

Assignment 6: Geometric Design Standards

Date Due: March 17, 2016

Problem #1

A new airport is expected to serve new generation commercial transport aircraft such as the Boeing 787-800 and the Airbus A350-900. The airport located at 3,200 feet above sea level conditions expected to have an 10,500 foot runway and an instrument landing system with an approach procedure with visibility minima down to 1/2 miles (ILS Category I equivalent approach). The airport will have a new ILS landing system.

a) Determine the dimensions of the complete runway and taxiway layout shown in Figure 1 (for the new airport). Clearly indicate the FAA standards used including the tables consulted in the FAA advisory circular 150/5300-13A.

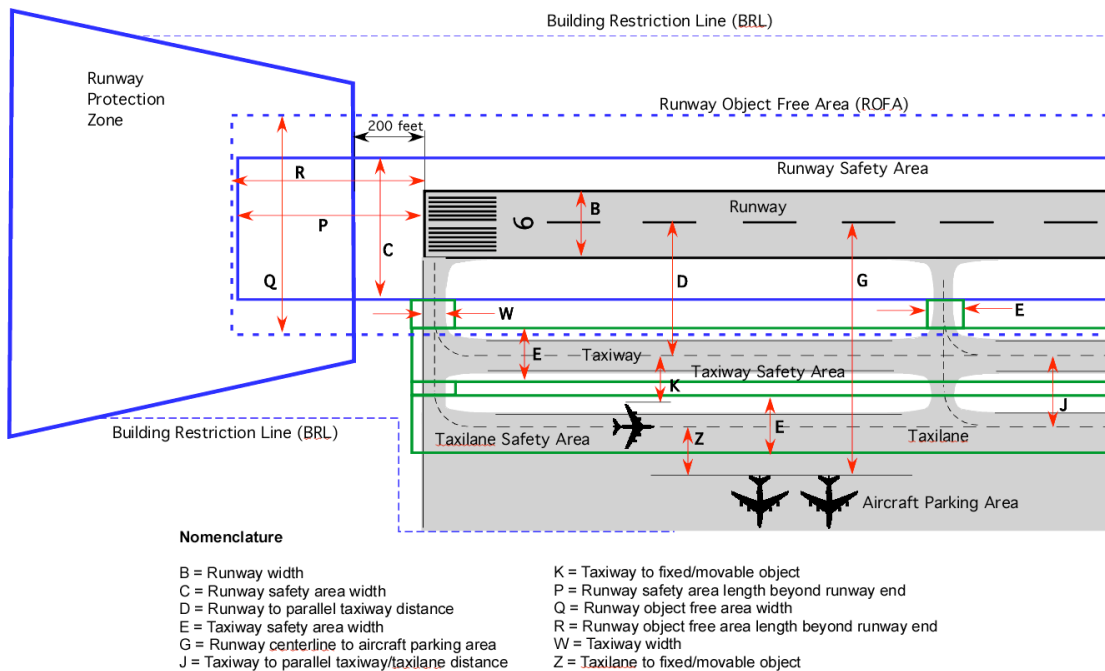


Figure 1. Simplified Airport Layout for Problem 1.

- b) Find the width and size of the runway and taxiway shoulders and blast pad areas needed at this airport.
- c) Find the closest perpendicular distance to the runway to place an 80-foot tall hangar on the North side of the airport (top of the diagram). In this analysis consider both Inner Transitional OFZ and FAR Part 77 surfaces. Explain which set of criteria is the most critical.

Problem #2

The airport authority wants to know if the objects near an airport constitute obstacles to navigation. The proposed location of these objects is shown in Figure 2. Determine if each object is an obstruction to navigation. State which surface is the most critical for the location of each object. The runway shown in Figure 2 is a 2,500 meter **non-precision** runway to be operated with visibility minimums as low as 3/4 of mile.

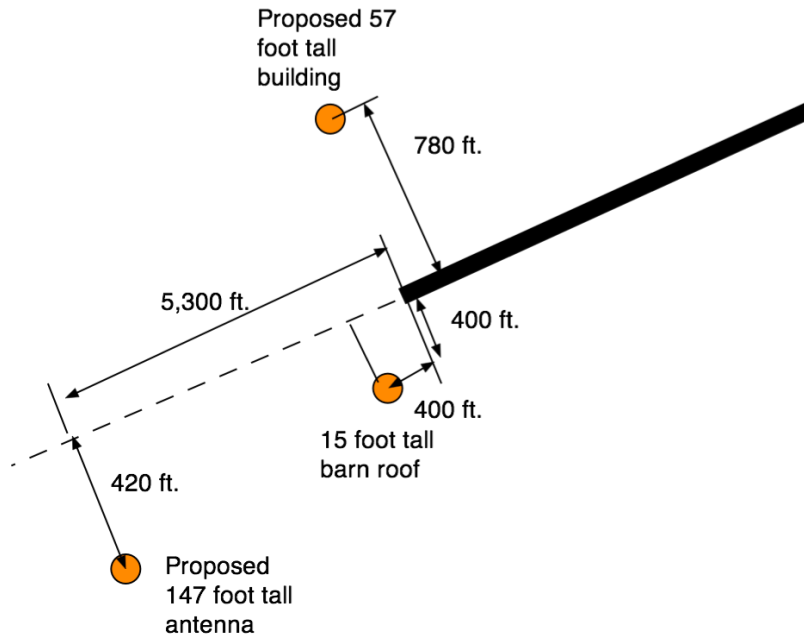


Figure 2. Potential obstructions to navigation for Problem 2.

Problem #3

Consider the following situation at the Atlanta Jackson-Hartsfield International Airport. Use Google Earth and Airnav Systems as needed to solve the problem. The Marriott Renaissance Concourse Hotel is shown in Figure 3. The hotel has great views of the Northern runways of this airport. Determine the highest permissible elevation of the hotel to comply with FAA design standards. State what surfaces did you check in your analysis.



Figure 3. Northern Side of the Atlanta International Airport.

Problem 4. Airport Geometric Design Forensics

A ground collision between an Airbus A380 and a Bombardier CRJ-700 at JFK International Airport illustrates the importance of complying with geometric design standards at airports. According to the accident report, the A380 was taxiing on taxiway Alpha (see Figure 4) while the Regional Jet (CRJ-700) was waiting at one of the holding positions across taxiway Mike as shown in the figure. The video of the accident is at: <https://www.youtube.com/watch?v=WJCqBQLTWmw>.

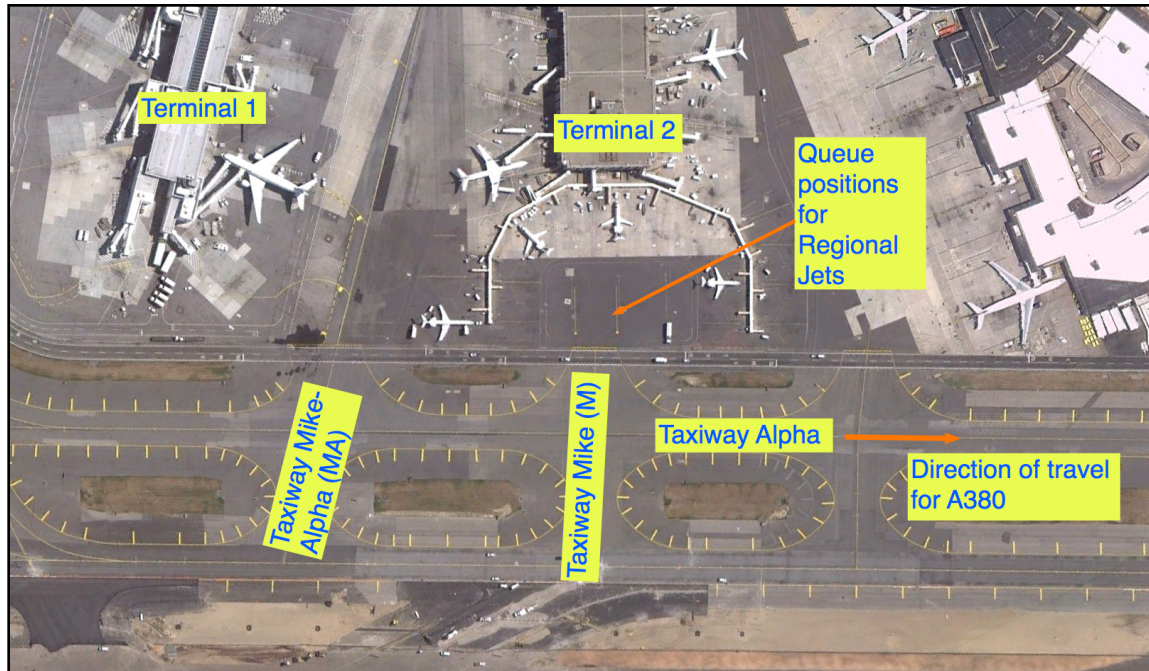


Figure 4. Geometry of Taxiways Alpha (A) and Mike (M) near JFK Terminal 2.

- Determine the relevant geometric design standards to check if taxiway Alpha at JFK meets the FAA design criteria for the Airbus A380.
- Find the minimum distance from taxiway Alpha centerline to the closest fixed object.
- Find the minimum distance from taxiway Alpha centerline to the building restriction line. Does Terminal 2 meet the criteria? Assume Terminal 2 is 40 feet tall.
- If the Bombardier CRJ-700 was waiting for its gate at the queue position, was there any risk of collision? Explain.
- Provide a couple of scenarios on why both aircraft collided. Explain based on your knowledge of airport engineering and consider human factors in your answers.
- Find if taxiway Alpha and taxiway Bravo (i.e., parallel taxiway meet the A380 design criteria).