

Appendix E

Table 3-4, Engineering Brief 99



Federal Aviation Administration

Memorandum

Date: July 24, 2020

To: All Airports Regional Division Managers

From: Michael A.P. Meyers, P.E.
Manager (Acting), Airport Engineering Division, AAS-100
MICHAEL A. MEYERS Digitally signed by
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Date: 2020.07.24
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Prepared by: Carlton Lambiasi, P.E., AAS-120, Airport Data and Airspace Branch

Subject: Engineering Brief No. 99A, Changes to Tables 3-2 and 3-4 of Advisory Circular 150/5300-13A, Airport Design

This Engineering Brief (EB) provides an update to Table 3-2, specifically providing the new dimensional standard for the instrument departure surface. This revision is the result of the FAA's recent completion of a safety risk assessment of the proposed modifications to the instrument departure surface described in FAA Order 8260.3, United States Standard for Terminal Instrument Procedures (TERPS). Please note Table 3-4 remains unaffected by the modifications to the departure surface.

Flight Procedures will continue to use the guidance in TERPS, and 8260.46, Departure Procedure (DP) Program for evaluating, documenting, and publishing instrument departure procedures until revisions to those directives are complete. Airport operators seeking to utilize the modified departure surface are to provide the ADO/RO assurance that this surface is free of penetrations.

This Engineering Brief provides the latest guidance to Airport Design Tables 3-2 and 3-4. Please apply this EB until such time the FAA publishes a new version of Airport Design Advisory Circular.

Attachment



**FAA
Airports**

ENGINEERING BRIEF #99A

Updates to Tables 3-2 and 3-4 of Advisory Circular 150/5300-13A, *Airport Design*

1.0 Introduction.

This Engineering Brief (EB) updates Table 3-2 of AC 150/5300-13A by providing the new dimensional standard for the instrument departure surface. This is the result of the FAA's recent completion of a safety risk assessment of the proposed modifications to the instrument departure surface described in FAA Order 8260.3, United States Standard for Terminal Instrument Procedures (TERPS). This update only addresses the departure surface revision. Other information in Engineering Brief 99 remains in effect.

Approach and Departure Standards, including Instrument Approach Procedures, captured within Advisory Circular (AC) 150/5300-13A, *Airport Design*, are no longer applicable. This EB establishes the most current guidance. Please apply this EB until such time the FAA publishes a new version of Airport Design Advisory Circular.

2.0 Applicability

The guidance here is not legally binding in its own right and will not be relied upon by the FAA as a separate basis for affirmative enforcement action or other administrative penalty. Conformity with this guidance, as distinct from existing statutes, regulations, and grant assurances, is voluntary only, and nonconformity will not affect rights and obligations under existing statutes and regulations.

3.0 Effective Date

This EB is effective once signed by the Manager, FAA Airport Engineering Division, AAS-100.

4.0 Background.

The Airport Obstructions Standards Committee (AOSC) requested the Flight Procedures and Airspace Group to engage stakeholders to assess the current instrument departure surface and evaluate the possibility of modifying the instrument departure surface based on present risk. A workgroup of subject matter experts from the FAA, the Department of Defense, and industry completed the evaluation.

4.1 Current Criteria

FAA Order 8260.3 defines the current departure surface as centered on the runway centerline extended and used to evaluate obstacle clearance during a climb to 400 feet above the departure end of the runway elevation at a standard climb of 200 feet per nautical mile (NM). The surface length is normally 2 nautical miles (NM)

long and has an initial width of 1,000 feet. The area splays outward at a rate of 15 degrees relative to the extended runway centerline. Advisory Circular 150/5300-13A, Airport Design, currently includes this same surface.

4.2 Modified Criteria

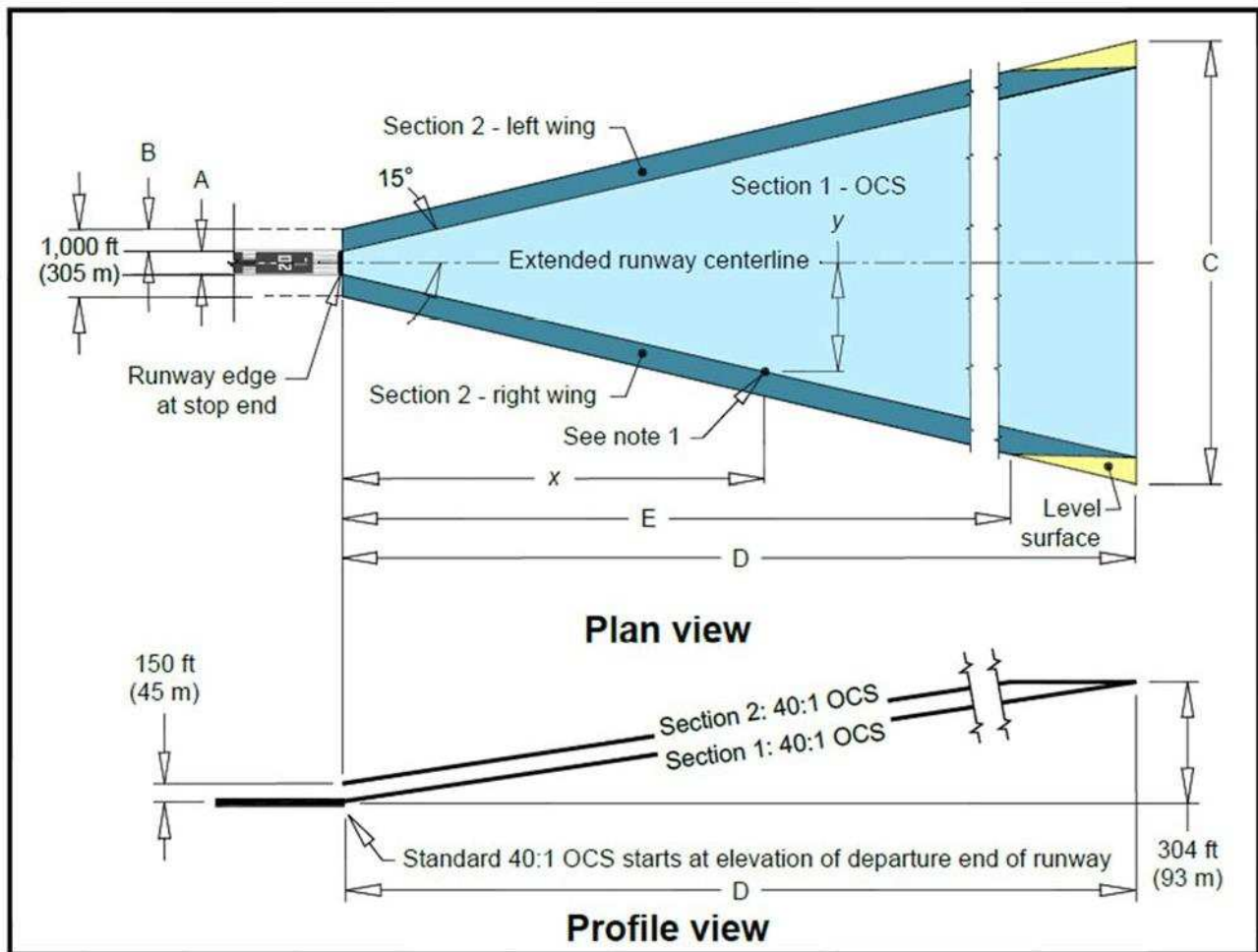
The modified departure surface (Section 1) starts at the departure end of the runway end elevation and matches the width of the usable runway. If a clearway is present, the departure surface will start at the end of the clearway surface at an elevation determined by applying the following formula:

$$\text{Departure Surface Elevation with Clearway} = \frac{\text{TODA} - \text{TORA}}{80} + \text{DER}_{\text{elev}}$$

From the edge of the usable runway, the new surface (Section 2) rises upward to 150 feet above the runway end elevation at a point 500 feet on either side of the runway centerline. The new surface rises upward along the extended runway centerline at the current 40:1 slope until reaching 304 feet above the runway end elevation. Upon reaching 304 feet, the surface levels out until the end of the departure surface. The splay of segment 1 remains at 15-degrees relative to the runway centerline extended. The length of 12,152 feet represents a 2 NM nominal value for planning purposes. The information below for “Runways providing instrument departure operations” replaces the current Runway Type 7 information in Table 3-2. In addition, Figures 1 and 2 of this Engineering Brief replaces Figure 3-4 of AC 150/5300-13.

Runway Type		Dimensional Standards Feet (Meters)					Slope
		A	B	C	D	E	
7	Runways providing instrument departure operations	Runway Width (RW)	500 (152) – ½ RW	7,512 (2290)	12,152 (3704)	6,160 (1878)	40:1

Figure 1. Instrument Departure Runway Obstacle Clearance Surface



Note 1: The half-width of Section 1 is calculated by the formula:
 $\text{Section 1 Half Width} = (1/2 \text{ RWY Width}) + (\tan 15^\circ * X)$, where X = distance from stop end.

Figure 2. Departure Surface – Perspective View

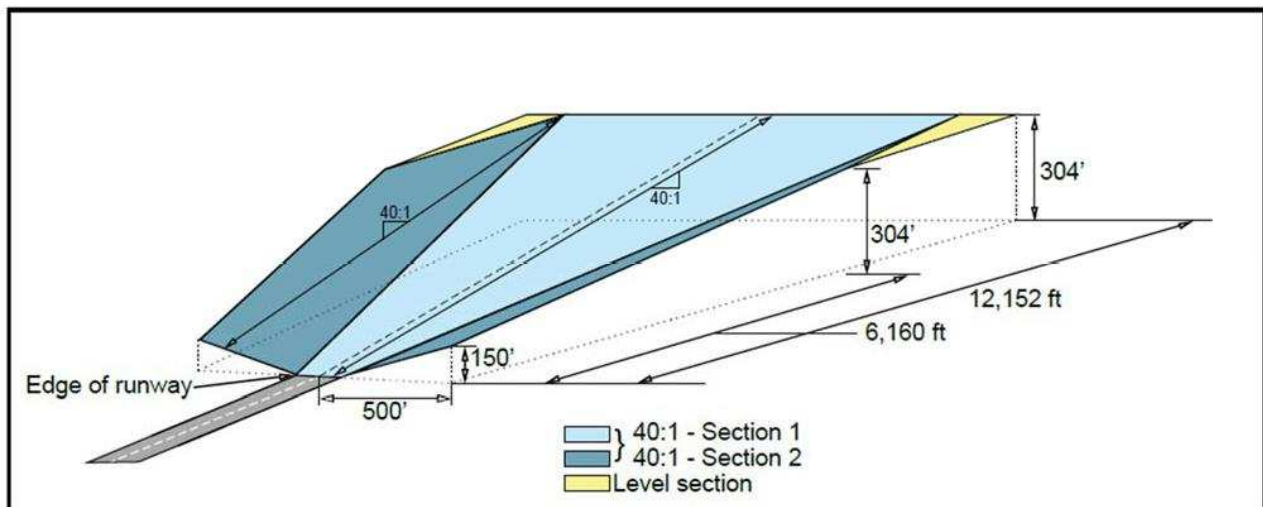


Table 3-2. Approach and Departure Standards Table ^{1,2}

Runway Type		DIMENSIONAL STANDARDS*					Slope
		Feet (Meters)					
		A	B	C	D	E	
1	Approach end of runways expected to serve small airplanes with approach speeds less than 50 knots. (Visual runways only, day/night).	0 (0)	120 (37)	300 (91)	500 (152)	2,500 (762)	15:1
2	Approach end of runways expected to serve small airplanes with approach speeds of 50 knots or more. (Visual runways only, day/night).	0 (0)	250 (76)	700 (213)	2,250 (686)	2,750 (838)	20:1
3	Approach end of runway expected to serve large airplanes. (Visual runways only, day/night).	0 (0)	400 (122)	1,000 (305)	1,500 (457)	8,500 (2591)	20:1
4	Approach end of runways expected to accommodate instrument approaches having visibility greater than or equal to 3/4 statute mile. ³	200 (61)	400 (122)	3,400 (1036)	10,000 ⁴ (3048)	0 (0)	20:1
5	Approach end of runways expected to accommodate instrument approaches having visibility minimums less than 3/4 statute mile.	200 (61)	800 (244)	3,400 (1036)	10,000 ⁴ (3048)	0	34:1
6 ⁵	Approach end of runways expected to accommodate instrument approaches with vertical guidance.	0 (0)	Runway Width + 200 (61)	1520 (463)	10,000 ⁴ (3048)	0 (0)	30:1
7	Departure runway ends used for any instrument operations.	Runway Width (RW)	500 (152) – ½ RW	7,512 (2290)	12,152 (3704)	6,160 (1878)	40:1

* The letters are keyed to those shown in Figure 3-2 of AC 150/5300-13A. For Row 7, refer to Figure 1 of this Engineering Brief

General Notes:

1. This table presents the dimensional standards applicable to varying runway types based on normal conditions (e.g. standard 3-degree glidepath angle). Meeting the requirements of this table will protect the use of the runway in both visual and instrument meteorological conditions near the airport while ensuring maximum runway utility. Final published visibility minimums are determined, in part, by applying the criteria described in FAA Order 8260.3.
2. For planning purposes, ensure objects remain clear of the surfaces provided in this table. The FAA Flight Procedures Team must mitigate existing obstacles that penetrate instrument procedures that cannot be removed, relocated, or lowered. FAA will not consider a modification of standards for the surfaces described in this table, in accordance with FAA Order 5300.1.
3. Marking and lighting of obstacle penetrations to this surface or the use of a Visual Guidance Slope Indicator (VGSI), may avoid displacing the threshold. Contact the Flight Procedures Team if existing obstacles penetrate this surface.
4. 10,000 feet (3048 m) represents a nominal value for planning purposes. For runways with only straight-in approaches, the length is dependent on the TERPS visual descent point or DA point. For runways with both circling and straight-in approaches, the length is the greater of 10,000 feet or the TERPS visual descent point/DA point.
5. The criteria in Row 6 is required in addition to the applicable approach surface established within the table. Applicable to ILS, GLS, LPV, LNAV/VNAV, and RNP lines of minima.

Table 3-4. Standards for Instrument Approach Procedures ¹

Standards	Visibility Minimums			
	< 3/4 statute mile	3/4 to < 1 statute mile	≥ 1 statute mile straight-in	Circling ² ≥ 1 statute mile
HATh ³	≤ 250 ft.	≥ 250 ft.	≥ 250 ft.	≥ 350 ft.
Table 3-2, Row 6 Obstacle Clearance Surface	Clear	Clear	Clear	Not Required
TERPS PA Final Approach Segment	Clear ⁴	Not Required	Not Required	Not Required
POFZ (PA & APV only)	Required	Not Required	Not Required	Not Required
OCS (Table 3-2)	34:1 clear	20:1 clear	20:1 clear	20:1 clear
ALP ⁵	Required	Required	Required	Required
Minimum Runway Length	4,200 ft.	3,200 ft. ⁶	3,200 ft. ⁶	3,200 ft. ⁶
Paved Surface	Required	Recommended ⁷	Recommended ⁷	Recommended ⁷
Runway Markings (See AC 150/5340-1)	Precision	Non-precision	Non-precision	Visual
Holding Position Signs & Markings (See AC 150/5340-1, AC 150/5340-18)	Required	Required	Required	Required
Runway Edge Lights ⁸	HIRL or MIRL	HIRL or MIRL	MIRL or LIRL	MIRL or LIRL (Required only for night minimums)
Parallel Taxiway ⁹	Required	Required	Recommended	Recommended
Approach Lights ¹⁰	Required	Recommended ¹¹	Recommended ¹¹	Not Required
VGSI ¹²	Recommended	Recommended	Recommended	Recommended
Applicable Runway Design Standards, (Reference Table 3-5)	Lower than 3/4 mile visibility minimums	Not lower than 3/4 mile visibility minimums	Not lower than 1 mile visibility minimums	Not lower than 1 mile visibility minimums
Approach Surface To Be Met (Reference paragraph 303)	Table 3-2, Row 5	Table 3-2, Row 4	Table 3-2, Row 4	Table 3-2, Row 4
Optimum Survey Type ¹³	VGS	VGS (PA & APV)	NVGS	NVGS ¹⁴
		NVGS		

General Notes:

1. Visibility minimums and described standards are subject to the application of FAA Order 8260.3 (TERPS) and associated orders. For each level of visibility, the optimum conditions within the same column must be met or exceeded.
2. All runways authorized for circling must meet requirements for threshold siting (reference paragraph 303) and OFZ (reference paragraph 308).
3. Height Above Airport (HAA) for circling. The HATh/HAA indicated is for planning purposes; actual obtainable HATh/HAA is determined by TERPS and may be higher due to obstacles or other requirements.
4. Applicable to PA only, as defined by paragraph 102. The FAA Flight Procedures Team must mitigate existing obstacles that penetrate this surface that cannot be removed, relocated, or lowered.
5. An ALP is only required for obligated airports in the NPIAS; it is recommended for all others.
6. Runways less than 3,200 ft. are protected by 14 CFR Part 77 to a lesser extent. However, runways as short as 2,400 ft. could support an instrument approach provided the lowest HATh is based on clearing any 200-ft (61 m) obstacle within the final approach segment.
7. Unpaved runways require case-by-case evaluation by the IFP Validation Team in accordance with FAA Order 8260.43.
8. Runway edge lighting is required for night approach minimums. High intensity lights and an RVR touchdown zone sensor are required for RVR-based minimums.
9. A full-length parallel taxiway leading to and from the thresholds is advisable to achieve the lowest possible minimums, and minimizes the time aircraft are on the runway. Refer to the minimum visibility requirements on airport conditions in FAA Order 8260.3. Construction of a parallel taxiway, while advisable, is not a requirement for publication of an instrument approach procedure with visibility minima ≥ 1 statute mile.
10. A full approach light system (ALSF-1, ALSF-2, SSALR, or MALSR) is required for visibility < 3/4 statute mile. Intermediate (MALSF, MALS, SSALF, SSALS, SALS/SALSF) or Basic (ODALs) systems will result in higher

visibility minimums. An ALSF-1 or ALSF-2 is required for CAT II/III ILS. HATh < 250 ft. without MALSR, SSALR, or ALSF is permitted with visibility not less than $\frac{3}{4}$ SM.

11. ODALS, MALSR, SSALS, and SALS are acceptable. Approach lights are only recommended where a visibility credit of at least $\frac{1}{4}$ statute mile can be achieved.
12. To preclude a nonstandard instrument flight procedure, it is critical the instrument approach vertical descent angle (VDA) or glidepath angle (GPA) is coincident with the VGSI angle.
13. See AC 150/5300-18 for Vertically Guided Survey (VGS) and non-Vertically Guided Survey (NVGS) requirements. When an AC 150/5300-18 VGS is not available, the equivalent legacy vertically guided (VG) surveys are ANAPV/LPV/PC, and PIR.
14. Absence of a survey does not preclude authorization to establish circling to a runway but may result in the procedure being restricted to daytime only operations.



FAA

Aviation Safety

Memorandum


Date: July 1, 2020

To: John Dermody, Director, Airport Safety and Standards
Gary Powell, Director, Aeronautical Information Services

From: Mark Steinbicker, Manager, Flight Technologies and Procedures Division

Prepared by: Thomas Nichols, Section Manager, Flight Procedures and Airspace Group

Subject: Engineering Brief No. 99A, Changes to Tables 3-2 and 3-4 of Advisory Circular 150/5300-13A, Airport Design

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We concur with your request to use the modified departure Initial Climb Area (ICA) for the purpose described in draft Engineering Brief No. 99A. Combined with the January 31, 2020 memorandum titled "Initial Climb Area Obstacle Clarification", this allows the Office of Airports to use the modified departure ICA for both fixed objects and movable objects (i.e. taxiing aircraft) prior to Flight Standards update of related 8260-series directives or Aeronautical Information Services fielding the associated automation tools.

Guidance in Orders 8260.3, United States Standard for Terminal Instrument Procedures (TERPS) and 8260.46, Department Procedure (DP) Program continues to apply to the evaluation, documentation, and publication of instrument departure procedures until revisions to those directives are complete.

Attachment: Draft Engineering Brief No. 99A.

cc: Christopher Cox
Wayne Eckenrode
Stephanie C. Harris