Introduction to Airport Engineering

Preston Rufe, PE
T-O Engineers

Overview

- Three (3) types of airports criteria:
  1. FAR Part 77 – Objects Affecting Navigable Airspace
  2. FAA AC 150/5300-13 – Airport Design
  3. FAA Order 8260.3B, The United States Standard for Terminal Instrument Procedures (TERPS)

- Unfortunately, not all three agree, all the time
- Let’s take a look at each component

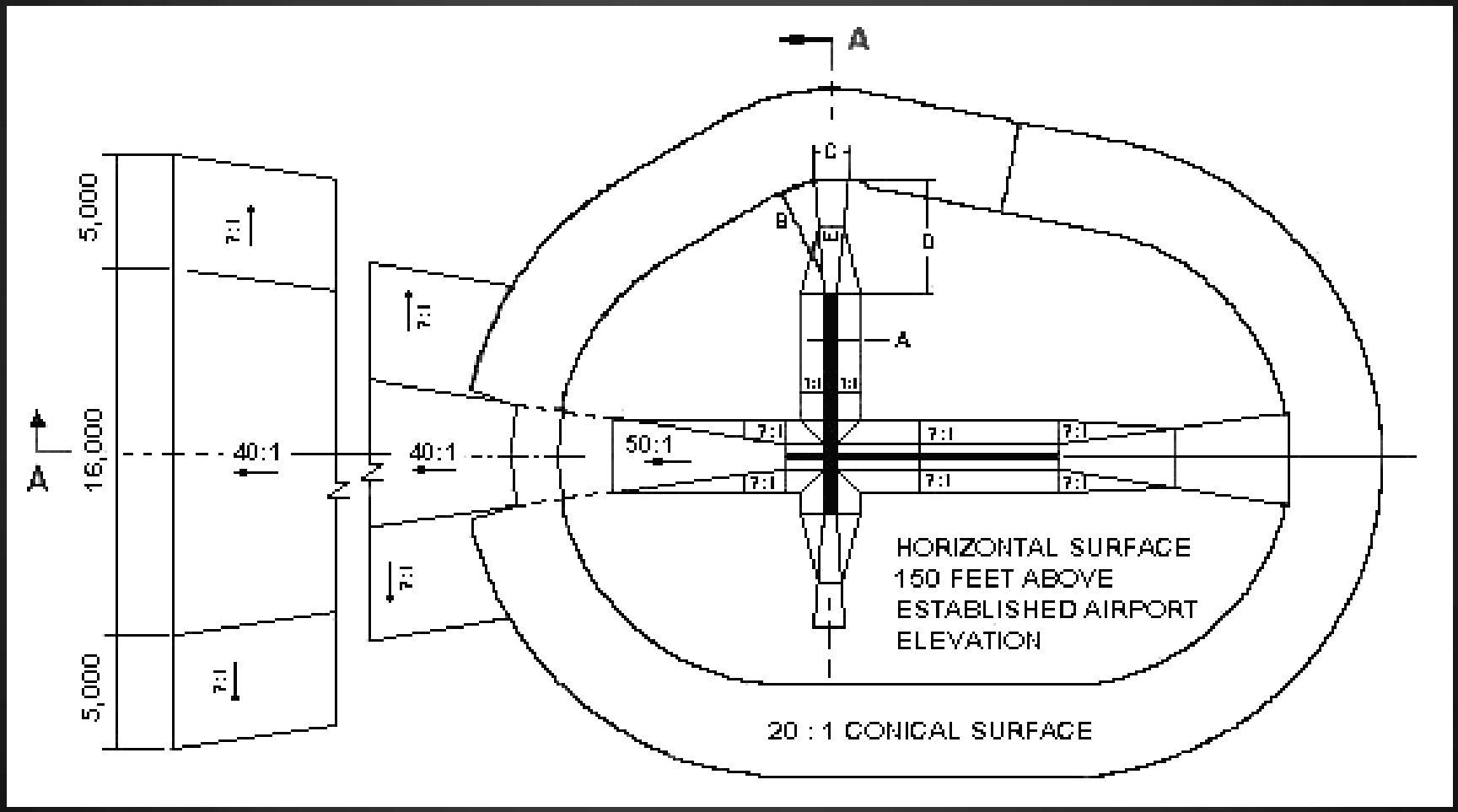
FAR Part 77 Airspace

- Federal Aviation Regulations Part 77
- This part establishes:
  a) The requirements to provide notice to the FAA of certain proposed construction, or the alteration of existing structures;
  b) The standards used to determine obstructions to air navigation, and navigational and communication facilities;
  c) The process for aeronautical studies of obstructions to air navigation or navigational facilities to determine the effect on the safe and efficient use of navigable airspace, air navigation facilities or equipment; and
  d) The process to petition the FAA for discretionary review of determinations, revisions, and extensions of determinations.

FAR Part 77 Airspace

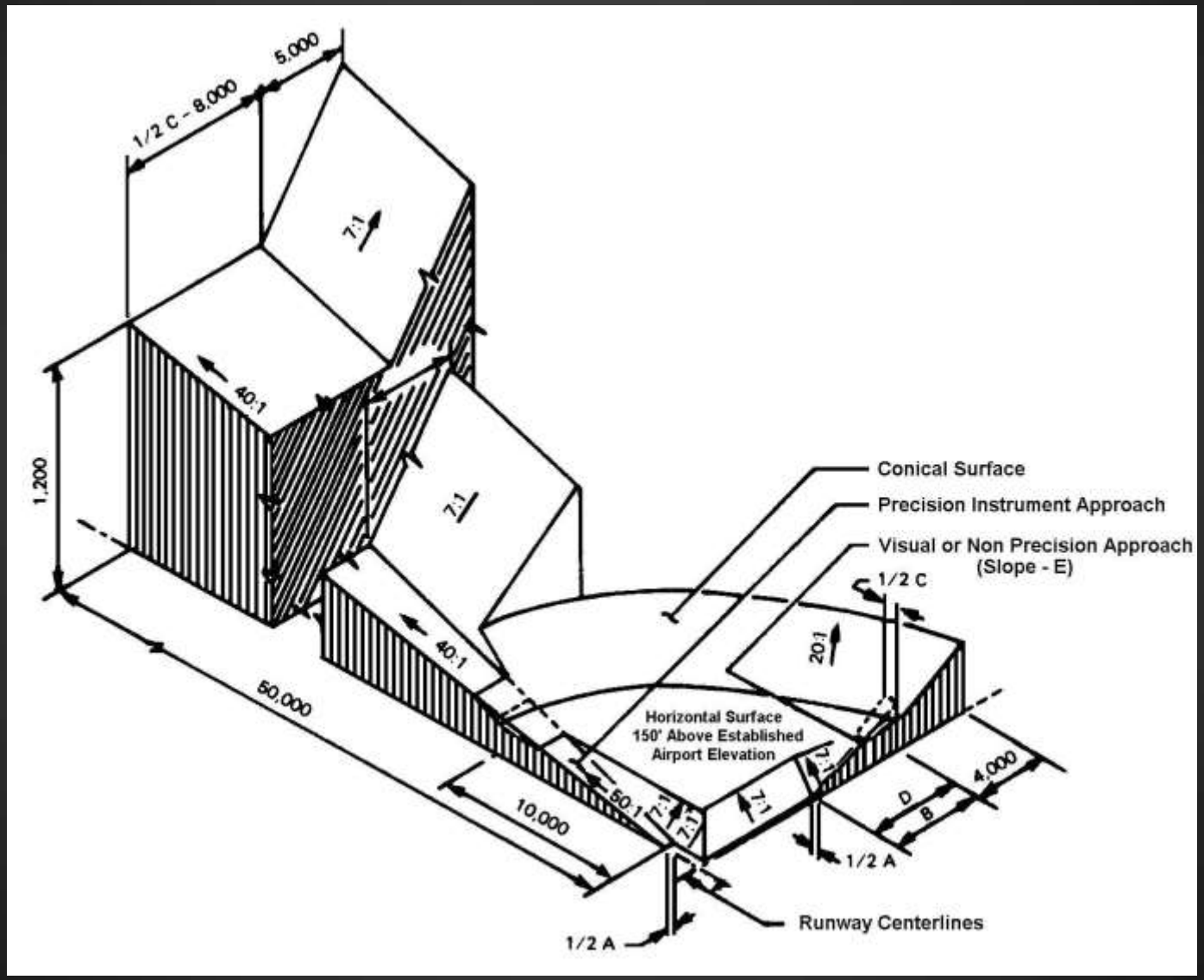
- FAA review under Part 77 results in:
  - No Objection, or
  - Objection with Mitigation, or
  - Objection

Part 77 Surfaces, Plan View



Source: http://www.ngs.noaa.gov/AERO/yplanfar77.gif

Part 77 Surfaces, 3-D View



Source: http://www.ngs.noaa.gov/AERO/3dfar77.html

OBSTRUCTION IDENTIFICATION SURFACES
FEDERAL AVIATION REGULATIONS PART 77

DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON - PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY PIR
		A	B	A	B		
					C	D	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON - PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT APPROACH
		A	B	A	B		
					C	D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

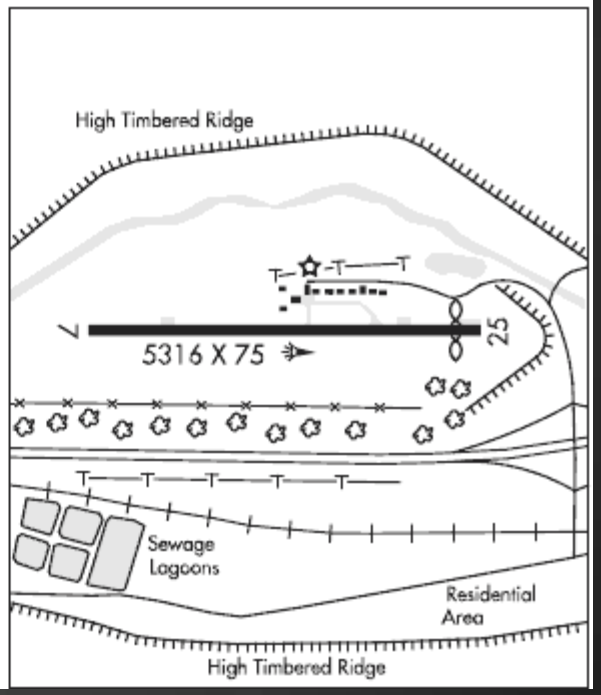
- A - UTILITY RUNWAYS
- B - RUNWAYS LARGER THAN UTILITY
- C - VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
- D - VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
- * - PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET

Source: http://www.ngs.noaa.gov/AERO/oisspec.html

An Example of Part 77 Surfaces

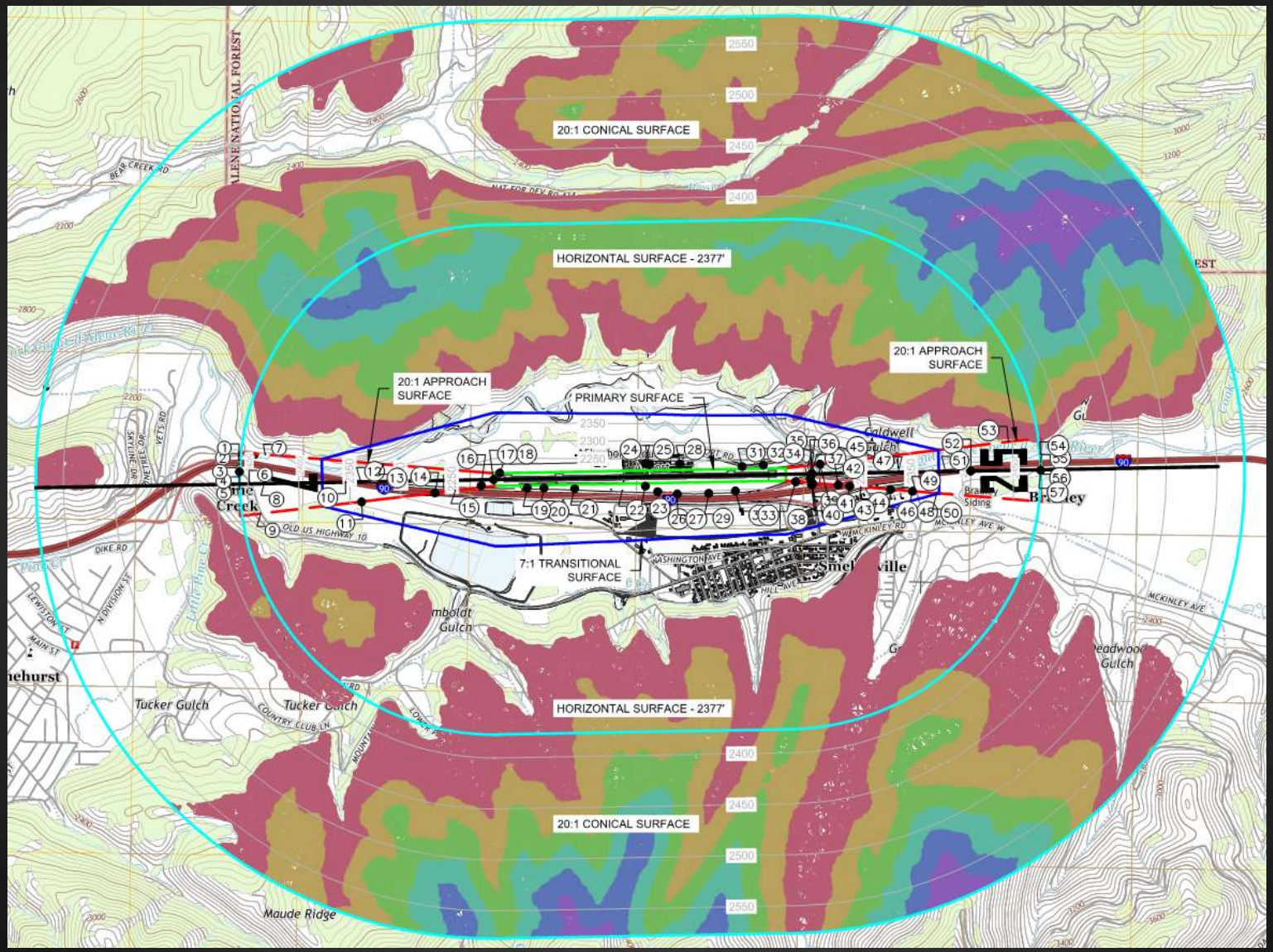
- Airport/Facility Directory

SHOSHONE CO (S83) 3 W UTC–8(–7DT) N47°32.84′ W116°11.34′ **GREAT FALLS**
2227 B S3 **FUEL** 100LL TPA—3227(1000) NOTAM FILE BOI **H–1D, L–13B**
RWY 07–25: H5316X75 (ASPH) S–14 MIRL 0.4% up E
RWY 07: Tree. Rgt tfc.
RWY 25: Thld dsplcd 335′. Tree.
AIRPORT REMARKS: Attended dalgt hrs. ACTIVATE MIRL Rwy 07–25—CTAF.
AIRPORT MANAGER: 208-786-5381
COMMUNICATIONS: CTAF/UNICOM 122.8
RADIO AIDS TO NAVIGATION: NOTAM FILE MLP.
MULLAN PASS (H) VORW/DME 117.8 MLP Chan 125 N47°27.41′
W115°38.76′ 269° 22.7 NM to fld. 6100/15E. **HIWAS.**
VOR portion unusable:
060°–090° byd 20 NM blo 9,500′



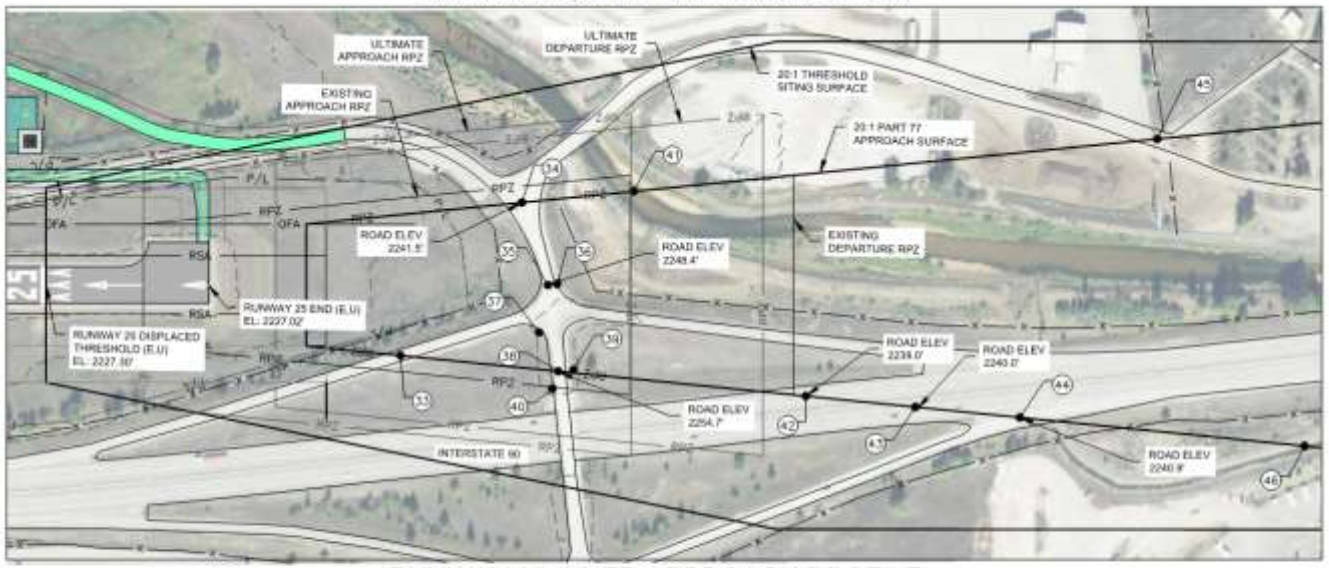
Source: SkyVector

An Example of Part 77 Surfaces



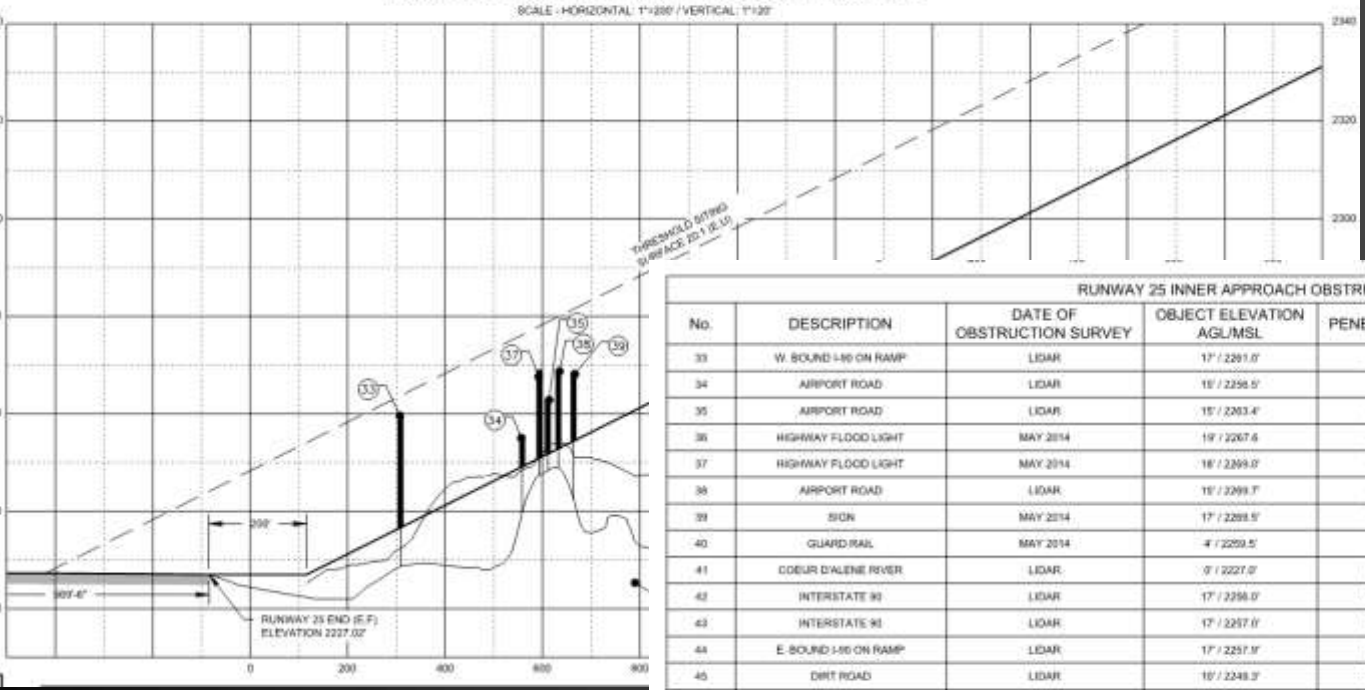
Source: T-O Engineers

RUNWAY 25 INNER APPROACH PLAN



RUNWAY 25 INNER APPROACH PROFILE

SCALE - HORIZONTAL: 1"=200' / VERTICAL: 1"=20'



RUNWAY 25 INNER APPROACH OBSTRUCTIONS

No.	DESCRIPTION	DATE OF OBSTRUCTION SURVEY	OBJECT ELEVATION AGL/MSL	PENETRATION	SURFACE PENETRATED	PROPOSED ACTION	YEAR OF ACTION
33	W. BOUND I-90 ON RAMP	LIDAR	17' / 2261.0'	+24.3'	PART 77 APPROACH/TRANSITIONAL	NONE	NONE
34	AIRPORT ROAD	LIDAR	15' / 2258.5'	+7.3'	PART 77 APPROACH/TRANSITIONAL	RELOCATE	2025
35	AIRPORT ROAD	LIDAR	15' / 2263.4'	+11.0'	PART 77 APPROACH	RELOCATE	2025
36	HIGHWAY FLOOD LIGHT	MAY 2014	19' / 2267.6	+14.8'	PART 77 APPROACH	OBSTRUCTION LIGHT	2020
37	HIGHWAY FLOOD LIGHT	MAY 2014	18' / 2269.0'	+16.1'	PART 77 APPROACH	OBSTRUCTION LIGHT	2020
38	AIRPORT ROAD	LIDAR	15' / 2269.7'	+16.9'	PART 77 APPROACH/TRANSITIONAL	NONE	NONE
39	SIGN	MAY 2014	17' / 2269.5'	+15.0'	PART 77 APPROACH	OBSTRUCTION LIGHT	2020
40	GUARD RAIL	MAY 2014	4' / 2259.5'	+1.9'	PART 77 TRANSITIONAL	NONE	NONE
41	COEUR D'ALENE RIVER	LIDAR	0' / 2227.0'	NONE	NONE	NONE	NONE
42	INTERSTATE 90	LIDAR	17' / 2256.0'	NONE	NONE	NONE	NONE
43	INTERSTATE 90	LIDAR	17' / 2257.0'	NONE	NONE	NONE	NONE
44	E. BOUND I-90 ON RAMP	LIDAR	17' / 2257.9'	NONE	NONE	NONE	NONE
45	DIRT ROAD	LIDAR	10' / 2248.3'	NONE	NONE	NONE	NONE
46	WATER CHANNEL	LIDAR	0' / 2238.0'	NONE	NONE	NONE	NONE

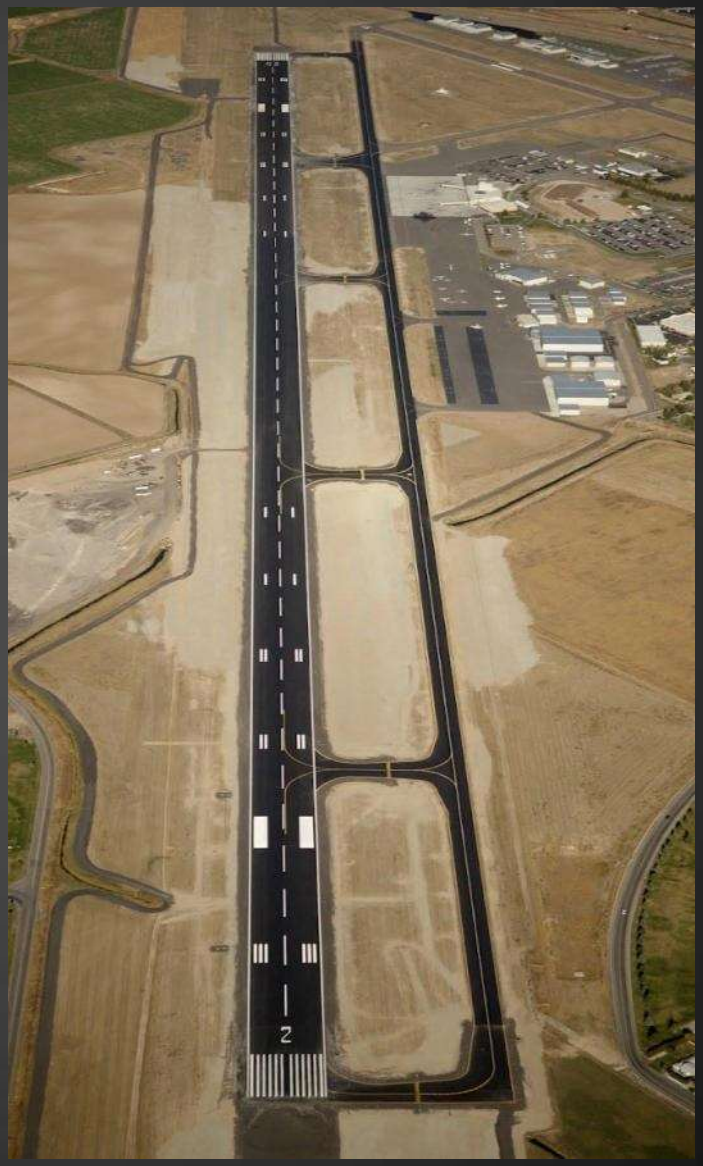
NOTE: TRAVERSEWAY ELEVATIONS SHOWN INCLUDE THE 14 CRF PART 77 TRAVERSEWAY ADJUSTMENT (17' FOR INTERSTATE HIGHWAYS, 15' FOR PUBLIC ROADS, AND 10' FOR PRIVATE ROADS)
ALL LATITUDE AND LONGITUDE COORDINATES ARE BASED ON NAD 83. ALL ELEVATIONS LISTED ARE BASED ON NAVD 88.

T-O ENGINEERS

Source: T-O Engineers

AC 150/5300-13A Airport Design

- Runway
- Taxiway
- Aprons
- Terminal



Source: T-O Engineers

Design Process

- FAA Advisory Circulars
  - http://www.faa.gov/airports/engineering/design_standards/
    - Airport Design – 150/5300-13A
  - Determine Design Aircraft
- Runway Design Code (RDC)

Aircraft Approach Category (AAC)	
Category	Approach Speed (kts)
A	<91
B	91 - <121
C	121 - <141
D	141 - <166
E	166 or more

Airplane Design Group (ADG)		
Group #	Tail Height (ft)	Wingspan (ft)
I	<20	<49
II	20 - <30	49 - <79
III	30 - <45	79 - <118
IV	45 - <60	118 - <171
V	60 - <66	171 - <214
VI	66 - <80	214 - <262

Source: AC 150/5300-13A

Design Process

- Runway Design Code (RDC) (con't)

Visibility Minimums	
RVR (ft)	Instrument Flight Visibility Category (SM)
5000	>= 1
4000	¾ - <1
2400	½ - < ¾
1600	¼ - < ½
1200	< ¼

  - Example RDC: *B-II-2400*

Source: AC 150/5300-13A

Design Process

- Basically, aircraft characteristics and design components drive design

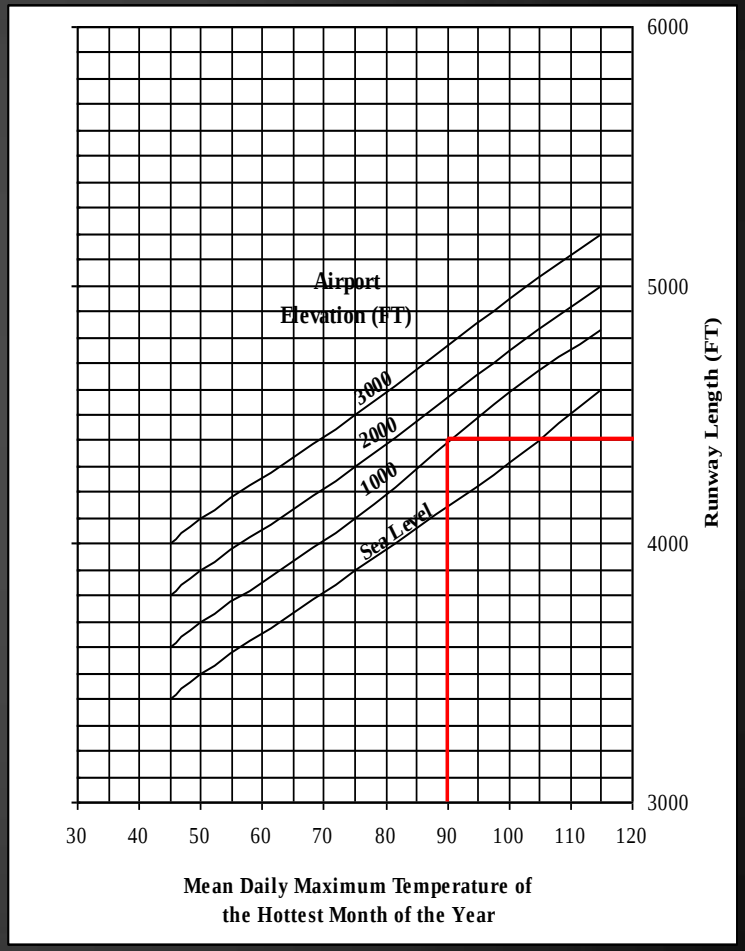
Aircraft Characteristics	Design Components
Approach Speed	RSA, ROFA, RPZ, runway width, runway-to-taxiway separation, runway-to-fixed object.
Landing and Takeoff Distance	Runway length
Cockpit to Main Gear Distance (CMG)	Fillet design, apron area, parking layout
Main Gear Width (MGW)	Taxiway width, fillet design
Wingspan / Tail Height	Taxiway and apron OFA, parking configuration, hangar locations, taxiway-to-taxiway separation, runway to taxiway separation

- "Instrument flight procedures minimums are based on the characteristics and infrastructure of the runway (i.e., markings, approach light system, protected airspace, etc.), airspace evaluation, and the navigation system available to the aircraft. Unless these items are considered in the development of the airport, the operational minimums may be other than desired."
(AC 150/5300-13A, 201.(a.))

Source: AC 150/5300-13A

Runway Design

- Basic Considerations
  - Length
    - Aircraft Performance
    - Elevation
    - Temperature
  - Width - Aircraft Size
  - Orientation -Wind Coverage



Source: FAA Advisory Circular 5325-4

Wind Rose

- Orient runway to achieve 95% Wind Coverage
- Allowable crosswind component determined by RDC (10.5 kts to 20 kts)

https://airports-gis.faa.gov/airportsgis/publicToolbox/windroseForm.jsp

Source: T-O Engineers

Airfield Separations

- Runway to Runway
- Runway to Taxiway
- Runway to Aircraft Parking
- Taxiway to Taxiway

Function of

- Aircraft Size
- Visibility Minimums

Source: T-O Engineers

Taxiway Design

- Separation
- Width - Aircraft Size
- Intersection - Gear Layout
- Additional Considerations

Source: T-O Engineers

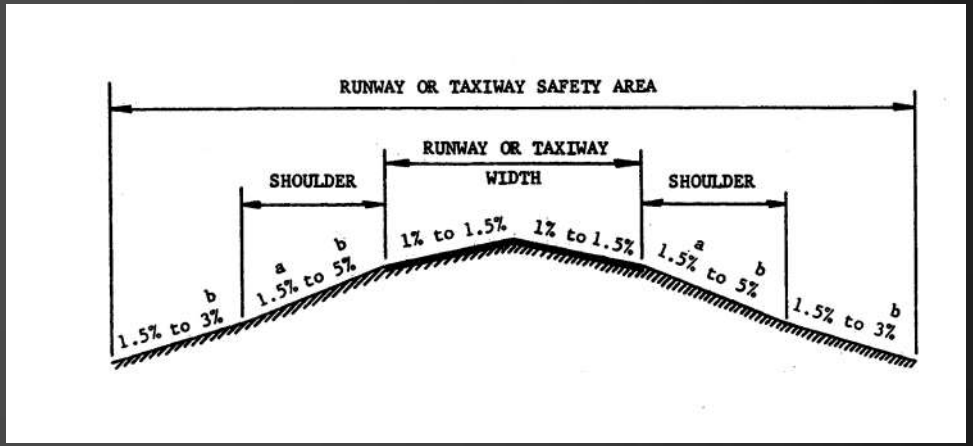
Apron Design

- Function
  - General Aviation versus Commercial
- Aircraft Size
  - Length
  - Wingspan

Source: T-O Engineers

Surface Gradients

- Pavement and Safety Areas
  - Longitudinal
  - Transverse
  - Vertical Curves
- Surface
  - PFC
  - Grooving



Source: FAA Advisory Circular 5300-13

Pavement Section Design

- Layered Elastic Design
  - FAARFIELD
- Considerations
  - Fleet Mix
  - Operations
  - Aircraft Weight
  - Gear Configuration
    - Single, Dual, Dual Tandem, Double Dual Tandem
  - Frost Protection

Additional Airfield Components

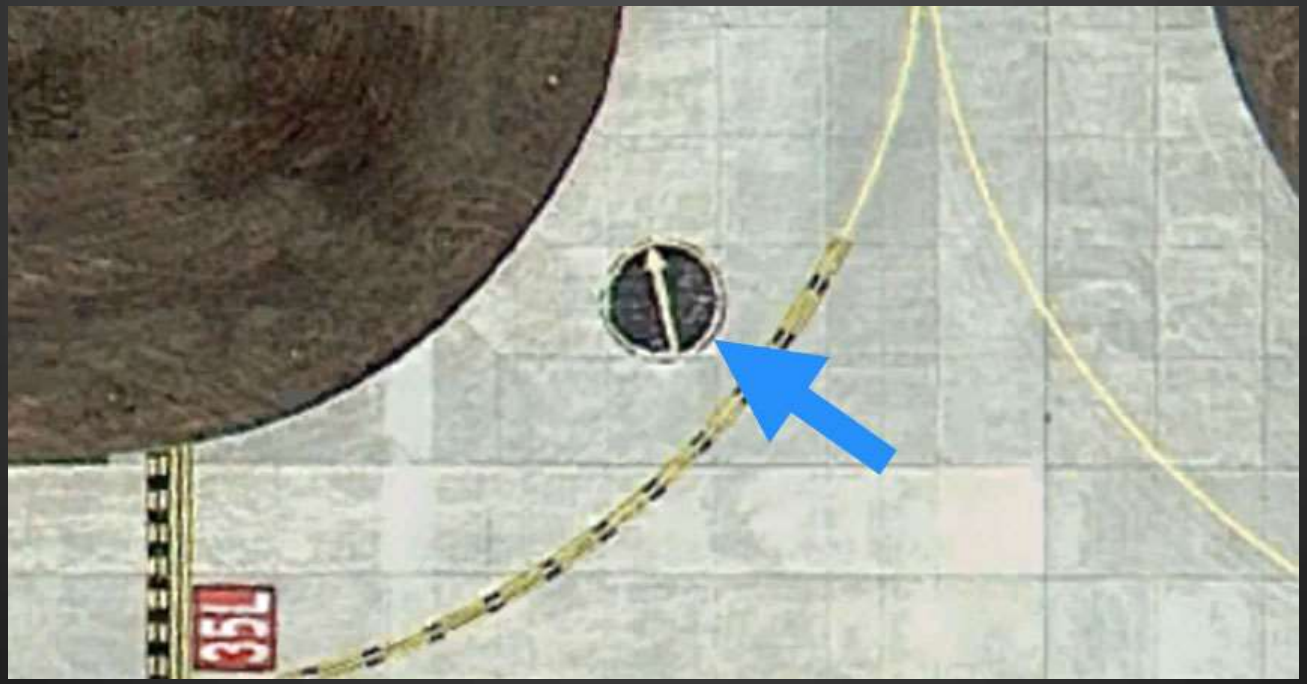
- Electrical
  - Lights
  - Signs
  - NAVAIDS
- Markings
- Drainage

Source: T-O Engineers

Airfield Markings

You're approaching a lit runway for landing. What color are the threshold lights?

You're taxiing and see this painted on the concrete. What does it mean?



Source: www.boldmethod.com

Airfield Markings

You're landing and you see this sign on the side of the runway. What does it mean?

What color are taxiway centerlines?

Ground control tells you to hold short of runway 33 What sign are you looking for?

Source: www.boldmethod.com

Additional Considerations

- 307 - Runway Safety Area
  - On rwy C/L – NO OBJECTS HIGHER THAN 3”, except those necessary for their function (e.g., NAVAID)
- 308 - Runway Object Free Zone
  - Volume of airspace above rwy C/L – precludes aircraft and other object penetrations except frangible NAVAIDs
- 309 - Runway Object Free Area
  - On rwy C/L – clear of objects protruding above nearest point of RSA (e.g., LOC, GS)
- 310 - Runway Protection Zone
  - Seeks to protect people and property on the ground. Control generally sought through purchase of property.

TERPS

- FAA Order 8260.3B
- Instrument Approach & Departure Minimums
  - Approach:
    - Most require: 20:1 OCS (34:1 for vis < ¾ SM)
  - Departure:
    - 40:1 OCS (152 ft/NM)
    - Std Climb (200 ft/NM)
    - OEI Climb Gradient? - NO
- If obstacles penetrate OCS:
  - Reduce TODA
  - Non-Std Climb Gradient
  - Increase Vis required
- <u>Not all TERPS criteria are contained in FAR Part 77 Surfaces</u>

What does this correspond to?
Hint: Glideslope

Source: www.AirNav.com

Standards for Instrument Approach Procedures

Visibility Minimums [1]	< 3/4 statute mile	3/4 to < 1 statute mile	≥ 1 statute mile straight-in	Circling [2]
HATh [3]	< 250 ft	≥ 250 ft	≥ 250 ft	≥ 350 ft
TERPS GQS [4]	Clear	Clear	Clear	Not applicable
PA final approach surfaces [5]	Clear	Not Required	Not Required	Not applicable
POFZ (PA & APV only)	Required	Not Required	Not Required	Not applicable
TERPS Chapter 3, Section 3	34:1 clear	20:1 clear	20:1 clear [6]	20:1 clear [6]
ALP [7]	Required	Required	Required	Recommended
Minimum Runway Length	4,200 ft (paved)	3,200 ft [8, 9]	3,200 ft [8, 9]	3,200 ft [8, 9]
Runway Markings (See AC 150/5340-1)	Precision	Non-precision [9]	Non-precision [9]	Visual (Basic) [9]
Holding Position Signs & Markings (See AC 150/5340-1, AC 150/5340-18)	Precision	Non-precision [9]	Non-precision [9]	Visual (Basic) [9]
Runway Edge Lights [10]	HIRL / MIRL	HIRL / MIRL	MIRL / LIRL	MIRL / LIRL (Required only for night minimums)
Parallel Taxiway [11]	Required	Required	Recommended	Recommended
Approach Lights [12]	MALSR, SSALR, or ALSF	Recommended [13]	Recommended [13]	Not Required
Applicable Runway Design Standards, e.g. OFZ	< 3/4-statute mile approach visibility minimums	≥ 3/4-statute mile approach visibility minimums	≥ 3/4-statute mile approach visibility minimums	Not Required
Threshold Siting Criteria To Be Met (Reference paragraph 303)	Table 3-2, row 7	Table 3-2, row 6	Table 3-2, rows 1-5	Table 3-2, rows 1-4
Survey Required [14]	VGS	VGS (PA & APV) NVGS	NVGS [15]	NVGS [16]

ALP – Airport Layout Plan
GQS – Glide Path Qualification Surface
PA – Precision Approach
POFZ - Precision Obstacle Free Zone

Source: AC 150/5300-13A Table 3-4

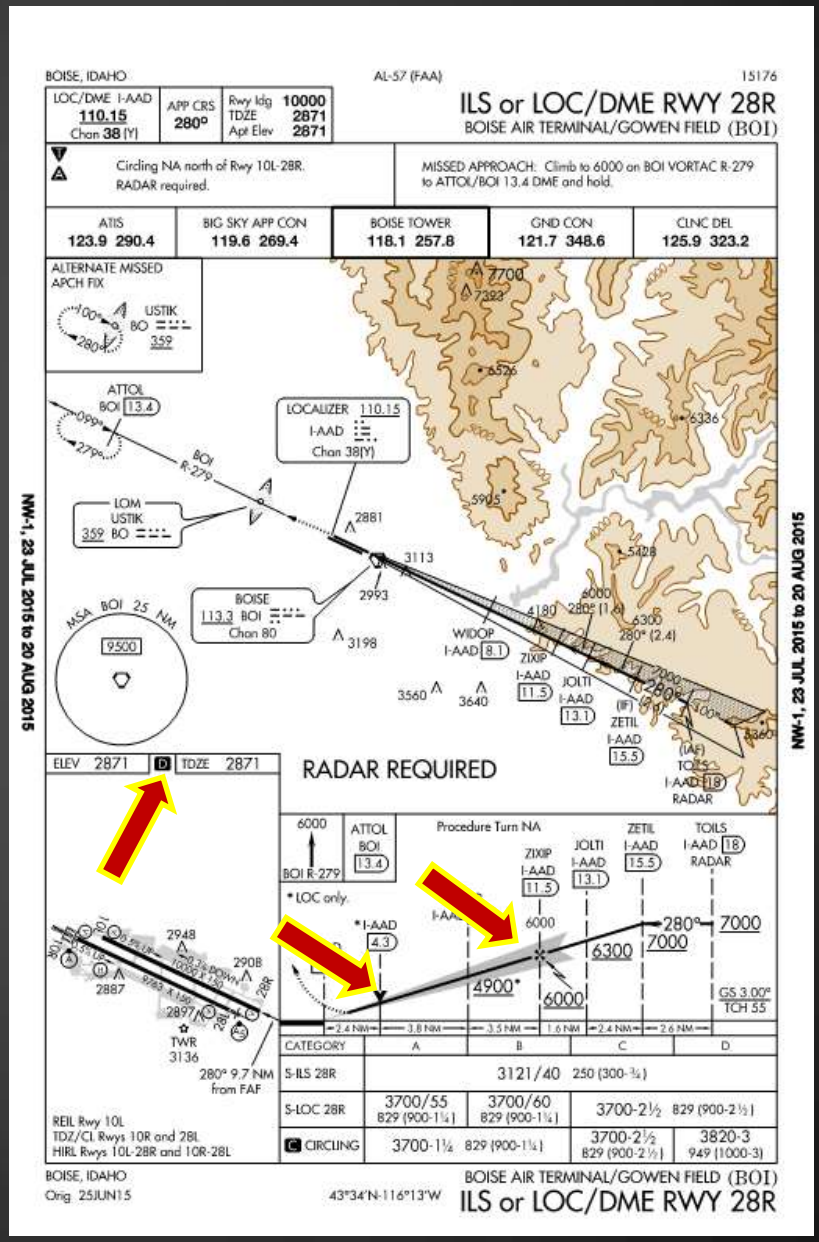
SIAP

Do you need DME for this approach?

Celtic Cross = Final Apporach Fix (NPA)
Lightning Bolt = FAF (PA)
Co-located on this IAP

Visual Descent Point = earliest location a visual descent can commence with required visual references (AVRRRRTTTTTTNormalVis)

Declared Distance Information is available



ODP vs SID…

L19

TAKEOFF MINIMUMS, (OBSTACLE) DEPARTURE PROCEDURES, AND DIVERSE VECTOR AREA (RADAR VECTORS)

15204

MEDFORD, OR
ROGUE VALLEY INTL-MEDFORD (MFR)
TAKEOFF MINIMUMS AND (OBSTACLE)
DEPARTURE PROCEDURES
AMDT 10 13066 (FAA)
TAKEOFF MINIMUMS: **Rwy 14,** std. w/ min. climb of 435' per NM to 4500, or 2900-3 for climb in visual conditions. **Rwy 32,** std. w/ min. climb of 260' per NM to 6800, or 2900-3 for climb in visual conditions.
DEPARTURE PROCEDURE: **Rwy 14,** climbing right turn direct OED VORTAC, or for climb in visual conditions, cross Rogue Valley Intl-Medford airport at or above 4100 before proceeding direct OED VORTAC. When executing VCOA, notify ATC prior to departure. Thence ...
Rwy 32, climbing right turn direct OED VORTAC, or for climb in visual conditions, cross Rogue Valley Intl-Medford airport at or above 4100 before proceeding direct OED VORTAC. When executing VCOA, notify ATC prior to departure. Thence ...
...all aircraft climb in OED VORTAC holding pattern (hold NW, right turns, 153° inbound) to cross OED VORTAC at or above MEA or MCA for direction of flight.

MILES CITY, MT
FRANK WILEY FIELD (MLS)
TAKEOFF MINIMUMS AND (OBSTACLE)
DEPARTURE PROCEDURES
ORIG 11349 (FAA)
NOTE: **Rwy 4,** REIL 40' from DER, 112' left of centerline, 1' AGL/2627' MSL. REIL 40' from DER, 115' right of centerline, 2' AGL/2628' MSL. Fence 130' from DER, 400' left of centerline, up to 8' AGL/2629' MSL. **Rwy 12,** fence 215' from DER, left and right of centerline, up to 8' AGL/2634' MSL. **Rwy 22,** fence beginning 4' from DER, left and right of centerline, up to 8' AGL/2638' MSL. REIL 10' from DER, 112' left of centerline, 1' AGL/2630' MSL. REIL 10' from DER, 115' right of centerline, 2' AGL/2631' MSL. Sign 28' from DER, 199' left of centerline, 6' AGL/2630' MSL. Terrain 30' from DER, 482' left of centerline, 2630' MSL. **Rwy 30,** trees beginning 69' from DER, left and right of centerline, up to 26' AGL/2647' MSL.

MISSOULA, MT
MISSOULA INTL (MSO)
TAKEOFF MINIMUMS AND (OBSTACLE)
DEPARTURE PROCEDURES
AMDT 8 08213 (FAA)
TAKEOFF MINIMUMS: **Rwys 7,25,** NA-Obstacles.
DEPARTURE PROCEDURE: **Rwys 11, 29,** use GRZLY DEPARTURE.

MOSES LAKE, WA
GRANT COUNTY INTL (MWH)
TAKEOFF MINIMUMS AND (OBSTACLE)
DEPARTURE PROCEDURES
ORIG-A 12264 (FAA)
NOTE: **Rwy 14R,** antenna 3902' from DER, 828' right of centerline, 98' AGL/1268' MSL. **Rwy 18,** pole 405' from DER, 334' right of centerline, 30' AGL/1209' MSL. Windsock 496' from DER, 371' left of centerline, 16' AGL/1195' MSL. **Rwy 32L,** antenna 660' from DER, 401' left of centerline, 11' AGL/1191' MSL. Pole 1317' from DER, 369' left of centerline, 22' AGL/1202' MSL.

23 JUL 2015 to 20 AUG 2015

MOUNTAIN HOME AFB (KMUO)
MOUNTAIN HOME, ID
TAKEOFF MINIMUMS AND (OBSTACLE)
DEPARTURE PROCEDURES
AMDT 1 12096
Rwy 12, 30, 6700-3*
* Or standard with minimum climb of 270/NM to 9100.
TAKEOFF OBSTACLES: **Rwy 12,** Terrain 0' AGL/3035' MSL, 824' from DER, 721' right of centerline. Terrain 0' AGL/3035' MSL, 848' from DER, 686' right of centerline. Terrain 0' AGL/3032' MSL, 378' from DER, 600' right of centerline. Road/Vehicle 15' AGL/3024' MSL, 1144' from DER, 793' right of centerline. Power pole 35' AGL/3049' MSL, 2911' from DER, 939' right of centerline. Tower 30' AGL/3030' MSL, 1064' from DER, 901' right of centerline. Tower 28' AGL/3037' MSL, 1168' from DER, 795' right of centerline. Tower 45' AGL/3049' MSL, 2148' from DER, 1479' left of centerline. **Rwy 30,** Terrain 0' AGL/2995' MSL, 16' from DER, 500' left of centerline. Terrain 0' AGL/2995' MSL, 81' from DER, 500' left of centerline. Terrain 0' AGL/2995' MSL, 296' from DER, 579' left of centerline. Terrain 0' AGL/2995' MSL, 427' from DER, 614' left of centerline. Terrain 0' AGL/2995' MSL, 445' from DER, 619' left of centerline. Terrain 0' AGL/2998' MSL, 253' from DER, 568' right of centerline. Terrain 0' AGL/3000' MSL, 378' from DER, 500' right of centerline. Terrain 0' AGL/3007' MSL, 570' from DER, 653' right of centerline. Terrain 0' AGL/3002' MSL, 737' from DER, 525' right of centerline. Road/Vehicle 35' AGL/3018' MSL, 949' from DER, 772' left of centerline.

MOUNTAIN HOME, ID
MOUNTAIN HOME MUNI (U76)
TAKEOFF MINIMUMS AND (OBSTACLE)
DEPARTURE PROCEDURES
AMDT 4A 14093 (FAA)
TAKEOFF MINIMUMS: **Rwy 10,** 3500-2 or std. with a min. climb of 305' per NM to 7300. **Rwy 28,** 3500-2 or std. with a min. climb of 290' per NM to 7300.
DEPARTURE PROCEDURE: **Rwy 10,** climbing left turn direct STI NDB. **Rwy 28,** climbing right turn direct STI NDB. **All aircraft** departing STI NDB 084° CW 344° climb on course. All others climb in hold (hold E, left turns, 275° inbound) to cross STI NDB at or above 7300.
NOTE: **Rwy 10,** transmission line towers beginning 1307' from DER, 125' left of centerline, up to 52' AGL/3198' MSL. Vegetation 24' from DER, 282' left of centerline, 4' AGL/3160' MSL. Tower 3249' from DER, 890' right of centerline, 126' AGL/3273' MSL. Building 575' from DER, 602' right of centerline, 41' AGL/3197' MSL. **Rwy 28,** railroad 1038' from DER, 322' right of centerline, 23' AGL/3193' MSL.

23 JUL 2015 to 20 AUG 2015

NAMPA, ID
NAMPA MUNI (MAN)
TAKEOFF MINIMUMS AND (OBSTACLE)
DEPARTURE PROCEDURES
AMDT 2 97170 (FAA)
DEPARTURE PROCEDURE: **Rwy 11,** climbing right turn direct MPA NDB, continue climb in MPA holding pattern (NW, right turns, 145° inbound). Depart MPA NDB at or above 5500 before proceeding on course. **Rwy 29,** climb runway heading to 3700 then climbing right turn direct MPA NDB, continue climb in MPA holding pattern (NW, right turns, 145° inbound). Depart MPA NDB at or above 5500 before proceeding on course.
NOTE: **Rwy 11,** 70' AGL tree, 1225' from DER, 90' right of centerline.

15204

TAKEOFF MINIMUMS, (OBSTACLE) DEPARTURE PROCEDURES, AND DIVERSE VECTOR AREA (RADAR VECTORS)

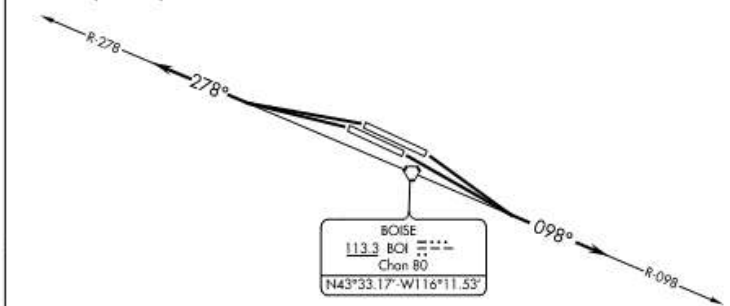
L19 NW-1

(BOI2.BOI) 13290 SL-57 (FAA)

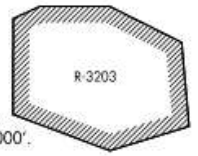
BOISE TWO DEPARTURE

BOISE AIR TERMINAL/GOWEN FIELD (BOI)
BOISE, IDAHO

ATIS 123.9 290.4
CLNC DEL 125.9 323.2
GND CON 121.7 348.6
BOISE TOWER 118.1 257.8
BIG SKY DEP CON 126.9 351.85 [279°-097°] 119.6 269.4 [098°-278°]



NOTE: Chart not to scale.



NOTE: RADAR Required

TAKEOFF MINIMUMS
Rwy 28L/R: Standard.
Rwy 10L/R: Standard with minimum climb of 240' per NM to 5700. ATC climb of 420' per NM to 7000'.

TAKEOFF OBSTACLE NOTES
Rwy 10L: DME antenna 5' from DER, 415' right of centerline, 21' AGL/2881' MSL.
Light on building 271' from DER, 567' left of centerline, 29' AGL/2889' MSL.
Equipment on road 462' from DER, 444' left of centerline, 17' AGL/2887' MSL.
Rwy 28L: Tree 2048' from DER, 510' left of centerline, 100' AGL/2909' MSL.
Rwy 28R: Anemometer 452' from DER, 306' left of centerline, 11' AGL/2842' MSL.

DEPARTURE ROUTE DESCRIPTION

TAKEOFF RUNWAY 10L/R: Climb to 12000' or lower assigned altitude on BOI VORTAC R-098, Thence . . .

TAKEOFF RUNWAY 28L/R: Climb to 12000' or lower assigned altitude on BOI VORTAC R-278, Thence . . .

. . . Expect RADAR vectors to assigned route, expect filed altitude 10 minutes after departure.

LOST COMMUNICATIONS: If not in contact with Boise Departure Control at 10000' or assigned altitude, if lower, continue climb to assigned altitude and thence on assigned route.

BOISE TWO DEPARTURE
(BOI2.BOI) 13290

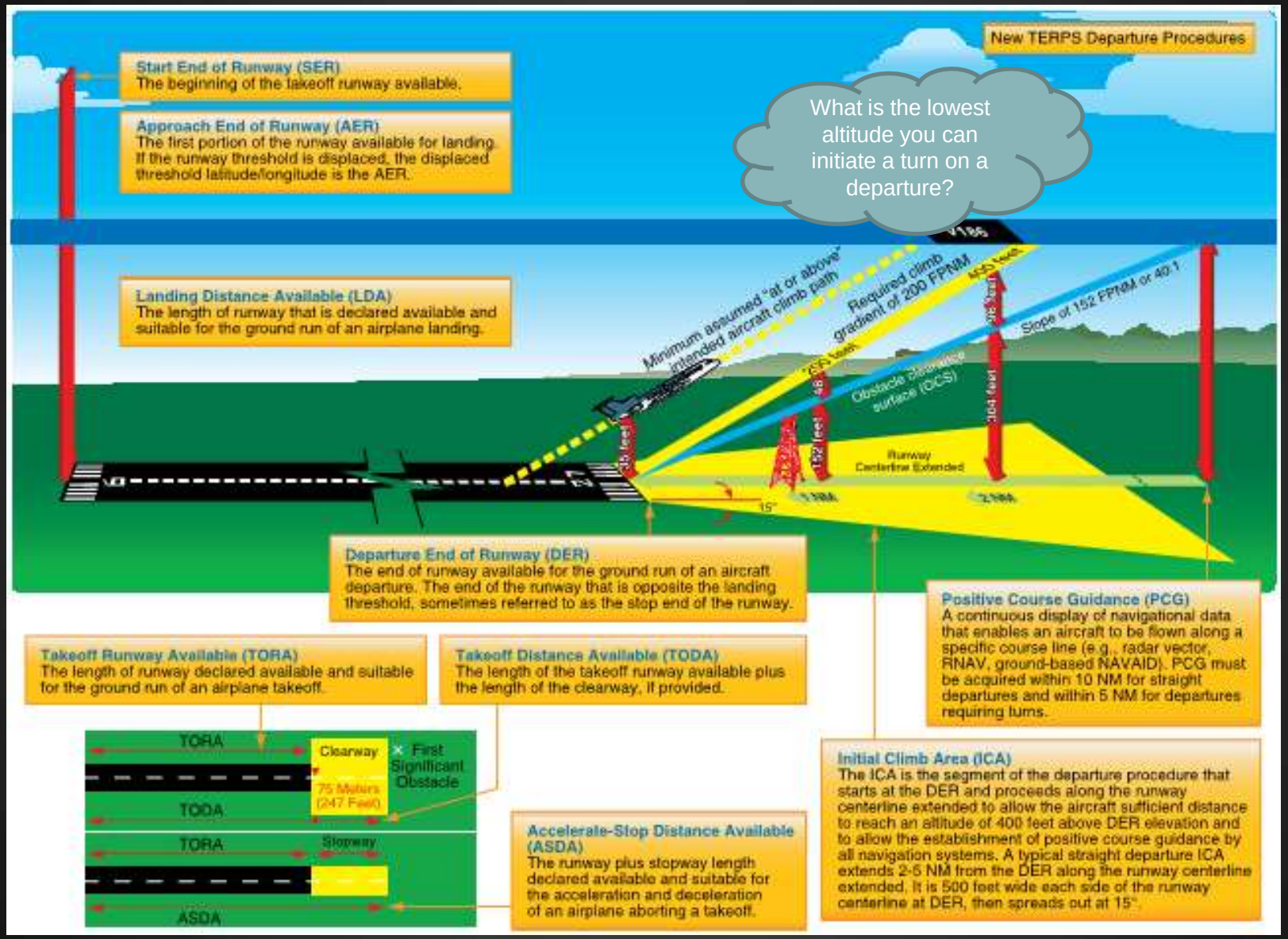
BOISE, IDAHO
BOISE AIR TERMINAL/GOWEN FIELD (BOI)

NW-1, 20 AUG 2015 to 17 SEP 2015

NW-1, 20 AUG 2015 to 17 SEP 2015

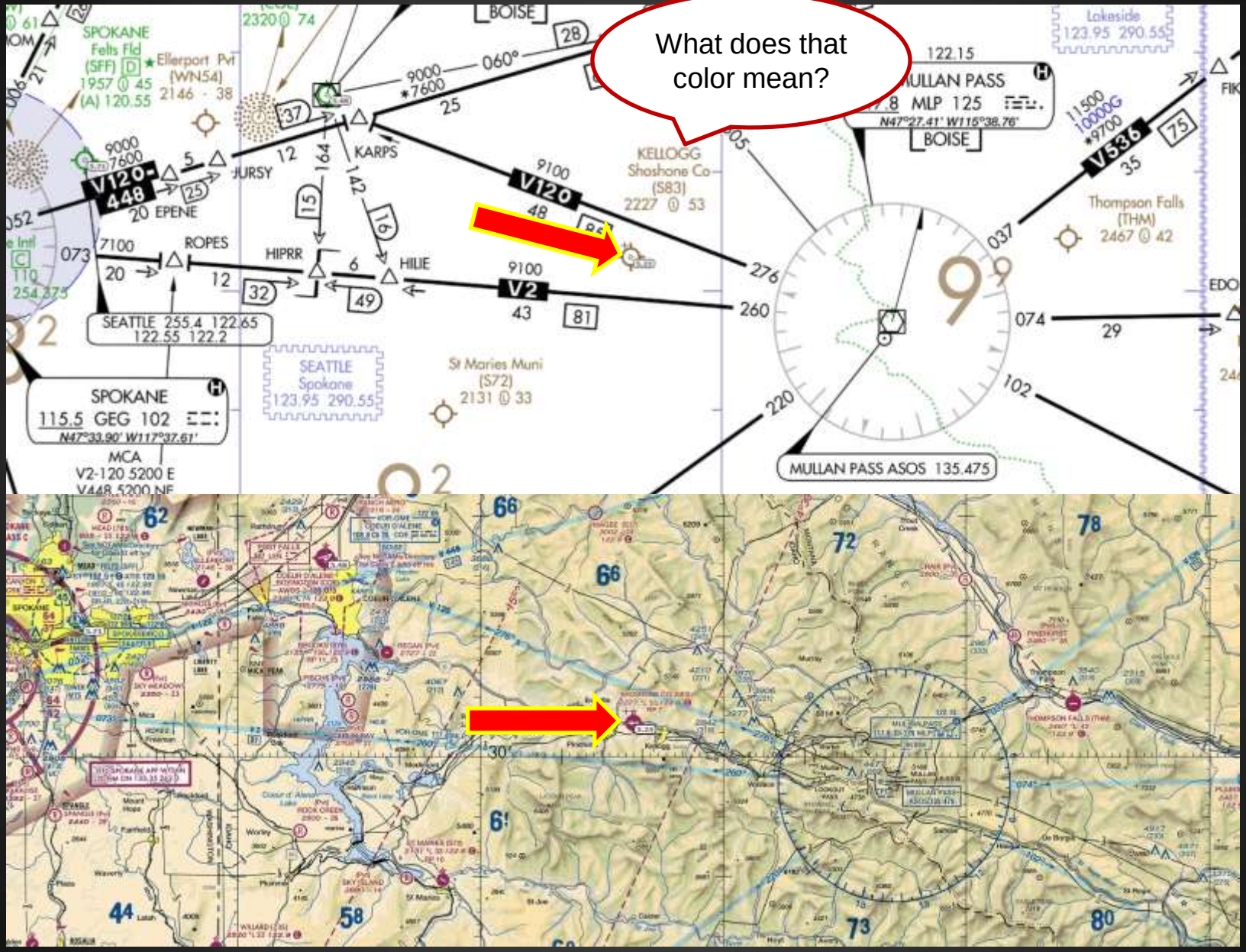
T-O ENGINEERS

Source: www.AirNav.com



TERPS Departure Procedures

Source: FAA Inst Procedure Handbook



Low Enroute Chart / VFR Sectional

Source: SkyVector

Wow…Let's put that together

How far and what direction is the airport from Boise?

On what sectional and low level chart can this airport be located?

What is the ASDA for 10L?

What does it mean if the TORA and TODA are the same?

What frequency is the VOT?

What indication on the VOR CDI/OBS indicates a correct signal from the VOT?

BOISE AIR TERMINAL/GOWEN FLD (BOI)(KBOI) P (ANG ARNG) 3 S UTC–7(–6DT) N43°33.86′ W116°13.37′ **SALT LAKE CITY H–1C, 3C, L–11B IAP, AD**

2871 B S4 **FUEL** 100LL, JET A1+ OX 1, 2, 3, 4 AOE Class I, ARFF Index C

NOTAM FILE BOI

RWY 10L–28R: H10000X150 (ASPH–GRVD) S–100, D–210, 2S–175, 2D–446, 2D/2D2–947 PCN 105F/C/W/T HIRL

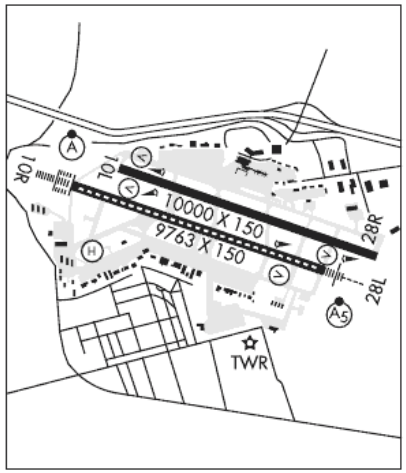
RWY 10L: REIL. VASI(V4L)—GA 3.0° TCH 53′. Antenna. 0.5% up.

RWY 28R: VASI(V4L)—GA 3.0° TCH 54′. Rgt tfc. 0.3% down.

RWY 10R–28L: H9763X150 (ASPH–GRVD) S–100, D–210, 2S–175, 2D–430, 2D/2D2–994 PCN 76 F/B/W/T HIRL CL

RWY 10R: ALSF2. TDZL. VASI(V4L)—GA 3.0° TCH 64′. Rgt tfc. 0.5% up.

RWY 28L: MALSR. TDZL. VASI(V4L)—GA 3.0° TCH 50′.



RUNWAY DECLARED DISTANCE INFORMATION

RWY 10L: TORA–10000 TODA–10000 ASDA–10000 LDA–10000

RWY 10R: TORA–9763 TODA–9763 ASDA–9763 LDA–9763

RWY 28L: TORA–9763 TODA–9763 ASDA–9763 LDA–9763

RWY 28R: TORA–10000 TODA–10000 ASDA–10000 LDA–10000

MILITARY SERVICE: LGT Arpt lgt sched dusk to dawn. **JASU** 1(MC–1M) 6(AM32A–60) 4(A/M32A–86) **FUEL** A, A+ (1300–0600Z‡Mon–Fri; 1300–0300‡ Sat–Sun and hol, call C208–338–1872, 25 min PN rqr, $90 fee.) J8(Mil) (NC–100LL, A1+) **FLUID** PRESAIR **OIL** O–133–148(Mil) SOAP

AIRPORT REMARKS: Attended continuously. Extv helicopter ops sfc to 3500′ within 1 NM east and west and 5 NM south of Rwy 10R–28L. Moderate migratory bird activity within 5 NM of the arpt Oct–Mar. Security rqrs PPR with FBO due to locked gates and fencing btn hrs 0500–1400Z‡ for ingress/egress to arpt. All twys clsd to acft with wingspan over 147′ 1", exc with 1 hr PPR 208–424–5670. Twy B east of Twy C clsd to acft with wingspan over 118′ when east arm/dearm pad is in use. Twy J north of Twy F clsd to acft with wingspan over 94′ when west arm/dearm pad is in use. Portions of Twy K and the southwest ramp not visible to twr. Do not use Twy Z for tkf roll on Rwy 10L. Rwy 28R midfield rwy visual range avbl. Rwy 10R and Rwy 28L touchdown rwy visual range avbl. Rwy 10R rollout rwy visual range avbl. Flight Notification Service (ADCUS) avbl Mon–Fri 1500–0000Z‡, weekends if notified by Thur 0000Z‡.

AIRPORT MANAGER: 208-383-3110

WEATHER DATA SOURCES: ASOS (208) 388–4640

COMMUNICATIONS: D–ATIS 123.9 **UNICOM** 122.95

RCO 122.2 122.6 (BOISE RADIO)

Ⓡ **BIG SKY APP/DEP CON** 119.6 (South) 126.9 (North)

TOWER 118.1 119.0 **GND CON** 121.7 **CLNC DEL** 125.9

AIRSPACE: CLASS C svc ctc **APP CON**

VOR TEST FACILITY (VOT) 116.7

RADIO AIDS TO NAVIGATION: NOTAM FILE BOI.

(H) VORTACW 113.3 BOI Chan 80 N43°33.17′ W116°11.53′ 280° 1.5 NM to fld. 2876/17E.

VOR portion unusable:
001°–044° byd 22 NM blo 11,000′
001°–044° byd 32 NM blo 14,500′
045°–071° byd 32 NM blo 12,500′
072°–084° byd 32 NM blo 10,500′

TACAN AZIMUTH & DME portion unusable:
010°–060° byd 12 NM blo 13,000′
010°–060° byd 27 NM blo 15,500′
113°–155° byd 30 NM blo 7,000′
348°–010° byd 20 NM blo 13,000′
348°–010° byd 27 NM blo 15,500′

USTIK NDB (HW/LOM) 359 BO N43°35.81′ W116°18.91′ 101° 4.5 NM to fld.

ILS/DME 111.1 I–BOI Chan 48 Rwy 10R. Class IIIE. LOM USTIK NDB. Localizer backcourse unusable byd 10° north and south of course. Localizer backcourse unusable byd 10 NM blo 5,900′ and byd 15.1 NM blo 6,800′.

ILS/DME 110.15 I–AAD Chan 38(Y) Rwy 28R. Class IT. DME unusable byd 12 NM blo 5,500′; byd 16 NM blo 6,000′. Glideslope unusable byd 06 NM blo 4,700′. LOC unusable byd 12 NM blo 5,500′; byd 16 NM blo 6,000′.

T-O ENGINEERS

Source: SkyVector

What is the TORA for RWY 13?

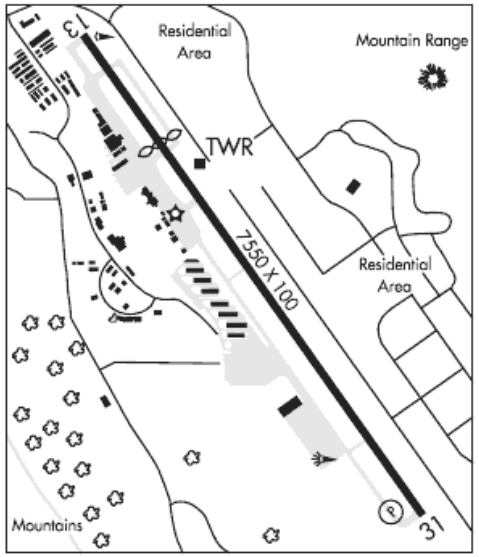
What is the TODA for RWY 13?

What is the ASDA for RWY 13?

What is the LDA for RWY 13?

WHAT???!!!???

FRIEDMAN MEM (SUN)(KSUN) 1 SE UTC–7(–6DT) N43°30.23′ W114°17.73′ **SALT LAKE CITY**
5320 B S4 **FUEL** 100LL, JET A1+ OX 1, 3 ARFF Index—See Remarks NOTAM FILE SUN **H–3D, L–11C**
RWY 13–31: H7550X100 (ASPH–GRVD) S–65, D–95, 2D–150 HIRL **IAP, AD**
0.8% up NW
RWY 13: Thld dsplcd 1701′. Road.
RWY 31: PAPI(P4L)—GA 3.5° TCH 55′. Tree.
RUNWAY DECLARED DISTANCE INFORMATION
RWY 13: TORA–7150 TODA–7550 ASDA–7150 LDA–5450
RWY 31: TORA–6850 TODA–7550 ASDA–6631 LDA–6631



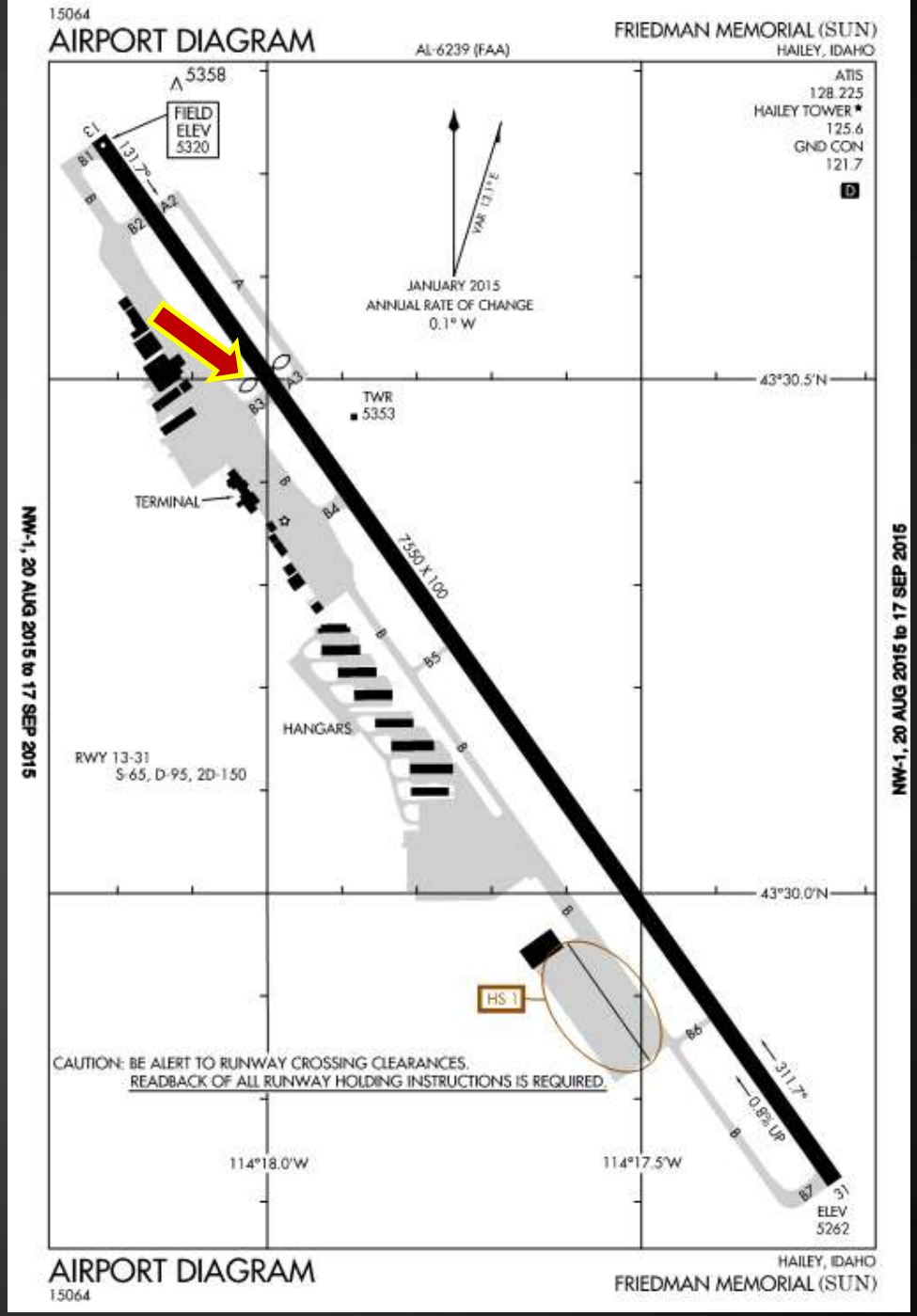
AIRPORT REMARKS: Attended dawn–dusk. Fuel avbl after dusk PPR 208–788–9511. Class I, ARFF Index A. ARFF avbl 1400–0600Z‡. ATCT 275′ east of Rwy 13–31 cntrln. Afld sfc cond not monitored btn the hrs of 0600Z‡ and 1400Z‡. Bird activity southeast end Rwy 31. When twr clsd land Rwy 31 tkf Rwy 13 due to opposite direction tfc, use ldg lgts in tfc pat. Due to opposite tfc, apch Rwy 31 along east side of valley, depart Rwy 13 along west side of valley, show ldg lgt. Ctc aprt mgr 208–788–4956 or 208–720–5186 for NS ABTMT procedures. Rwy 13–31 ltd to acft not exceeding 95,000 lbs certificated max tkf weight, dual wheel. Acft with published max tkf weight exceeding 95,000 lbs must seek prior permission by submitting to arpt mgr a manufacturer′s acft svc change that installs a placard verifying acft is certificated for SUN with a max tkf weight of 95,000 lbs. APU ops ltd to 30 minutes maximum run time. Not recommended for ngt use or in marginal wx by unfamiliar pilots due to mountainous terrain. Twy A open between Twys A2 and A3 dalgt hrs only. Twys B5 and B6 rstd to acft with wingspans of 79′ or less (Acft Design Group II) only. PPR for all scheduled air carrier ops btn 0600–1300Z‡ call arpt mgr 208–788–4956. No locked brake turns. All tran parking ctc 208–788–9511. Ltd parking avbl for air carrier acft. ACTIVATE HIRL Rwy 13–31—CTAF when twr clsd. PAPI Rwy 31 opr 24 hrs. Ldg fee for acft greater than 6,000 lbs.
AIRPORT MANAGER: 208-788-4956
WEATHER DATA SOURCES: AWOS–3 128.225 (208) 788–9213. LAWRS.
COMMUNICATIONS: CTAF 125.6 **ATIS** 128.225 (208) 788–2108 **UNICOM** 122.95
HAILEY RCO 122.4 (BOISE RADIO)
SALT LAKE CENTER APP/DEP CON 118.05
HAILEY TOWER 125.6 (1400–0600Z‡) **GND CON** 121.7
AIRSPACE: CLASS D svc 1400–0600Z‡ other times CLASS E.
RADIO AIDS TO NAVIGATION: NOTAM FILE BYI.
BURLEY (L) VORW/DME 114.1 BYI Chan 88 N42°34.81′ W113°51.95′ 323° 58.5 NM to fld. 4226/18E.
VOR/DME unusable:
120°–150° byd 30 NM blo 15,000′
HAILEY NDB/DME (MHW) 220 HLE Chan 25 N43°19.79′ W114°14.62′ 335° 10.7 NM to fld. NOTAM FILE SUN. NDB/DME unmonitored.
DME unusable:
080°–280°
280°–080° byd 12 NM
NDB unusable:
310°–350° byd 6 NM
COMM/NAV/WEATHER REMARKS: Emerg frequency 121.5 not avbl at twr.

T-O ENGINEERS

Source: SkyVector

What is this symbol?

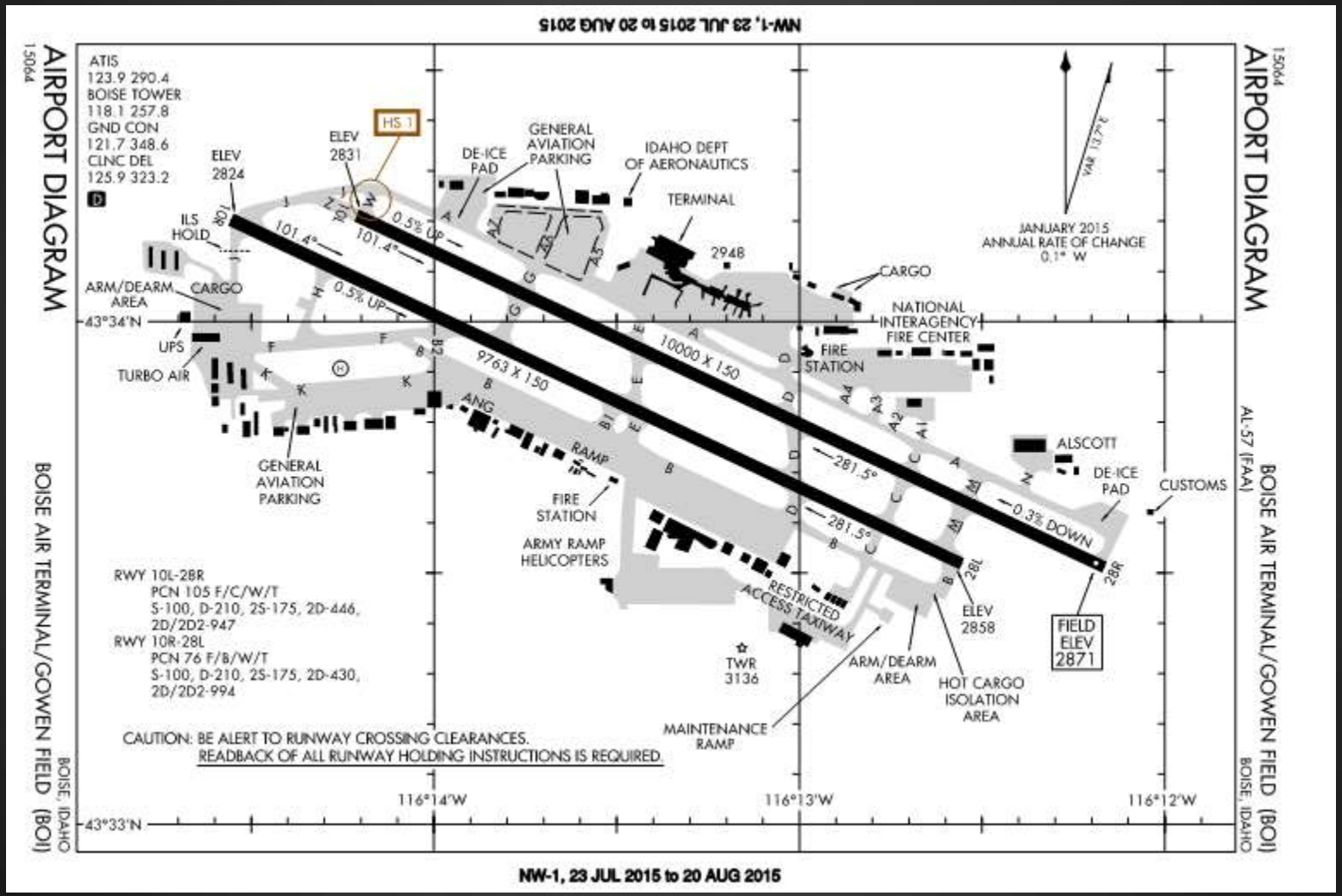
What symbol represents the limit of the TORA?



Source: SkyVector


Main St
Cedar St
Colorado
Broadford Highlands Dr
Google earth

What is a Hot Spot?



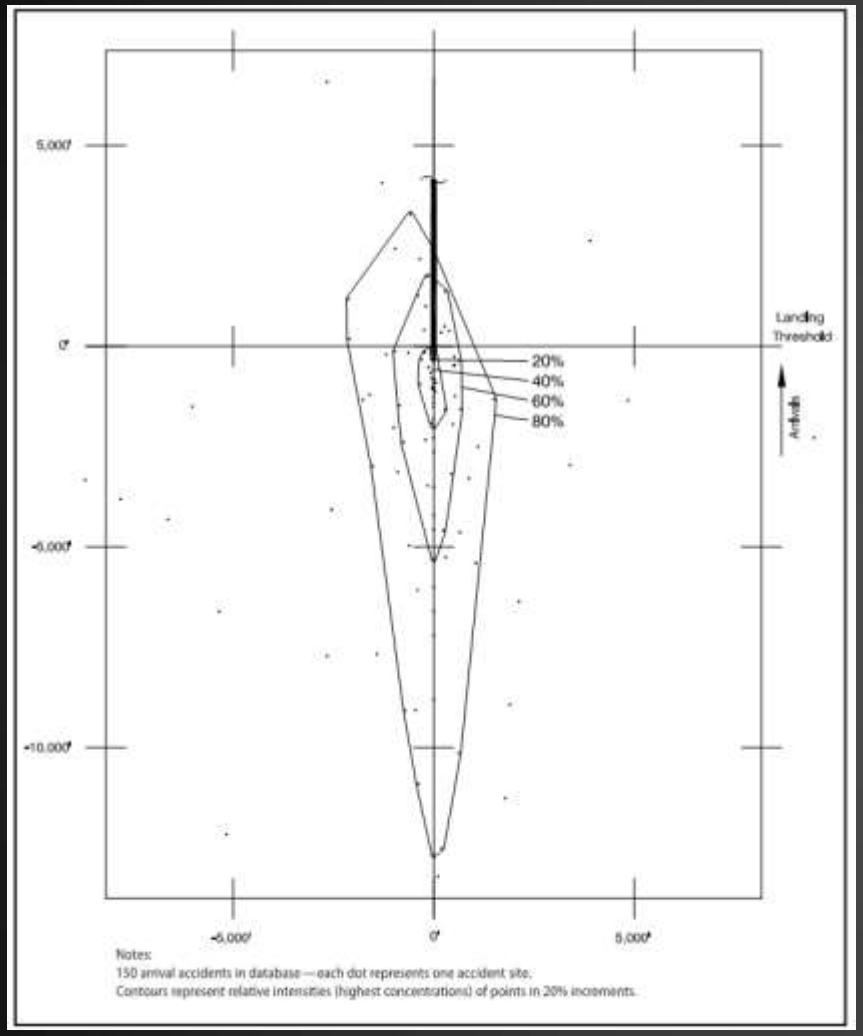
Source: SkyVector

T-O ENGINEERS

Source: Google Earth

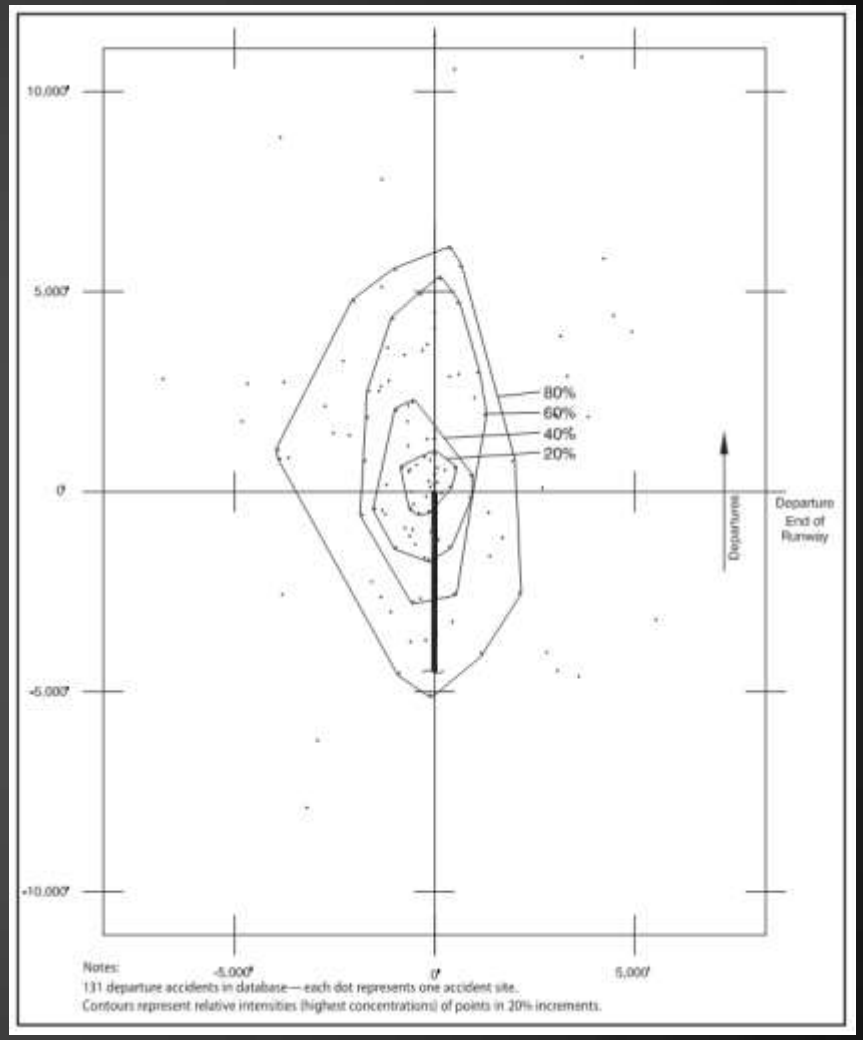
Accident Data

Approach and Departure Accident Trend



GA Accidents-Approach
Rwy 4000-5,999 ft

Source: CA Airport Land Use Planning Handbook Figure 3F



GA Accidents-Departure
Rwy 4000-5,999 ft

Source: CA Airport Land Use Planning Handbook Figure 3G

T-O ENGINEERS

Questions?

- Checkout the site: www.boldmethod.com