Lighting Calculations for Aprons, taxiways, Control Towers

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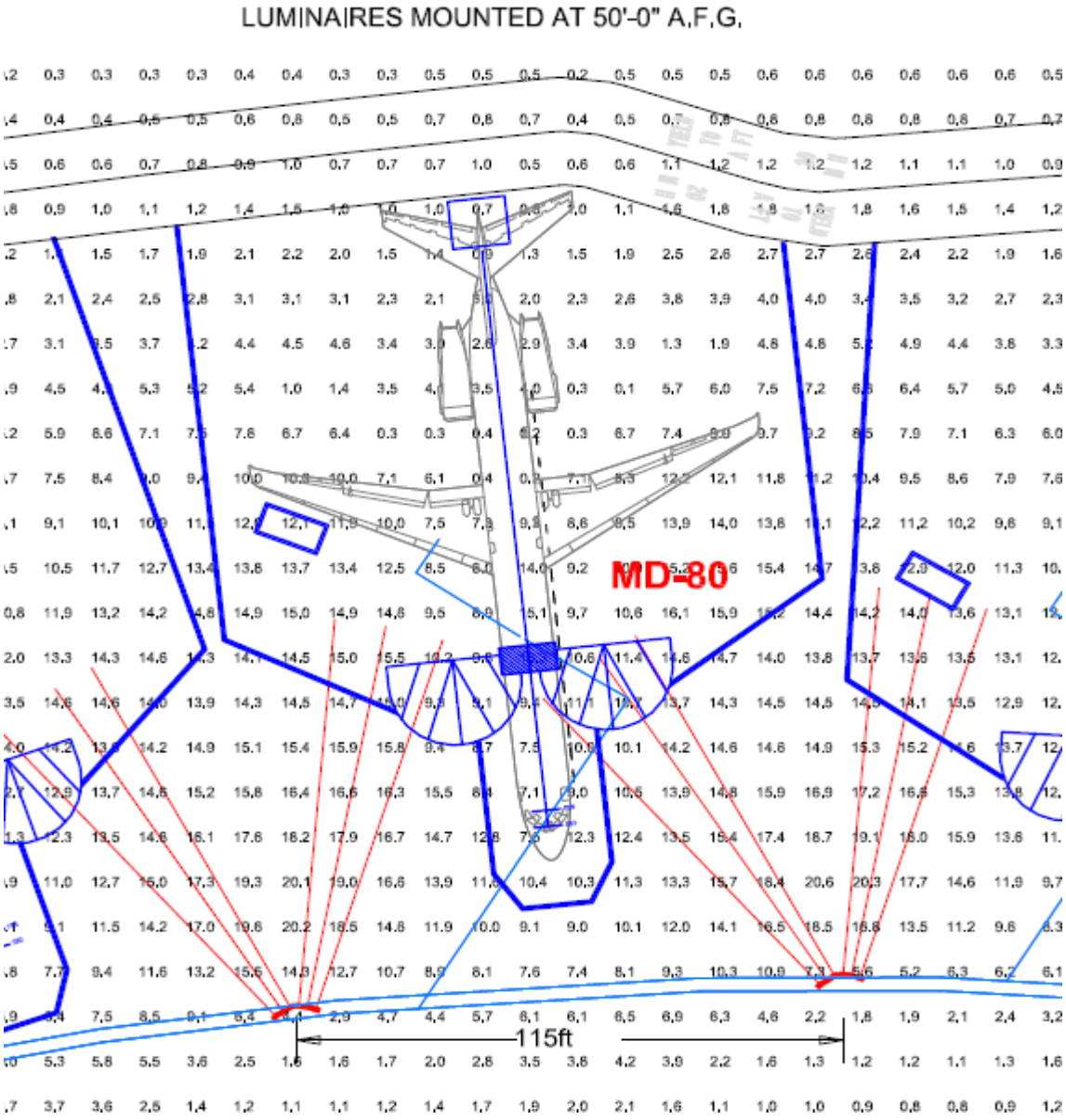
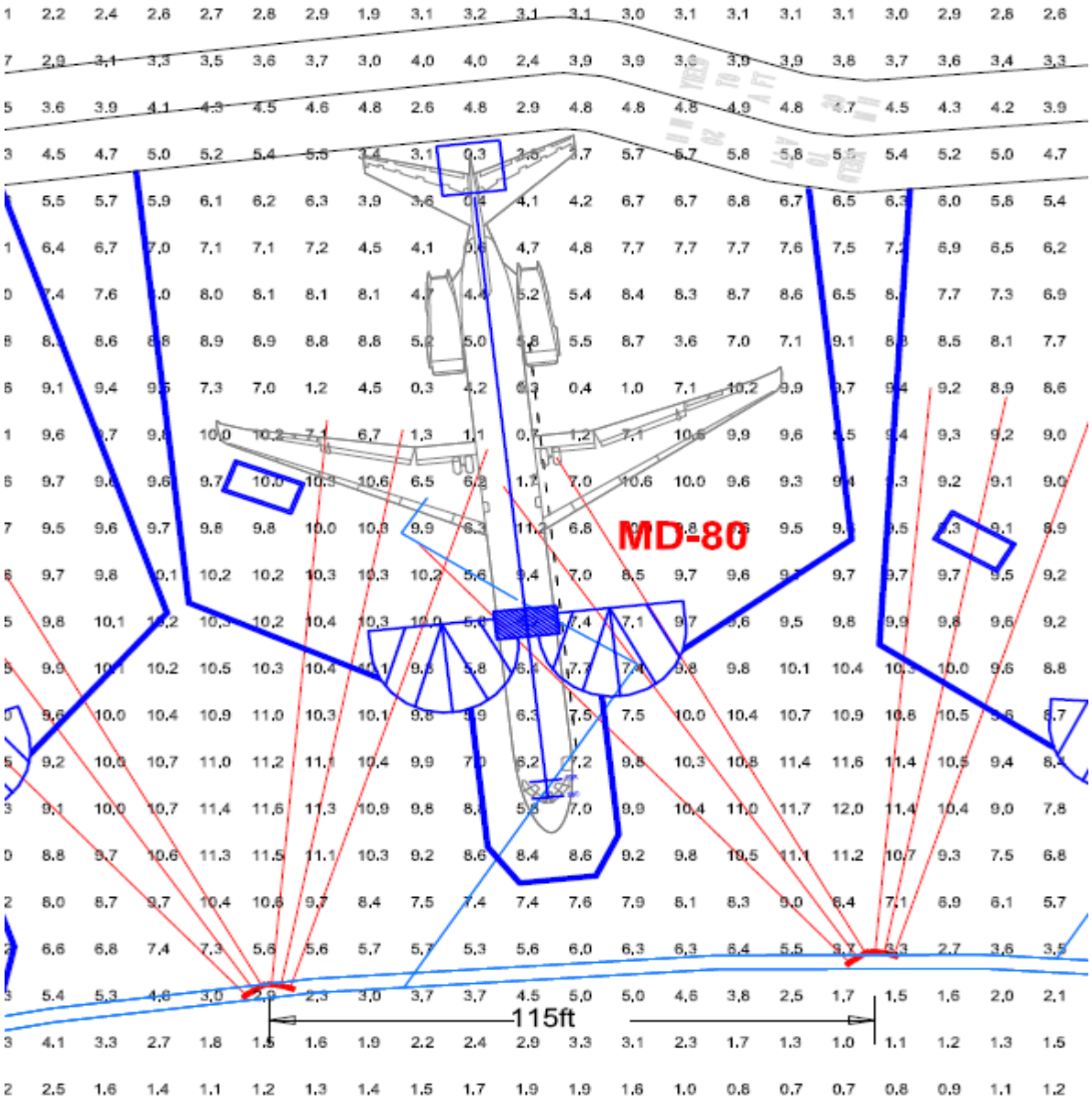
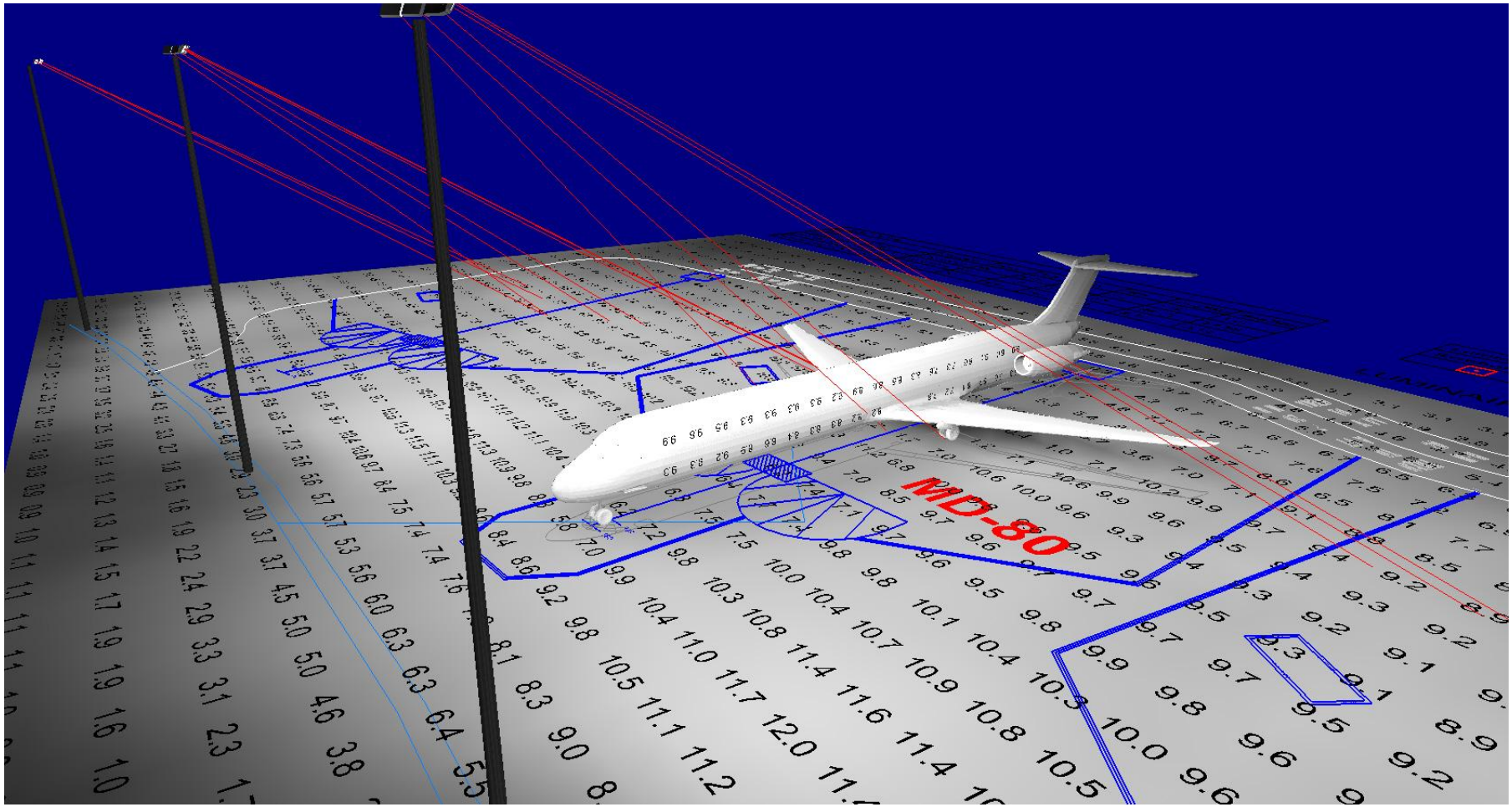
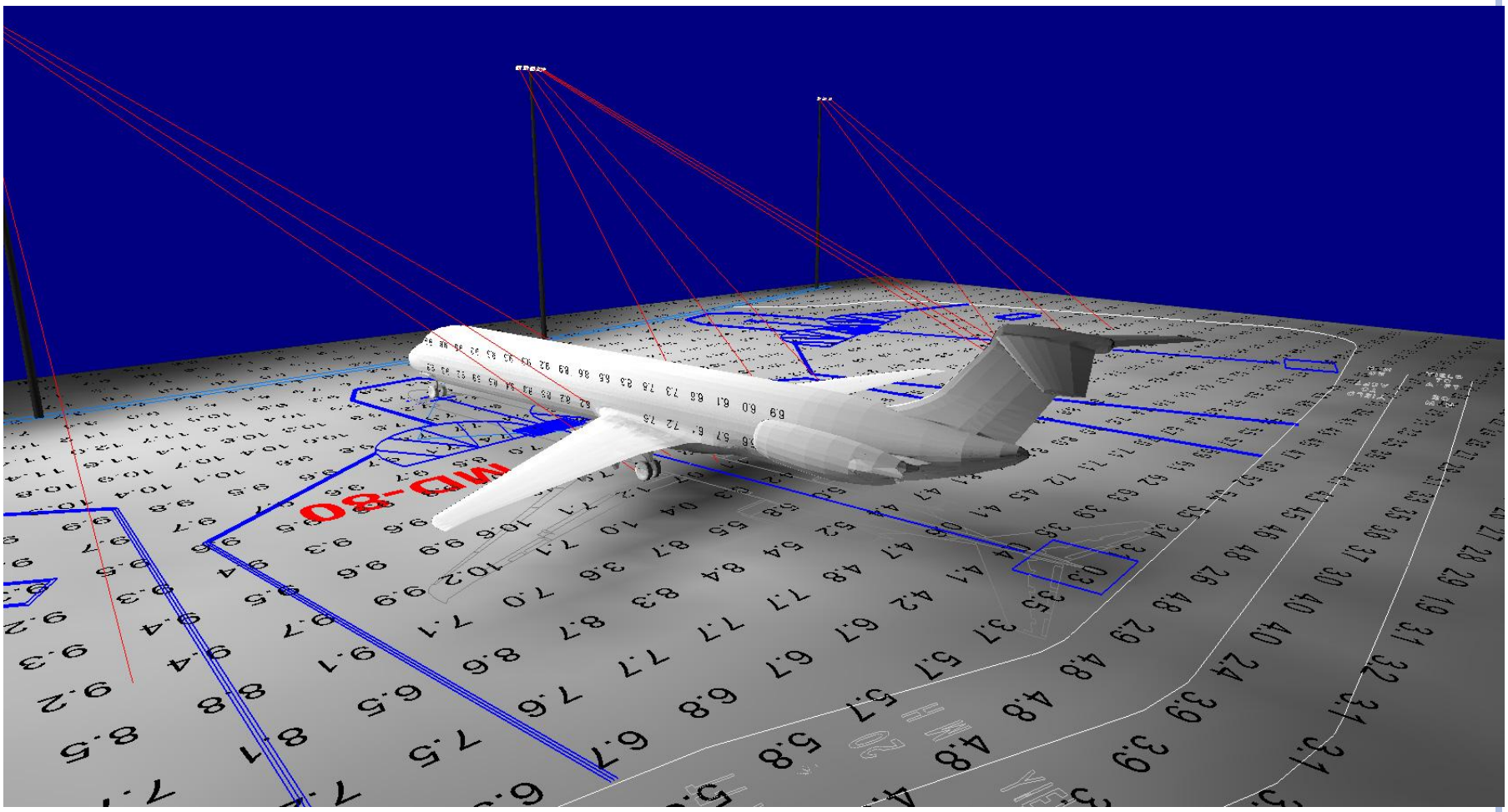

LUMINAIRES MOUNTED AT 50'-0" A.F.G.
MD-80
115ft

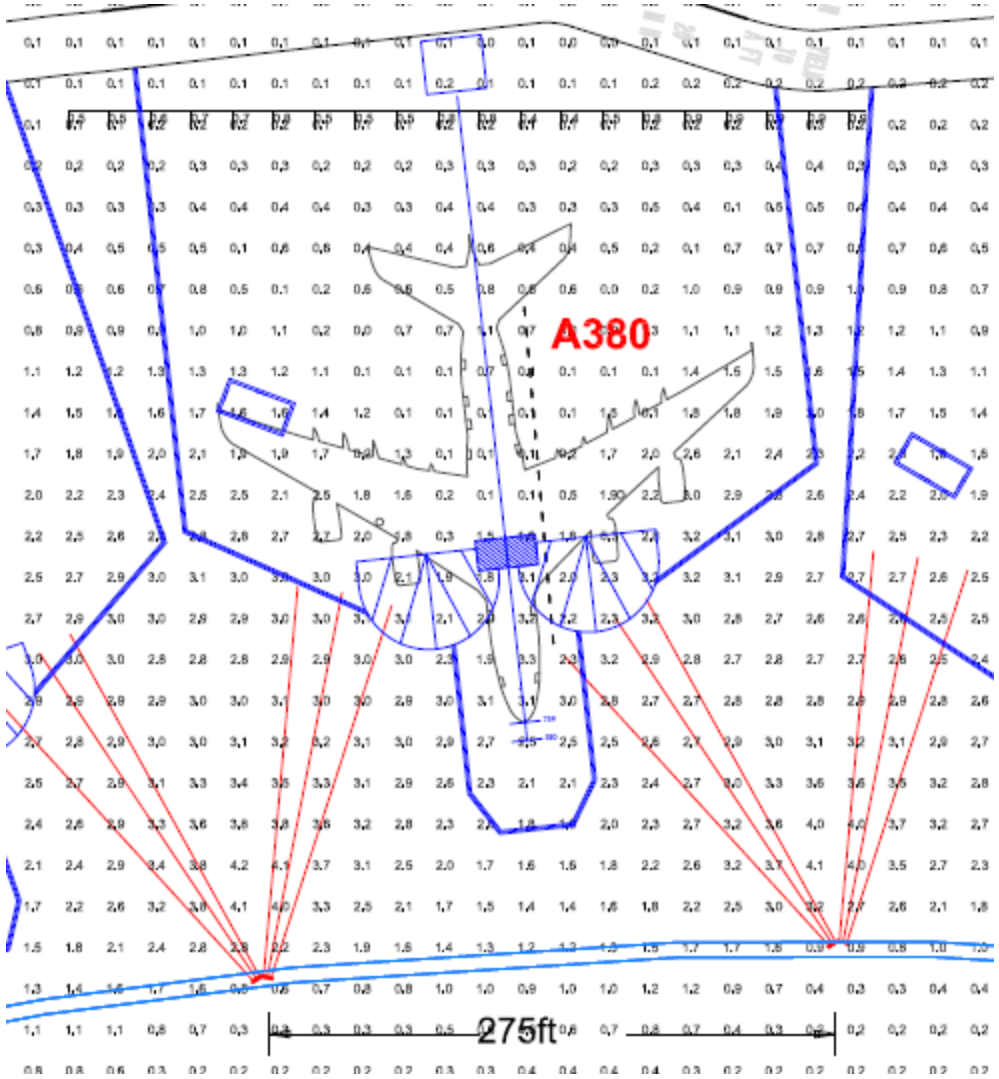
LUMINAIRES MOUNTED AT 70'-0" A.F.G.



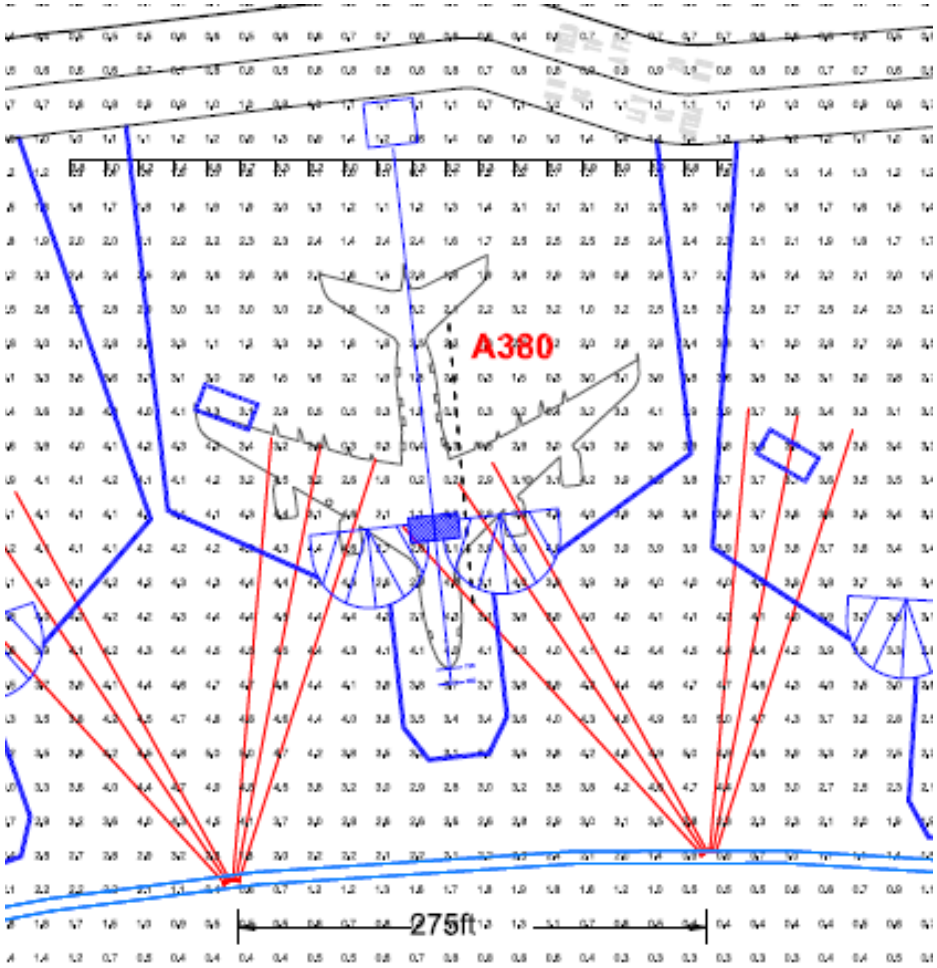

MD-80

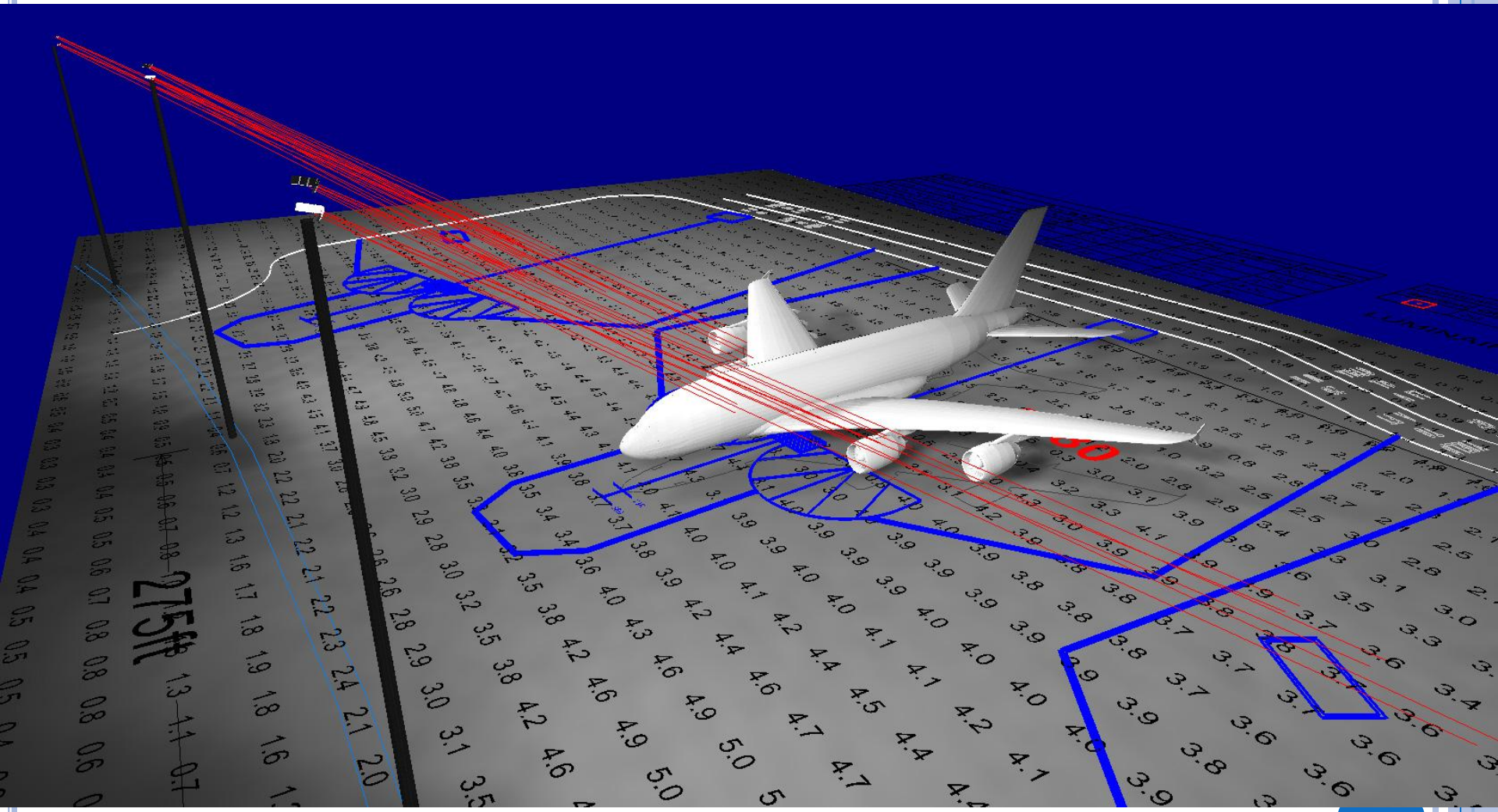

MD-80

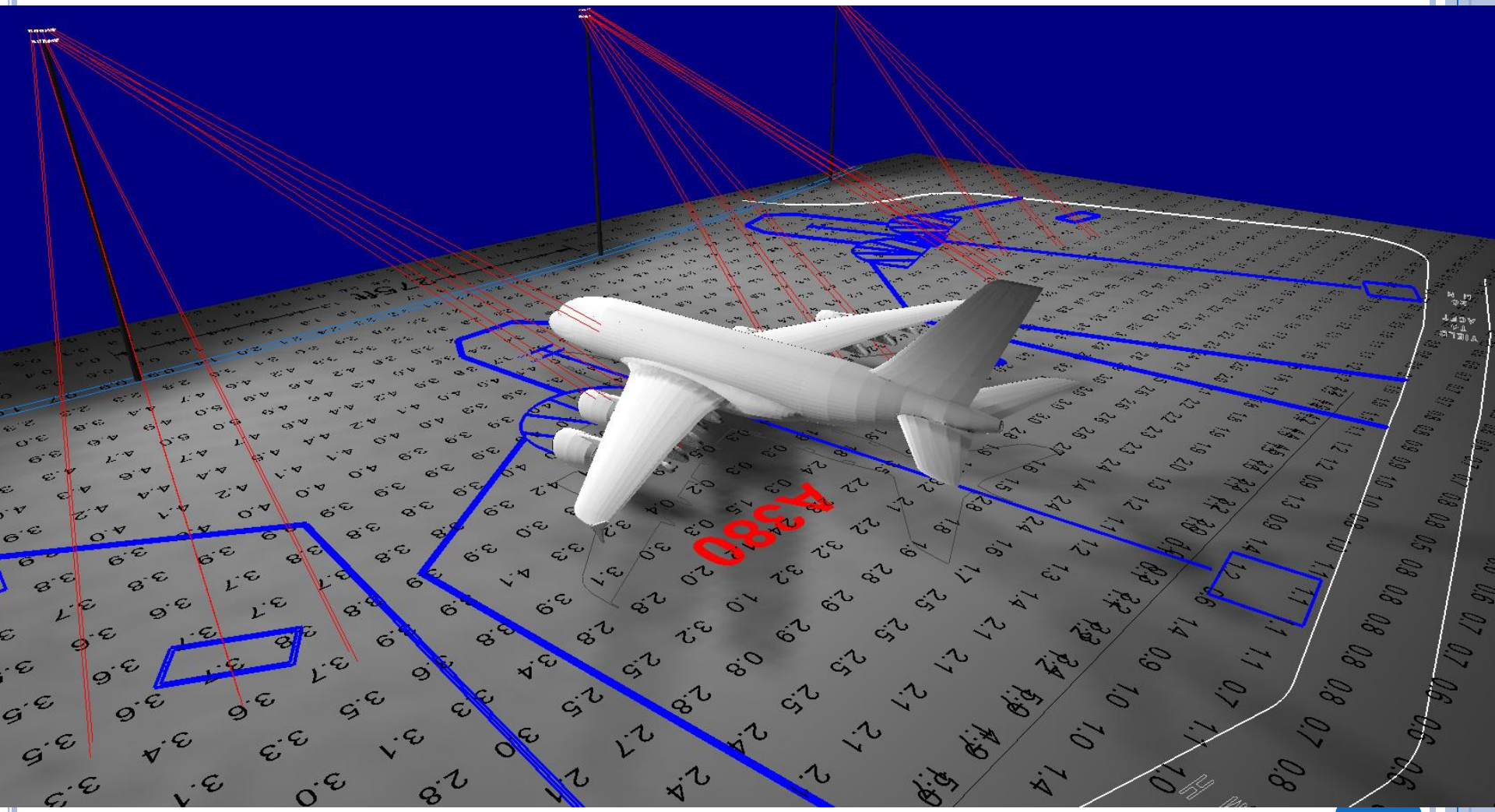
110’ Mounting Height, Super Jumbo Jets



150’ Mounting Height, Super Jumbo




27L/R


A380

Note:

Do NOT expect a designer or manufacturer to run calculations over a terminal apron containing several 3D airplane models! It is much too time-consuming, would require monster computers.

It is reasonable to ask for one typical stand to be shown with and without the plane modeled in.

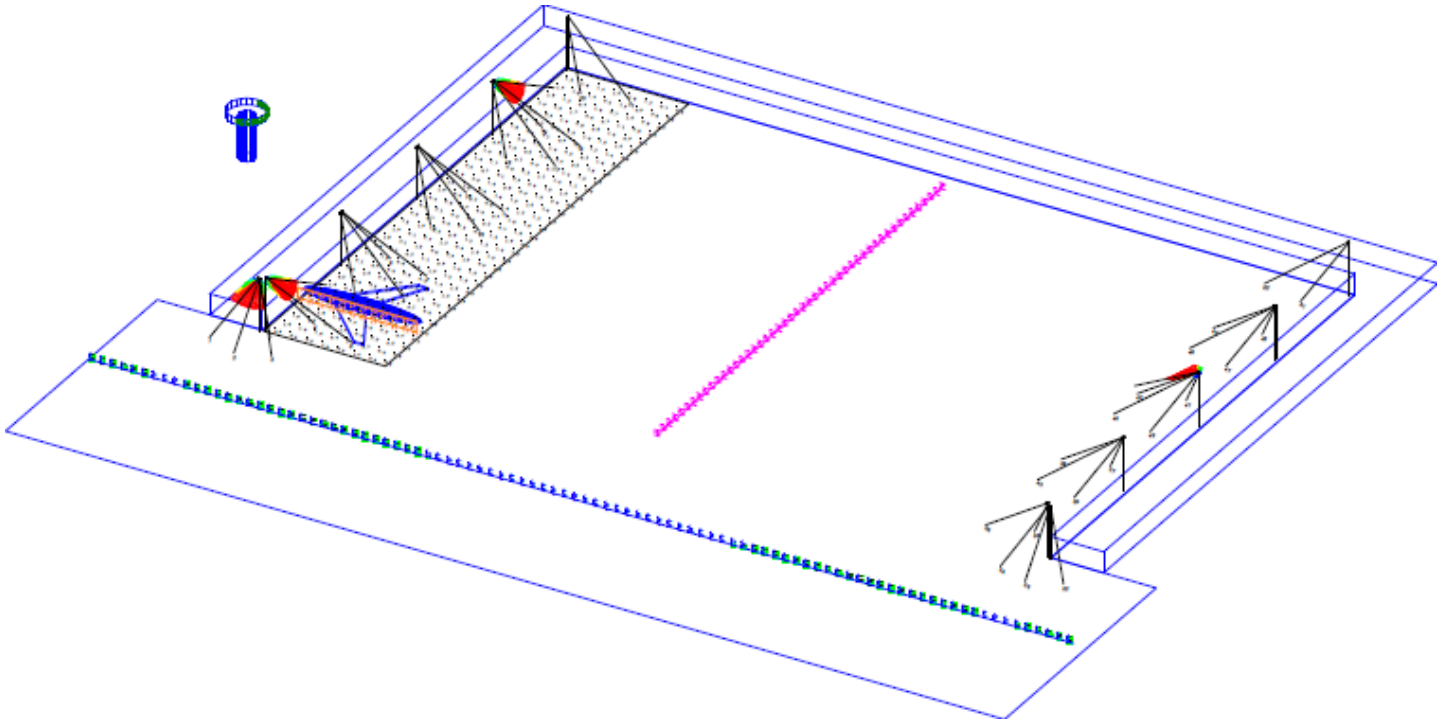
Airplane classes, in RP37. Pole height needed tbd

Airplane Design Group (ADG)	Maximum Wingspan Feet	Meters	NBEG	
I. Small Regional	49	15	0.4	 No. of Narrowbody Aircraft in wingspan of ADG I Aircraft = 0.4
II. Medium Regional	79	24	0.7	 No. of Narrowbody Aircraft in wingspan of ADG II Aircraft = 0.7
III. Narrowbody	118	36	1.0	 No. of Narrowbody Aircraft in wingspan of ADG III Aircraft = 1.0
IIIa. B757	135	41	1.1	 No. of Narrowbody Aircraft in wingspan of ADG IIIa Aircraft = 1.1
IV. Widebody	171	52	1.4	 No. of Narrowbody Aircraft in wingspan of ADG IV Aircraft = 1.4
V. Jumbo	214	65	1.8	 No. of Narrowbody Aircraft in wingspan of ADG V Aircraft = 1.8
VI. Super Jumbo	262	80	2.2	 No. of Narrowbody Aircraft in wingspan of ADG VI Aircraft =2.2

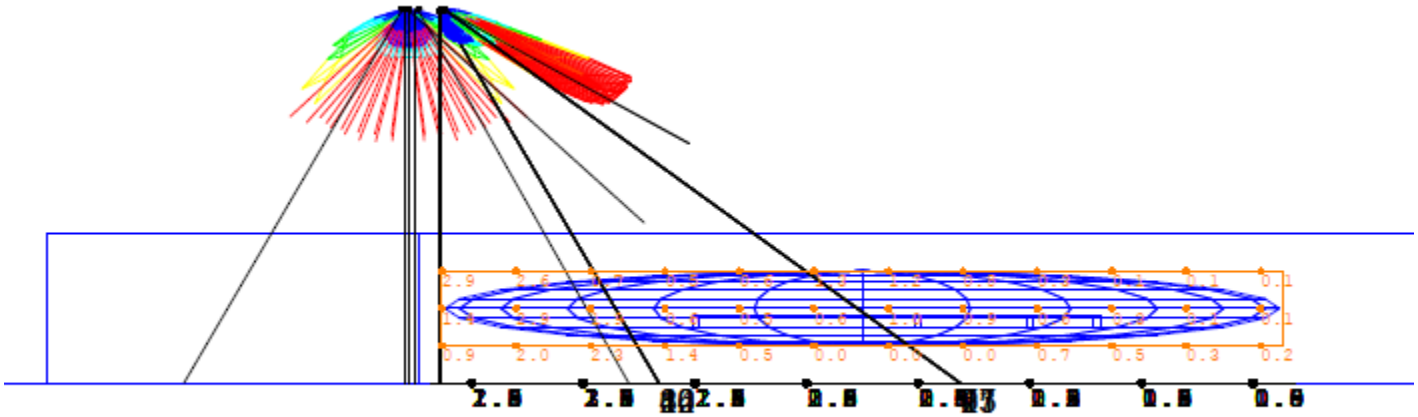
Source: Hirsh Associates and Landrum & Brown

Figure 4.4 Identification of Aircraft Types.

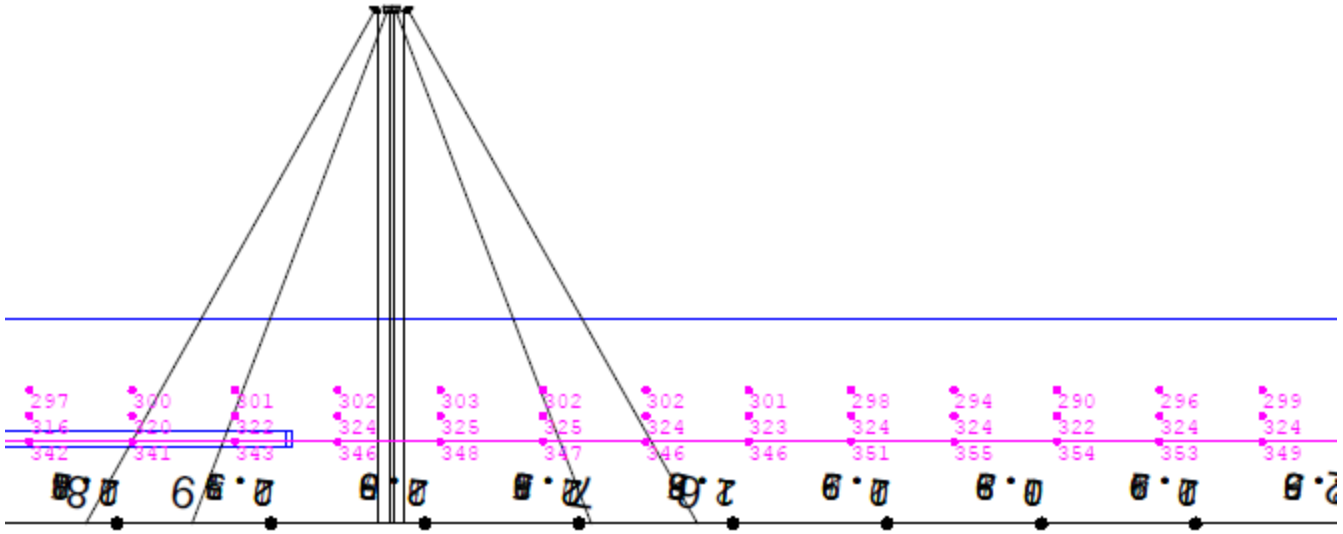
Layout of Aprons, Taxiway, Runway, Control Tower



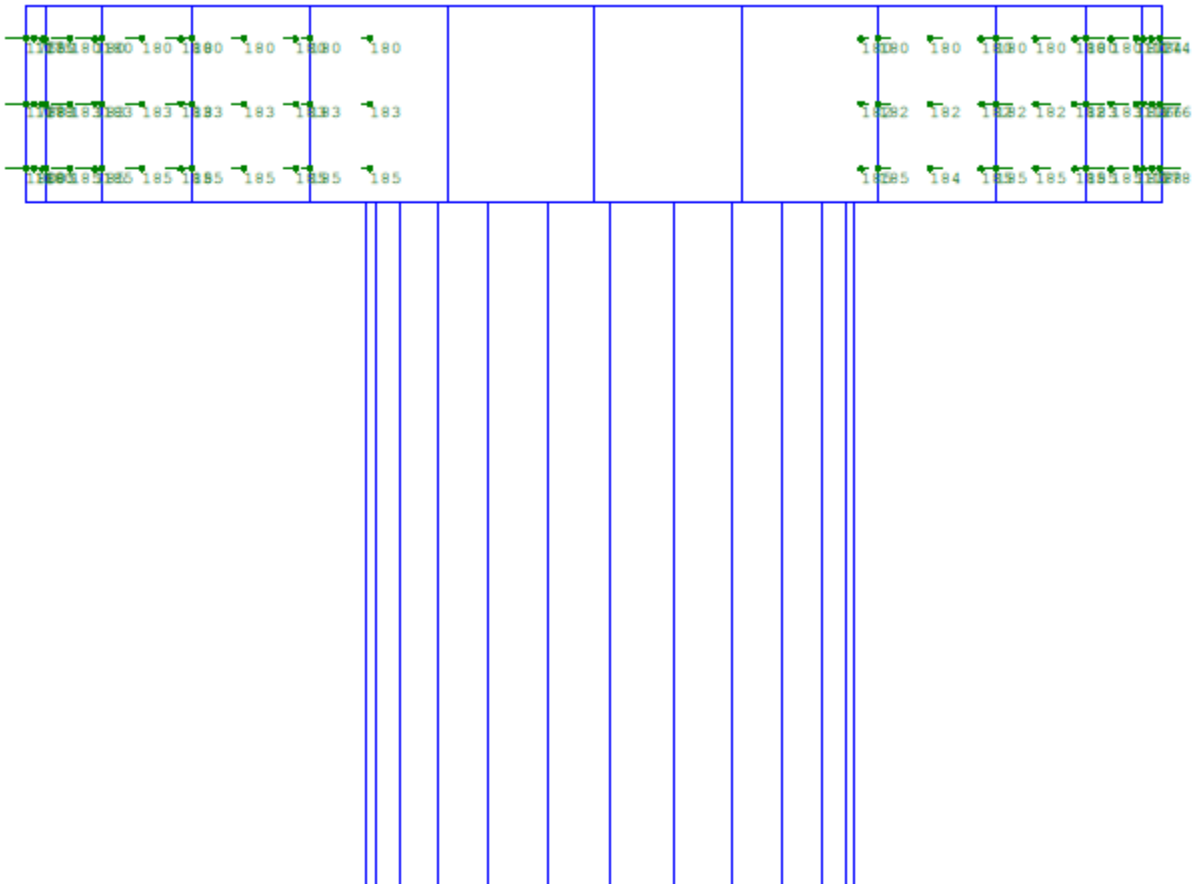
Vertical Lux on Side of Plane



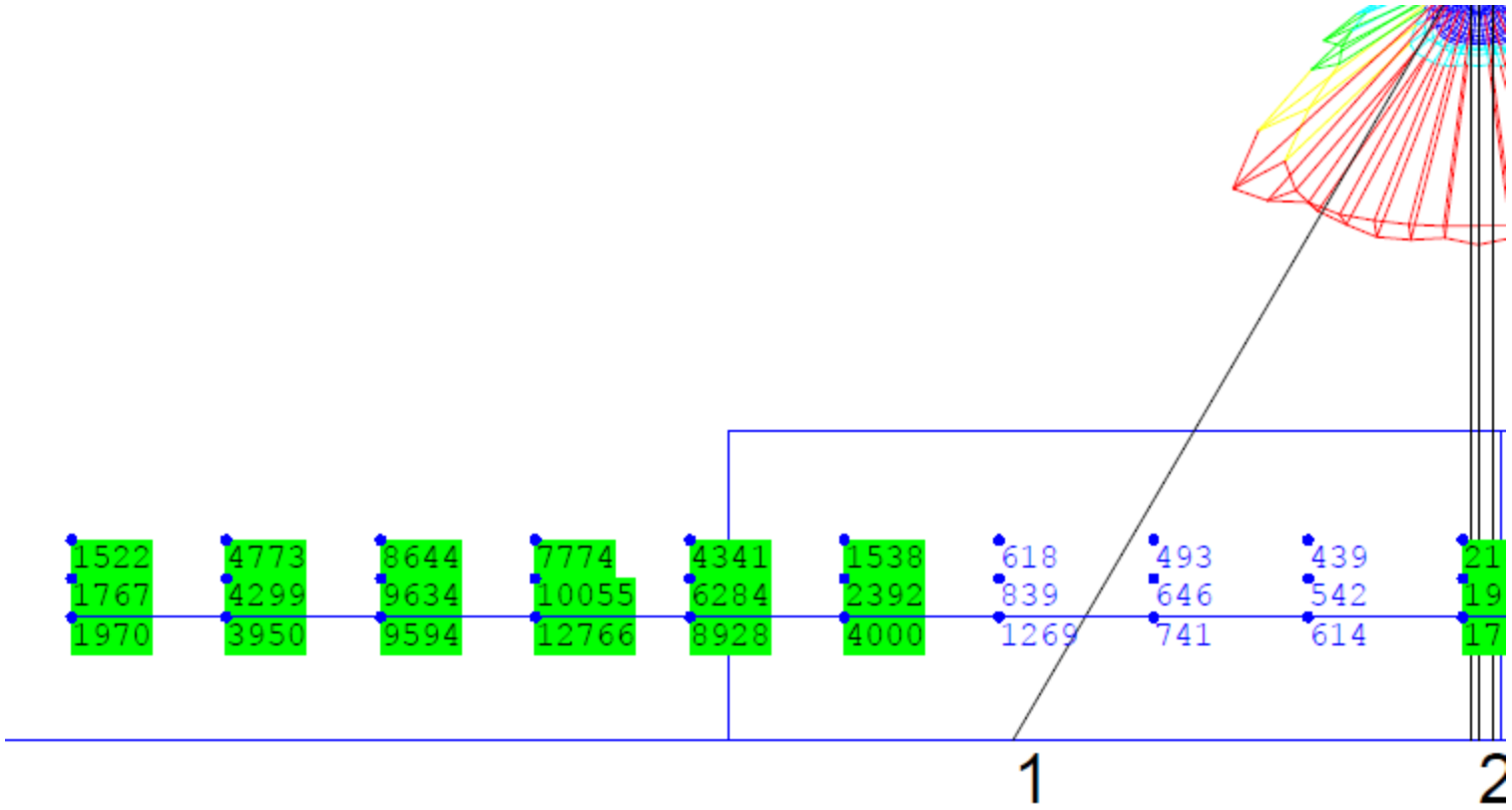
Luminous Intensity at Taxiway



Luminous Intensity on Control Tower



Runway


1522
1767
1970
4773
4299
3950
8644
9634
9594
7774
10055
12766
4341
6284
8928
1538
2392
4000
618
839
1269
493
646
741
439
542
614
21
19
17
1
2

Takeaway –

1. Adequate pole height is critical, recommendations for each class of plane will be in RP37
2. Pole placement is equally important – at each corner
3. Proper equipment – special optics that provide long throw, but not high vertical spill

1. Request typical calculations on one 3-d model of the largest plane at each terminal, to see lux levels on and around the plane
2. Then check that all locations are lighted similarly
3. Insist on glare calculations – max luminous intensity at control tower and runways
4. Low-polygonal models are needed for the various classes in order for calcs to be done. A library of such needs to be made available for agi32 and other software programs

Many thanks to Dawn De Grazio of Lighting Analysts for
providing the example airport glare calculations.