

Flight Procedures Cover Page	Task Action: FLIGHT CHECK	Task Type: IAP	Estimated Chart Date: 12/24/2026	APWS Task ID: B96524360A164F0B84E0F76518FAF6FB	APWS Project ID: 230653690E4E48408A2093466E379B59
Procedure: RNAV (RNP) Z RWY 16R AMDT 3		Enroute: NO	Specialist: Stubblefield, Byron		Agreement Number:
Airport ID: KDEN			Airport City: DENVER		State: CO
Facility ID:	Facility Type:	Flight Inspection Remark Type: New FC Slot			
Procedure Comments: ACTIVE DATA USED FOR KDEN AIRPORT AND RWYS. WAIVER (1): FAA Order 8260.58D, table 1-2-2 Indicated Airspeed (KIAS), Minimum Airspeed Restriction, maximum speed of 170kts at ZITNO is required to alleviate aircraft exceeding the speed limitation and overshooting the course. WAIVER (2): FAA Order 8260.58D, paragraph 1-3-1E(2), The flight path of the leg from HELBY to OBIBY does not remain within 15 NM of the ARP coordinates. WAIVER (3): FAA ORDER 8260.58D paragraph 1-3-1c, RNAV (RNP) Z RWY 16R using the leg length from KAILE to OGINE of 1.90 NM. APPROVAL LETTER (1): FAA Order 8260.19K, paragraph 8-6-11N(1), Mandatory altitudes at CLFFF, GSHEN and FESKA. POC: CASEY HILL 405-954-0624 QUALITY 9 CHECKED BEGUE QUALITY 37 CHECKED					

1. FLIGHT PROCEDURE IDENTIFICATION:

DENVER, CO
KDEN
RNAV (RNP) Z RWY 16R

2. WAIVER REQUIRED AND APPLICABLE STANDARD:

FAA 8260.58D table 1-2-2 Indicated Airspeed (KIAS), Minimum Airspeed Restrictions CAT C & D minimum airspeed on intermediate segment (Table requires 180 knots minimum airspeed).

3. REASON FOR WAIVER (JUSTIFICATION FOR NONSTANDARD TREATMENT):

This maximum speed of 170kts is required to alleviate aircraft exceeding the speed limitation and overshooting the course, based on findings from the monitoring program of the offset procedures.

4. EQUIVALENT LEVEL OF SAFETY PROVIDED:

4a. Aerodynamic Safety Margins and Intermediate Flap Justification

An airspeed restriction of 170 KIAS remains safe and provides more than adequate stalling margins for the target aircraft classes.

Category C and D Speed Envelopes: The final approach reference landing speeds (VREF) range from 121 to 140 KIAS for Category C and 141 to 165 KIAS for Category D. A 170 KIAS restriction provides a safety buffer of at least 30 knots for CAT C and 5 knots for CAT D above their maximum landing configuration stall baselines.

Intermediate Flap Configuration Advantage: To maintain 170 KIAS, transport category aircraft must be operated in a standard, high-drag maneuvering flap configuration (such as Flaps 1, 5, or equivalent depending on the airframe). This configuration significantly lowers the actual stall speed (VS1 or VSR) compared to a clean wing, increasing the safety margin well above stall buffet onset or 1.3VSR limits. Operating configured also provides a highly stable thrust profile and cockpit deck angle during intermediate maneuvering, reducing pilot workload and enhancing flight path stability prior to the final approach segment.

4b. Path Conformance at the RF-to-TF Tangent Transition

At ZITNO, the procedure transitions from a curved RF leg (JAKRA-ZITNO) to a straight TF leg (ZITNO-FESKA). Because RF legs require the aircraft to precisely fly a coded ground track rather than anticipating a turn (as in a Fly-By TF-TF turn), standard DTA criteria do not apply.

However, establishing a maximum speed of 170 KIAS reduces the aircraft's True Airspeed (TAS) and groundspeed at the transition point. This lower speed minimizes autopilot lateral path-tracking transients (overshoots or undershoots) as the flight guidance system transitions from curved RF roll commands back to straight-line tracking, physically guaranteeing that the aircraft conforms tightly to the centerline and stays well within the 1.00 NM RNP primary boundary.

4c. Mandatory Coupled Flight Guidance and Tracking Tolerances

As an RNAV (RNP) [RNP AR APCH] procedure, the use of a coupled Autopilot (AP) or Flight Director (FD) is mandatory. This coupling restricts lateral Flight Technical Error (FTE) to nominal design baselines, eliminating manual steering drift.

Under AC 90-101A tracking rules, pilots are required to monitor lateral tracking on the primary flight instruments. Normal operations require the pilot to limit cross-track error (XTK) to ± 0.5 times the RNP value (which equates to a very tight ± 0.5 NM on this RNP 1.00 intermediate segment). Momentary lateral deviations (transients) during the RF-to-TF transition at ZITNO are strictly limited to a maximum of 1.0 times the RNP value (1.0 NM), with an immediate missed approach or ATC breakout mandated if the aircraft ever reaches the primary OEA boundary.

5. ALTERNATIVE ACTIONS DEEMED NOT FEASIBLE:

Altering the procedure design is not possible because of ATC requirements from simultaneous operations on RWY 16L.

6. COORDINATION WITH USER ORGANIZATIONS (SPECIFY):

DEN TRACON, ZDV, DEN Tower.

7. SUBMITTED BY:

DATE	OFFICE IDENTIFICATION	TITLE	SIGNATURE
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8. AFS ACTIONS:

☐ APPROVED ☐ DISAPPROVED ☐ NOT REQUIRED

COMMENTS:

DATE	ROUTING SYMBOL	SIGNATURE
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1. FLIGHT PROCEDURE IDENTIFICATION:

Denver, CO
KDEN
RNAV (RNP) Z RWY 16R

2. WAIVER REQUIRED AND APPLICABLE STANDARD:

8260.58D Para 1-3-1e(2) Length.

For PBN SIAPs, intermediate segment length is independent of the amount of turn at the IF. The default length for CAT A/B is 3 NM. The default length for CAT C/D is 5 NM. The minimum length is as specified in paragraph 1-2-5.b(1). The intermediate segment length may not be greater than 15 NM unless the nominal track of the entire segment is within 15 NM of the ARP.

3. REASON FOR WAIVER (JUSTIFICATION FOR NONSTANDARD TREATMENT):

Request to publish the RNAV (RNP) Z RWY 16R where the (IF) segment from CLFFF exceeds 15 NM from the ARP. The maximum distance from the ARP the RF leg is 16.68 NM (1.68 NM over the 15 NM limit) at WP61 waypoint. The Denver Intl Airport occupies a large area of land with the 6 runways and the approach end of RWY 16R is 2.3 NM away from the ARP. The furthest the aircraft gets from the approach end of RWY 16R is 14.4 NM at the furthest point of the arc. Due to the high number of TCAS RA's being caused by the previous RF leg from (IF) CLFFF to intercept the off-set final approach course (FAC), the RF turn was redesigned to shallow out the turn to prevent the aircraft from overshooting the off-set FAC. The added benefit of shallowing out of the turn allows the two aircraft TCAS to not activate as the systems don't predict the flight paths merging which would cause an activation of the system.

4. EQUIVALENT LEVEL OF SAFETY PROVIDED:

1. The Minimum Enroute Altitude for the WP62 to WP61 segment is 7000 which provides of protection over the calculated minimum segment altitude (6700).
2. Due to the excessive length of final, there is an additional 500 ft of Required Obstruction Clearance (ROC) provided in this segment which increases the total ROC provided to 1000 ft as compared to the 500 ft required in criteria which makes the minimum segment altitude 7000 an equivalent level of safety.

5. ALTERNATIVE ACTIONS DEEMED NOT FEASIBLE:

1. AMDT 2 of the RNAV (RNP) Z RWY 16R is currently published with the RF segment within 15 NM from the ARP but, it has not reduced the TCAS RA's with RWY 16L traffic caused when aircraft fly the RF segment to join final.
2. The current location of (IF) CLFFF can't be relocated at the current time of amendment due to ATC requirements.

6. COORDINATION WITH USER ORGANIZATIONS (SPECIFY):

DEN TRACON, ZDV, DEN Tower.

7. SUBMITTED BY:

DATE	OFFICE IDENTIFICATION	TITLE	SIGNATURE
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8. AFS ACTIONS:

☐ APPROVED ☐ DISAPPROVED ☐ NOT REQUIRED

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1. FLIGHT PROCEDURE IDENTIFICATION:

Denver, Colorado
KDEN
RNAV (RNP) Z RWY 16R

2. WAIVER REQUIRED AND APPLICABLE STANDARD:

8260.58D para 1-3-1c:

The first leg of an initial and the first leg of an intermediate segment must be a TF that accommodates a 90-degree intercept angle.

3. REASON FOR WAIVER (JUSTIFICATION FOR NONSTANDARD TREATMENT):

Request to publish the RNAV (RNP) Z RWY 16R using the leg length from KAILE to OGINE of 1.90 NM versus the requirement of at least 3.86 NM to support ATC vectors.

4. EQUIVALENT LEVEL OF SAFETY PROVIDED:

1. When aircraft are vectored to the procedure, they are only vectored to intercept the straight intermediate segment and not initial segment fixes.
2. Aircraft going to KAILE are inbound via LONGZ STAR and require less than 20° of heading change when reaching the (IAF).
3. The prohibition against vectoring to KAILE or OGINE for this procedure will be included in the next version of the facilities Standard Operation Policy (SOP).
4. A feeder segment was temporarily added to the procedure to mimic the LONGZ ARRIVAL segment from WP SWAYN to KAILE. TARGETS identified no criteria issues other than the subject of this waiver before or after KAILE.

5. ALTERNATIVE ACTIONS DEEMED NOT FEASIBLE:

1. Extending the leg length from KAILE to OGINE is not feasible as it would cause tie in problems with the existing LONGZ STAR and intercept angle to FAC.
2. Moving the KAILE WP to accommodate the leg length requirement would impact multiple arrivals and additional Instrument Approaches which leads to descent gradient and segment length criteria violations.
3. Changes to the LONGZ ARRIVAL will additionally require changes to integrated procedures entering and exiting TRACON airspace via this gate. Due to limited time available to resolve the high risk TCAS safety issue at this airport, there is not sufficient time to redesign the entire TRACON northwest gate structure.

6. COORDINATION WITH USER ORGANIZATIONS (SPECIFY):

DEN TRACON, ZDV, DEN Tower.

7. SUBMITTED BY:

DATE	OFFICE IDENTIFICATION	TITLE	SIGNATURE
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8. AFS ACTIONS:

☐ APPROVED ☐ DISAPPROVED ☐ NOT REQUIRED

COMMENTS:

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Federal Aviation Administration

Memorandum

Date: 08/21/2026
To: Wade Terrell, Manager, Flight Technologies and Procedures Division THRU:
Wayne Radicke, Manager, Flight Procedures and Airspace Group
From: Julie Morgan, Manager, Team 1, AJV-A41
Subject: Approval Request: DENVER INTL (KDEN), RNAV (RNP) Z RWY 16R

RNAV (RNP) Z RWY 16R
DENVER INTL DENVER CO (KDEN)

ISSUE: MANDATORY ALTITUDE RESTRICTION: INTERMEDIATE SEGMENT CLFFF-
HELBY-APASE

Per the 8260.19K 8-6-11n, maximum, mandatory or block altitudes in the intermediate, final and/or missed approach segment require Flight Standards approval.

The intermediate segment for the RNAV (RNP) Z RWY 16R CLFFF-JOEZZ-LEGIY-GSHEN-FESKA-APASE has a mandatory altitude of 11000 MSL at CLFFF. The following four STARS that service KDEN have a mandatory altitude of 11000 MSL at CLFFF: CLASH ARRIVAL, NIIXX ARRIVAL, TBARR ARRIVAL and SSKII ARRIVAL.

Per the 8260.3G 2-2-7f, an altitude restriction must be established at the termination fix of the STAR if the same fix is charted on an approach procedure. If the approach procedure fix has an altitude restriction associated with it, then the STAR termination altitude restriction must be identical to it.

This procedure has been flight checked and flown as satisfactory in both the current revision and previous amendments with the same mandatory altitude restriction with no issues noted by Flight Check, ATC operations or the flying public.

Requesting approval to continue to publish the mandatory altitude restriction at the intermediate fix CLFFF IAW the 8260.3G 2-2-7f criteria. It is not possible to easily convert CLFFF to an initial fix without significant redesign of the subsequent segment due to leg length and TF to RF requirements.

APP CRS
170°

Rwy Ldg
TDZE
5326

Apt Elev
5434

OLD

RNAV (RNP) Z RWY 16R
DENVER INTL (DEN)

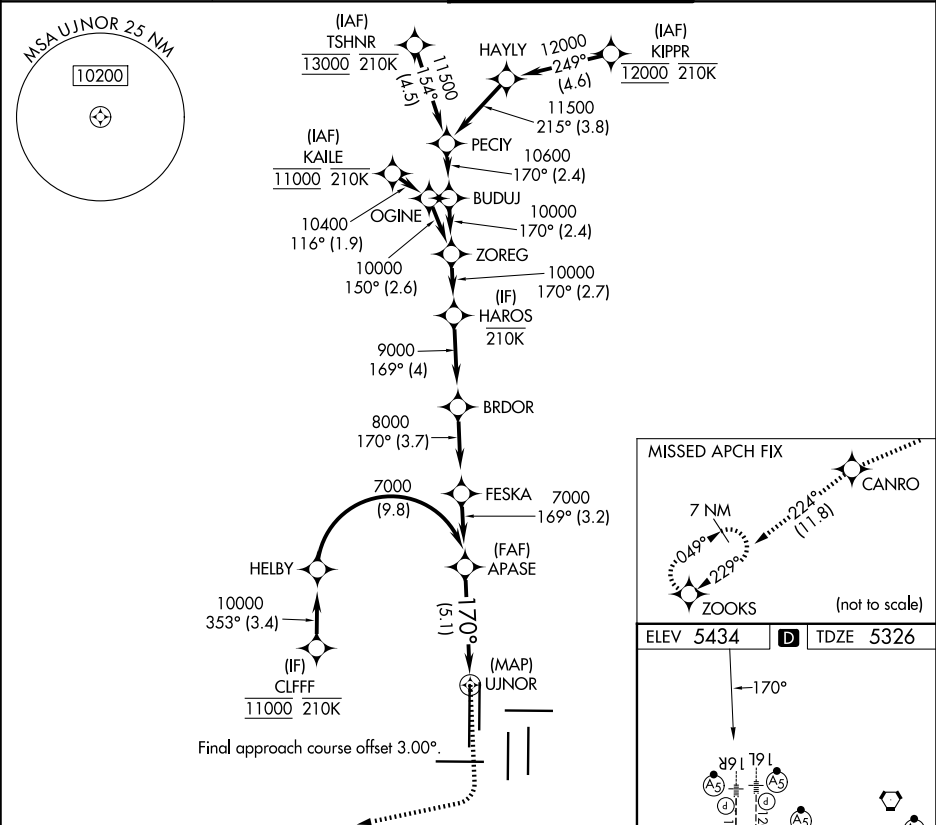
RNP AR APCH - GPS. Authorization required. From CLUFF: RF.

▼ For uncompensated Baro-VNAV systems, procedure NA below -26°C or above 54°C. Simultaneous approach authorized. For inop ALS, increase RNP 0.30 all Cats visibility to RVR 4500.

MALSR

MISSED APPROACH: Climb to 5900 then climbing right turn to 10000 direct CANRO and on track 224° to ZOOKS and hold.

D-ATIS 125.6 379.9	DENVER APP CON 119.3 307.3 (N) 120.35 379.3 (S)	DENVER TOWER 135.3 351.95	GND CON 121.35 379.175 (W) 121.85 377.1 (E)
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APASE
7000

GP 3.00°
TCH 55

7000

170°

See planview for multiple IF locations.

5.1 NM

5900

10000

CANRO

tr 224°

ZOOKS

VGSI and RNAV glidepath not coincident
(VGSI Angle 3.00/TCH 71).

UJNOR

CATEGORY	A	B	C	D
RNP 0.30 DA	5598/24 272 (200-½)			

AUTHORIZATION REQUIRED

ELEV 5434

TDZE 5326

HIRL all Rwys
TDZL/RCLS Rwys 7, 16L, 16R, 17R, 26, 34L, 34R, 35L, 35R