

EXISTING USERS

	KC-10A (DC-10)	C-130	F-15	Q-200
Approach Speed (knots)	< 166	< 141	< 166	< 121
Wingspan (Feet)	165.4	132.6	42.8	85
Gross Weight (Pounds)	590,000	155,000	68,000	36,300
Gear Width (Feet)	40.25	16.44	10.35	29.70
Wheel Base (Feet)	72.4	32.1	17.8	26.08
Tail Height (Feet)	58.1	38.4	18.5	24.7
ARC	D-IV	C-IV	C-I	B-III

FUTURE USERS

	Q-400	CRJ-700	BBJ	G-550
Approach Speed (knots)	< 121	< 141	< 141	< 141
Wingspan (Feet)	93.3	76.3	117.4	93.5
Gross Weight (Pounds)	62,500	75,000	171,000	89,000
Gear Width (Feet)	38.18	15.18	21.62	15.76
Wheel Base (Feet)	27.8	44.0	56.3	38.1
Tail Height (Feet)	27.2	24.1	41.2	25.8
ARC	C-III	C-II	D-III	D-III

DESIGN AIRCRAFT SELECTION**Primary Airfield Facilities**

Current:	DC-10 (KC-10A)	ARC D-IV
Future:	No Change	No Change

Secondary Airfield Facilities

Current:	Q-200	ARC B-III
Future:	No Change	No Change

AIRCRAFT DESCRIPTION

- ▶ KC-10A: advanced tanker/cargo aircraft is a version of the Boeing [McDonnell Douglas] DC-10-30CF (convertible freighter).
- ▶ Lockheed C-130: military cargo aircraft with many variant models and missions. Information provided is for C-130H model.
- ▶ F-15: Boeing [McDonnell Douglas] F-15 tactical fighter used by OANG. Information provided is for the F-15B two-seat model that is based at Kingsley Field.
- ▶ Q-200: 30-seat turbo-prop operated by Horizon Air and originally manufactured as the DeHavilland Dash 8 200 Series.

AIRCRAFT DESCRIPTION

- ▶ Q-400: 70-seat turbo-prop operated by Horizon Air and originally designed as the DeHavilland Dash 8 400 Series.
- ▶ CRJ-700: 70-seat regional jet manufactured by Bombardier [Canadair] and operated by Horizon Air.
- ▶ BBJ: Boeing Business Jet is a large "corporate" jet that is a version of the Boeing 737 commercial airliner. The BBJ consists of a 700 series fuselage and an 800 series wing and landing gear design. Not included on the table is the stretched BBJ-2, which utilizes a longer 800 series fuselage.
- ▶ G-550: A large "corporate" jet manufactured by Gulfstream and commonly known by its former designation, the G-V.

TABLE TERMINOLOGY

- ▶ Gross Weight: Maximum certificated takeoff weight.
- ▶ Gear Width- distance between the outer edges of the main gear tires and calculated at 1.15 times the main gear centerline-to-centerline distance.
- ▶ Wheel Base: Centerline distance between the nose and main gear.
- ▶ Design Aircraft: the most critical aircraft using the airport on a regular basis (at least 500 annual operations).
- ▶ Secondary Airfield Facilities: the crosswind runway and related taxiways, which are restricted to a smaller design aircraft. Note that certain tenant facilities, e.g., T-hangars and aircraft parking areas, may utilize a smaller airport design group.

Table 3A

Aircraft Characteristics**Design Aircraft**


Item	FAA Airport Design Standards ¹				
	B-I (small)	B-II	B-III	C-III	D-IV
<i>Airport Reference Code</i>	B-I (small)	B-II	B-III	C-III	D-IV
Aircraft Approach Speed	<121 kts	<121 kts	<121 kts	< 141	<166 kts
Aircraft Wingspan	<49 ft.	<118 ft.	<118 ft.	< 118	<171 ft.
Aircraft Weight Group (lbs)	≤12,500	>12,500	>12,500	> 12,500	>12,500
<i>Approach Visibility Minimums</i>	Visual	Visual or 1 mile	Prim: ≥¼ mile Sec: Visual	Prim: <¼ mile Sec: ≥¼ mile	Prim: <¼ mile Sec: ≥¼ mile
<i>Runway Design</i>					
Width	60 ft.	100 ft.	100 ft.	150 ft. ²	150 ft.
Blast Pad					
Width	80 ft.	140 ft.	140 ft.	200 ft. ²	200 ft.
Length beyond Runway End	60 ft.	200 ft.	200 ft.	200 ft.	200 ft.
Safety Area					
Width	120 ft.	300 ft.	300 ft.	500 ft.	500 ft.
Length beyond Runway End	240 ft.	600 ft.	600 ft.	1,000 ft.	1,000 ft.
Obstacle Free Zone ³					
Shape ⁴	A	A	A	C	C
Width (W)	250 ft.	400 ft.	400 ft.	400 ft.	400 ft.
Vertical Height (H) ^{5,6}	NA	NA	NA	37.6 ft.	32.6 ft.
Slope (S)	NA	NA	NA	6:1	6:1
Object Free Area					
Width	250 ft.	800 ft.	800 ft.	800 ft.	800 ft.
Length beyond Runway End	240 ft.	600 ft.	600 ft.	1,000 ft.	1,000 ft.
Gradient (maximum)	2.0%	2.0%	2.0%	1.5% ⁷	1.5% ⁷
<i>Runway Setbacks</i>					
From Runway Centerline to:					
Parallel Runway Centerline ⁸	700 ft.	700 ft.	700 ft.	700 ft.	2,500 ft. ⁹
Hold Line ¹⁰	125 ft.	200 ft.	250 ft.	250 ft.	250 ft.
Parallel Taxiway	150 ft.	300 ft.	300 ft.	400 ft.	400 ft.
Aircraft Parking Line	125 ft.	400 ft.	400 ft.	500 ft.	500 ft.
Building Restriction Line ¹¹	370 ft.	495 ft.	745 ft.	745 ft.	745 ft.
Helipad for:					
Sm. Helicopters (≤ 6,000#)	300 ft.	500 ft.	500 ft.	500 ft.	500 ft.
Med. Helicopters (≤ 12,000#) lbs.)	500 ft.	500 ft.	500 ft.	500 ft.	500 ft.
Hvy. Helicopters (> 12,000#)	700 ft.	700 ft.	700 ft.	700 ft.	700 ft.
<i>Taxiway Design</i>					
Width	25 ft.	58.2 ¹²	58.2 ¹²	58.2 ¹²	75 ft.
Safety Area Width	49 ft.	118 ft.	118 ft.	118 ft.	171 ft.
<i>Taxiway and Taxilane Setbacks</i>					
From Taxiway Centerline to:					
Parallel Taxiway/Taxilane ^{13, a}	69 ft.	152 ft.	152 ft.	152 ft.	215 ft.
Fixed or Movable Object ^b	44.5 ft.	93 ft.	93 ft.	93 ft.	129.5 ft.
From Taxilane Centerline to:					
Parallel Taxilane ^{13, c}	64 ft.	140 ft.	140 ft.	140 ft.	198 ft.
Fixed or Movable Object ^d	39.5 ft.	81 ft.	81 ft.	81 ft.	112.5 ft.
<i>Runway Protection Zone¹⁴</i>					
Width at Inner End	250 ft.	500 ft.	1,000 ft.	1,000 ft.	1,000 ft.
Width at Outer End	450 ft.	700 ft.	1,510 ft.	1,750 ft.	1,750 ft.
Length	1,000 ft.	1,000 ft.	1,700 ft.	2,500 ft.	2,500 ft.

Table 3B


Airport Design Standards
Klamath Falls Airport

NOTES:


- ¹ Source: FAA Advisory Circular 150/5300-13, Change 7, *Airport Design* (October 2002).
- ² For airplane design group III serving airplanes with maximum certificated takeoff weights greater than 150,000 pounds, the standard runway width is 150 feet, the shoulder width is 25 feet, and the blast pad width is 200 feet.
- ³ Object Free Zone normally extends 200 feet beyond end of runway; additional length is required for runways with approach light systems.
- ⁴ Runway Obstacle Free Zone cross-section shapes:
- A:



B:



C:


- ⁵ Height increases 3 feet per 1,000 feet of airport elevation.
- ⁶ Indicated dimensions for runways with approach visibility minimums $< \frac{3}{4}$ mile are for Category I instrument runways. Criteria for Category II and Category III runways are more restrictive.
- ⁷ Maximum of 0.8% in first and last quarters of runway.
- ⁸ Indicated runway separation is for planning purposes. FAA air traffic control criteria permit simultaneous VFR operations by light, single-engine propeller airplanes with runways as close as 300 feet apart and by twin-engine propeller airplanes with runway separation of 500 feet. [FAA Order 7110.65N].
- ⁹ Separation requirements assume the presence of wake turbulence.
- ¹⁰ Source: FAA Advisory Circular 150/5340-1H, *Standards for Airport Markings* (August 1999).
- ¹¹ The FAA no longer has fixed-distance standards for the Building Restriction Line location. The indicated setback distances are based on providing 7:1 transitional slope clearance over a 35-foot building situated at the same base elevation as the adjacent runway and can be adjusted in accordance with local conditions.
- ¹² Taxiway width is greater than standard to provide adequate taxiway edge safety margin for the Q-400, which has an undercarriage width of 38.2 feet.
- ¹³ Assumes same size airplane uses both the first taxiway/taxilane and the adjacent taxiway/taxilane. Distance can be reduced if secondary taxiway/taxilane is limited to use only by smaller airplanes.
- ¹⁴ Dimensions provided are for the runway direction having the lowest approach minimums. Opposing runway direction may use a smaller RPZ.

Modification of Standards:

The values obtained from the following equations may be used to show that a modification of standards will provide an acceptable level of safety.

- ^a Taxiway centerline to parallel taxiway/taxilane centerline equals 1.2 times airplane wingspan plus 10 feet.
- ^b Taxiway centerline to fixed or movable object equals 0.7 times airplane wingspan plus 10 feet.
- ^c Taxilane centerline to parallel taxilane centerline equals 1.1 times airplane wingspan plus 10 feet.
- ^d Taxilane centerline to fixed or movable object equals 0.6 times airplane wingspan plus 10 feet.

Table 3B, continued

WIND ANALYSIS**Percent Wind Coverage**

Crosswind Component								
Runway	10.5 Knots		13 Knots		16 Knots		20 Knots	
	ALL WX	IFR	ALL WX	IFR	ALL WX	IFR	ALL WX	IFR
RW 14	52.84	65.04	53.84	66.21	54.58	67.41	54.86	67.94
RW 32	63.48	58.08	65.01	59.26	66.11	60.22	66.39	60.52
RW 14-32	94.93	94.46	97.45	96.80	99.28	98.94	99.84	99.78
RW 7	47.10	57.58	48.34	58.70	49.91	60.20	50.43	60.56
RW 25	63.81	61.43	66.47	63.80	69.29	66.61	70.37	67.66
RW 7-25	89.34	90.11	93.21	93.57	97.56	97.84	99.15	99.23
Combined	98.43	98.07	99.39	98.94	99.81	99.64	99.96	99.94

Source:

U.S. Department of Commerce, National Climatic Data Center, Asheville, N.C.
 Station: Klamath Falls Airport, Oregon #72589
 Period of Coverage: 1/1/1992 through 12/31/2001

Table Notes

- ▶ ALL WX: All weather conditions reported.
- ▶ IFR: Wind conditions reported when cloud ceiling is reported as less than 1,000 feet above the surface and/or visibility is less than 3 statute miles, but the ceiling is not lower than 200 feet above the surface and the visibility is not less than ½ statute mile. These are IFR conditions from which a civil approach to the airport can reasonably be made (Approach Category I and above).

Conclusions

- ▶ Runway orientation provides adequate crosswind protection; no additional crosswind runways are necessary.
- ▶ Optimal primary runway alignment is 150-330 degrees magnetic for all weather conditions and 170-350 degrees magnetic for IFR weather conditions.
- ▶ Wind conditions often favor Runway 25. The crosswind runway is particularly important to small and slower aircraft with less crosswind capabilities.
- ▶ IFR wind conditions often favor Runway 14, which has a non-precision instrument approach to ¾-miles visibility. Tailwind approaches to Runway 32 are common given the lower approach minimums for that runway.

Table 3C

Surface Wind Analysis

Klamath Falls Airport

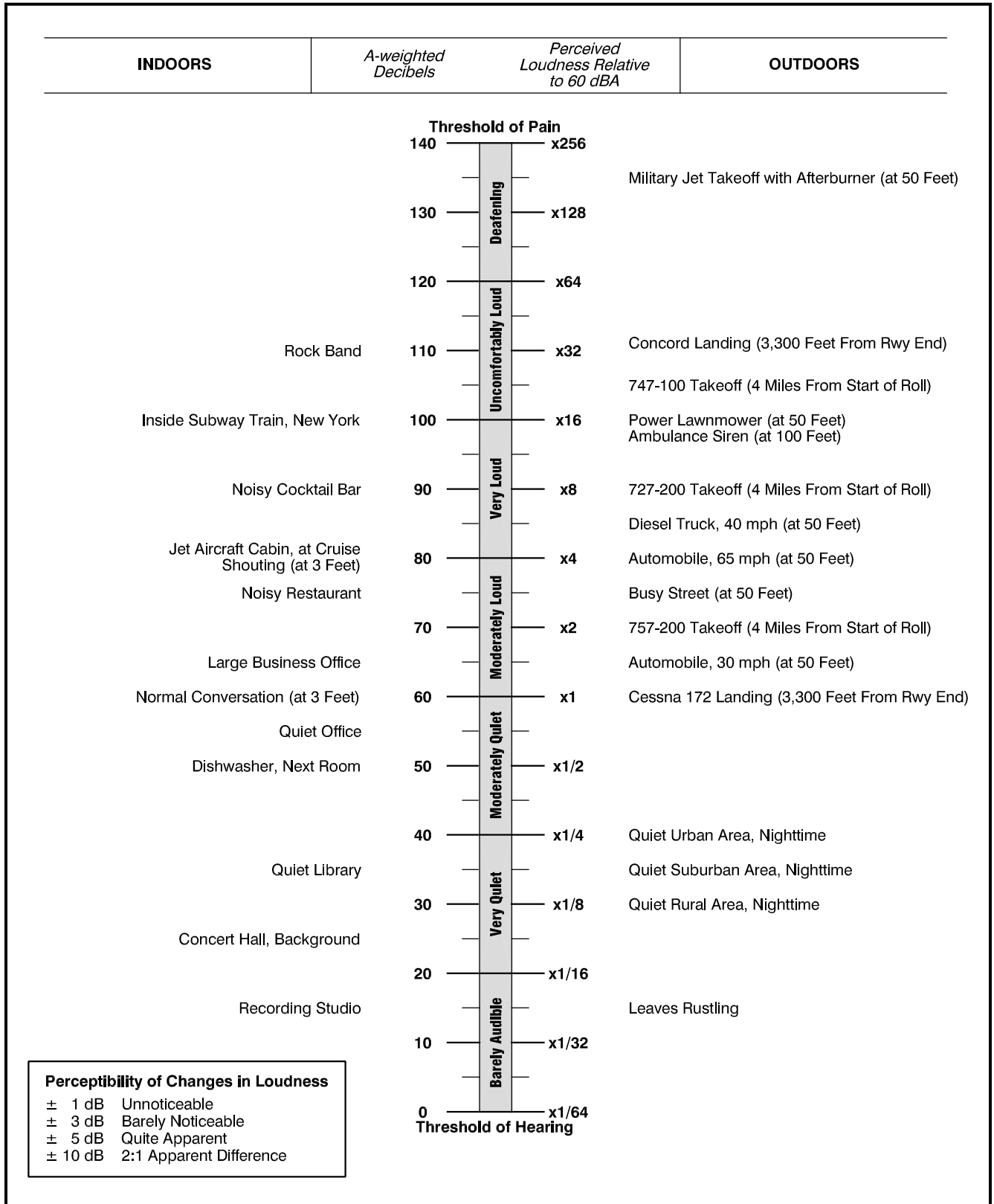


Figure 6A
Typical Decibel Level of Common Sounds

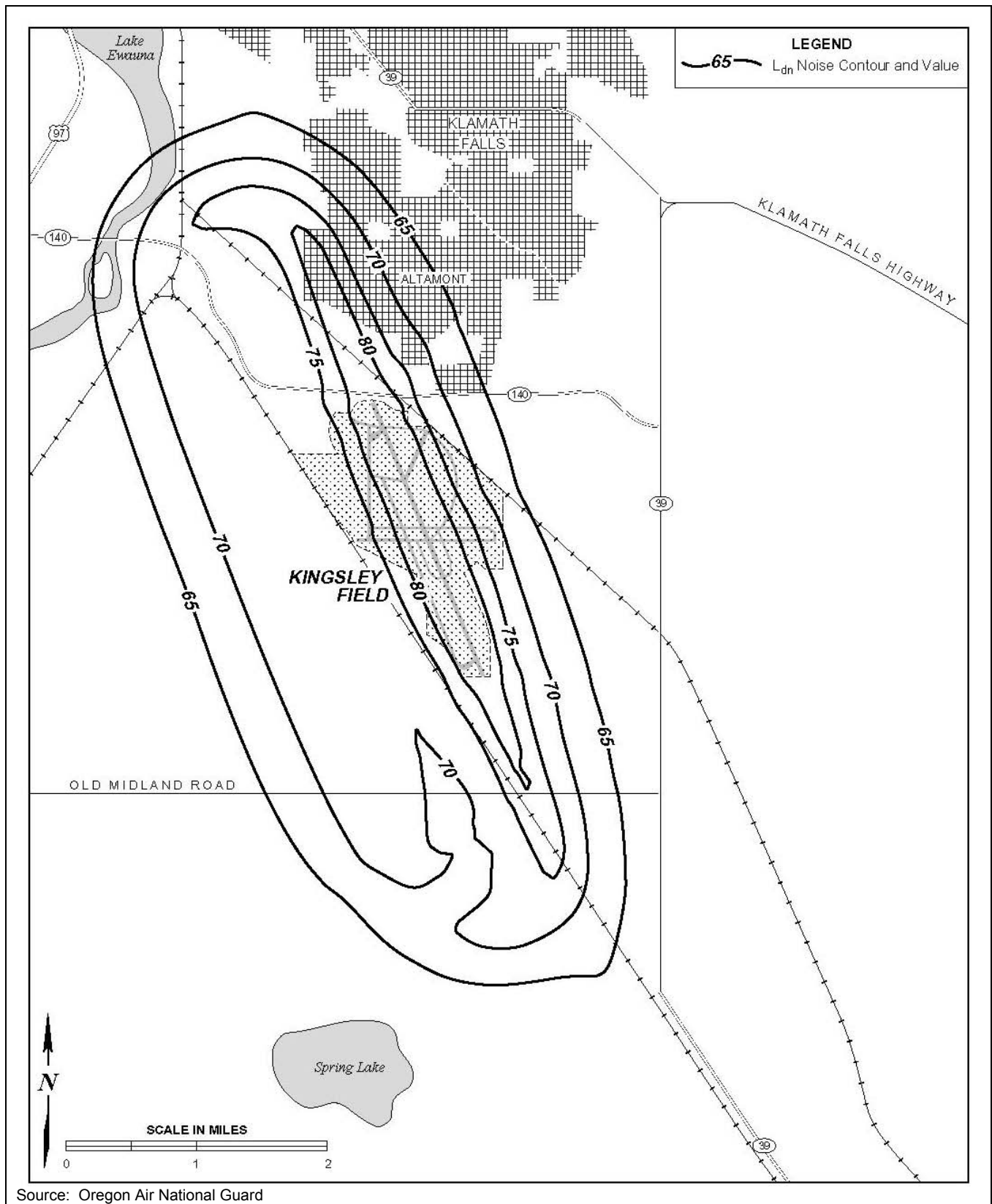


Figure 6B
Airport Noise Contours
Klamath Falls Airport

SLUCM Code	Land Use Name	Noise Zone I (65–70)	Noise Zone II (70–75)	Noise Zone III (75+)
10	Residential			
11	Household Units	25 ¹	30 ¹	N
11.11	Single Units – detached	25 ¹	30 ¹	N
11.12	Single Units – semi-detached	25 ¹	30 ¹	N
11.13	Single Units – attached row	25 ¹	30 ¹	N
11.21	Two Units – side-by-side	25 ¹	30 ¹	N
11.22	Two Units – over-under	25 ¹	30 ¹	N
11.31	Apartments – walk-up	25 ¹	30 ¹	N
11.32	Apartments – elevator	25 ¹	30 ¹	N
12	Group Quarters	25 ¹	30 ¹	N
13	Residential Hotels	25 ¹	30 ¹	N
14	Mobile Home Parks	N	N	N
15	Transient Lodgings, Hotels, Motels	Y ²	Y ³	N
16	Other Residential	25 ¹	30 ¹	N
20	Manufacturing	Y	Y ²	Y ³
21	Food and kindred products	Y	Y ²	Y ³
22	Textile mill products	Y	Y ²	Y ³
23	Apparel and other finished products made from Fabrics, leather and similar materials	Y	Y ²	Y ³
24	Lumber and wood products (except furniture)	Y	Y ²	Y ³
25	Furniture and fixtures	Y	Y ²	Y ³
26	Paper and allied products	Y	Y ²	Y ³
27	Printing, publishing and allied industries	Y	Y ²	Y ³
28	Chemicals and allied products	Y	Y ²	Y ³
29	Petroleum refining and allied industries	Y	Y ²	Y ³
31	Rubber and miscellaneous plastic	Y	Y ²	Y ³
32	Stone, clay and glass products	Y	Y ²	Y ³
33	Primary metal industries	Y	Y ²	Y ³
34	Fabricated and metal products	Y	Y ²	Y ³
35	Professional, scientific and controlling instruments; photographic and optical goods; watches and clocks	Y	25	30
39	Miscellaneous manufacturing	Y	Y ²	Y ³
40	Transportation, Communications, and Utilities			
41	Rail transportation	Y	Y ²	Y ³
42	Motor vehicle transportation	Y	Y ²	Y ³
43	Aircraft transportation	Y	Y ²	Y ³
44	Marine craft transportation	Y	Y ²	Y ³
45	Highway and street right-of-way	Y	Y ²	Y ³
46	Automobile parking	Y	Y ²	Y ³
47	Communication	Y	Y ²	Y ³
48	Utilities	Y	Y ²	Y ³
49	Other transportation, communication/utilities	Y	Y ²	Y ³
50	Trade			
51	Wholesale trade	Y	Y ²	Y ³
52	Retail trade-building materials, hardware and farm equipment	Y	Y ²	Y ³
53	Retail trade – general merchandise	Y	25	30
54	Retail trade – food	Y	25	30
55	Retail trade – auto	Y	25	30
56	Retail trade – apparel and accessories	Y	25	30
57	Retail trade – furniture and home furnishings	Y	25	30
58	Retail trade – eating/drinking establishment	Y	25	30
59	Other retail trade	Y	25	30

Table 6A

Land Use Compatibility Guidelines

SLUCM Code	Land Use Name	Noise Zone I (65–70)	Noise Zone II (70–75)	Noise Zone III (75+)
60	Services			
61	Finance, insurance and real estate	Y	25	N
62	Personal services	Y	25	N
62.4	Cemeteries	Y	Y ²	N
63	Business services	Y	25	30
64	Repair services	Y	Y ²	Y ³
65	Professional services	Y	25	30
65.1	Hospitals, nursing homes	25*	30*	N
65.1	Other medical facilities	Y	25	30
66	Contract construction	Y	25	30
67	Governmental services	Y*	25*	30*
68	Education services	25*	30*	N
69	Miscellaneous services	Y	25	30
70	Cultural, Entertainment, and Recreational			
71	Cultural activities (including churches)	25*	30*	N
71.2	Natural exhibits	Y*	N	N
72	Public assembly	Y	N	N
72.1	Auditoriums, concert halls	25	30	N
72.11	Outdoor music shells, amphitheaters	N	N	N
72.2	Outdoor sports arenas, spectator sports	Y ⁴	Y ⁴	N
73	Amusements	Y	Y	N
74	Recreational activities (including golf courses, riding stables, water recreation)	Y*	25*	30*
75	Resorts and group camps	Y*	Y*	N
76	Parks	Y*	Y*	N
79	Other cultural, entertainment, and recreation	Y*	Y*	N

Notes:

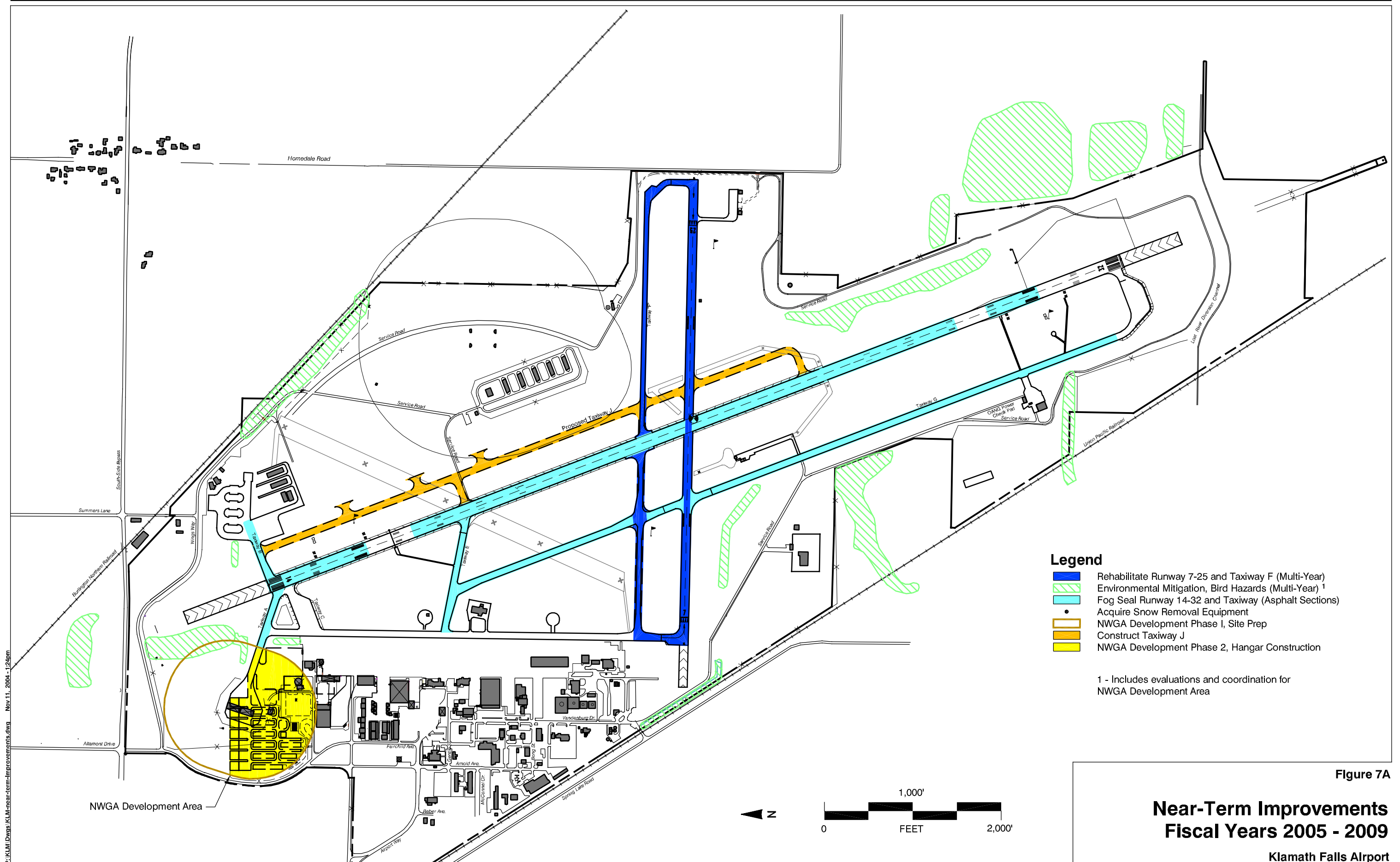
1. All residences in Zone I are discouraged, and all residences in Zone II are strongly discouraged. Prior to approving residential uses in Zones I and II, the community should conduct an analysis to determine that a greater community need is being met by permitting residential uses within either zone. Where it is determined that residential uses must be allowed, measures to achieve a 25-dB reduction from outdoor noise levels (i.e., Noise Level Reduction or NLR) in Zone I and a 30-dB reduction in Zone II should be a condition of approval. (Normal construction can be expected to provide a NLR of 20, thus the reduction requirements normally assume mechanical ventilation and closed windows year round). An avigation easement for noise should be provided to (the airport authority).
NLR criteria will not eliminate outdoor noise problems. However, building location, site planning and the design and use of berms and barriers can help mitigate outdoor noise exposure particularly from ground-level sources. Measures that reduce noise at a site should be used wherever practical in preference to measures that protect only interior space.
2. Measures to achieve NLR of 25 shall 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 shall 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. Land-use compatible, provided that special sound reinforcement systems are installed.

Key to Table of Land Use Compatibility Standards

- SLUCM Standard Land-Use Coding Manual, US Urban Renewal Admin. and Bureau of Public Roads, 1965.
- Y (Yes) Land use and related structures compatible without restrictions.
- N (No) Land use and related structures are not compatible and should be prohibited.
- NLR Noise Level Reduction (NLR) measured as the difference between outdoor and indoor noise levels.
- 25 or 30 Land use and related structures generally compatible; measures to achieve NLR of 25 or 30 dB should be incorporated into design and construction of structure.
- 25* or 30* Land use generally compatible with NLR; however, measures to achieve an overall noise reduction do not necessarily solve noise difficulties and additional evaluation is warranted.
- Y* Land use and related structures generally compatible; see notes 2 and 3.

Source: Federal Interagency Committee on Urban Noise, *Guidelines for Considering Noise in Land Use Planning and Control*, Washington, D.C., 1980.

Table 6A, continued



- Legend**
- █ Rehabilitate Runway 7-25 and Taxiway F (Multi-Year)
 - ▨ Environmental Mitigation, Bird Hazards (Multi-Year) ¹
 - ▨ Fog Seal Runway 14-32 and Taxiway (Asphalt Sections)
 - Acquire Snow Removal Equipment
 - ▨ NWGA Development Phase I, Site Prep
 - ▨ Construct Taxiway J
 - ▨ NWGA Development Phase 2, Hangar Construction

¹ - Includes evaluations and coordination for NWGA Development Area

Figure 7A

**Near-Term Improvements
Fiscal Years 2005 - 2009**

Klamath Falls Airport

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