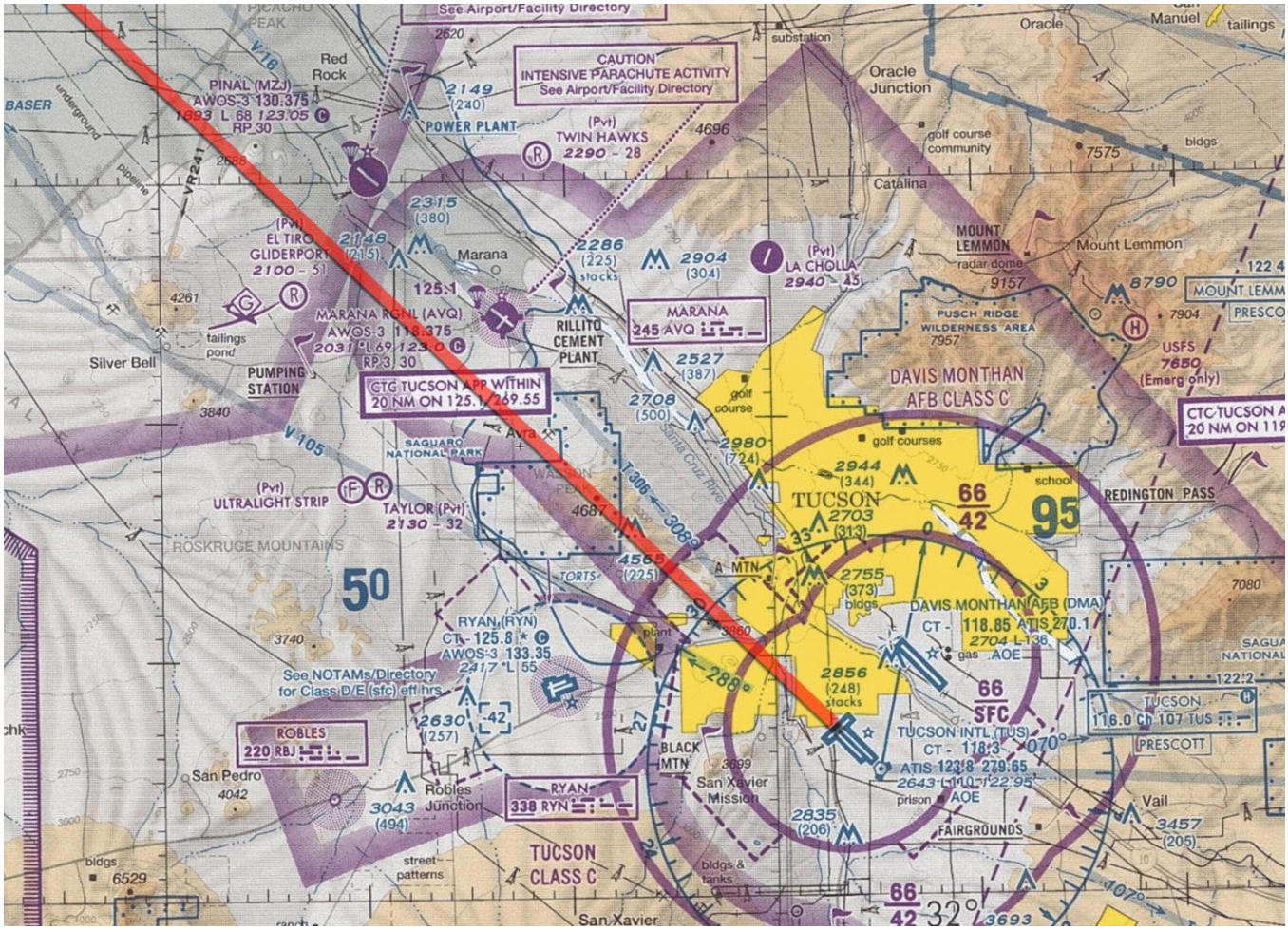
Chart Challenge: Live
scenario answer explanations

“VFR Voyage”

Question 1: The GPS route for the first leg of the trip is shown below. All things considered, is it a good route?

A. Heck yeah
B. Eh, it’s okay
C. **No, not really**

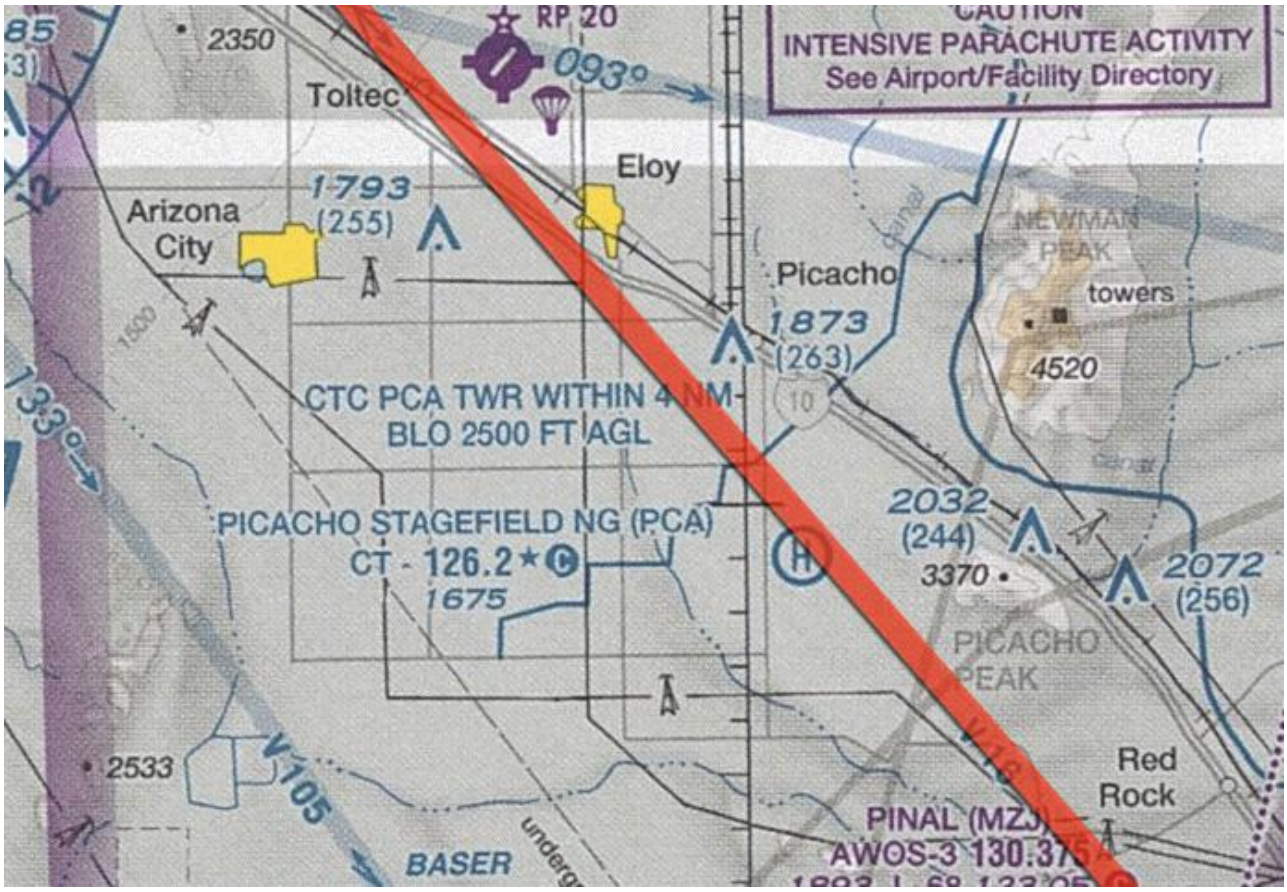


Explanation: The question here is: Why fly directly over the sole mountain in your immediate path—and the wilderness area that sits on top of it—when a small jog to the east will put you over considerably lower terrain? (Not to mention an interstate highway, which isn’t a bad thing in the middle of the desert.)

Just because a route is “direct,” doesn’t necessarily mean it’s the best one. Especially in areas where there’s significant terrain and/or high density altitude, people flying relatively low performance aircraft really need to look carefully at the chart. Terrain features that could cause problems don’t necessarily always “jump out at you.”

Question 2: The chart instructs you to contact Picacho Stagefield Tower within 4nm. The airspace surrounding the field is _____ .

A. Class D
B. Class E surface area
C. Class G



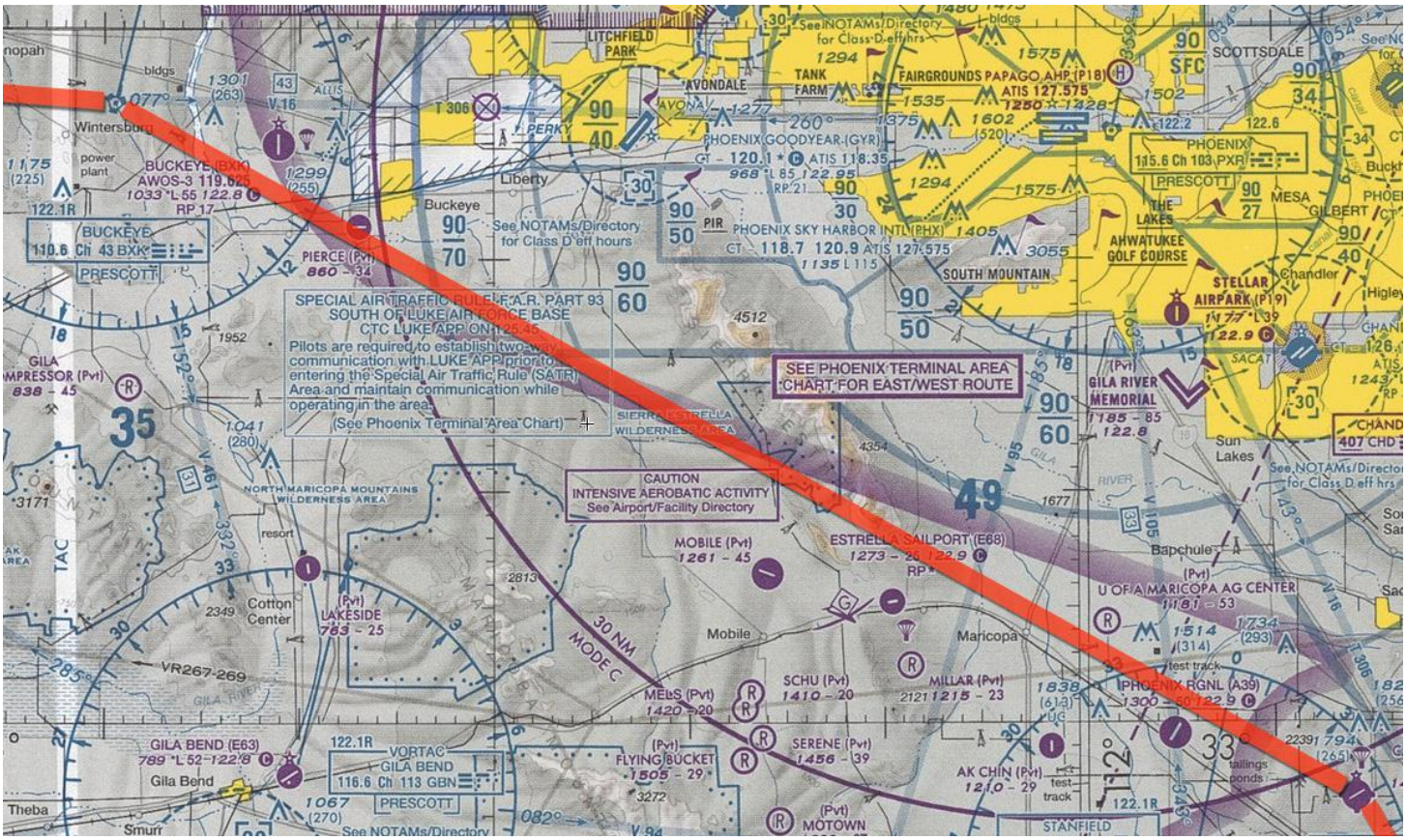
Explanation: This is one of those "Huh?" things you see from time to time. Tower? What tower? Where's the airport? Does "contact within 4nm" mean it's in Class D airspace? If so, where's the airspace?

FAR 91.126(d) allows for the possibility of control towers in Class G (uncontrolled) airspace. How's that for an oxymoron? There are a few of these scattered around the country.

In this case, the field is actually a National Guard heliport. It's in an area where Class E starts at 700' (which isn't obvious from this view, but can still be determined from the shading of the magenta line at the left edge of the chart excerpt), so the airport itself is in Class G airspace.

Question 3: You're using a mix of GPS and pilotage. Which of these would serve as a good backup for avoiding the special area southwest of Luke AFB?

A. Gila Bend 350 FROM
B. Buckeye 100 TO
C. **Buckeye 280 TO**

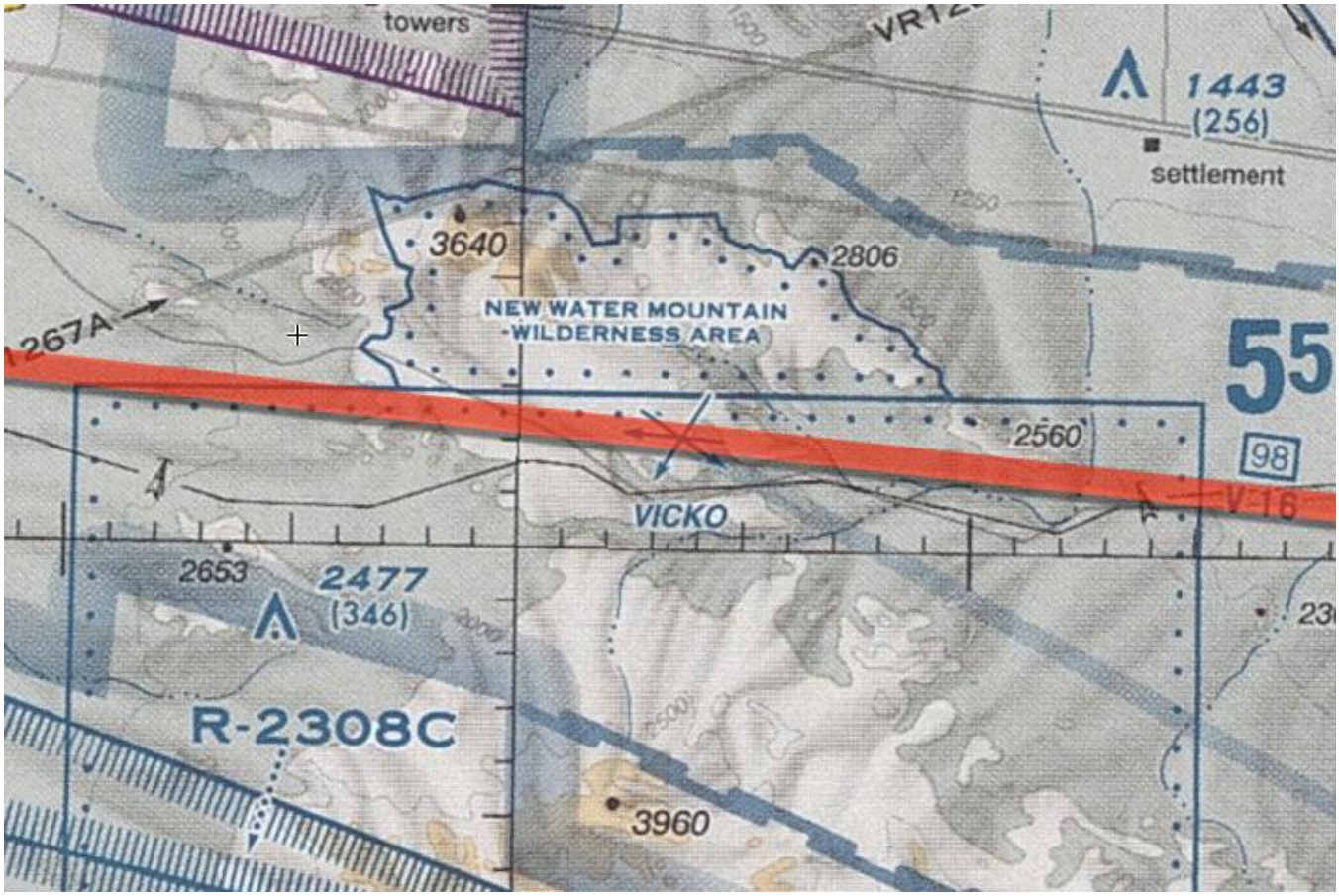


Explanation: Even in the GPS age, there are good uses for VOR navigation—not only as a way of backing up your primary nav, but as a way of making extra sure you don't stray into the wrong place.

In this case, in order to avoid the special area southwest of Luke AFB, you'd want to stay on the south side of a NW-SW line. The Buckeye VORTAC is the obvious choice for creating that line, since it's on your flight path and in the proper relationship to the area to be avoided. Having made that determination, you want to choose a radial that will keep you clear of the area (100 works here), and make sure you have a "TO" indication (otherwise, you'll get reverse-sensing, since you're headed toward the VOR). That means selecting the reciprocal of the 100 radial—280. As long as you stay on the south side of that course, you won't be in the airspace.

Question 4: The depicted route _____ .

A. Should not be flown; it passes through restricted airspace
B. **Should not be flown lower than 2,000 AGL**
C. Must not be flown lower than 2,000 AGL



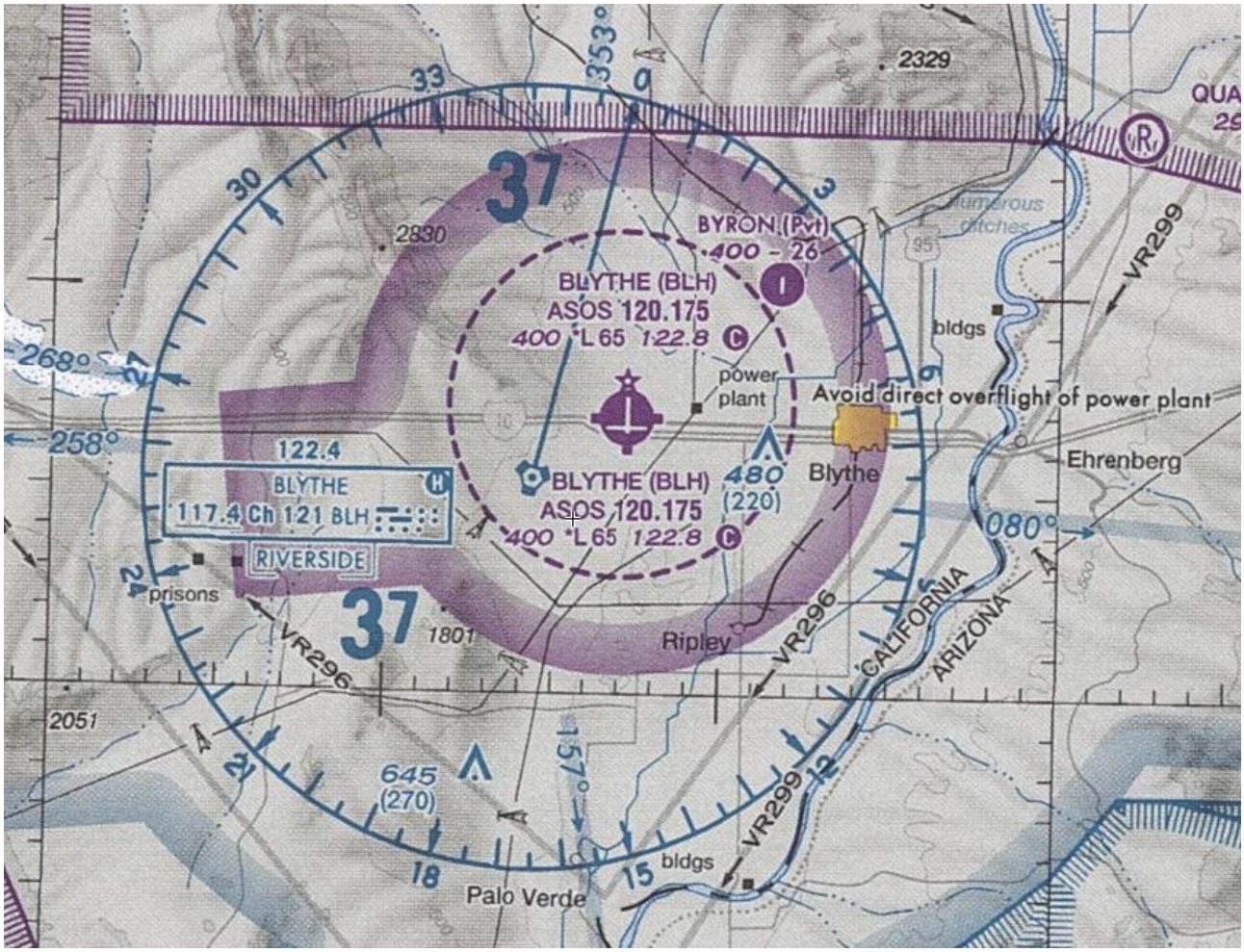
Explanation: It's not obvious at first glance, but we're actually looking at two different wilderness areas here. There's also a restricted area, but it extends to the south, rather than the north (the hash marks on the boundary line are pointing away from our route).

Our course passes through the more southern of the two wilderness areas. Because pilots are requested (but not legally required) to maintain at least 2,000 AGL in these areas, the route really shouldn't be flown any lower than that—but it could be (hence the distinction between "must" and "should" in the answer choices).

AIM 7-4-6: "Pilots are requested to maintain a minimum altitude of 2,000 feet above the surface of the following: National Parks, Monuments, Seashores, Lakeshores, Recreation Areas and Scenic Riverways administered by the National Park Service, National Wildlife Refuges, Big Game Refuges, Game Ranges and Wildlife Ranges administered by the U.S. Fish and Wildlife Service, and Wilderness and Primitive areas administered by the U.S. Forest Service."

Question 5: In the mid-section of the route, you'll be using GPS for primary navigation. Flying east to west (previous waypoint: Buckeye VOR), which of these would be a better waypoint?

A. Blythe airport
B. **Blythe VOR**

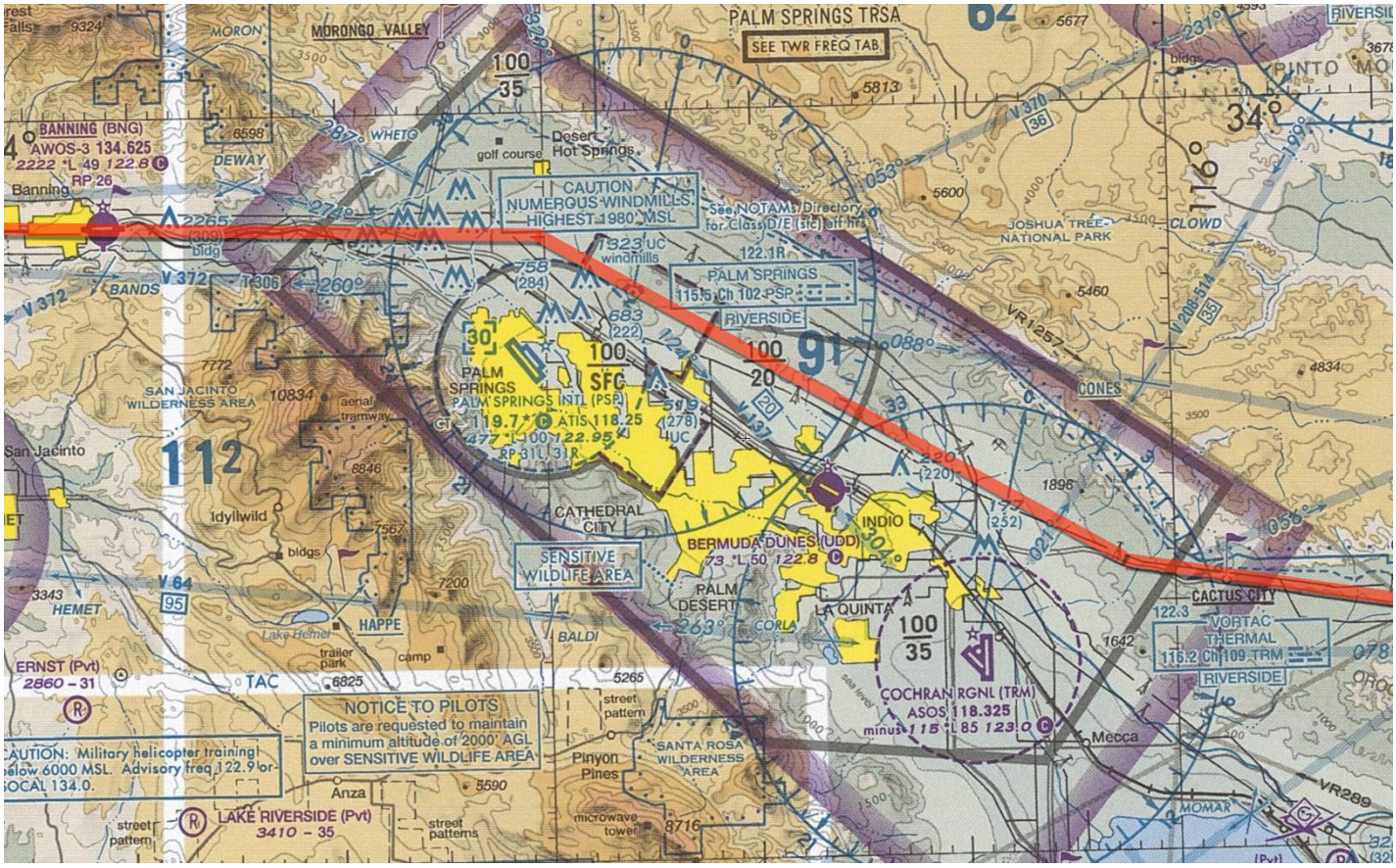


Explanation: If you put "KBLH" (the airport) into your GPS, rather than "BLH" (the VOR)—and were coming from the Buckeye VOR (that is, from the east along the depicted airway)—your course would take you directly over the power plant that the chart tells you to avoid.

It's easy to mix up airport and associated VOR when programming a GPS—one of those little details that sometimes matters.

Question 6: You plan to fly the depicted portion of the route at 6,500 msl. At this altitude, will you be required to contact ATC?

A. Yes
B. **No**



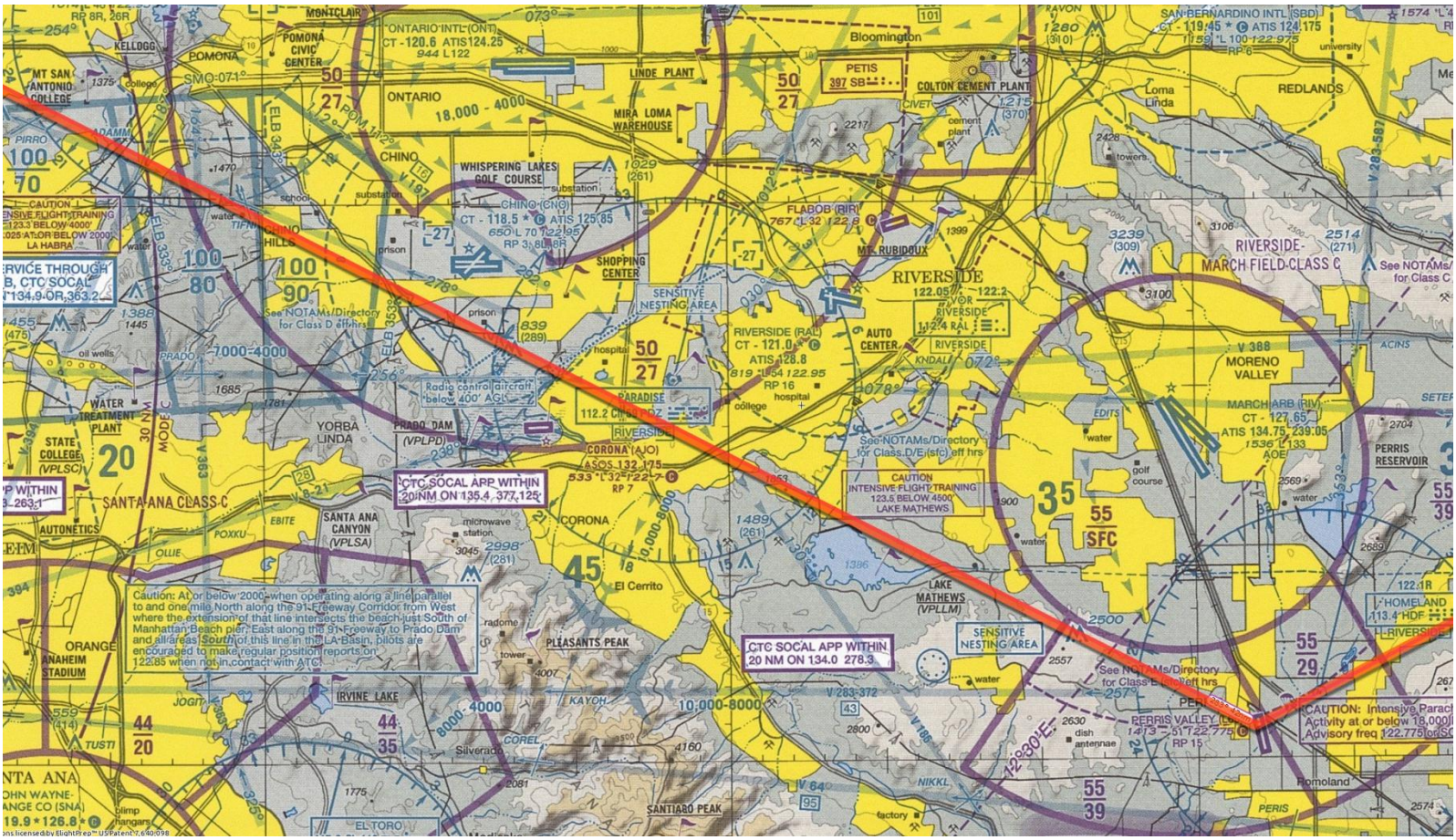
Explanation: The first thing here is recognizing that you're looking at a TRSA—a relatively rare holdover from the previous airspace classification system (and one that usually isn't shaped like this). The second thing is knowing that participation is voluntary. The third is determining that the route takes you outside and over Palm Springs' Class D airspace.

However, the main idea is not to point out that you **can** get around talking to ATC here, but that there's really no good reason to try. If there weren't a reason for the TRSA, it wouldn't be there. Do you really want to be intermixing with the airline traffic coming and going from PSP, and have ATC trying to figure out what you're up to? It's best to just give them a call.

For more information on TRSAs, see AIM 3-5-6

Question 7: True / False: You could (theoretically) fly the depicted route at 2,500 msl without talking to ATC.

A. True
B. False

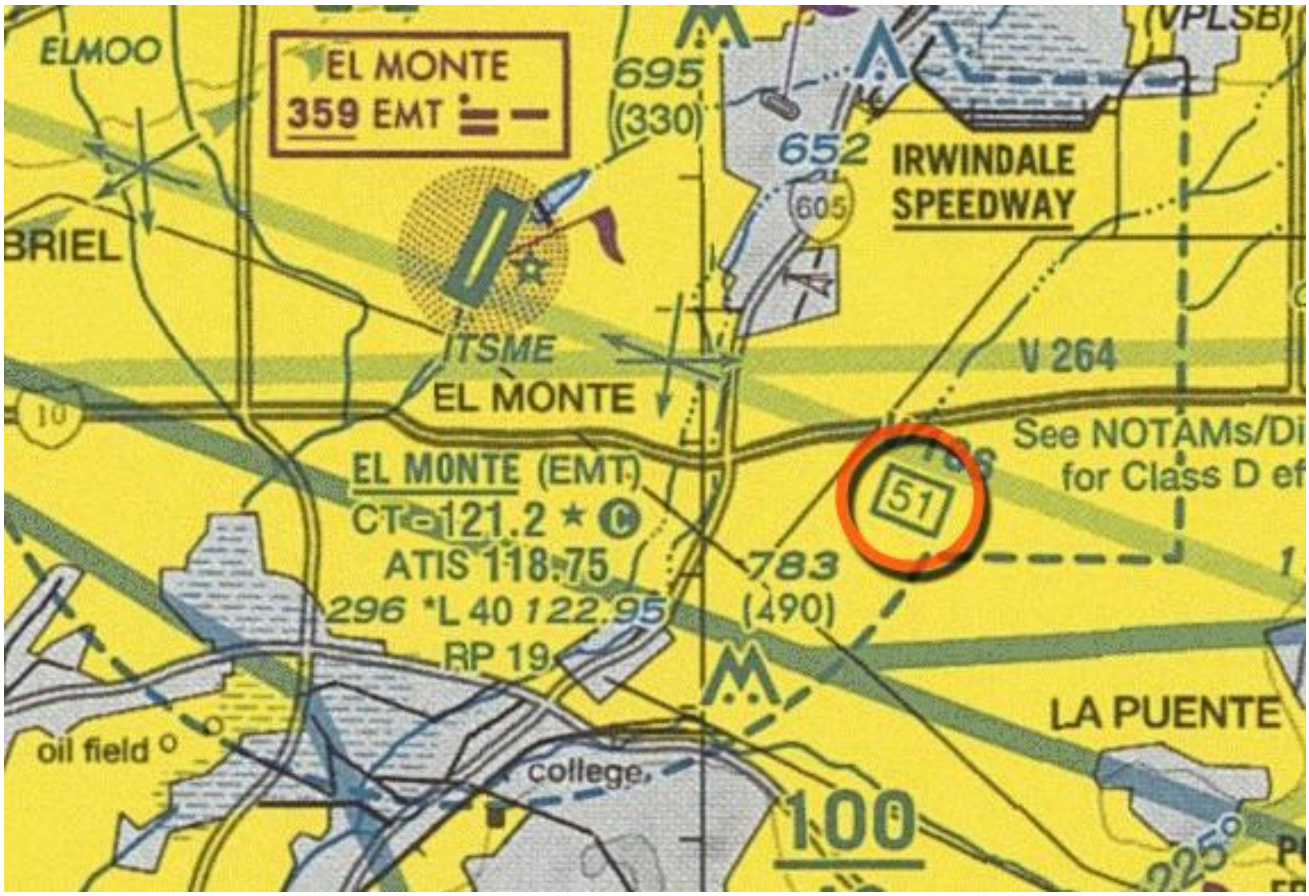


Explanation: This one calls for careful examination of the various airspace ceilings and floors. The depicted route **almost** squeaks through—but it catches the top of the Class D at Chino (which extends upward to 2,700 msl—see the small [-27]), so you couldn't fly it as depicted without talking to them.

For information on operations in Class D airspace, see FAR 91.129

Question 8: The boxed "51" southeast of El Monte is the:

A. Upper extent of the Class D airspace
B. Designator of the highway above it
C. **Mileage between navaids**



Explanation: The "51" symbol—which is the mileage between navaids on V166 (just above it) could be mistaken for the upper limit of the Class D airspace, since it looks somewhat similar to that notation (though it's smaller, and uses a box rather than brackets). One might also think it could be associated with the highway charted just above it.

For general information on symbology for both VFR and IFR charts, consult the FAA Aeronautical Chart User's Guide (downloadable free at the URL below).

http://aeronav.faa.gov/index.asp?xml=aeronav/applications/digital/aero_guide

“IFR Odyssey”

Question 1: While flight planning, you notice an unfamiliar symbol over a portion of an airway near your route. It signifies _____ .

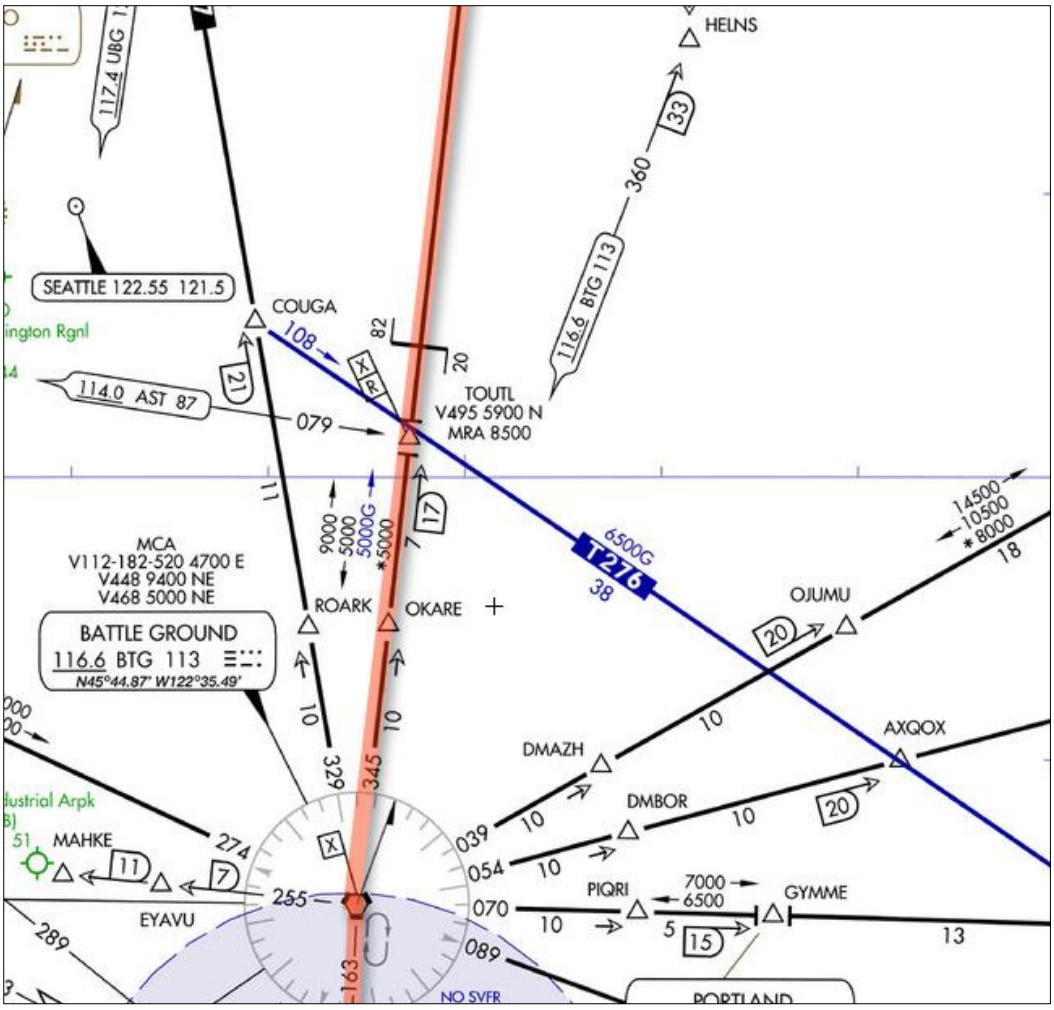
A. An unusable airway segment
B. Intermittent navaid signal in the area
C. The airway penetrates a restricted area

Explanation: The odd thing in this example is that the line for the airway (and the hash marks) doesn’t actually penetrate the restricted area. Remember, though, that the airway extends out 4nm either side of the centerline—so the outer edge probably gets into it a little bit.

See the IFR low-enroute chart legend, or the Aeronautical Chart User’s Guide for more information.

Question 2: (True/False) Had you chosen to file it, the airway T276 would have been available to you.

A. True
B. False



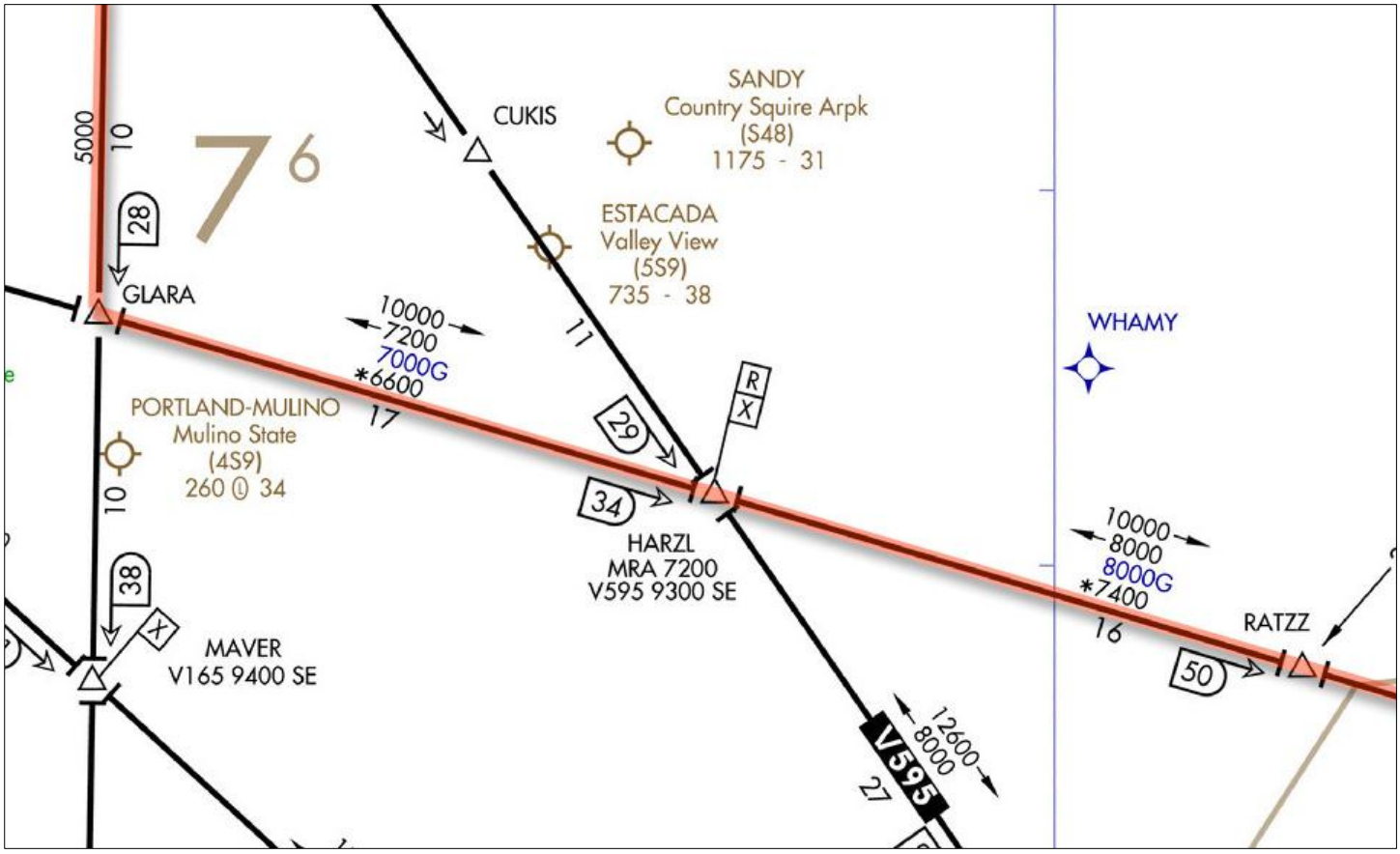
Explanation: The blue airway is a "T-Route," designed for use by RNAV aircraft. They can be filed by any RNAV-capable /E /F or /G aircraft (and it was specified in the scenario setup that we're flying an aircraft with IFR GPS).

"The FAA is proposing an amendment to Title 14 Code of Federal Regulations (14 CFR) part 71 to establish a low altitude RNAV route in the Portland, OR, terminal area. The route would be designated T-276, and would be depicted on the appropriate IFR En Route Low Altitude charts....The T-route described in this notice is being proposed to enhance safety, and to facilitate the more flexible and efficient use of the navigable airspace for en route IFR operations transitioning through and around the Portland Terminal Area."

For more information, see:
http://www.faa.gov/air_traffic/publications/bulletins/media/atb_dec_06.pdf

Question 3: What is the distance between GLARA and RATZZ?

A. 33
B. 34
C. 50

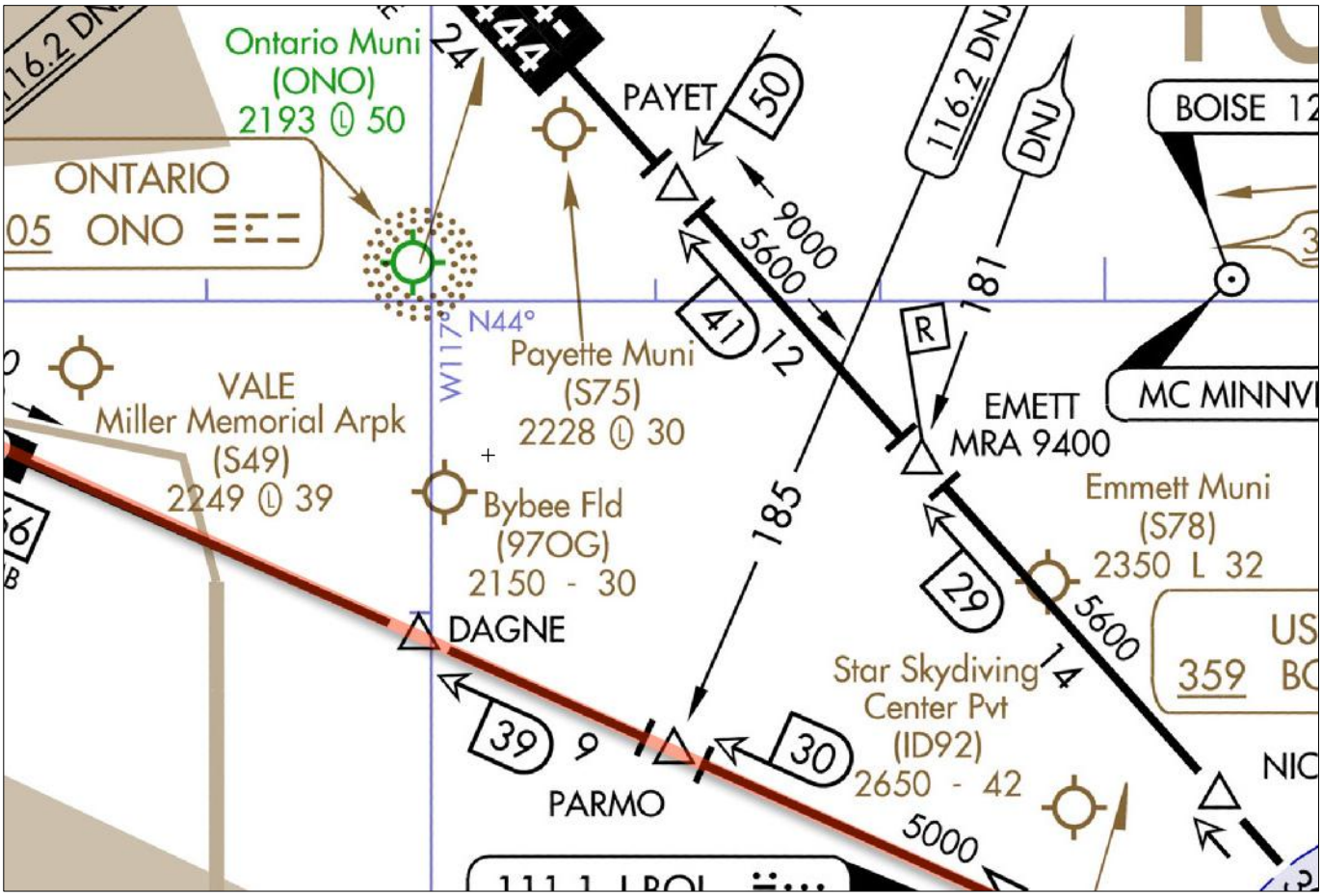


Explanation: The challenge here is decoding the "numerical soup" of airway distances. The "34" refers to the DME distance from the navaid (not pictured) to HARZL, and the "50" refers to the DME distance from the same navaid to RATZZ. The correct answer means adding the distance from GLARA to HARZL (17) and the distance from HARZL to RATZZ (16).

See the IFR low-enroute chart legend, or the Aeronautical Chart User's Guide for more information.

Question 4: How many airports along this section of your route have instrument approaches?

A. 0
B. 1
C. 5

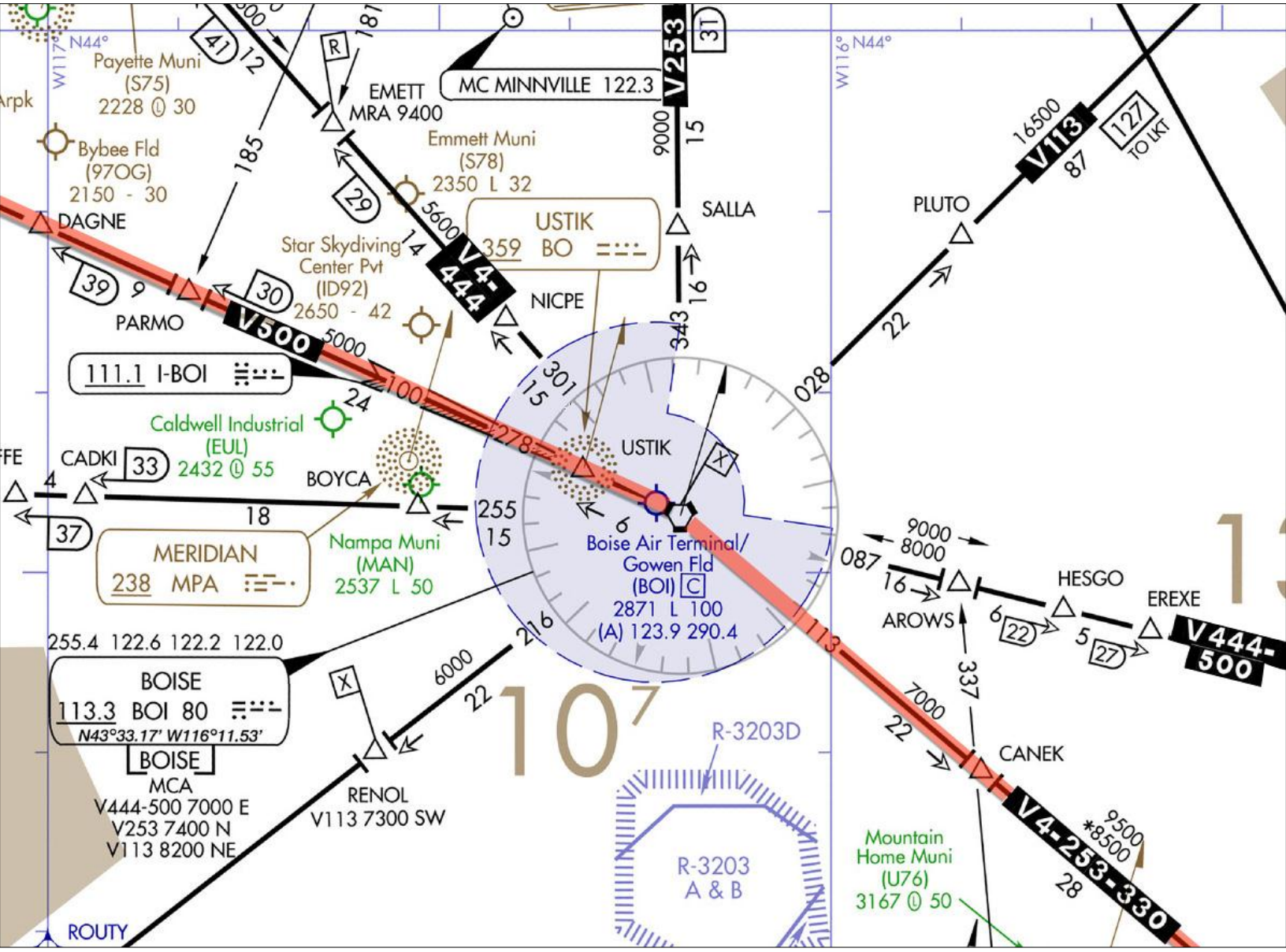


Explanation: There are six airports in this chart snippet, but only one has an instrument approach (airports charted in brown do not have approaches).

See the IFR low-enroute chart legend, or the Aeronautical Chart User's Guide for more information.

Question 5: Flying southeast-bound on the depicted route, the minimum altitude at which you could cross Boise VORTAC is _____ .

A. 5,000
B. 7,000
C. 7,400
D. Ask ATC



Explanation: See next page

Question 5: (cont.)

Explanation: This is kind of a tricky one, but the key point is this: An MCA only has meaning when it's accompanied by a specific altitude charted as the crossing altitude for that route segment. If there are multiple airways off the fix, and some of those airways are **not** listed as having a specific crossing altitudes, then those airways don't have MCAs.

Another way of putting it: Just because you're proceeding toward a new, higher MEA on the other side of a fix that happens to have an associated MCA, it does not necessarily mean that you have to cross at the new, higher altitude.

In this case, all four of the "outbound" east-side airways between 343 and 113 degrees have higher MEAs than their "inbound" west-side counterparts (with the exception of V330 west of the fix, which has an MEA of 8,000 due to high terrain considerably further west). This is because there's rising terrain from north through southeast of the fix. There are four of these airways, clockwise from north:

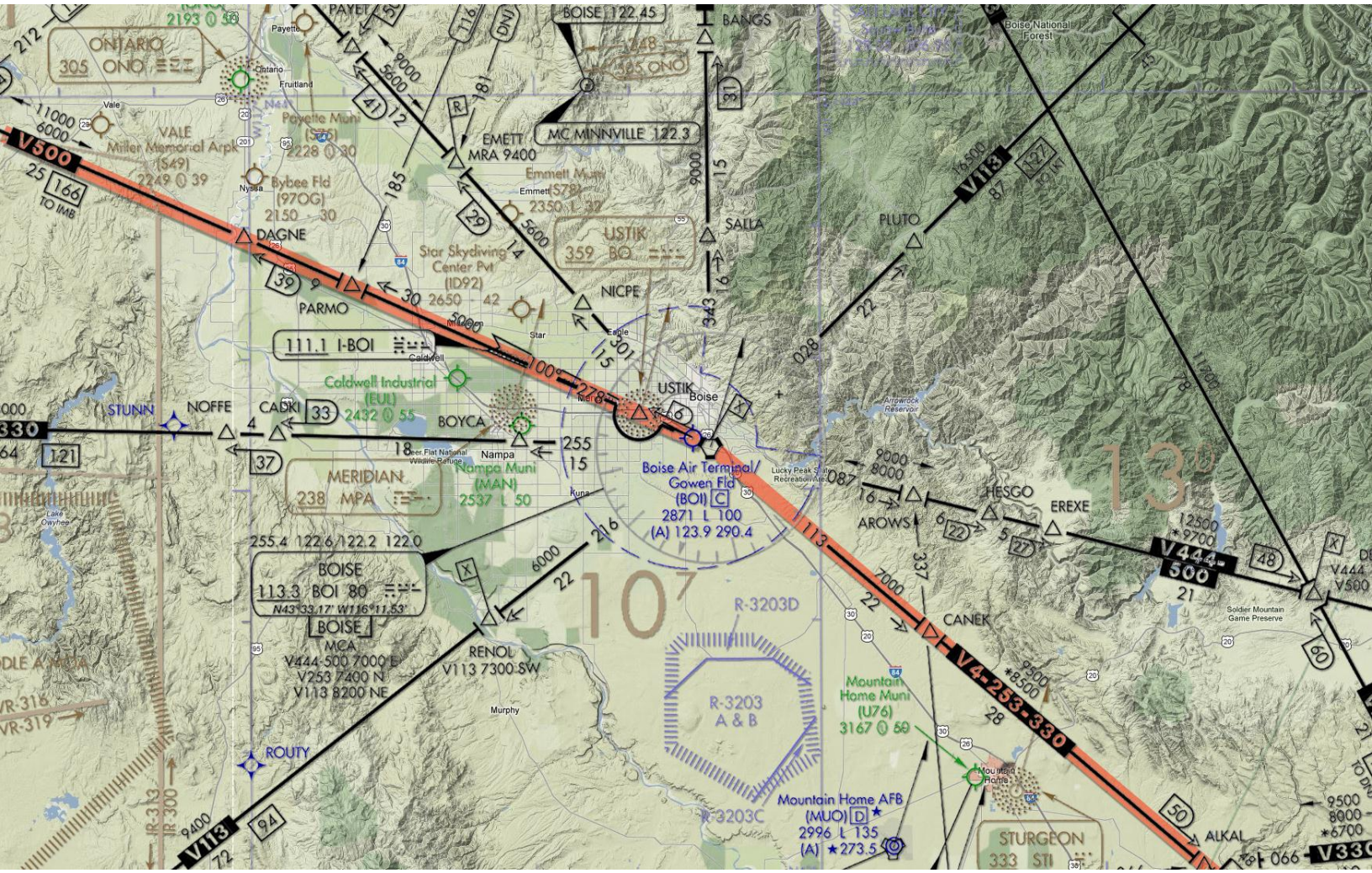
V253 (Northbound)
V113 (NE-bound)
V444-500 (ESE-bound)
V4-253-330 (SE-bound) - the route on which we're leaving the VOR

But only three of the four—V253, V113, and V444-500—are specifically listed as having MCAs in the text below the VOR data block. Our hypothetical flight will be outbound from the VOR on V4-253-330, which does not have an MCA listed in that block. Thus, you could theoretically be at 5,000 msl inbound on V500, cross the VOR at 5,000, and, after crossing, begin your climb to the new MEA on V4-253-330, which is 7,000. This is because, when an MCA is not specified, you can begin a climb to the higher MEA after crossing the fix (see FAA Instrument Procedures Handbook, Chapter 3, or section 4-5-6 of the Air Traffic Controller's Handbook (7110.65)).

This is made more apparent by the map on the following page, on which we've overlaid the enroute chart on a terrain map of the area. Looking at the terrain involved, it's pretty apparent why those three airways have MCAs, and why "ours" doesn't—it stays down in the valley.

We also accepted "Ask ATC" as a correct answer—since that's always the best thing to do if you're not certain. However, it could be argued that one would be most likely to encounter this situation in a lost-communication scenario, in which you haven't received instructions to climb to the higher altitude.

Question 5: (cont.)



Question 6: The notation “MEA GAP” signifies _____ .

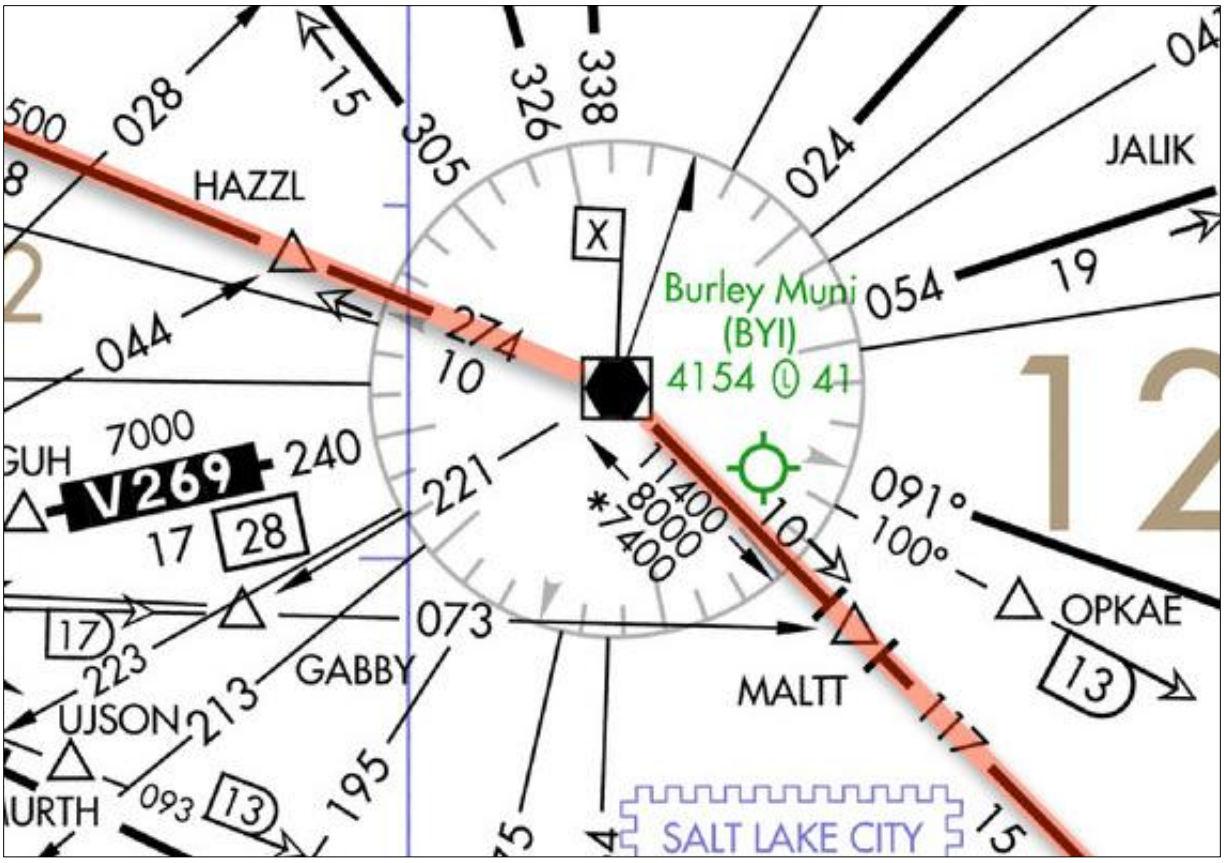
A. A large difference between adjacent MEAs
B. **A gap in navigational signal coverage**
C. A large difference between MEA and MOCA

Explanation: This notation is used where there may be a gap in navigational signal coverage at the MEA. Why not simply raise the MEA to get reliable signal coverage? Most likely because raising it high enough would cause a conflict with Class A airspace, or other issues with available altitudes (it’s already at 16,000 feet). Here the MEA is already more than 4,000 feet higher than the MOCA.

See the IFR low-enroute chart legend, or the Aeronautical Chart User’s Guide for more information.

Question 7: The Burley VOR/DME is blacked-out because _____ .

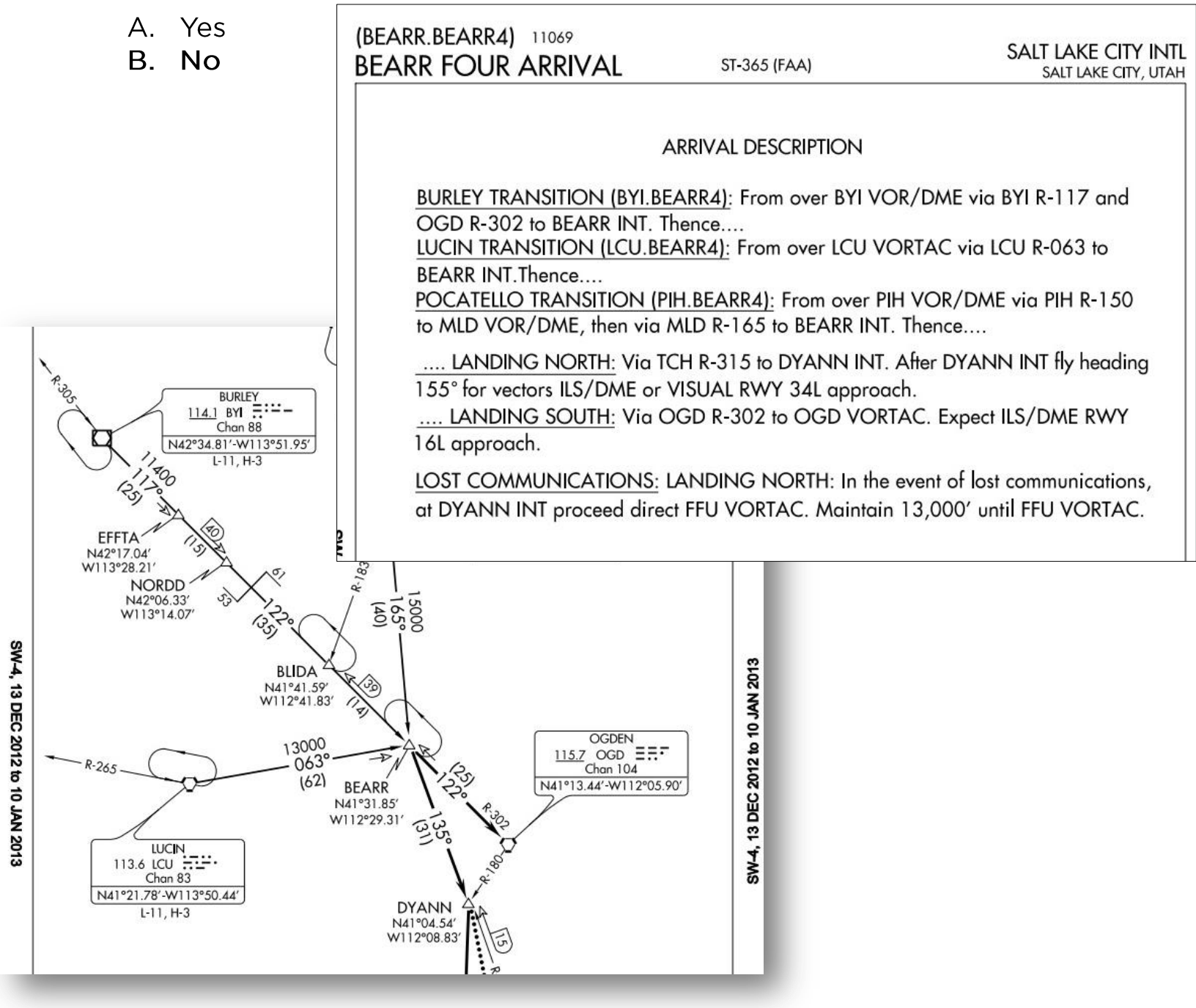
A. The station is out of service
B. **It's a mandatory reporting point**
C. It's co-located with an airport



Explanation: Just a reminder that you can have mandatory reporting points that aren't intersections. Of course, "mandatory" only refers to non-radar situations. See FAR 91.183, the IFR low-enroute chart legend, or the Aeronautical Chart User's Guide for more information.

Question 8: You're cleared for the BEARR FOUR arrival, Burley transition, landing south. Should you overfly DYANN intersection?

A. Yes
B. No



(BEARR.BEARR4) 11069
BEARR FOUR ARRIVAL ST-365 (FAA)
SALT LAKE CITY INTL
SALT LAKE CITY, UTAH

ARRIVAL DESCRIPTION

BURLEY TRANSITION (BYI.BEARR4): From over BYI VOR/DME via BYI R-117 and OGD R-302 to BEARR INT. Thence....
LUCIN TRANSITION (LCU.BEARR4): From over LCU VORTAC via LCU R-063 to BEARR INT.Thence....
POCATELLO TRANSITION (PIH.BEARR4): From over PIH VOR/DME via PIH R-150 to MLD VOR/DME, then via MLD R-165 to BEARR INT. Thence....

.... LANDING NORTH: Via TCH R-315 to DYANN INT. After DYANN INT fly heading 155° for vectors ILS/DME or VISUAL RWY 34L approach.
.... LANDING SOUTH: Via OGD R-302 to OGD VORTAC. Expect ILS/DME RWY 16L approach.

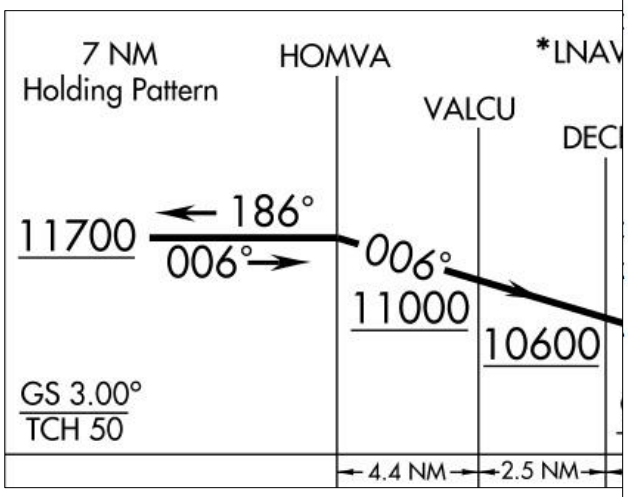
LOST COMMUNICATIONS: LANDING NORTH: In the event of lost communications, at DYANN INT proceed direct FFU VORTAC. Maintain 13,000' until FFU VORTAC.

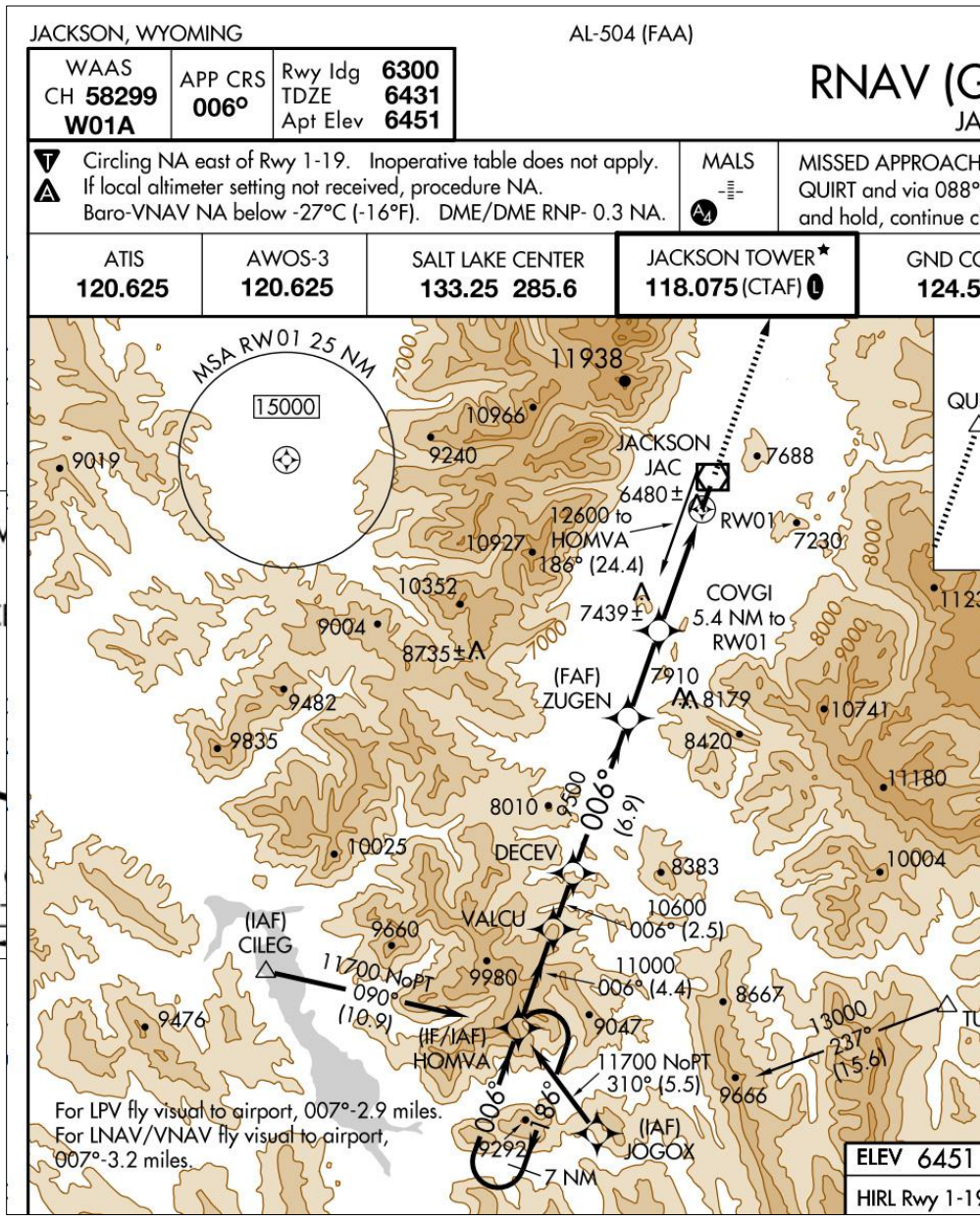
Explanation: This one is just an exercise in reading the arrival description. You would fly from BYI to BEARR intersection, then (since you're landing south) fly via the OGD R-302 to the OGD VORTAC.

“Approach Plates”

Question 1: (RNAV (GPS) X Rwy 1, KJAC) You’ve just crossed JAC southbound at an assigned altitude of 13,000 when ATC clears you for the approach. You should _____ .

A. Maintain 13,000
B. Descend to 12,600
C. Descend to 1 1,700



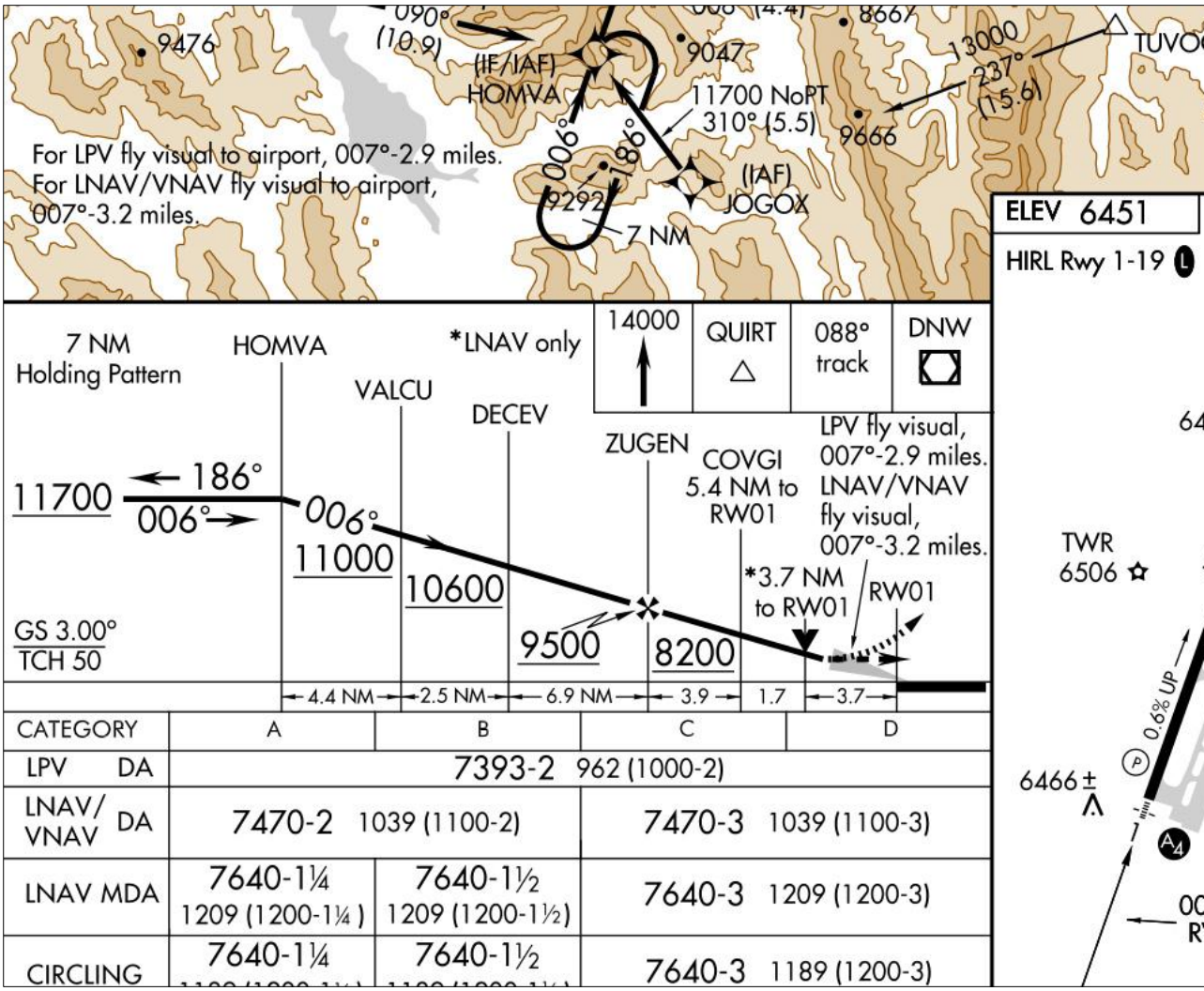


Explanation: This one’s a little tricky, since it’s easy to miss the “12600 to HOMVA” notation.

FAR 91.175(i): "When operating on an unpublished route or while being radar vectored, the pilot, when an approach clearance is received, shall...maintain the last altitude assigned to that pilot until the aircraft is established on a segment of a published route or instrument approach procedure unless a different altitude is assigned by ATC...” This regulation resulted from a 1974 accident in which a Boeing 727 collided with terrain after confusion about the control status of the flight and the implications of the phrase "cleared for the approach" led the pilots to descend prematurely.

Question 2: (RNAV (GPS) X Rwy 1, KJAC) You're flying LNAV/VNAV minimums. At 3.2 miles from the runway, you have over two miles visibility—but can't see the airport. Can you continue the approach?

A. Yes
B. No

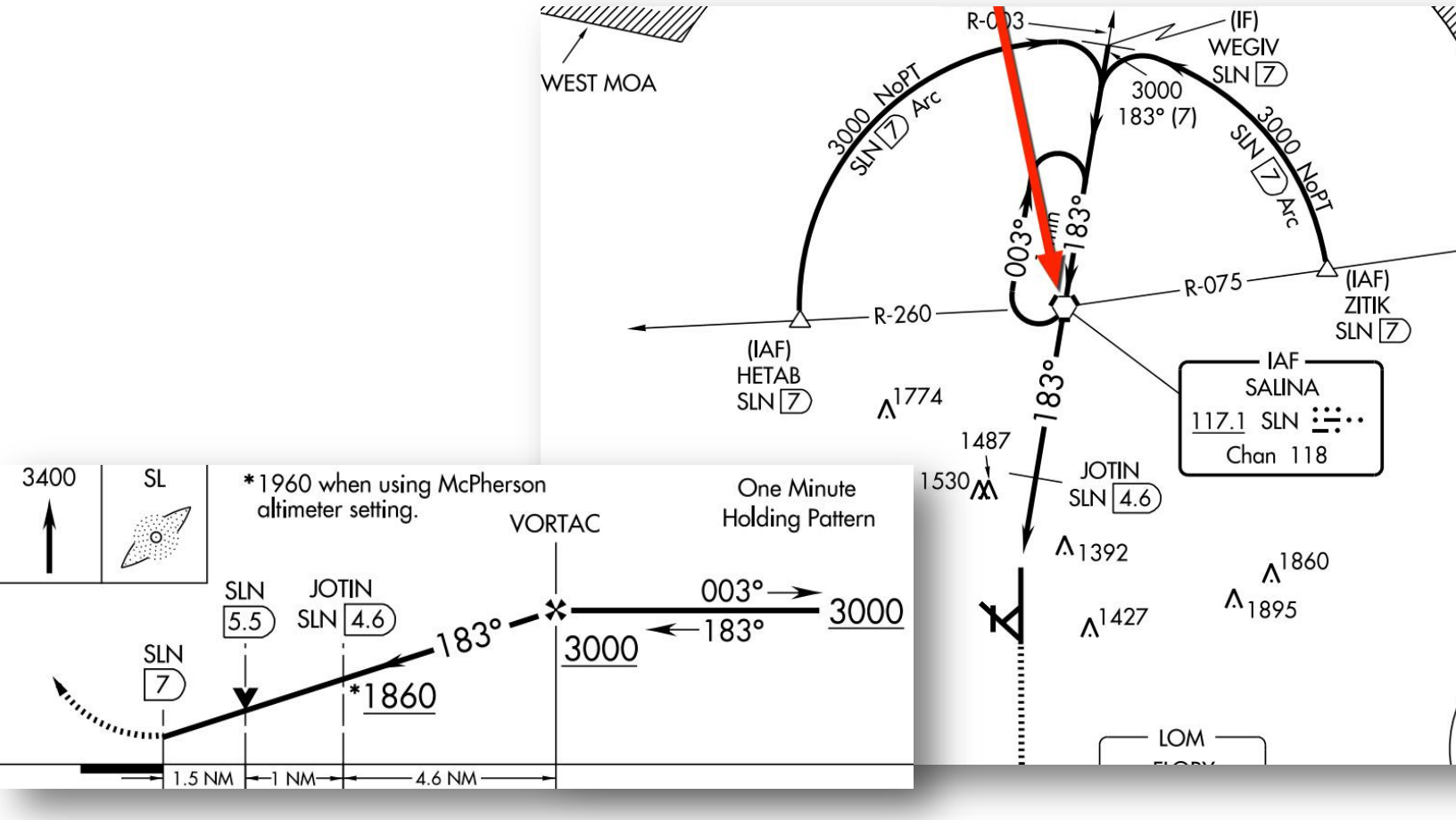


Explanation: "'Fly visual' segments are typically seen on approaches to airports in mountainous areas. If you see one, give the procedure a closer look. First, the visibility required for the approach is sometimes less than the length of the "fly visual" segment—meaning that the pilot can legally continue beyond the DA/MAP without the runway environment in sight, provided he/she has the required flight visibility. If you find yourself in such a situation, and there's any doubt about whether to proceed, it's best to opt for the missed approach. See AIM 5-4-5(g).

In many cases, the underlying reason for the "fly visual" is that terrain in the missed approach area would necessitate unreasonably high minimums if the MAP were in its normal position. By displacing the MAP a few miles, the designers can build a missed approach segment that doesn't have terrain problems. The danger for pilots is that the unanticipated need to initiate a missed approach beyond the MAP can lead to obstruction conflicts.

Question 3: (VOR Rwy 17, KSLN) You're NNW of the IAF when the controller instructs you to proceed direct SLN and clears you for the approach. At SLN, you should ___ .

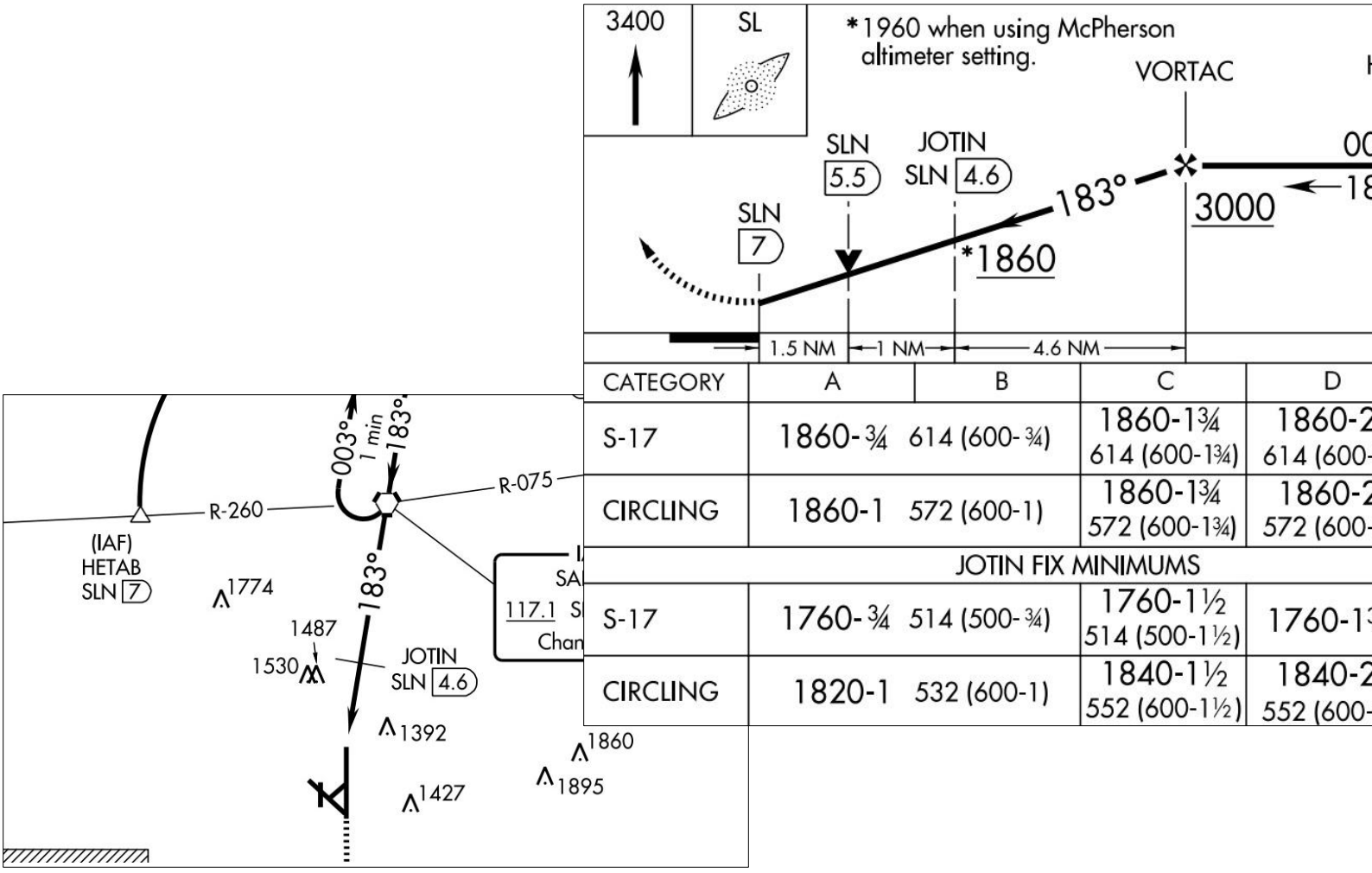
A. **Fly the published course reversal**
B. Proceed directly onto the final approach course



Explanation: Unless you're receiving radar vectors to final, or you're on a route segment where "NoPT" is specified, or you're specifically cleared for a straight-in approach (none of which apply to the scenario above), you're supposed to fly the procedure turn. See AIM 5-4-9.

Question 4: (VOR Rwy 17, KSLN) On final at 5.0 DME, the field comes into view. You _____ .

A. Must maintain at least 1,860 until 5.5 DME
B. Must maintain at least 1,760 until 5.5 DME
C. **May descend below 1,760 at your discretion**



CATEGORY	A	B	C	D
S-17	1860-¾ 614 (600-¾)		1860-1¾ 614 (600-1¾)	1860-2 614 (600-
CIRCLING	1860-1 572 (600-1)		1860-1¾ 572 (600-1¾)	1860-2 572 (600-
JOTIN FIX MINIMUMS				
S-17	1760-¾ 514 (500-¾)		1760-1½ 514 (500-1½)	1760-1
CIRCLING	1820-1 532 (600-1)		1840-1½ 552 (600-1½)	1840-2 552 (600-

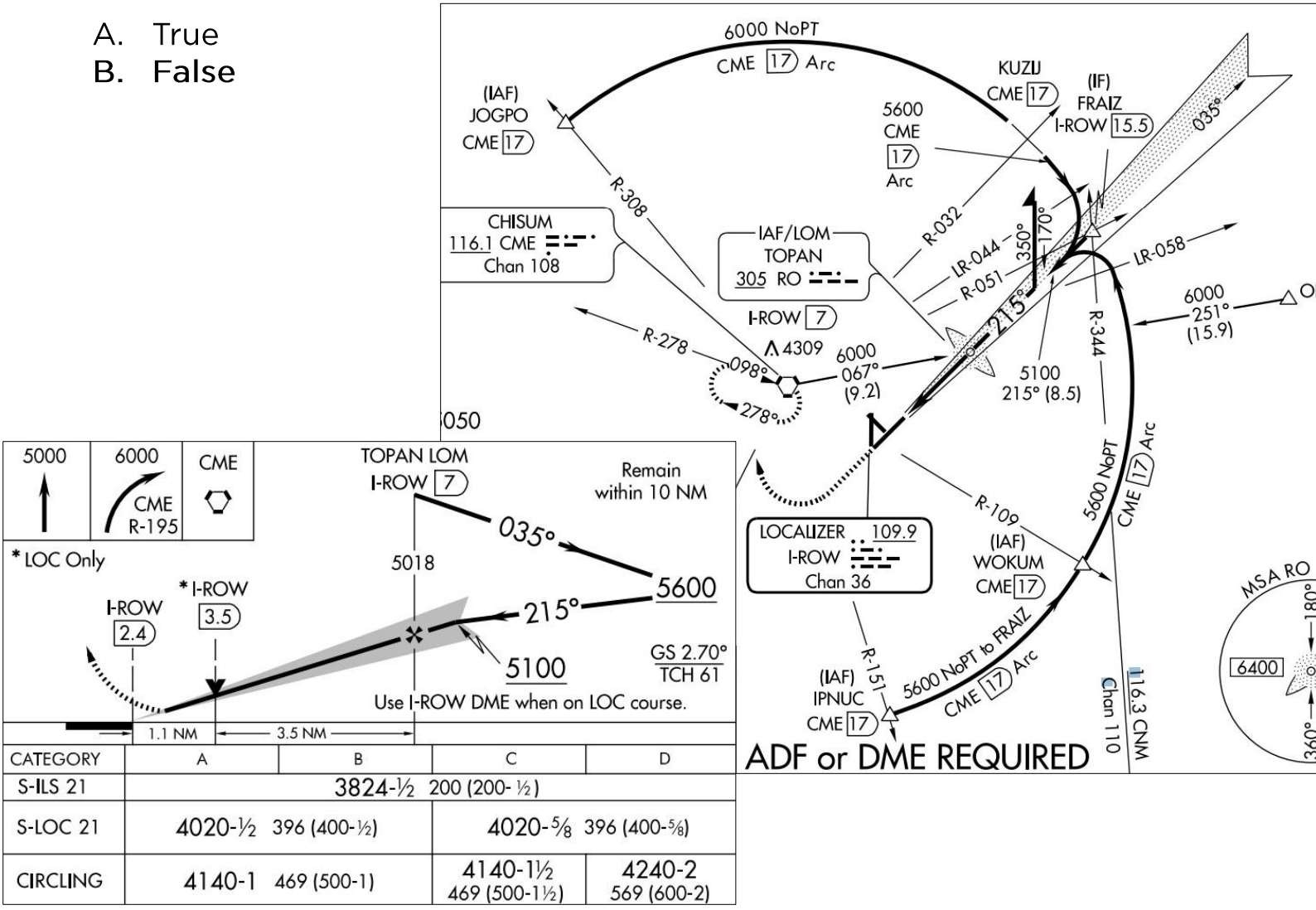
Explanation: Getting the correct answer here means: A) Understanding that, since you have DME, you can use the JOTIN minimums; and B) Understanding that you are not required to wait until the VDP to begin your descent—assuming you have the necessary visual references in sight. See FAR 91.175 and AIM 5-4-5(f).

In other words, the VDP is advisory in nature and not mandatory—though it's generally a good idea to wait until you reach it before descending further.

In the opposite situation—reaching the VDP without the runway environment in sight—you should be getting ready to execute a missed approach. This is because you're entering a situation in which it may be difficult or impossible to make a normal descent to the runway, should it come into view.

Question 5: (ILS or LOC Rwy 21, KROW) T / F: Because CHISUM is offset from the final approach course, you should expect the DME countdown to slow as you near the airport.

A. True
B. False

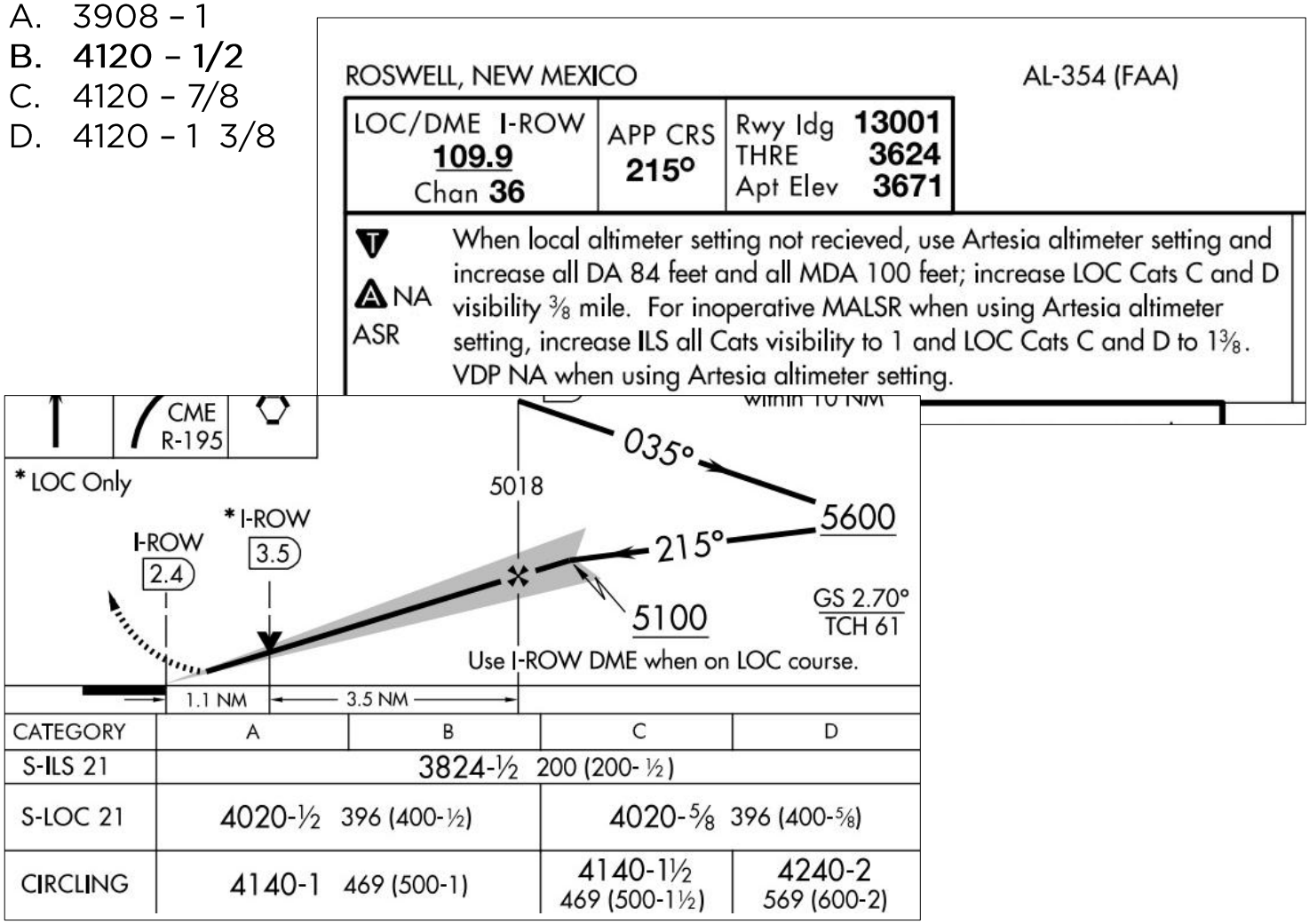


CATEGORY	A	B	C	D
S-ILS 21	3824-½ 200 (200-½)			
S-LOC 21	4020-½ 396 (400-½)		4020-⅝ 396 (400-⅝)	
CIRCLING	4140-1 469 (500-1)		4140-1½ 469 (500-1½)	4240-2 569 (600-2)

Explanation: The main thing to recognize here is the fact that you're dealing with two different DME sources on the approach—the VOR and the localizer. If you flew the DME arc using CME, and then failed to switch over to ROW on the final approach course, it could cause some real confusion.

Question 6: (ILS or LOC Rwy 21, KROW) You're flying the localizer approach in a Cessna 172, with the Artesia altimeter setting. The MALSR is inop. Your approach minimums are:

A. 3908 – 1
B. 4120 – 1/2
C. 4120 – 7/8
D. 4120 – 1 3/8



Explanation: Getting the right answer here takes some close reading. Because you don't have the local altimeter, and are flying the localizer approach (which has an MDA, rather than a DA)—and you're in a category A aircraft--you'd have an MDA of 4120. The rest of the notation doesn't apply to you, so the visibility minimum remains unchanged at 1/2.