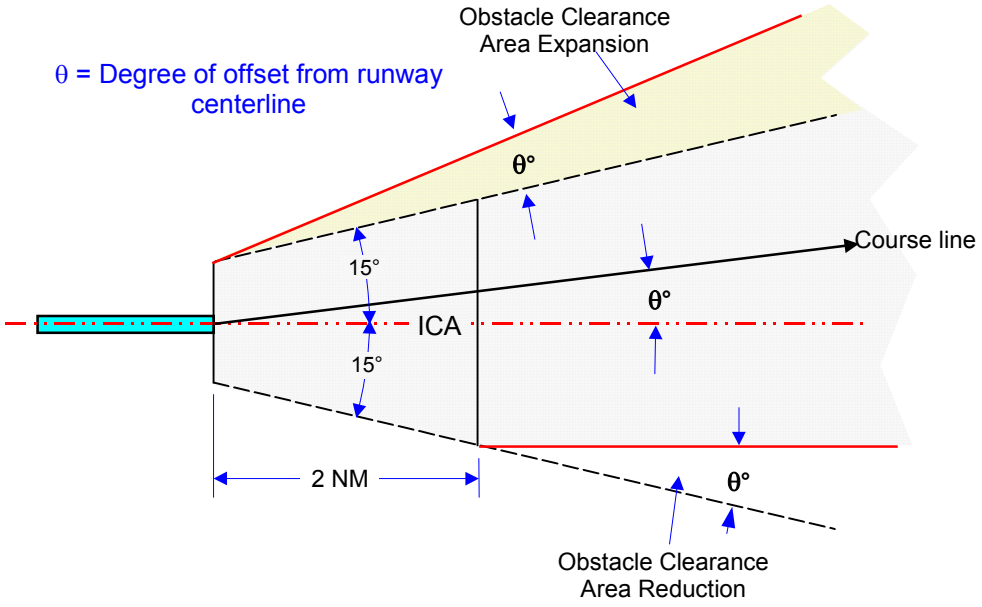
CHAPTER 3. DEPARTURE ROUTES

3.0 STRAIGHT ROUTE DEPARTURE SEGMENTS.

Straight departures are aligned within 15° of the runway centerline. The initial climb area (ICA) is aligned along the runway centerline for at least 2 NM (see paragraph 1.6). If a turn at the departure end of runway (DER) is desired, expand the obstacle clearance area in the direction of the turn an amount equal to the departure course degree of offset from runway centerline (see figure 3-1). Reduce the obstacle clearance area following the ICA on the side opposite the turn an amount equal to the expansion on the opposite side.

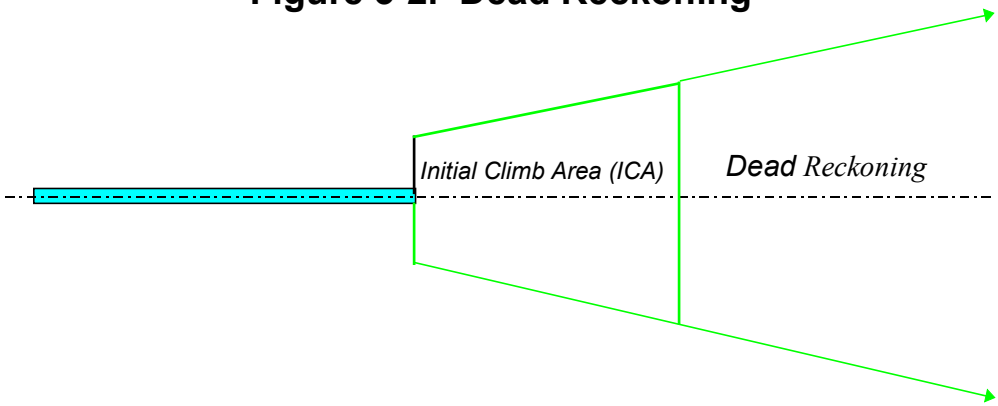
Figure 3-1. Turn ≤15° at DER



3.1 DEAD RECKONING (DR) DEPARTURE.

The boundary lines of the departure obstacle clearance surface (OCS) splay outward 15° relative to the departure course from the end of the ICA (see figures 3-1 and 3-2). Limit the DR segment to a maximum distance of 10 NM from DER.

Figure 3-2. Dead Reckoning



3.2 POSITIVE COURSE GUIDANCE (PCG) DEPARTURE, 15° OR LESS.

Calculating Obstruction Area Half Widths. Apply the values from table 3-1 to the following formulae to calculate the obstruction primary area half-width (1/2 W_P), and the width of the secondary area (W_S).

$$\tfrac{1}{2}W_p = k_P \times D + A$$
$$W_S = k_S \times D$$

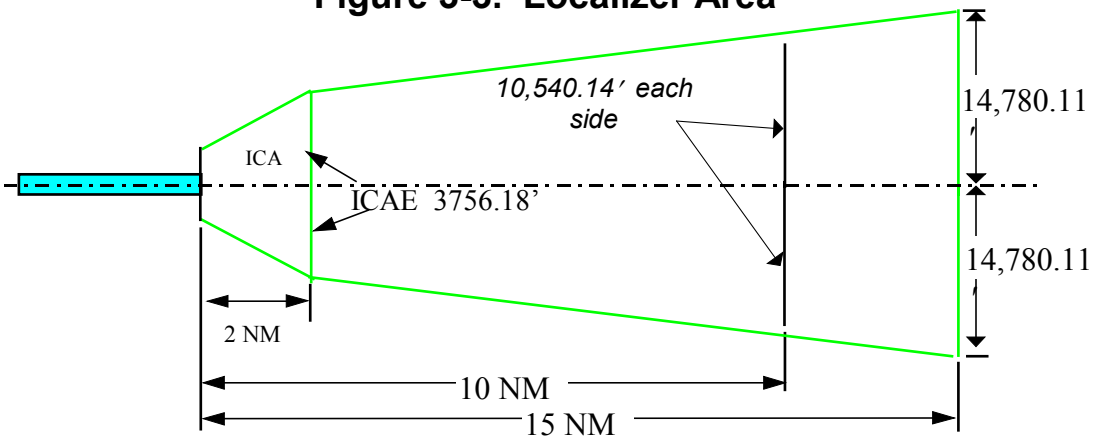
Table 3-1

½ Width	k_P	k_s	D	A
Dep DR	0.267949	none	Distance (ft) from DER	500′
Localizer	0.139562	none	Distance (ft) from ICAE	3756.18′
NDB	0.0833	0.0666	Distance (NM) from facility	1.25 NM
VOR / TACAN	0.05	0.0333	Distance (NM) from facility	1 NM

3.3 LOCALIZER GUIDANCE.

The obstruction evaluation area (OEA) begins at the initial climb area end-line (ICAE). The maximum length of the segment is 15 NM from DER. Evaluate for standard climb gradient (SCG) in accordance with paragraph 1.4.1. If necessary, calculate the required minimum climb gradient using the formula in paragraph 1.4.2 where D is the shortest distance to the initial climb area baseline (ICAB) (see figure 3-3).

Figure 3-3. Localizer Area



3.3.1 **NDB Guidance.** Evaluate for SCG in accordance with paragraph 1.4.1. If necessary, calculate the required minimum climb gradient using the formula in paragraph 1.4.2. Figures 3-5, 3-6, and 3-7 illustrate possible facility area configurations.

3.3.2 **VOR/TACAN Guidance.** Evaluate for SCG in accordance with paragraph 1.4.1. If necessary, calculate the required minimum climb gradient using the formula in paragraph 1.4.2. Figures 3-4, 3-5, and 3-6 illustrate possible facility area configurations.

Figure 3-4. Facility Area and DR Area Relationship

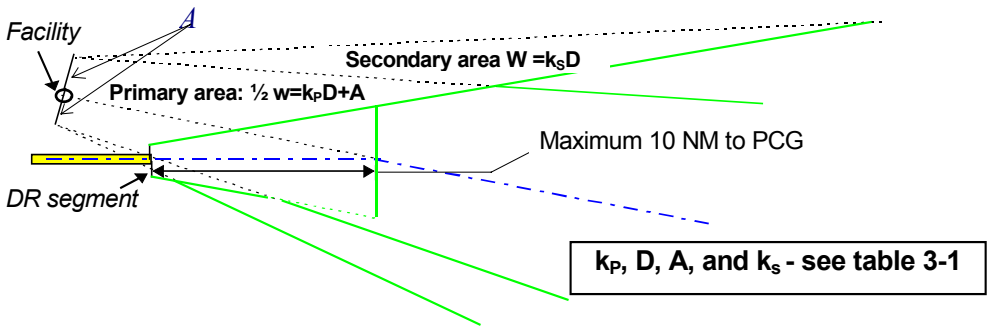
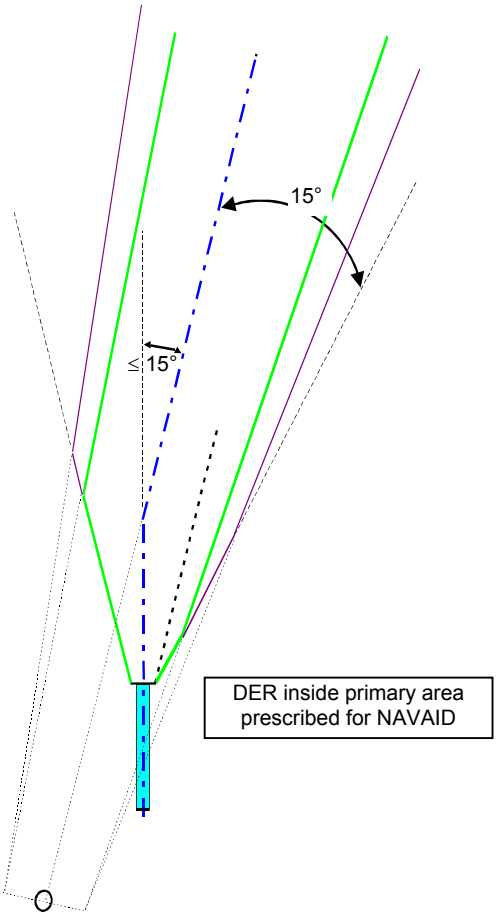


Figure 3-5. DER within Primary Area Facility



3.3.3 **Secondary Area Obstructions.** Secondary areas may be constructed and employed where PCG is provided.

3.4 **RESERVED.**

Table 9. STANDARD STRAIGHT-IN MINIMUMS

	NONPRECISION APPROACHES Procedures associated with 14 CFR Part 97.23, 25, 27, 31, 33, and 35					
	APPROACH LIGHT CONFIGURATION	CAT →	A — B — C		D	
		HAT[1]	Vis	or RVR	Vis	or RVR
1	NO LIGHTS	250	1	5000	1	5000
2	ODALS	250	3/4	4000	1	5000
3	MALS	250	3/4	4000	1	5000
4	SSALS/SALS	250	3/4	4000	1	5000
5	MALSR	250	1/2[2]	2400	1[3]	5000
6	SSALR	250	1/2[2]	2400	1[3]	5000
7	ALSF-1	250	1/2[2]	2400	1[3]	5000
8	DME Arc Any Light Configuration	500	1	5000	1	5000

[1] Add 50 ft to HAT for VOR without FAF or NDB with FAF.
Add 100 ft to HAT for NDB without FAF.
[2] For NDB approaches, 3/4 mile or RVR 4000.
[3] For LOC and LNAV/VNAV, 3/4 miles or RVR 4000.

	PRECISION APPROACHES 14 CFR Part 97.29					
	APPROACH LIGHT CONFIGURATION	CAT →	A — B — C		D	
		HAT[4]	Vis	or RVR	Vis	or RVR
9	NO LIGHTS	200	3/4	4000	3/4	4000
10	MALSR	200	1/2	2400	1/2	2400
11	SSALR	200	1/2	2400	1/2	2400
12	ALSF-1	200	1/2	2400	1/2	2400
13	ALSF-1-TDZ/CL MALSR-TDZ/CL SSALR-TDZ/CL	200	-	1800	-	1800

[4] ILS includes LOC, GS, and OM (or FAF). For an Offset LOC, the minimum HAT is 250 and minimum RVR is 2400.

NOTE: HIRL is required for RVR. Runway edge lights required for night.

Table 10. MILITARY STANDARD STRAIGHT-IN MINIMUMS

		NO LIGHTS		ALS TDZ/CL		ALS		SSALR		SALS or SSALS		MALSR		MALS		ODALS	
PRECISION																	
HAT	CAT	MILE	RVR[1]	MILE	RVR	MILE	RVR	MILE	RVR	MILE	RVR	MILE	RVR	MILE	RVR	MILE	RVR
100	A–E	1/2	24	—	12	1/4	16	1/4	16	1/4	16	1/2	24	1/2	24	1/2	24
200	A–B	3/4	40	1/2	18	1/2	24	1/2[2]	24[2]	1/2	24	1/2	24	3/4	40	1/2	24
200	C.D.E..	3/4	40	1/2[2]	24[2]	1/2[2]	24[2]	1/2[2]	24[2]	3/4	40	1/2[2]	24[2]	3/4	40	3/4	40
250	A–B	3/4[4]	40[4]	1/2	24	1/2[3]	24[3]	1/2	24	3/4	40	1/2	24	3/4	40	3/4	40
250	C.D.E	1	50	1/2	24	1/2[3]	24[3]	1/2	24	3/4	40	1/2	24	3/4	40	1	50
NONPRECISION																	
AS REQUIRED	A-B	1	50	1/2	24	1/2	24	1/2	24	3/4	40	1/2	24	3/4	40	3/4	40
AS REQUIRED	C.D.E	1	50	3/4	40	3/4	40	3/4	40	3/4	40	3/4	40	3/4	40	3/4	40
DME ARC APPROACH																	
AS REQUIRED	A–E	1	50	(REDUCTION BELOW ONE MILE NOT AUTHORIZED)													

[1]RVR shown in hundreds of feet, i.e., RVR 24=2,400 feet.
[2]Minimum length of approach lights is 2,000 feet.
[3]For non-standard ALS lengths of:
a. 2,400 to 2,900 feet, use SSALR.
b. 1,000 to 2,300 feet, use SSALS.
[4]When the MAP is located 3/4 statute mile or less from the threshold.

INSTRUCTIONS FOR ESTABLISHING MILITARY STRAIGHT-IN MINIMUMS (Use Table 10)

STEP 1.	Determine the required DH or MDA by applying criteria found in the appropriate facility chapter of this Order.
STEP 2.	Determine the height above touchdown (HAT) zone elevation.
STEP 3.	Determine the visibility value as follows: a. Precision Approaches. (1) HAT 250 feet or less. Enter "precision" portion of table 10 at HAT value for aircraft approach category. Read across table to determine minimum visibility for the appropriate light system. If the HAT is not shown on the table, use the next higher HAT. (2) HAT greater than 250 feet. Use the instructions for the nonprecision minimums in paragraph b below. Paragraph 331 does not apply. b. Nonprecision Approaches. Determine the basic visibility by application of criteria in paragraphs 330 and 331. If the basic visibility is 1 mile, enter table 10 with aircraft approach category being considered. Read across the table to determine minimum visibility for the appropriate light system.
STEP 4.	Establish ceiling values in 100-foot increments in accordance with paragraph 310.

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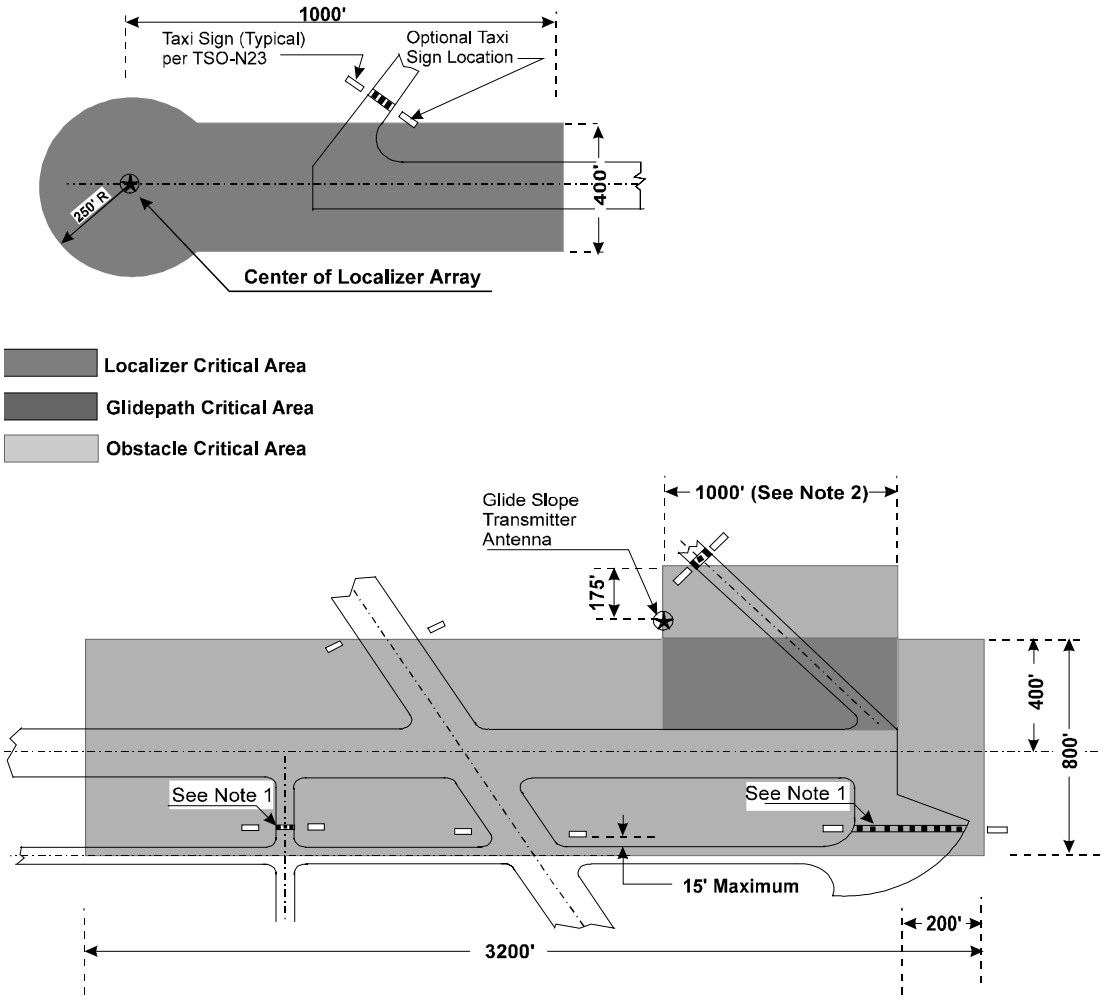
Figure 2-6. ILS Critical Areas



NOTES: 1. Location of hold lines when operations are permitted on a 400-foot parallel taxiway.
2. Or to the end of the runway, whichever is greater.

2.14 CATEGORY I ILS ANTENNA MAST LIMITATIONS FOR OBSTACLE CLEARANCE

The FAA Advisory Circular 150/5200-13, Airport Design, runway OFZ is applicable to airplane design group 1-6 aircraft. Category I glide slope antennas must not penetrate the runway OFZ.