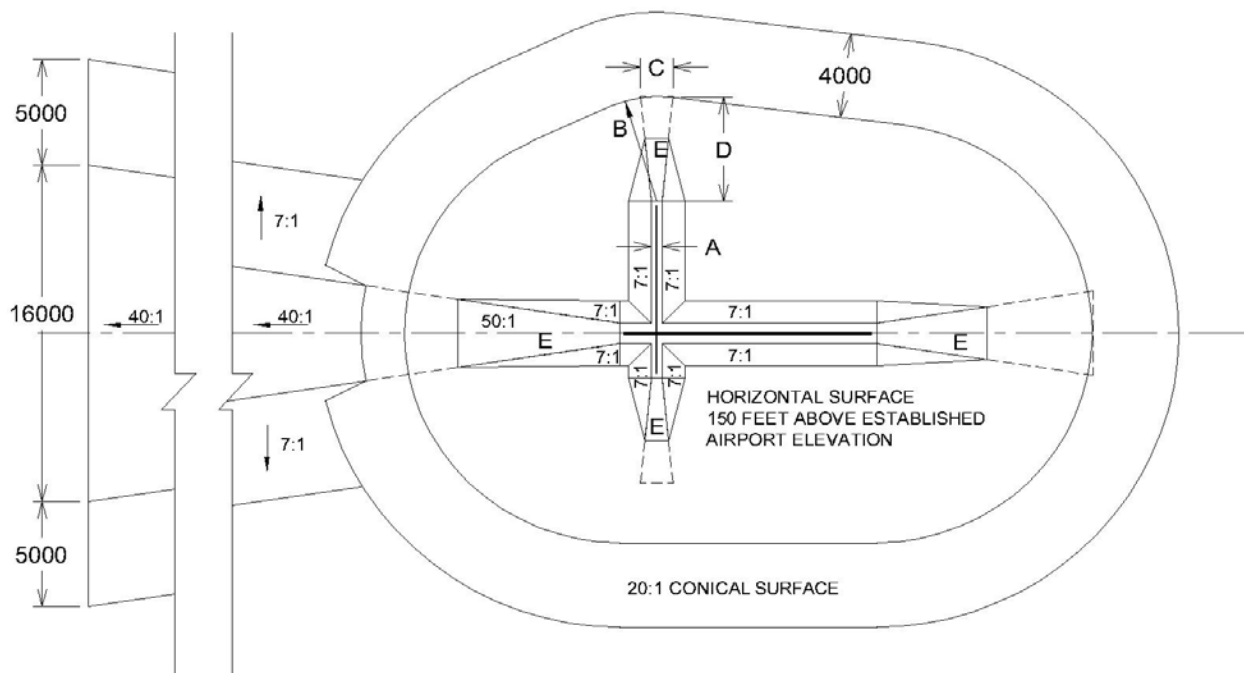
## Exhibit #1 – Public Use Airport Overlay Zone

1. Airport Approach Zone means the land that underlies the approach surface, excluding the Runway Protection Zone.
2. Airport Imaginary Surfaces mean surfaces established with relation to the airport and to each runway based on the category of each runway according to the type of approach available or planned for that runway. The slope and dimensions of the approach surface applied to each end of the runway shall be determined by the most precise approach existing or planned for that runway end.
3. Approach Surface means a surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the primary surface. An approach surface is applied to each end of the runway based upon the type of approach available or planned for that runway end.
  - a) The inner edge of the approach surface is the same width as the primary surface and it expands uniformly to a width of:
    - A) 1,250 feet for that end of a utility runway with only visual approaches.
    - B) 1,500 feet for that end of a runway other than a utility runway with only visual approaches.
    - C) 2,000 feet for that end of a utility runway with a non-precision instrument approach.
    - D) 3,500 feet for that end of a non-precision instrument runway other than utility, having visibility minimums greater than three-fourths statute mile.
    - E) 4,000 feet for that end of a non-precision instrument runway, other than utility, having a non-precision instrument approach with visibility minimums as low as three-fourths statute mile.
    - F) 16,000 feet for precision instrument runways.
  - b) The approach surface extends for a horizontal distance of:
    - A) 5,000 feet at a slope of 20 to 1 for all utility and visual runways.
    - B) 10,000 feet at a slope of 34 to 1 for all non-precision instrument runways other than utility.
    - C) 10,000 feet at a slope of 50 to 1 with an additional 40,000 feet at a slope of 40 to 1 for all precision instrument runways.
  - c) The outer width of an approach surface to an end of a runway will be that width prescribed in this subsection for the most precise approach existing or planned for that runway end.

4. Conical Surface means a surface extending outward and upward from the periphery of the horizontal surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet.
5. Horizontal Surface means a horizontal plane 150 feet above the established airport elevation, the perimeter of which is constructed by swinging arcs of specified radii from the center of each end of the primary surface of each runway of each airport and connecting the adjacent arcs by lines tangent to those arcs. The radius of each arc is:
  - a) 5,000 feet for all runways designated as utility or visual.
  - b) 10,000 feet for all other runways.
  - c) The radius of the arc specified for each end of a runway will have the same arithmetical value. That value will be highest determined for either end of the runway. When a 5,000 foot arc is encompassed by tangents connecting two adjacent 10,000 foot arcs, the 5,000 foot arc shall be disregarded on the construction of the perimeter of the horizontal surface.
6. Primary Surface means a surface longitudinally centered on a runway. When the runway has a specially prepared hard surface, the primary surface extends 200 feet beyond the end of that runway, but when the runway has no specially prepared hard surface, or planned hard surface, the primary surface ends at the end of that runway. The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline. The width of the primary surface of a runway will be that width prescribed in this section for the most precise approach existing or planned for either end of the runway. The width of the primary surface is:
  - a) 250 feet for utility runways having only visual approaches.
  - b) 500 feet for utility runways having non-precision approaches
    - A) For other than utility runways the width is:
      - i) 500 feet for visual runways having only visual approaches,
      - ii) 500 feet for non-precision instrument runways having visibility minimums greater than three-fourths statute mile, and
      - iii) 1,000 feet for non-precision instrument runway having a non-precision instrument approach with visibility minimum as low as three-fourths of a statute mile, and for precision instrument runways.
7. Transitional Surface means those surfaces which extend upward and outward at 90 degree angles to the runway centerline and the runway centerline extended at a slope of seven (7) feet horizontally for each foot vertically from the sides of the primary and approach surfaces to the point of intersection with the horizontal and conical surfaces. Transitional surfaces for those portions of the precision approach surfaces, which project through

and beyond the limits of the conical surface, extend a distance of 5,000 feet measured horizontally from the edge of the approach surface and at a 90 degree angle to the extended runway centerline.

8. Non-Precision instrument runway means a runway having an existing instrument approach procedure utilizing air navigation facilities with only horizontal guidance, or area type navigation equipment, for which a straight-in non-precision instrument approach procedure has been approved, or planned, and for which no precision approach facilities are planned, or indicated on an FAA planning document.
9. Precision instrument runway means a runway having an existing instrument approach procedure utilizing an instrument approach procedure utilizing an Instrument Landing System (ILS), or a Precision Approach Radar (PAR). It also means a runway for which a precision approach system is planned and is so indicated by an FAA approved airport layout plan or any other FAA planning document.
10. Runway Protection Zone (RPZ) means an area off the runway end to enhance the protection of people and property on the ground. The dimensions of the RPZ for Public-use airports shall be as depicted in attachment #4 of these rules.
11. Utility runway means a runway that is constructed for and intended to be used by propeller driven aircraft of 12,500 maximum gross weight and less.
12. Visual runway means a runway intended solely for the operations of aircraft using visual approach procedures, with no straight-in instrument approach procedure and no instrument designation indicated on an FAA approved airport layout plan, or by any planning document submitted to the FAA by competent authority.



| DIM | ITEM                                                          | DIMENSIONAL STANDARDS |       |                                   |        |        |                               |
|-----|---------------------------------------------------------------|-----------------------|-------|-----------------------------------|--------|--------|-------------------------------|
|     |                                                               | Visual Runway         |       | Non-Precision Instrument Runway   |        |        | Precision Instrument Runway   |
|     |                                                               | A                     | B     | A                                 | B      | D      |                               |
| A   | Width Primary Surface and Approach Surface Width at Inner End | 250                   | 500   | 500                               | 500    | 1,000  | 1,000                         |
| B   | Radius of Horizontal Surface                                  | 5,000                 | 5,000 | 5,000                             | 10,000 | 10,000 | 10,000                        |
|     |                                                               | Visual Approach       |       | Non-Precision Instrument Approach |        |        | Precision Instrument Approach |
|     |                                                               | A                     | B     | A                                 | B      | D      |                               |
| C   | Approach Surface Width at End                                 | 1,250                 | 1,500 | 2,000                             | 3,500  | 4,000  | 16,000                        |
| D   | Approach Surface Length                                       | 5,000                 | 5,000 | 5,000                             | 10,000 | 10,000 | *                             |
| E   | Approach Slope                                                | 20:1                  | 20:1  | 20:1                              | 34:1   | 34:1   | *                             |

A – Utility Runways

B – Runways Larger Than Utility

C – Visibility Minimums Greater Than ¾ Mile

D – Visibility Minimums As Low As ¾ Mile

\* – Precision Instrument Approach Slope is 50:1 for Inner 10,000 Feet and 40,000 feet

## **Exhibit #2 – Private Use Airport Overlay Zone**

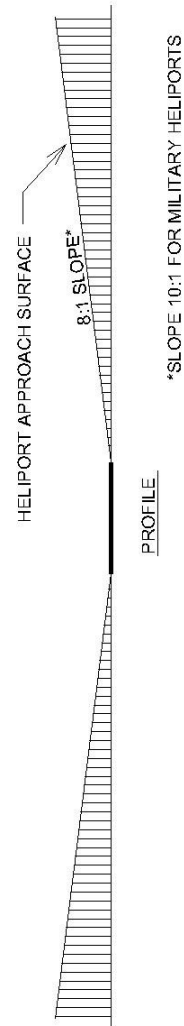
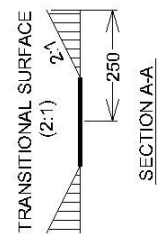
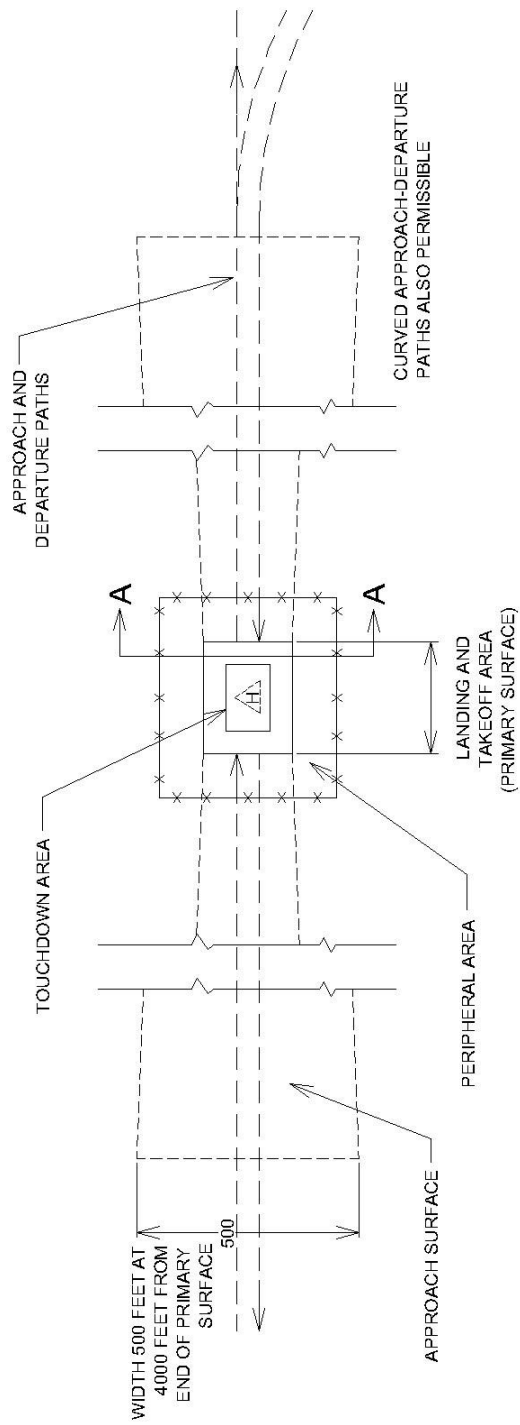
1. Airport Imaginary Surfaces mean surfaces established with relation to the airport and to each runway based on the category of each runway according to the type of approach available or planned for that runway. The slope and dimensions of the approach surface applied to each end of the runway shall be determined by the most precise approach existing or planned for that runway end.
2. Approach Surface means a surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the primary surface. An approach surface is applied to each end of each runway. The inner edge of the approach surface is the same width as the primary surface and expands uniformly to a width of 450 feet for that end of a private use airport with only visual approaches. The approach surface extends for a horizontal distance of 2,500 feet at a slope of twenty to one.
3. Primary Surface means a surface longitudinally centered on a runway. The primary surface ends at each end of the runway. The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline. The width of the primary surface is 200 feet for the Private Use airport runways.



| DIM | ITEM                                                             | DIMENSIONAL STANDARDS IN FEET |
|-----|------------------------------------------------------------------|-------------------------------|
| A   | WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END | 200                           |
| B   | APPROACH SURFACE WIDTH AT THE END                                | 450                           |
| C   | APPROACH SURFACE LENGTH                                          | 2500                          |
| D   | APPROACH SLOPE                                                   | 20:1                          |

### **Exhibit #3 – Heliport Overlay Zone**

1. Heliport means an area of land, water, or structure designated for the landing or take-off of helicopters or other rotorcraft.
2. Heliport Imaginary Surfaces means airport imaginary surfaces as they apply to heliports.
3. Heliport Approach Surface means the approach surface beginning at each end of the heliport primary surface and has the same width as the primary surface. The surface extends outward and upward for a horizontal distance of 4,000 feet where its width is 500 feet. The slope of the approach surface is 8 to 1 for civil heliports and 10 to 1 for military heliports.
4. Heliport Instrument Procedure Surfaces means the criteria for heliports set forth in the United States Standard for Terminal Instrument Procedures.
5. Heliport Primary Surface means the area of the primary surface that coincides in size and shape with the designated take-off and land area of a heliport. This surface is a horizontal plane at the established heliport elevation.
6. Heliport Transitional Surfaces means surfaces extending outward and upward from the lateral boundaries of the heliport primary surface and from the approach surfaces at a slope of 2 to 1 for a distance of 250 feet measured horizontally from the centerline of the primary and approach surfaces.

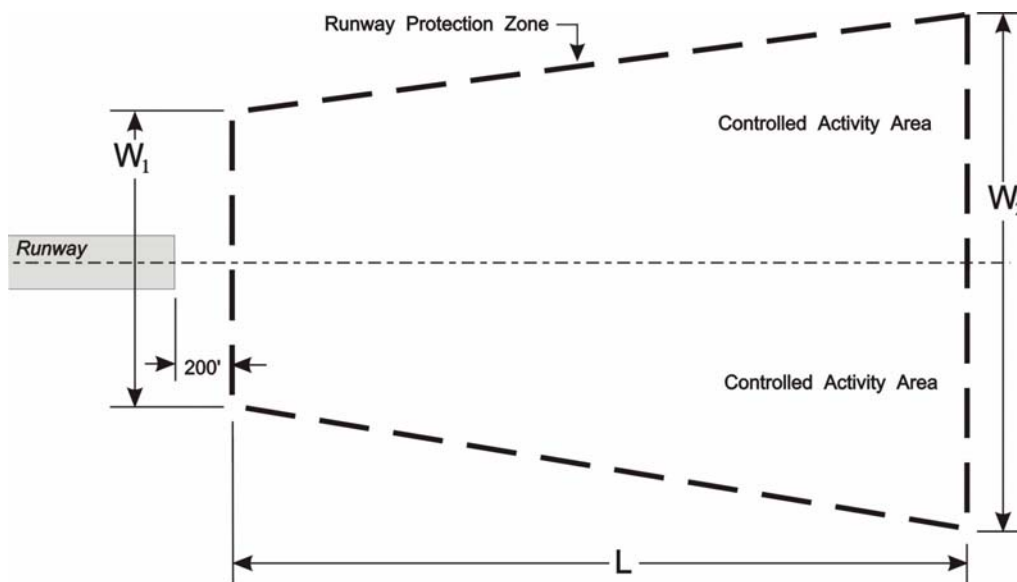


\*SLOPE 10:1 FOR MILITARY HELIPORTS

## **Exhibit #4 – Runway Protection Zone**

Runway Protection Zone (RPZ) means an area off the runway end to enhance the protection of people and property on the ground. The Runway Protection Zone is trapezoidal in shape and centered about the extended runway centerline. The RPZ dimension for a particular runway end is a function of the type of aircraft and the approach visibility minimum associated for that runway end.

- a) The RPZ extends from each end of the primary surface, as defined in Attachment 1, Section 10, for a horizontal distance of:
  - A) 1,000 feet for all utility and visual runways.
  - B) 1,700 feet for all non-precision instrument runways other than utility.
  - C) 2,500 feet for all precision instrument runways.

**Exhibit #4 - Runway Protection Zone and Dimension Requirements****Runway Protection Zone Dimension Requirements**

| Approach<br>Visibility<br>Minimums <sup>1</sup> | Facilities<br>Expected to<br>Serve    | Dimensions    |                             |                             |                |
|-------------------------------------------------|---------------------------------------|---------------|-----------------------------|-----------------------------|----------------|
|                                                 |                                       | Length<br>(L) | Inner<br>Width<br>( $W_1$ ) | Outer<br>Width<br>( $W_2$ ) | RPZ<br>(acres) |
| Visual and<br>Not lower<br>than<br>1 Mile       | Small Aircraft<br>Exclusively         | 1,000         | 250                         | 450                         | 8.035          |
|                                                 | Aircraft Approach<br>Categories A & B | 1,000         | 500                         | 700                         | 13.770         |
|                                                 | Aircraft Approach<br>Categories C & D | 1,700         | 500                         | 1,010                       | 29.465         |
| Not lower<br>than $\frac{3}{4}$ Mile            | All Aircraft                          | 1,700         | 1,000                       | 1,510                       | 48.978         |
| Lower than<br>$\frac{3}{4}$ Mile                | All Aircraft                          | 2,500         | 1,000                       | 1,750                       | 78.914         |

All dimensions in feet unless otherwise noted.

Source: FAA Advisory Circular 150/5300-13, *Airport Design*

**Note:**

<sup>1</sup>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 a RPZ begins other than 200 feet beyond the runway end, separate approach and departure RPZs should be provided. Refer to appendix 14 of FAA Advisory Circular 150/5300-13, *Airport Design*, for approach and departure RPZs.

| <b>Exhibit #5 – Noise Compatibility</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |                  |                  |                  |                  |                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------|------------------|------------------|------------------|------------------|
| <b>Legend:</b><br>Y (Yes) - Land use and related structures compatible without restrictions<br>N (No) - Land use and related structures are not compatible and should be prohibited<br>NLR - Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure<br>DNL - Average Day-Night Sound Level<br>25, 30, 35 - Land use and related structures generally compatible; measures to achieve NLR of 25, 30, 35 dB must be incorporated into design and construction of structure. |                 |                  |                  |                  |                  |                  |
| <b>Land Use</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Below 65</b> | <b>65-70</b>     | <b>70-75</b>     | <b>75-80</b>     | <b>85-85</b>     | <b>Over 85</b>   |
| <b>Residential</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 |                  |                  |                  |                  |                  |
| Residential, other than mobile homes and transient lodging                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Y               | N <sup>(1)</sup> | N <sup>(1)</sup> | N                | N                | N                |
| Mobile home parks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Y               | N                | N                | N                | N                | N                |
| Transient lodgings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Y               | N <sup>(1)</sup> | N <sup>(1)</sup> | N <sup>(1)</sup> | N                | N                |
| <b>Public</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |                  |                  |                  |                  |                  |
| Schools                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Y               | N <sup>(1)</sup> | N <sup>(1)</sup> | N                | N                | N                |
| Hospitals and nursing homes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Y               | 25               | 30               | N                | N                | N                |
| Churches, auditoriums, and concert halls                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Y               | 25               | 30               | N                | N                | N                |
| Government services                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Y               | Y                | 25               | 30               | N                | N                |
| Transportation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Y               | Y                | Y <sup>(2)</sup> | Y <sup>(3)</sup> | Y <sup>(4)</sup> | Y <sup>(4)</sup> |
| Parking                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Y               | Y                | Y <sup>(2)</sup> | Y <sup>(3)</sup> | Y <sup>(4)</sup> | N                |
| <b>Commercial</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |                  |                  |                  |                  |                  |
| Offices, business and professional                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Y               | Y                | 25               | 30               | N                | N                |
| Wholesale and retail - building materials, hardware and farm equipment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Y               | Y                | Y <sup>(2)</sup> | Y <sup>(3)</sup> | Y <sup>(4)</sup> | N                |
| Retail trade - general                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Y               | Y                | 25               | 30               | N                | N                |
| Utilities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Y               | Y                | Y <sup>(2)</sup> | Y <sup>(3)</sup> | Y <sup>(4)</sup> | N                |
| Communication                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Y               | Y                | 25               | 30               | N                | N                |

| <b>Exhibit #5 – Noise Compatibility (Continued)</b>    |                     |                  |                  |                  |                  |                    |
|--------------------------------------------------------|---------------------|------------------|------------------|------------------|------------------|--------------------|
| <b>Land Use</b>                                        | <b>Below<br/>65</b> | <b>65-70</b>     | <b>70-75</b>     | <b>75-80</b>     | <b>80-85</b>     | <b>Over<br/>85</b> |
| <b>Manufacturing &amp; Production</b>                  |                     |                  |                  |                  |                  |                    |
| Manufacturing - general                                | Y                   | Y                | Y <sup>(2)</sup> | Y <sup>(3)</sup> | Y <sup>(4)</sup> | N                  |
| Photographic and optical                               | Y                   | Y                | 25               | 30               | N                | N                  |
| Agricultural (except livestock) and forestry           | Y                   | Y <sup>(6)</sup> | Y <sup>(7)</sup> | Y <sup>(8)</sup> | Y <sup>(8)</sup> | Y <sup>(8)</sup>   |
| Livestock farming and breeding                         | Y                   | Y <sup>(6)</sup> | Y <sup>(7)</sup> | N                | N                | N                  |
| Mining and fishing, resource production and extraction | Y                   | Y                | Y                | Y                | Y                | Y                  |
| <b>Recreational</b>                                    |                     |                  |                  |                  |                  |                    |
| Outdoor sports arenas and spectator sports             | Y                   | Y <sup>(5)</sup> | Y <sup>(5)</sup> | N                | N                | N                  |
| Outdoor music shells, amphitheaters                    | Y                   | N                | N                | N                | N                | N                  |
| Nature exhibits and zoos                               | Y                   | Y                | N                | N                | N                | N                  |
| Amusement parks, resorts and camps                     | Y                   | Y                | Y                | N                | N                | N                  |
| Riding stables and water recreation                    | Y                   | Y                | 25               | 30               | N                | N                  |

Source: FAR Part 150, Appendix A, Table 1

**Notes:**

1. When the community determines that residential or school uses must be allowed, measures to achieve an outdoor to indoor NLR of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5,10 or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. The use of NLR criteria will not, however, eliminate outdoor noise problems.
2. Measures to achieve NLR of 25 dB 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.
3. Measures to achieve NLR of 30 dB 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.
4. Measures to achieve NLR of 35 dB 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.
5. Land use is compatible provided special sound reinforcement systems are installed.
6. Residential buildings require an NLR of 25 dB.
7. Residential buildings require an NLR of 30 dB.
8. Residential buildings not permitted.