

Proposed Minor Change to W291CC

Technical Statement

Minor Change and Fill-In Status

The instant application proposes a power increase and change in directional antenna pattern in order to improve service as a fill-in translator for co-owned primary station WNB(AM) at Newburyport, MA. No change of antenna site is proposed from that presently licensed (File No. BLFT-20120124ABS.) The proposed 60 dBu fill-in service contour remains entirely within the 2 mV/m service contour of primary station WNB(AM) at Newburyport, MA, as illustrated in Figures 1A and 1B (closeup) below.

74.1204 Study

All facilities not meeting the spacing requirements of Section 73.207 with respect to the proposed facility considered as a Class A were studied. These are:

<u>Call Sign</u>	<u>Location</u>	<u>Channel No.</u>	<u>Service Contour</u>
WROR-FM	Framingham, MA	289B	54 dBu
WHDQ	Claremont, NH	291B	54 dBu
WSCA-LP	Portsmouth, NH	291LP100	60 dBu
WFNQ	Nashua, NH	292A	60 dBu
WMJX	Boston, MA	294B	54 dBu

Figures 2A and 2B below illustrate the absence of prohibited overlap between the F(50,10) interfering contours from the proposed modified translator and the pertinent service contours of all facilities listed above except WROR-FM and WMJX. (Key: Contours of same color may not overlap.)

The proposed translator 94 dBu interfering contour falls inside the 54 dBu protected service contours of WROR-FM and WMJX, which are co-located together. Therefore, the applicant hereby respectfully requests a waiver pursuant to 74.1204(d) as described below.

As shown Figure 3, the signal levels from WROR-FM and WMJX in the vicinity of the antenna site are 56.7 dBu and 56.8 dBu respectively, so 56.7 dBu is the contour requiring slightly more stringent protection.

The Commission has generally considered overlap from a proposed second or third adjacent translator interfering contour to be acceptable where the ratio of undesired to desired signal (U/D) does not exceed 40 dB, i.e. where in the instant case the proposed translator F(50,10) interfering signal does not exceed 96.7 dBu at any residence, business, or major roadway.

Interference Protection to All Nearby Residences, Businesses, and Roadways

The proposed translator facility will operate with an ERP of 0.09 kW vertical-only. The proposed directional antenna is a phased array of four Nicom BLD-1/P vertical dipoles to be mounted with the center of radiation at 119 meters AMSL (20 meters above ground level of 99 meters AMSL) and oriented at 140 degrees True. For an ERP of 0.09 kW, the distance to the 96.7 dBu F(50,10) contour in free space is 973 meters. The array produces a vertical pattern that prevents the 96.7 dBu F(50,10) interfering contour from reaching within 10 meters of the ground at any point within 973 meters. Array parameters are provided in Attachment A.

The antenna site is located on Powwow Hill in Batchelder Park, a wooded town park in Amesbury, MA. There are residences and roadways below the summit of the hill, the closest residence being located 145 meters from the antenna site as shown in Figure 4. This residence is labeled as "2" in Figure 4.

Protection to all points on the ground (plus 10 meters to account for possible building height) from an interfering signal of 96.7 dBu was established as follows. Please refer to Figures 5A and 5B (closeup):

1. Within the entire 96.7 dBu interfering contour, concentric circles were drawn at intervals of 100 meters from the antenna site out to 1.0 km (50 meter intervals to 250 meters.) That is, from the nearest residence to slightly beyond the distance to the pertinent interfering contour in free space.
2. At each radial distance, the "worst case" point was determined. The "worst case" is the point 10 meters above ground at which the elevation is highest in a populated or traveled area such that the depression angle from the antenna CR to the ground is the smallest (i.e. most shallow.) The highest elevation at each radial distance was determined from the topographical map in Figures 5A and 5B. Worst case points are labeled "A" through "J." The azimuth bearing to each point, while not a factor, is notated to help facilitate visual location. It is also noted that for purposes of this study, the directional pattern of the antenna was not considered. That is, the field was assumed to be 1.000 at every azimuth.
3. The vertical angle from the antenna CR to the worst case point at each radial distance was determined, together with the actual distance from the antenna (hypotenuse.) See Figure 6.
4. The ERP and antenna vertical radiation profile field limit at which the 96.7 dBu F(50,10) interfering contour reaches each worst case point was determined using the free space equation. Please see table in Figure 6.
5. The field from the proposed antenna at each pertinent was compared to the limit to determine the margin of safety. This data is provided in the table in Figure 6. The margin of safety is illustrated visually in Figure 7.

As shown in Figures 6 and 7 and Attachment A, there is at least a 2.7 dB safety margin at every point. In most locations, protection is substantially greater. The applicant therefore submits that its application meets the requirements of Section 74.1204(d) with respect to "other factors" insuring no actual interference to either WROR-FM or WMJX. Nevertheless, as required by the Commission's Rules, in the event of any complaints that the proposed translator interferes with reception of either station, the applicant will take the required steps to eliminate the interference, including, if necessary, reducing power or cessation of translator operation.

Environmental Considerations

The proposed antenna will be mounted on an existing tower with no new construction or change in height. Compliance with RFR limits was determined by use of the Commission's RF Worksheet #1. The applicant will cease operation or reduce power as necessary in order to prevent uncontrolled or controlled exposure in excess of the guidelines of OET-65 Appendix A.

Respectfully submitted,



Dennis Jackson
Technical Consultant
July 19, 2012

Figure 1A

Proposed new 60 dBu service contour does not exceed the 2 mV/m service contour of primary station WNBP(AM).

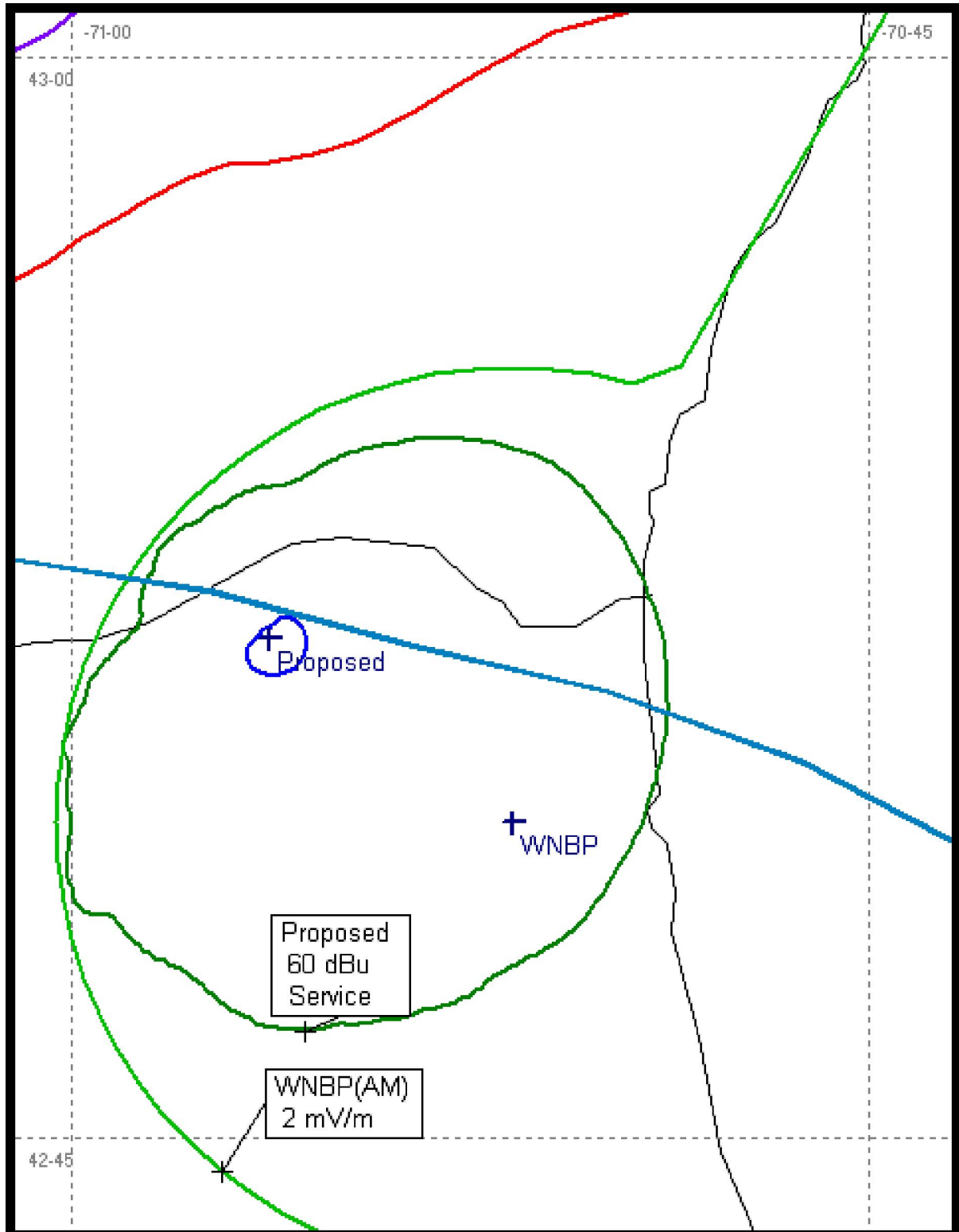


Figure 1B (closeup at closest point)

**Proposed new 60 dBu service contour does not exceed the 2 mV/m service contour
of primary station WNBP(AM).**

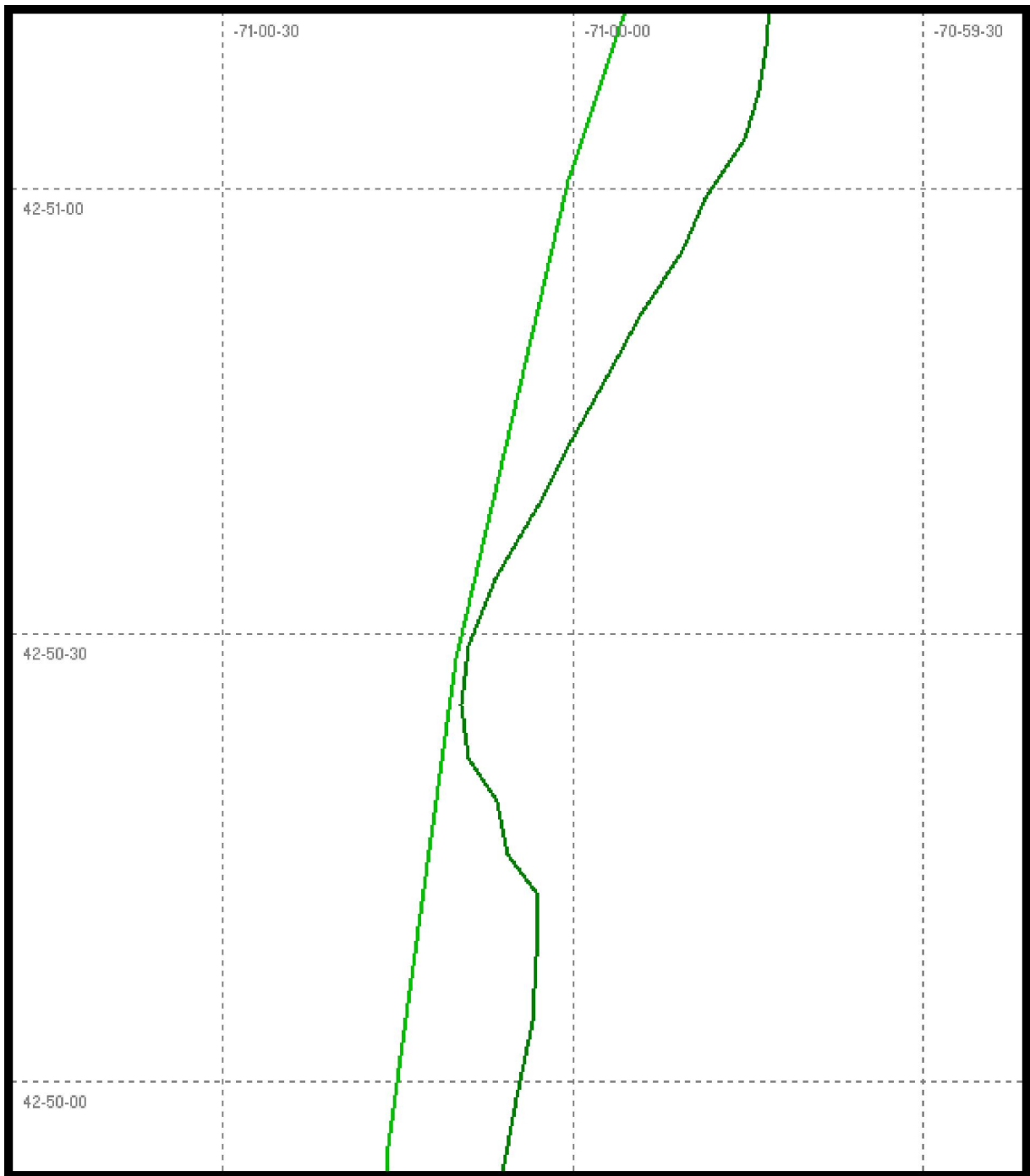


Figure 2A

**Proposed interfering contours do not overlap service contours
of WHDQ (54 dBu) , or WSCA-LP, or WFNQ (both 60 dBu.)**

(Key: same colors may not overlap.)

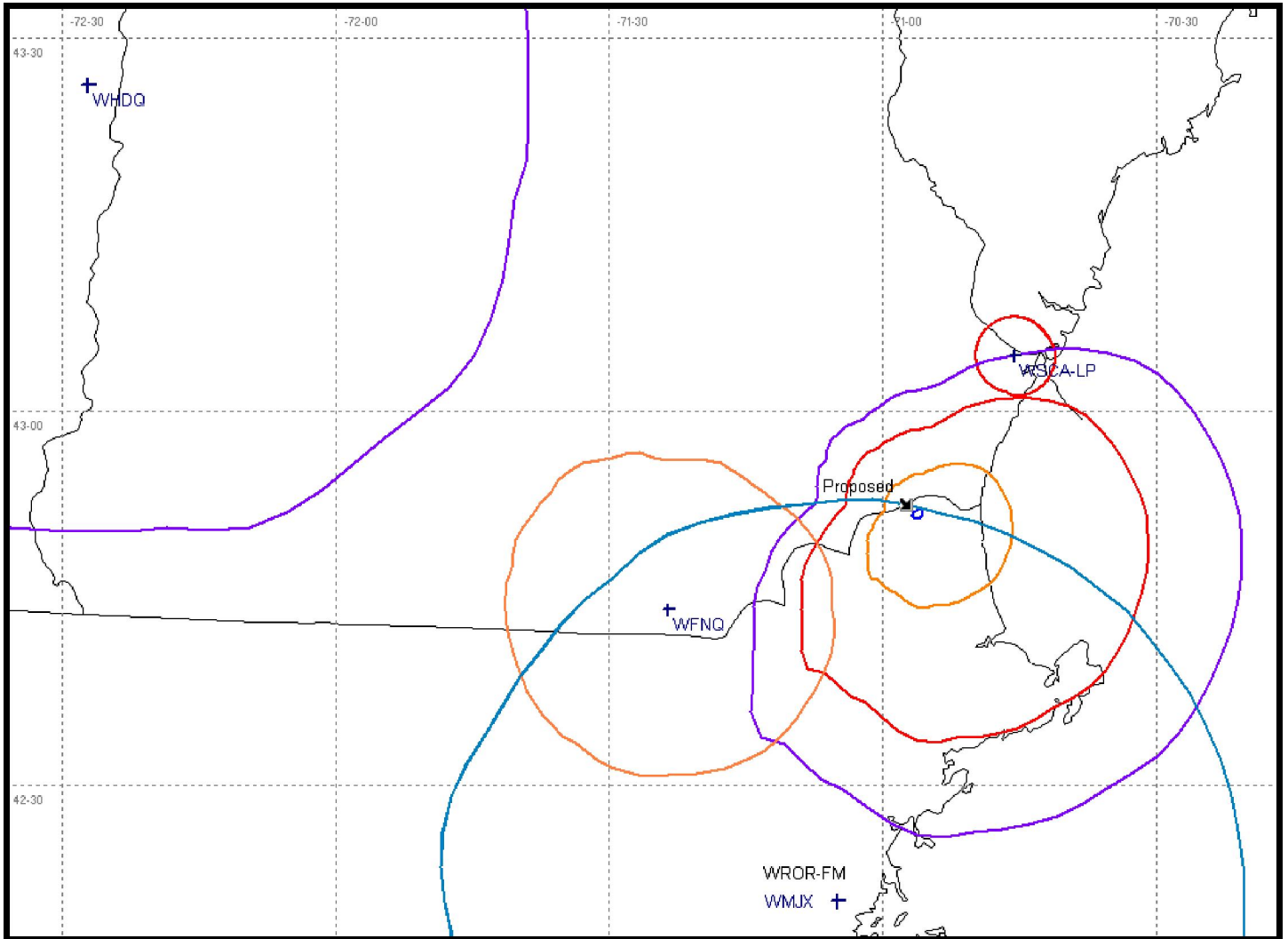


Figure 2B (closeup detail)

**Proposed interfering contour (40 dBu) does not overlap service contour
of WSCA-LP (60 dBu.)**

(Key: red contours may not overlap.)

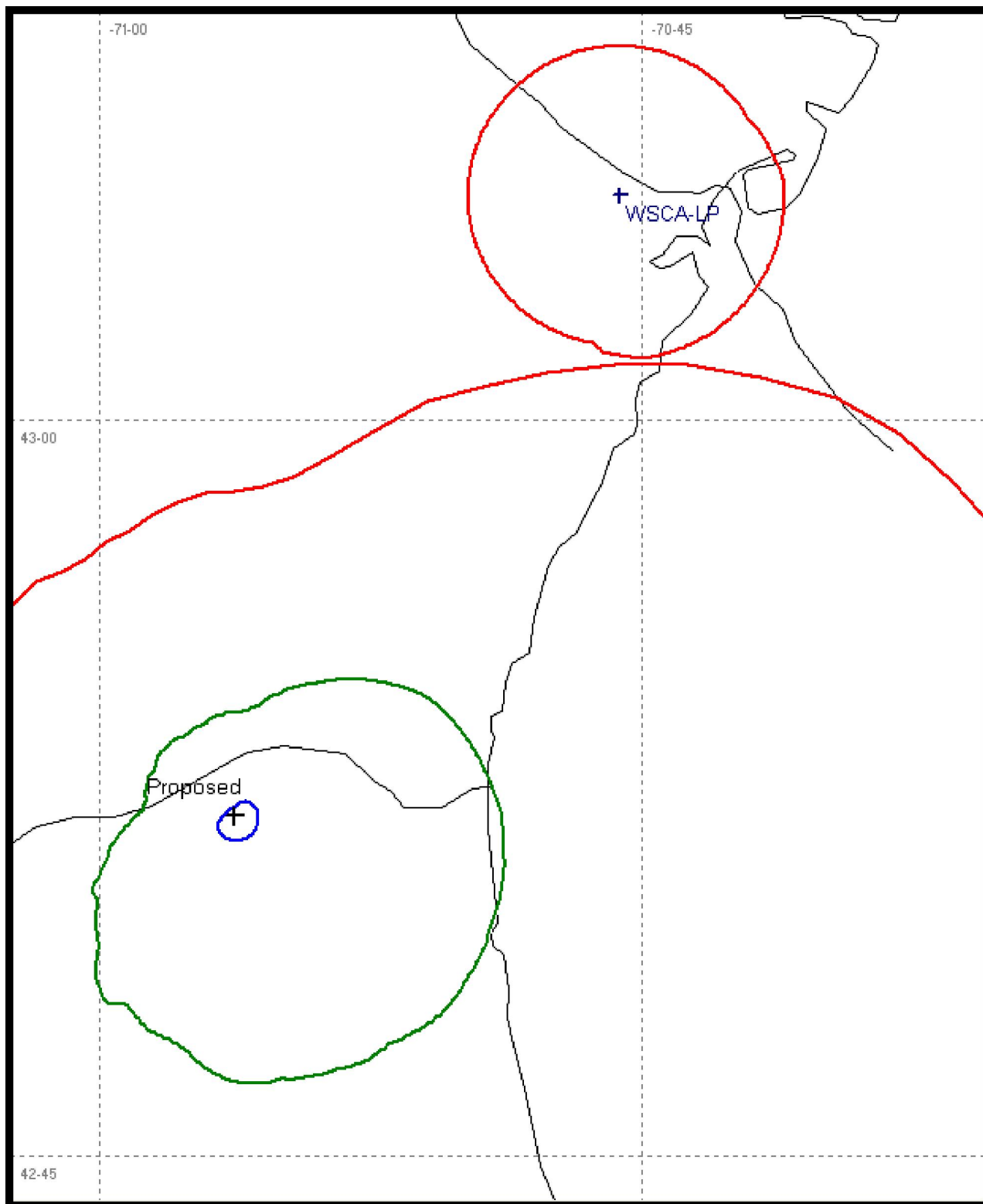


Figure 3

WROR-FM and WMJX place 56.7 dBu and 56.8 dBu service contours respectively just beyond the proposed translator 96.7 dBu interfering contour.

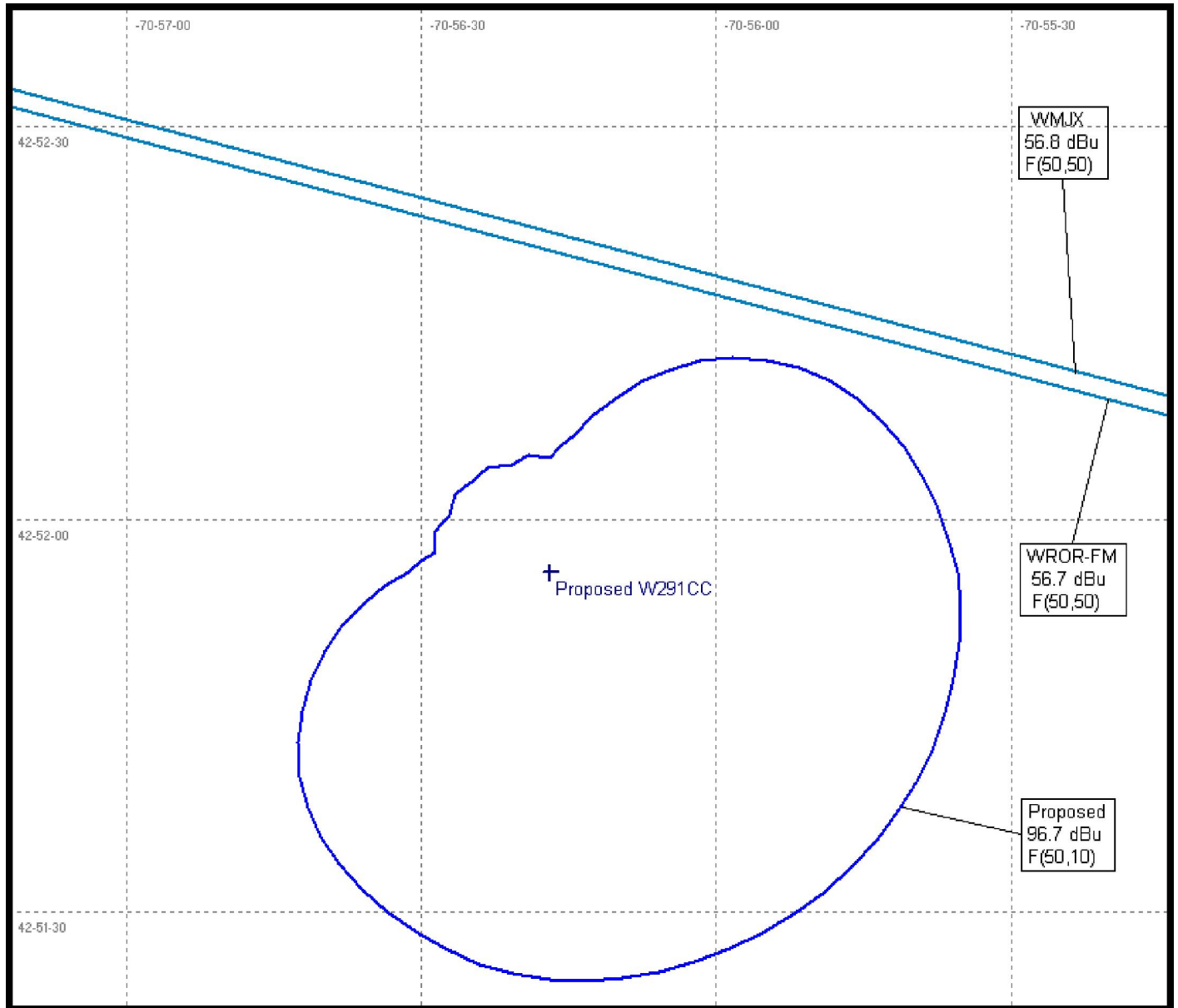


Figure 4

Closest Residence on Powwow Hill (labeled “2”) is 145 meters from antenna site

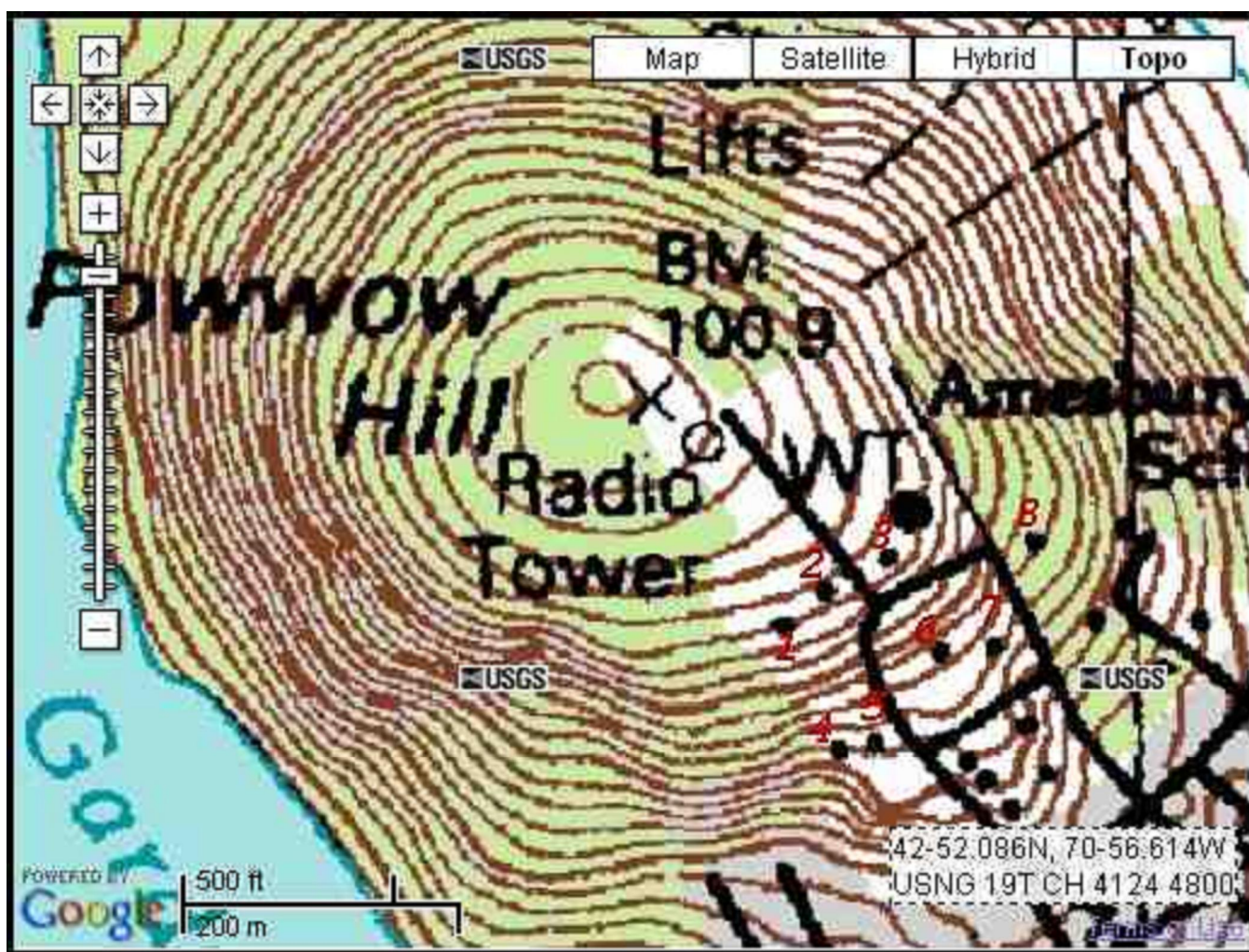


Figure 5A

Determination of highest point of land at each radial increment

(i.e. at 150, 200, 250, 300, 400, 500, 600, 700, 800 and 900 meters from antenna)

Highest point of land at each radial distance constitutes “worst case”

for purposes of determining protection from interference.

Points are labeled “A” through “J”.

Ten meters was added to land elevation to account for possible building height.

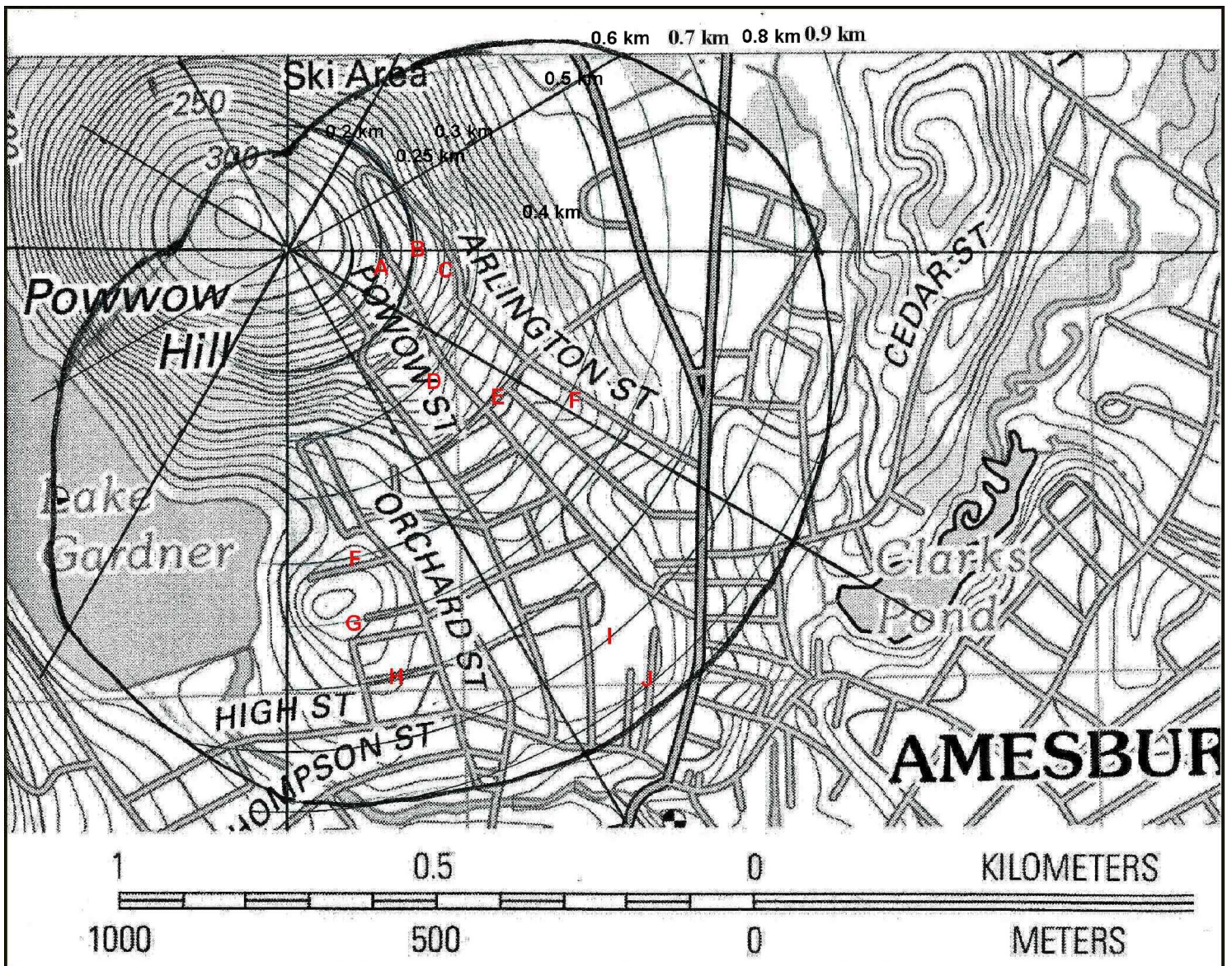


Figure 5B (closeup)

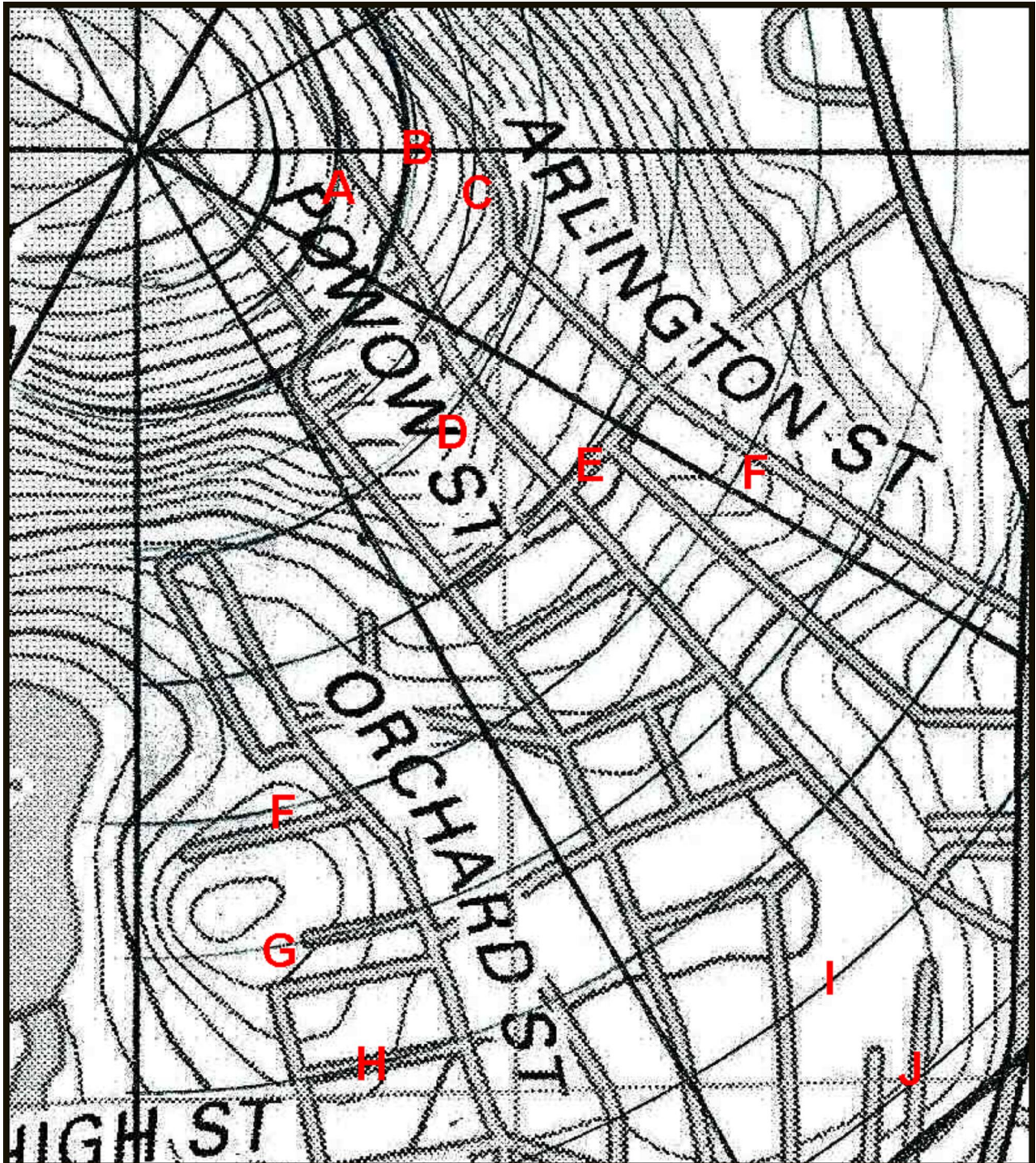
(i.e. at 150, 200, 250, 300, 400, 500, 600, 700, 800 and 900 meters from antenna)

Highest point of land at each radial distance constitutes “worst case”

for purposes of determining protection from interference.

Points are labeled “A” through “J”.

Ten meters was added to land elevation to account for possible building height.



Determination of Field Limits at Pertinent Vertical Angles

VS.

Actual Antenna Field at Vertical Angles (90 Watts ERP)

Margin of Safety is not less than 2.7 dB.

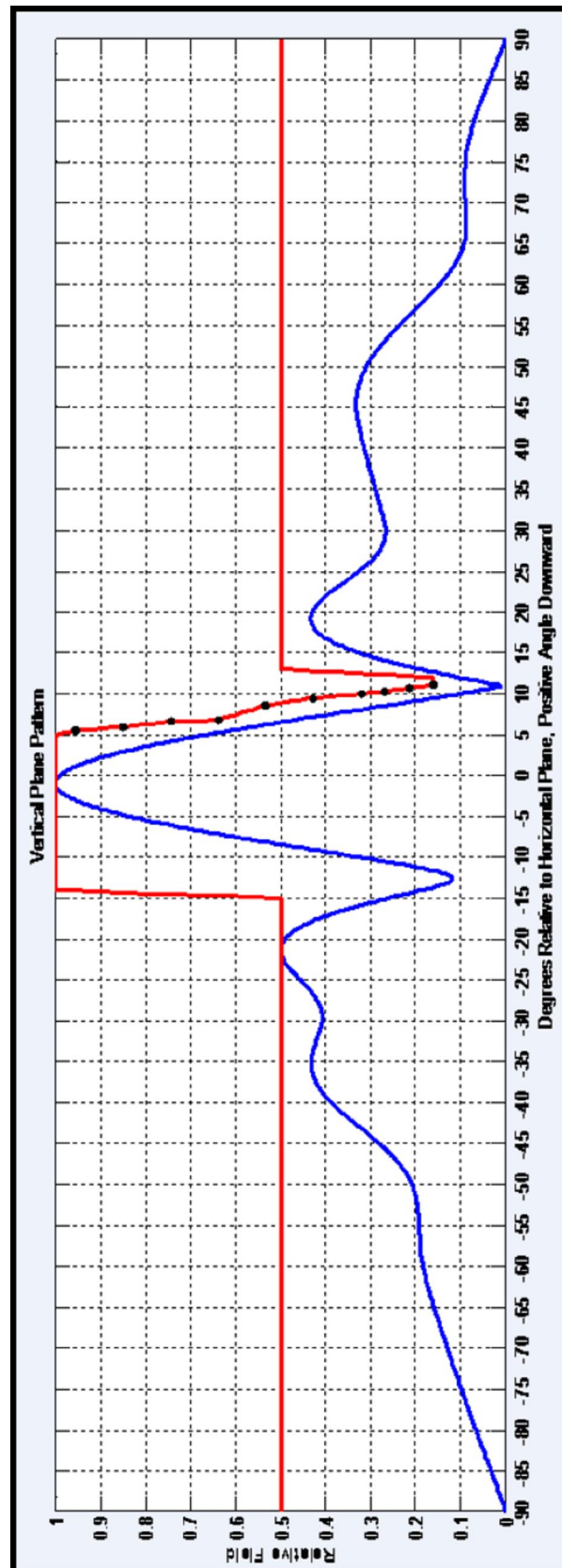
LIMITS																
Adding 10 meters to height																
HCRAMSL		119		Site = 99 meters HAMSL												
ERP		90		CR (4 bay) 20.0												
		Approx Bearing														

Figure 7

Vertical Plane Field Limits and Antenna Vertical Plane Pattern

Illustrating Margin of Safety

Key: Red Line is Field Limit, Blue Line is Actual Field



Attachment A

Antenna Array Design Parameters and Vertical Plane Pattern

Vertical Plane Pattern for 4-Bay Array

Vertical gain (100% efficiency) = 3.468 = 5.401 dB

Field at horizon (zero) = 0.9905

Beam tilt (positive is below horizon) = -1.00 degrees

Array length = 32.72 feet

Bay Spacing from Bottom (inches): 0 122.4 320.4 392.7

Relative Magnitude: 0.6455 1 1 0.6455

Relative Phase (degrees): 0 0 3 30
0.0000

Degrees Below Horizon	Field Limit	Actual Relative Field	Diff (dB)	
-1.2	---	0.999	---	
-1.1	---	1.000	---	
-1.0	---	1.000	---	
-0.9	---	1.000	---	
-0.8	---	1.000	---	
-0.7	---	0.999	---	
5.5	0.956	0.613	3.86	
5.6	0.935	0.602	3.82	
5.7	0.913	0.591	3.77	
5.8	0.892	0.581	3.73	
5.9	0.870	0.570	3.68	
6.0	0.849	0.559	3.63	
6.1	0.832	0.548	3.63	
6.2	0.814	0.537	3.62	
6.3	0.797	0.526	3.61	
6.4	0.779	0.514	3.61	
6.5	0.761	0.503	3.60	
6.6	0.744	0.492	3.60	
6.7	0.691	0.481	3.16	
6.8	0.638	0.469	2.67	worst case
6.9	0.632	0.458	2.81	
7.0	0.626	0.446	2.95	
7.1	0.621	0.435	3.09	
7.2	0.615	0.423	3.24	
7.3	0.609	0.412	3.40	
7.4	0.603	0.400	3.57	
7.5	0.598	0.389	3.74	
7.6	0.592	0.377	3.92	
7.7	0.586	0.365	4.11	
7.8	0.580	0.354	4.30	
7.9	0.574	0.342	4.50	
8.0	0.569	0.330	4.72	
8.1	0.563	0.319	4.94	

8.2	0.557	0.307	5.17
8.3	0.551	0.296	5.42
8.4	0.546	0.284	5.67
8.5	0.540	0.272	5.94
8.6	0.534	0.261	6.23
8.7	0.522	0.249	6.43
8.8	0.510	0.238	6.64
8.9	0.499	0.226	6.87
9.0	0.487	0.215	7.11
9.1	0.475	0.203	7.38
9.2	0.463	0.192	7.66
9.3	0.452	0.180	7.97
9.4	0.440	0.169	8.30
9.5	0.428	0.158	8.67
9.6	0.406	0.147	8.86
9.7	0.385	0.135	9.07
9.8	0.363	0.124	9.31
9.9	0.342	0.113	9.59
10.0	0.320	0.102	9.91
10.1	0.303	0.091	10.40
10.2	0.285	0.081	10.99
10.3	0.268	0.070	11.69
10.4	0.255	0.059	12.68
10.5	0.241	0.049	13.91
10.6	0.228	0.038	15.49
10.7	0.214	0.028	17.63
10.8	0.201	0.019	20.68
10.9	0.188	0.011	24.74
11.0	0.174	0.010	24.57
11.1	0.161	0.017	19.32