

Flight Procedures Cover Page	Task Action: FLIGHT CHECK	Task Type: STAR	Estimated Chart Date: 10/02/2025	APWS Task ID: B6D33EDE30BA4B6EB453CA1FDFDA51CE	APWS Project ID: 88CC04A9274948A898E79C7DABD80CFD
Procedure: BNA RYYMN THREE (RNAV) STAR		Enroute: YES	Specialist: Copeland, Guy		Agreement Number:
Airport ID: KBNA			Airport City: NASHVILLE		State: TN
Facility ID:	Facility Type:	Flight Inspection Remark Type: New FC Slot			
Procedure Comments: CONTACT ROBERT HAMILTON, AJV-A431 405-954-4608. LOA: 1. DESCENT GRADIENT QUALITY 35 CHECKED QUALITY 41 CHECKED					



Federal Aviation Administration

Memorandum

Date: January 30, 2025

To: Christopher Hope, Manager, Flight Technologies and Procedures Division
THRU: Romana Wolf, Manager, Flight Procedures and Airspace Group

From: Bev Bordy, Manager, Instrument Flight Procedures Coordination Team, AJV-A43

Prepared by: Erik J John, Sr. ATC Specialist, NAVTAC CTR Support

Subject: Descent Gradient Approval Request: Nashville International Airport (KBNA)
RYYMN (RNAV) STAR

PEKIE to TURNT Segment:

Per FAA Order 8260.3, 2-2-8. a.:

2-2-8. Descent Gradient (DG). Calculate DGs between fixes with an altitude restriction by using the guidance in this paragraph and the calculation methods in section 2-9. When deceleration is required, also use paragraphs 2-2-9 and 2-2-10. The DG past the termination fix of the STAR is not calculated as part of the STAR design; the overall airspace design should optimize the location and altitude for the STAR termination fix and that becomes an input to the STAR design.

a. The maximum DG (see figure 2-2-1) is based on altitude, deceleration, and airspeed constraints, as follows:

(1) The maximum permissible DG 10000 feet MSL and above is 330 ft/NM (approximately 3.11 degrees).

(2) The maximum permissible DG below 10000 feet MSL is 318 ft/NM (approximately 3.0 degrees).

(3) When a STAR contains a descent between fixes that passes through 10000 feet MSL, the maximum permissible DG is between 318 ft/NM and 330 ft/NM and is in proportion to the amount of the altitude change that is below/above 10000 feet MSL. Use formula 2-2-1 to determine the maximum DG (DG_{max}) between fixes that contain a descent that passes through 10000 feet MSL.

(6) If more than one of paragraphs 2-2-8.a(1) through 2-2-8.a(5) applies, use the lower of the resulting values for the maximum DG.

b. When a gradient exceeds the maximum DG allowed in paragraph 2-2-8.a, the STAR requires approval (see paragraph 1-4-2).

Formula 2-2-1. Maximum DG Passing Through 10000 Feet MSL (ft/NM)

$$DG_{max} = \frac{(Alt_1 - 10000) \times 12}{(Alt_1 - Alt_2)} + 318$$

Where:

Alt_1 = Altitude at the fix prior to crossing 10000 feet MSL

Alt_2 = Altitude at the fix after crossing 10000 feet MSL

A computed descent gradient value from PEKIE to TURNT of 335.42 FT/NM was calculated for aircraft descending from 12000 at PEKIE to 7000 at TURNT over 14.9 NM. Using the above formula, criteria states that the computed descent gradient should not exceed 322.8 FT/NM. In discussion with industry during design meetings, no objections to the altitude constraints were made and the descent gradient is well within limits of aircraft that will use the procedure.

Consideration was given to moving TURNT but that would have impacted the newly connected RNAV (RNP) approaches that begin at TURNT. Also, the group discussed a different altitude at TURNT but that impacted the traffic flow merging with traffic from the eastern arrival.

Therefore, Nashville ATCT requests approval to chart the procedure as designed with above descent gradient of 335.42 FT/NM.

(RYYMN.RYYMN2) 14205

OLD

RYYMN TWO ARRIVAL (RNAV)

NASHVILLE INTL (BNA)

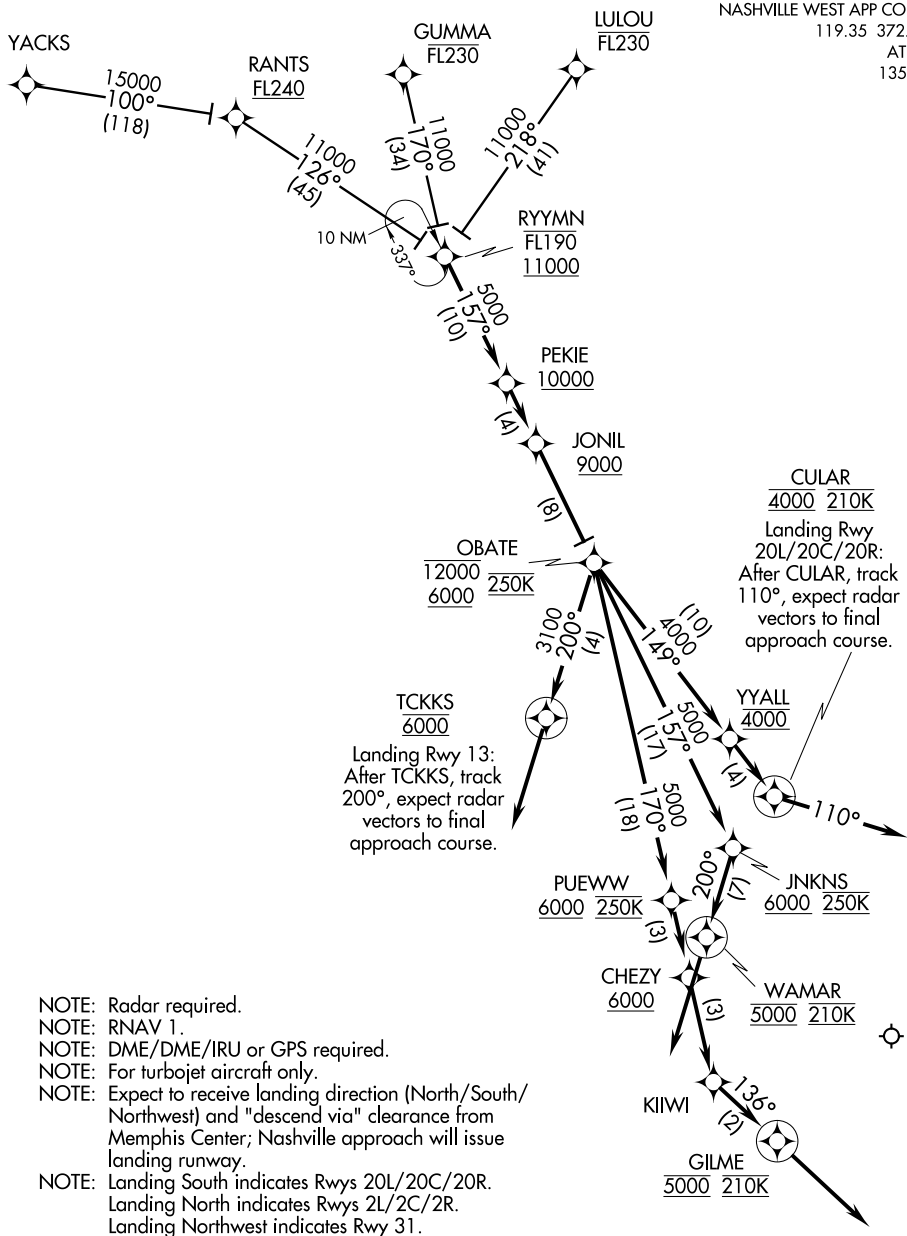
NASHVILLE, TENNESSEE

NASHVILLE WEST APP CON

119.35 372.0

ATIS

135.1



NOTE: Radar required.

NOTE: RNAV 1.

NOTE: DME/DME/IRU or GPS required.

NOTE: For turbojet aircraft only.

NOTE: Expect to receive landing direction (North/South/
Northwest) and "descend via" clearance from
Memphis Center; Nashville approach will issue
landing runway.

NOTE: Landing South indicates Rwy 20L/20C/20R.

Landing North indicates Rwy 2L/2C/2R.

Landing Northwest indicates Rwy 31.

(NARRATIVE ON FOLLOWING PAGE)

NOTE: Chart not to scale.

RYYMN TWO ARRIVAL (RNAV)

(RYYMN.RYYMN2) 14205

NASHVILLE, TENNESSEE

NASHVILLE INTL (BNA)

SE-1, 24 JUL 2014 to 21 AUG 2014



RYYMN TWO ARRIVAL (RNAV)

ARRIVAL ROUTE DESCRIPTION

- GUMMA TRANSITION (GUMMA.RYYMN2)
- LULOU TRANSITION (LULOU.RYYMN2)
- RANTS TRANSITION (RANTS.RYYMN2)
- YACKS TRANSITION (YACKS.RYYMN2)

From over RYYMN on track 157° to PEKIE at/above 10000, then on track 157° to cross JONIL at/above 9000, then on track 157° to cross OBATE at/above 6000 and at/below 12000 and at 250K, then on assigned runway transition.

LANDING NORTH (RWY 2L/2C/2R): From over OBATE on track 157° to cross JNKNS at/above 6000 and at 250K, then on track 200° to cross WAMAR at 5000 and 210K, then on track 200°. Expect radar vectors to final approach course.

LANDING SOUTH (RWY 20L/20C/20R): From over OBATE on track 149° to cross YYALL at 4000, then on track 149° to cross CULAR at 4000 and at 210K, then on track 110°. Expect radar vectors to final approach course.

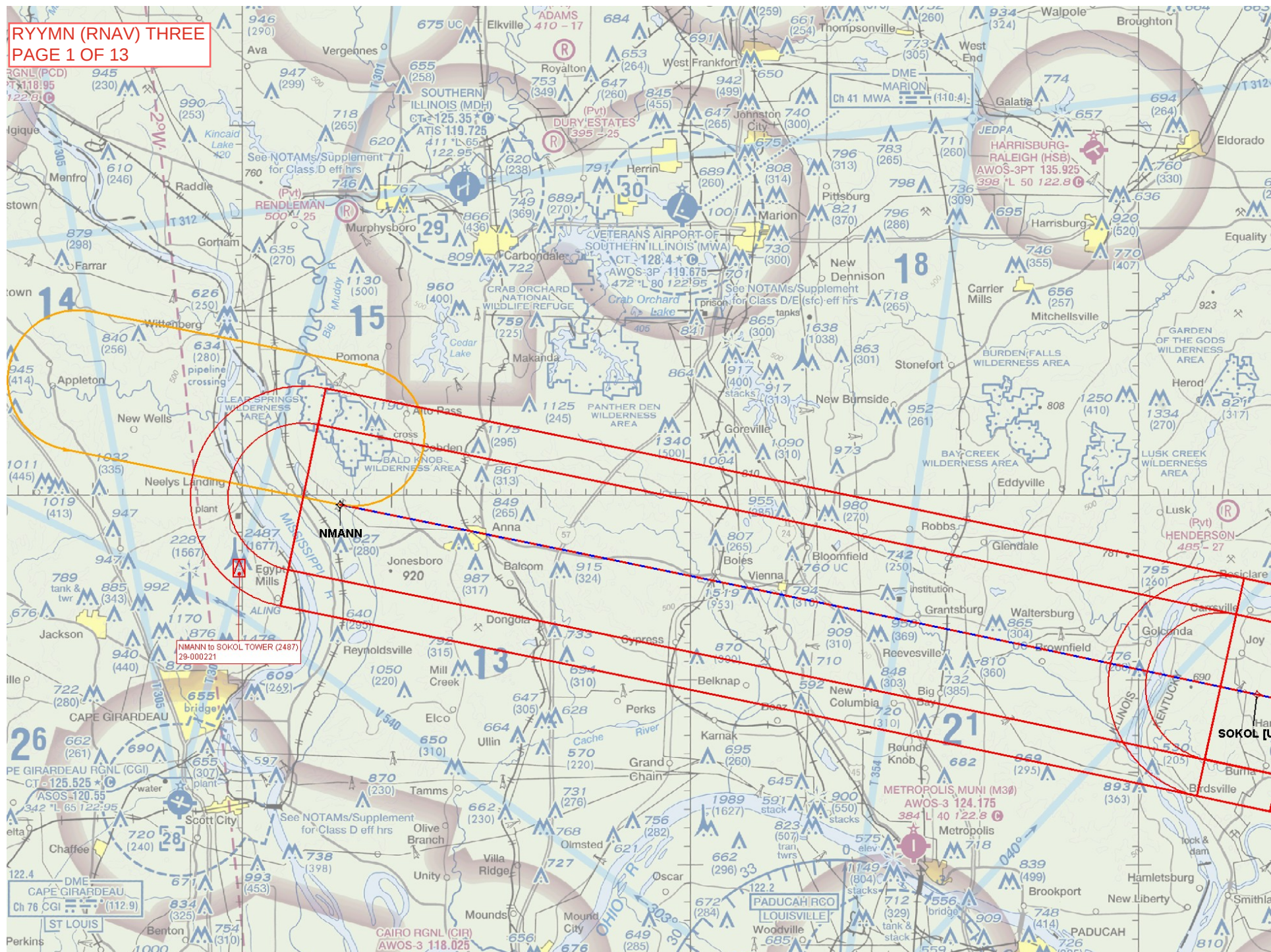
LANDING NORTHWEST (RWY 31): From over OBATE on track 170° to cross PEUWW at/above 6000 and at 250K, then on track 170° to cross CHEZY at/above 6000, then on track 170° to KIIWI, then on track 136° to cross GILME at 5000 and at 210K, then on track 136°, expect radar vectors to final approach course.

LANDING RWY 13: From over OBATE on track 200° to cross TCKKS at 6000, then on track 200. Expect radar vectors to final approach course.

SE-1, 24 JUL 2014 to 21 AUG 2014

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