

**August 2021  
FM Translator W296EA  
Manchester Township, PA Channel 296D  
Allocation Study**

**Allocation Study**

The attached spacing study shows the spacing between the proposed translator site and the location of cochannel and adjacent channel stations and proposals. This study was made with the Commission's Class A spacing requirements, and individual situations were examined to determine the lack of prohibited contour overlap per the requirements of §74.1204 of the Rules. The attached allocation study maps demonstrate compliance with the Commission's Rules for protection of FM broadcast stations and FM translators as outlined in §74.1204.

***Second- and Third-Adjacencies***

The proposed translator transmitter site is located within the 54 dBu protected contours of the second- and third-adjacent channel stations in the table below. The following calculations, performed using the *Living Way* methodology, demonstrate interference protection to those stations.

<b>Protected Station</b>	<b>Distance &amp; Bearing to Proposal</b>	<b>Station ERP and HAAT on that azimuth</b>	<b>Station Field Strength at Proposal</b>	<b>Corresponding Translator Interfering Contour</b>	<b>Distance to Translator Interfering Contour</b>
WWKL 294B	16.02 km 181 deg True	14 kW 283 meters	82.9 dBu F(50,50)	122.9 dBu	79.4 meters Free Space
WGTY 299B	35.30 km 58 deg True	7.1 kW 275 meters	65.4 dBu F(50,50)	105.4 dBu	595.3 meters Free Space

With respect to WWKL, the interference area extends only 79.4 meters from the antenna and does not reach ground level (as the antenna will be 106.7 meters above ground). There is no population within this contour. Therefore, the proposed facility is believed to satisfy the requirements of §74.1204(d) to WWKL.

With respect to WGTY, given that the transmitting antenna will be installed at a height of 106.7 meters above ground, and taking into consideration the vertical plane pattern of the Nicom model BKG77-3 3/4 wave spaced antenna, the attached Free Space calculations demonstrate that the

interference area will not reach ground level. There is no population within this contour. Therefore, the proposed facility satisfies the requirements of §74.1204(d) to WGTU.

The attached spacing study demonstrates compliance with §73.207 of the Commission's Rules regarding spacing restrictions to stations which are 53 or 54 channels removed from the proposed operation.

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SEARCH PARAMETERS                      FM Database Date: 20210830
Channel: 296A      107.1 MHz                      Page 1
Latitude: 40 1 37.0 (NAD83)
Longitude: 76 36 1.0
Safety Zone: 50 km
Job Title: W296EA ASR 1024692
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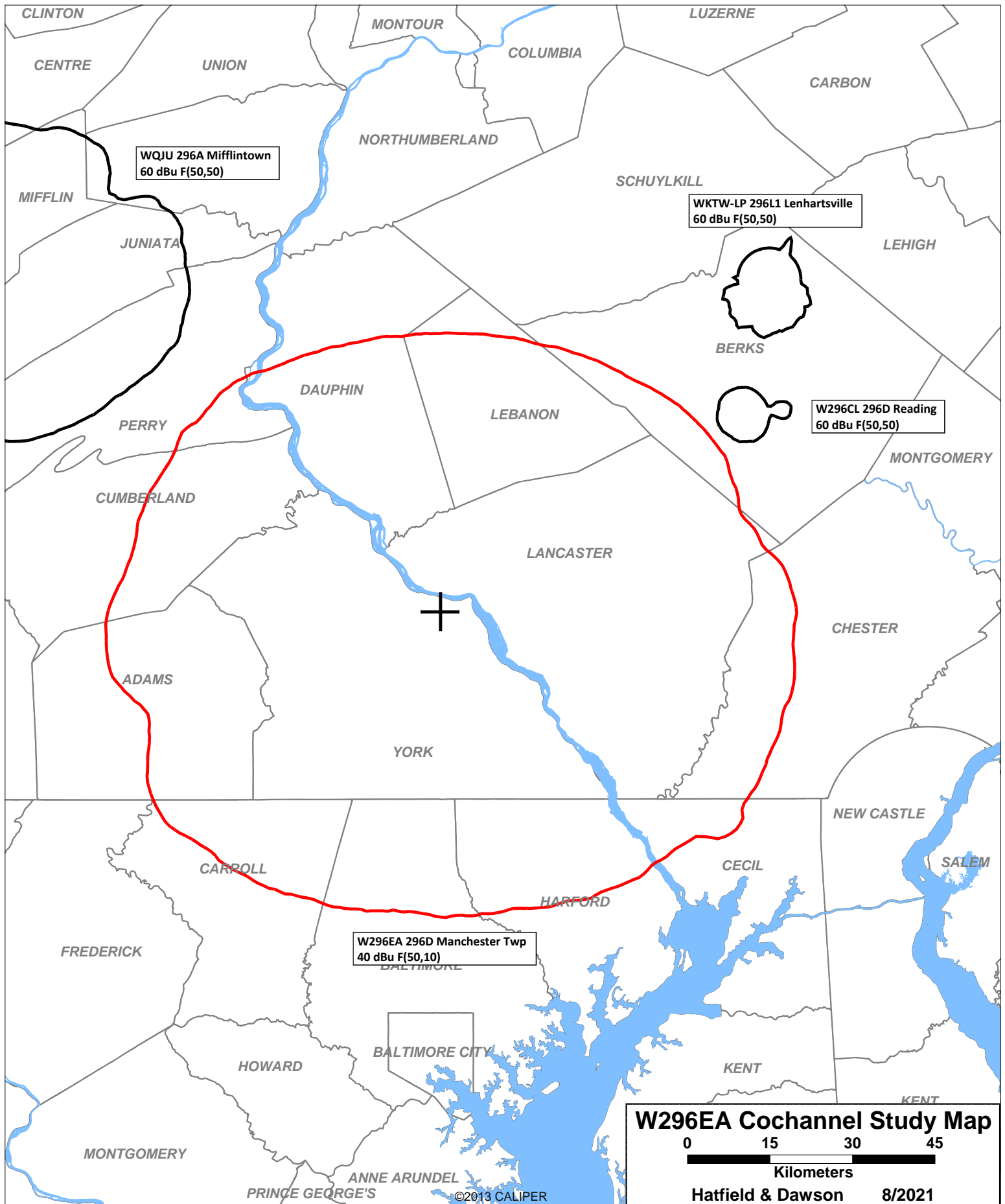
Call Status	City St	FCC File No.	Channel Freq.	ERP(kW) HAAT(m)	Latitude Longitude	Bearing deg-True	Dist (km)	Req (km)
W243BR LIC	HARRISBURG PA	BLFT-20150113ACC	243D 96.5	0.200 0.0	40 10 38.3 76 52 36.9	305.5	28.90 0.00	0 TRANS
W243DS LIC	COLUMBIA PA	BLFT-20161118ABT	243D 96.5	0.050 0.0	40 2 54.0 76 27 21.0	79.0	12.55 0.00	0 TRANS
WCFT-FM LIC	BLOOMSBURG PA	BLH-20000113AAR	293B 106.5	10.500 313.0	40 56 18.3 76 25 36.8	8.2	102.27 33.27	69 CLEAR
WWMX LIC	BALTIMORE MD	0000126870	293B 106.5	10.500 296.0	39 20 5.0 76 39 2.0	183.2	76.98 7.98	69 CLOSE
WWKL LIC	HERSHEY PA	BLH-19891127KA	294B 106.7	14.000 283.0	40 10 16.3 76 35 48.8	1.0	16.02 -52.98	69 SHORT
W295CV LIC	HAZLETON PA	BLFT-20190702ABC	295D 106.9	0.006 0.0	40 58 10.3 75 57 22.7	27.2	118.05 0.00	0 TRANS
WWEG LIC	MYERSVILLE MD	BLH-20070518AAX	295B 106.9	15.500 260.0	39 29 57.4 77 36 41.0	236.2	104.59 -8.41	113 SHORT
W295CR LIC	ALLENTOWN PA	BLFT-20190227AAT	295D 106.9	0.099 0.0	40 35 33.4 75 28 40.7	56.2	114.23 0.00	0 TRANS
WKVP LIC	CAMDEN NJ	BMLD-20130828AA	295B 106.9	38.000 168.0	39 54 33.4 75 5 58.6	95.4	128.87 15.87	113 CLEAR
W295BX LIC	BALTIMORE MD	BLFT-20190206ABJ	295D 106.9	0.110 0.0	39 18 42.4 76 29 27.9	173.3	79.95 0.00	0 TRANS
W295CJ LIC	CHESTERTOWN MD	BLFT-20180928ADO	295D 106.9	0.050 0.0	39 13 35.3 76 5 18.8	153.6	99.14 0.00	0 TRANS
W295BX CP	BALTIMORE MD	0000115801	295D 106.9	0.250 0.0	39 18 42.0 76 29 28.0	173.3	79.97 0.00	0 TRANS
W295BX APP	BALTIMORE MD	0000156879	295D 106.9	0.025 0.0	39 18 42.0 76 29 28.0	173.3	79.97 0.00	0 TRANS
W296CL LIC	READING PA	BLFT-20160209ABX	296D 107.1	0.010 0.0	40 21 15.3 75 53 53.7	58.4	69.96 0.00	0 TRANS

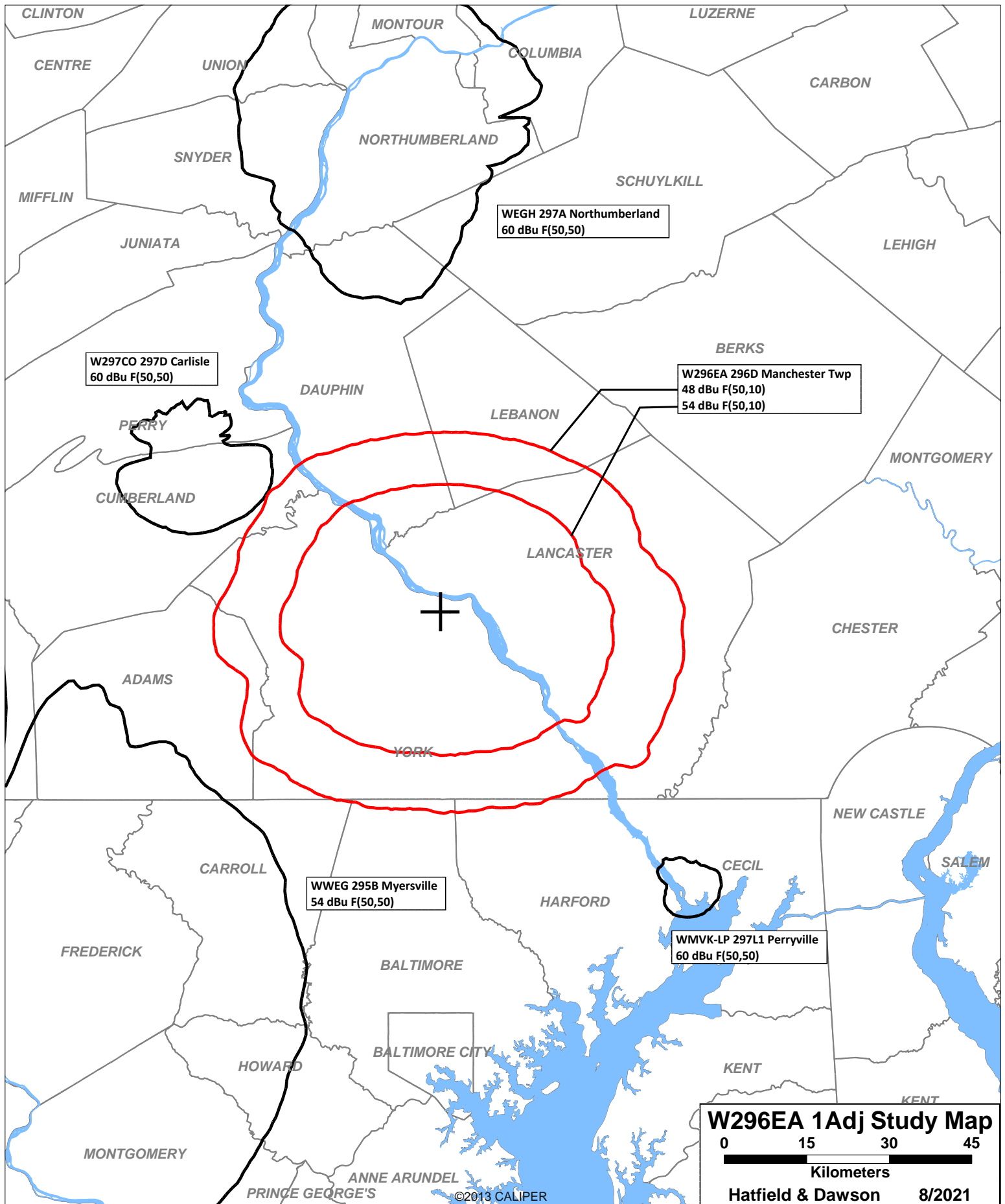
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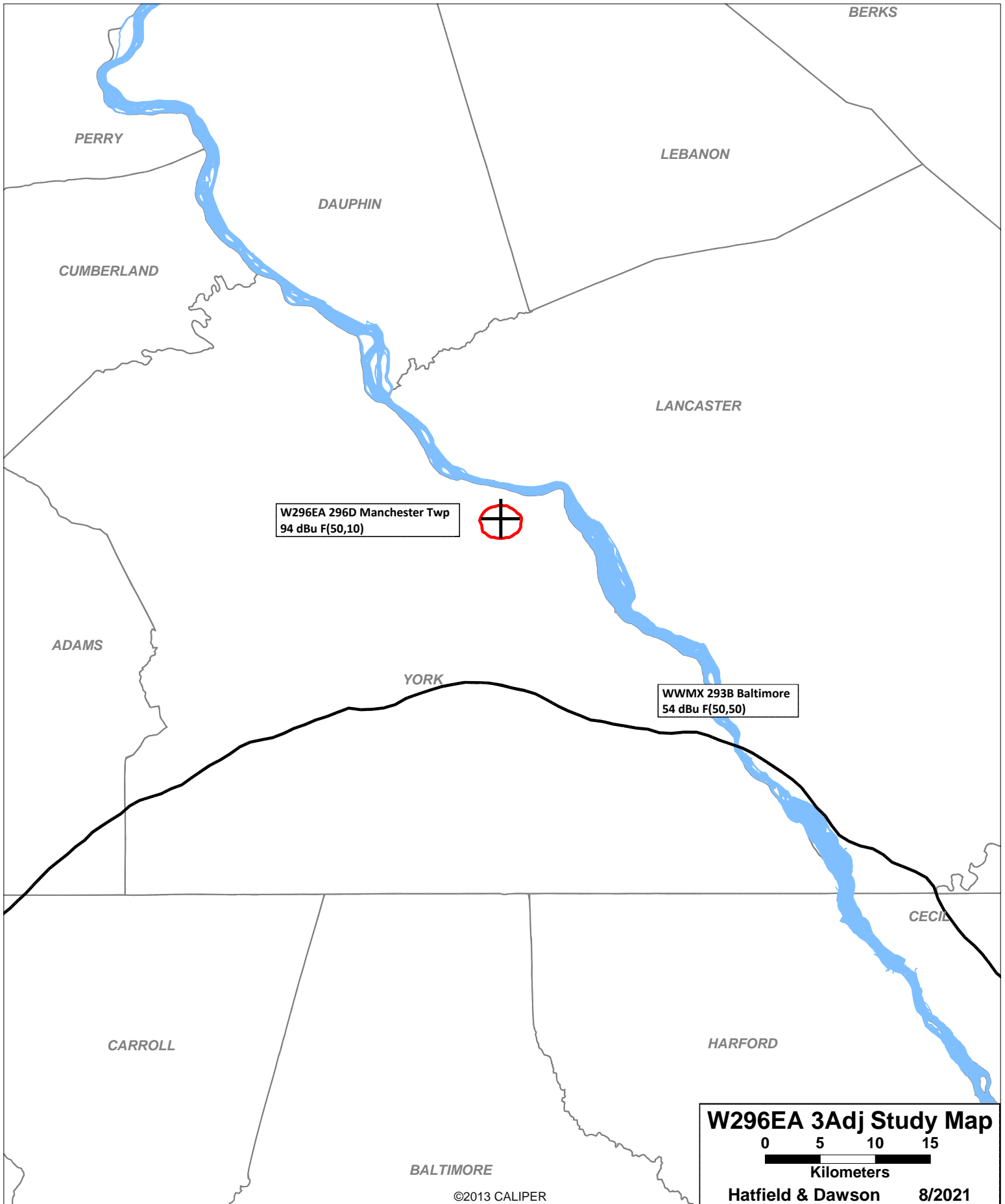
SEARCH PARAMETERS FM Database Date: 20210830  
 Channel: 296A 107.1 MHz Page 2  
 Latitude: 40 1 37.0 (NAD83)  
 Longitude: 76 36 1.0  
 Safety Zone: 50 km  
 Job Title: W296EA ASR 1024692

Call Status	City St	FCC File No.	Channel Freq.	ERP(kW) HAAT(m)	Latitude Longitude	Bearing deg-True	Dist (km)	Req (km)
WTDK LIC	FEDERALSBURG MD	BMLH-19891229KA	296A 107.1	3.900 124.0	38 46 2.4 75 44 44.7	152.1	158.03 43.03	115 CLEAR
W296EA CP	MANCHESTER TOWNSHIP PA	BNPFT-20180327AB	296D 107.1	0.250 0.0	39 59 56.0 76 41 42.0	248.9	8.67 0.00	0 TRANS
WKTW-LP LIC	LENHARTSVILLE PA	BLL-20171208AAR	296L1 107.1	0.100 21.2	40 34 10.3 75 53 55.7	44.4	84.78 0.00	0 LPFM
WQJU LIC	MIFFLINTOWN PA	BLER-20010612ABA	296A 107.1	0.370 397.0	40 34 20.3 77 30 50.0	308.3	98.49 -16.51	115 SHORT
WWYY LIC	BELVIDERE NJ	BLH-20180406ABA	296A 107.1	0.840 266.0	40 56 53.3 75 9 36.6	49.5	159.29 44.29	115 CLEAR
W296CD LIC	JONESTOWN PA	BLFT-20190725AAZ	296D 107.1	0.010 0.0	41 6 50.3 76 14 15.8	14.1	124.55 0.00	0 TRANS
W296AP LIC	WILLIAMSPORT PA	BLFT-19870901TA	296D 107.1	0.005 0.0	41 13 4.2 76 57 25.8	347.3	135.65 0.00	0 TRANS
WEGH LIC	NORTHUMBERLAND PA	BLH-19940805KC	297A 107.3	0.900 257.0	40 47 10.3 76 41 47.8	354.5 SS	84.70 12.70	72 CLEAR
W297CA LIC	WILMINGTON DE	BLFT-20190716AAA	297D 107.3	0.185 0.0	39 50 2.4 75 31 25.7	102.8	94.48 0.00	0 TRANS
WLVW LIC	WASHINGTON DC	BMLED-20190214AA	297B 107.3	19.500 246.0	38 57 1.4 77 4 45.9	199.1	126.43 13.43	113 CLEAR
WMVK-LP LIC	PERRYVILLE MD	BLL-20030709ABH	297L1 107.3	0.008 102.4	39 35 22.4 76 4 23.8	137.0	66.29 0.00	0 LPFM
W297CO LIC	CARLISLE PA	0000126775	297D 107.3	0.250 0.0	40 17 23.3 77 8 8.9	302.9	54.16 0.00	0 TRANS
W297AD LIC	PHILADELPHIA PA	BLFT-20080616AAO	297D 107.3	0.020 0.0	39 57 36.4 75 11 25.6	93.1	120.63 0.00	0 TRANS
WBYN-FM LIC	BOYERTOWN PA	BLH-20041116ABG	298B 107.5	30.000 186.0	40 24 15.3 75 39 7.6	62.2 SS	90.94 21.94	69 CLEAR
W298CG LIC	BEL AIR MD	BLFT-20170222AAK	298D 107.5	0.250 0.0	39 32 5.5 76 20 54.5	158.5	58.74 0.00	0 TRANS
WGTY LIC	GETTYSBURG PA	BLH-19890117KA	299B 107.7	16.000 259.0	39 51 23.3 76 56 55.9	237.6	35.30 -33.70	69 SHORT

===== END OF FM SPACING STUDY FOR CHANNEL 296 =====







# W296EA Free Space Interference Area Calculator

## Interference Area to WGTY

Antenna Height: 106.7 meters AGL  
 Contour Level: 105.4 dBu equals 0.2 V/m  
 ERP in Watts: 250 Watts

Maximum distance  
 to interfering contour is: 1953.0 feet equals 595.3 meters

Antenna: BKG77-3 3/4

Depression Angle (degrees)	Nicom BKG77-3 3/4 Relative Field	Adjusted ERP (Watts)	Free Space Distance To 105.4 dBu Contour Along the depression angle	Horizontal Distance (meters)	Contour AGL (meters)
-90	0.040	0.4	23.8 meters	0	82.9
-89	0.040	0.4	23.8	0.4	82.9
-88	0.041	0.4	24.4	0.9	82.3
-87	0.041	0.4	24.4	1.3	82.3
-86	0.041	0.4	24.4	1.7	82.4
-85	0.041	0.4	24.4	2.1	82.4
-84	0.042	0.4	25.0	2.6	81.8
-83	0.043	0.5	25.6	3.1	81.3
-82	0.044	0.5	26.2	3.6	80.8
-81	0.045	0.5	26.8	4.2	80.2
-80	0.045	0.5	26.8	4.7	80.3
-79	0.046	0.5	27.4	5.2	79.8
-78	0.047	0.6	28.0	5.8	79.3
-77	0.048	0.6	28.6	6.4	78.9
-76	0.048	0.6	28.6	6.9	79.0
-75	0.047	0.6	28.0	7.2	79.7
-74	0.047	0.6	28.0	7.7	79.8
-73	0.046	0.5	27.4	8.0	80.5
-72	0.044	0.5	26.2	8.1	81.8
-71	0.042	0.4	25.0	8.1	83.1
-70	0.039	0.4	23.2	7.9	84.9
-69	0.036	0.3	21.4	7.7	86.7
-68	0.032	0.3	19.0	7.1	89.0
-67	0.028	0.2	16.7	6.5	91.4
-66	0.022	0.1	13.1	5.3	94.7
-65	0.016	0.1	9.5	4.0	98.1
-64	0.009	0.0	5.4	2.3	101.9
-63	0.002	0.0	1.2	0.5	105.6
-62	0.007	0.0	4.2	2.0	103.0
-61	0.016	0.1	9.5	4.6	98.4
-60	0.026	0.2	15.5	7.7	93.3
-59	0.036	0.3	21.4	11.0	88.3
-58	0.047	0.6	28.0	14.8	83.0
-57	0.059	0.9	35.1	19.1	77.2
-56	0.071	1.3	42.3	23.6	71.7
-55	0.084	1.8	50.0	28.7	65.7
-54	0.096	2.3	57.1	33.6	60.5
-53	0.110	3.0	65.5	39.4	54.4
-52	0.123	3.8	73.2	45.1	49.0
-51	0.136	4.6	81.0	50.9	43.8
-50	0.149	5.6	88.7	57.0	38.8
-49	0.162	6.6	96.4	63.3	33.9



-48	0.174	7.6	103.6	69.3	29.7
-47	0.186	8.6	110.7	75.5	25.7
-46	0.197	9.7	117.3	81.5	22.3
-45	0.207	10.7	123.2	87.1	19.6
-44	0.216	11.7	128.6	92.5	17.4
-43	0.224	12.5	133.3	97.5	15.8
-42	0.230	13.2	136.9	101.7	15.1
-41	0.234	13.7	139.3	105.1	15.3
-40	0.237	14.0	141.1	108.1	16.0
-39	0.237	14.0	141.1	109.6	17.9
-38	0.235	13.8	139.9	110.2	20.6
-37	0.230	13.2	136.9	109.3	24.3
-36	0.223	12.4	132.7	107.4	28.7
-35	0.213	11.3	126.8	103.9	34.0
-34	0.199	9.9	118.5	98.2	40.5
-33	0.183	8.4	108.9	91.4	47.4
-32	0.164	6.7	97.6	82.8	55.0
-31	0.142	5.0	84.5	72.5	63.2
-30	0.116	3.4	69.1	59.8	72.2
-29	0.088	1.9	52.4	45.8	81.3
-28	0.056	0.8	33.3	29.4	91.1
-27	0.022	0.1	13.1	11.7	100.8
-26	0.015	0.1	8.9	8.0	102.8
-25	0.055	0.8	32.7	29.7	92.9
-24	0.097	2.4	57.7	52.7	83.2
-23	0.142	5.0	84.5	77.8	73.7
-22	0.188	8.8	111.9	103.8	64.8
-21	0.237	14.0	141.1	131.7	56.1
-20	0.287	20.6	170.8	160.5	48.3
-19	0.337	28.4	200.6	189.7	41.4
-18	0.389	37.8	231.6	220.2	35.1
-17	0.441	48.6	262.5	251.0	29.9
-16	0.493	60.8	293.5	282.1	25.8
-15	0.545	74.3	324.4	313.4	22.7
-14	0.595	88.5	354.2	343.7	21.0
-13	0.645	104.0	383.9	374.1	20.3
-12	0.693	120.1	412.5	403.5	20.9
-11	0.739	136.5	439.9	431.8	22.8
-10	0.783	153.3	466.1	459.0	25.8
-9	0.822	168.9	489.3	483.3	30.2
-8	0.857	183.6	510.1	505.2	35.7
-7	0.889	197.6	529.2	525.3	42.2
-6	0.918	210.7	546.5	543.5	49.6
-5	0.943	222.3	561.3	559.2	57.8
-4	0.963	231.8	573.2	571.8	66.7
-3	0.979	239.6	582.8	582.0	76.2
-2	0.990	245.0	589.3	589.0	86.1
-1	0.997	248.5	593.5	593.4	96.3
0	1.000	250.0	595.3	595.3	106.7

**August 2021**  
**FM Translator W296EA**  
**Manchester Township, PA Channel 296D**  
**RF Exposure Study**

**Facilities Proposed**

The proposed operation will be on Channel 296D (107.1 MHz) with a maximum lobe effective radiated power of 250 watts. Operation is proposed with an antenna to be mounted on an existing tower with FCC Antenna Structure Registration Number 1024692.

**RF Exposure Calculations**

The power density calculations shown below were made using the techniques outlined in OET Bulletin No. 65. "Ground level" calculations in this report have been made at a reference height of 2 meters above ground to provide a worst-case estimate of exposure for persons standing on the ground in the vicinity of the tower. The equation shown below was used to calculate the ground level power density figures from each antenna.

$$S(\mu W / cm^2) = \frac{33.40981 \times AdjERP(Watts)}{D^2}$$

Where: *AdjERP(Watts)* is the maximum lobe effective radiated power times the element pattern factor times the array pattern factor.

*D* is the distance in meters from the center of radiation to the calculation point.

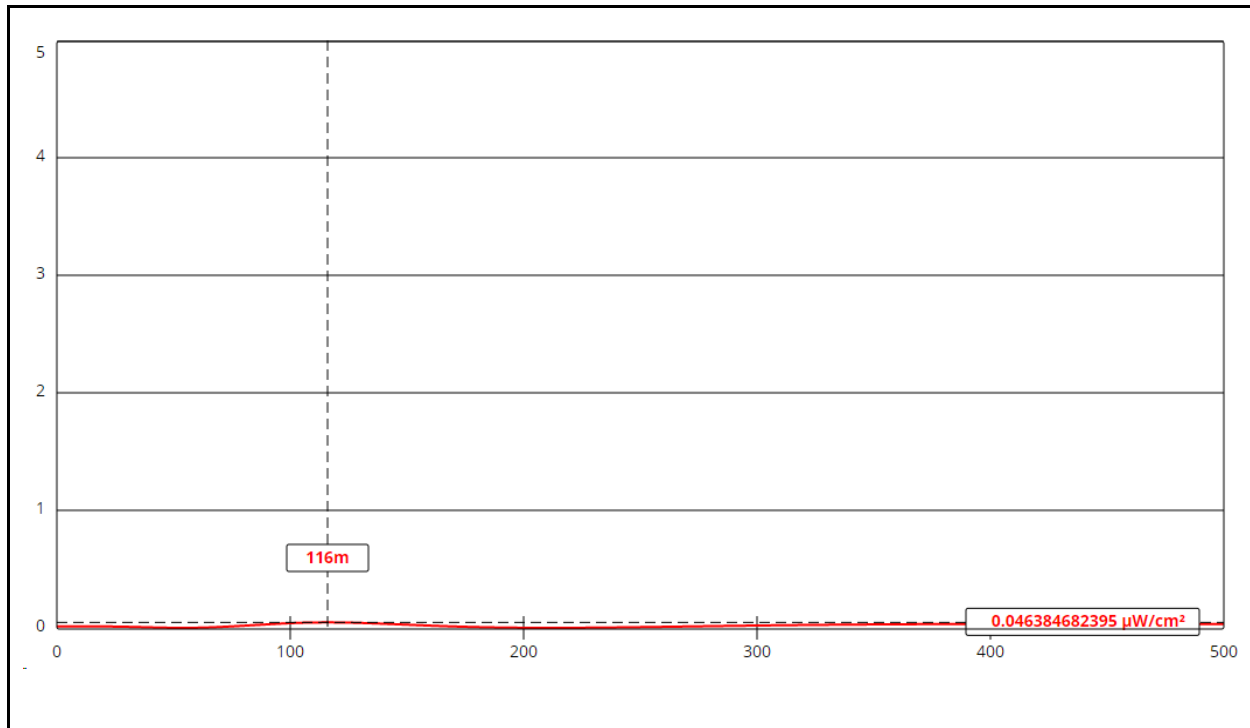
Ground level power densities have been calculated for locations extending from the base of the tower to a distance of 500 meters. Values past this point are increasingly negligible.

Calculations of the power density produced by the proposed antenna system assume a Type 2 element pattern, which is the element pattern for the Nicom BKG77-3 3/4 wave antenna proposed for use. The highest calculated ground level power density occurs at a distance of 116 meters from the base of the antenna support structure. At this point the power density is calculated to be 0.05  $\mu W/cm^2$ , which is 0.025% of 200  $\mu W/cm^2$  (the FCC standard for uncontrolled environments).

These calculations show that the maximum calculated power density produced at two meters above

ground level by the proposed operation of W296EA alone is less than 5% of the applicable FCC exposure limit at all locations between 1 and 500 meters from the base of the antenna support structure. Section 1.1307 of the Commission's Rules exempts applications for new facilities or modifications to existing facilities from the requirement of preparing an environmental assessment when the calculated emissions from the applicants proposed facility are predicted to be less than 5% of the applicable FCC exposure limit. Therefore, the proposed facility is in compliance with Section 1.1301 *et seq* and no further analysis of RF exposure at this site is required in this application.

The permittee/licensee in coordination with other users of the site must reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency exposure in excess of FCC guidelines.



## Ground-Level RF Exposure

OET FMModel

### W296EA Manchester Township

Antenna Type: Nicom BKG77-3 3/4 wave (Type 2)

No. of Elements: 3

Element Spacing: 0.75 wavelength

Distance: 500 meters

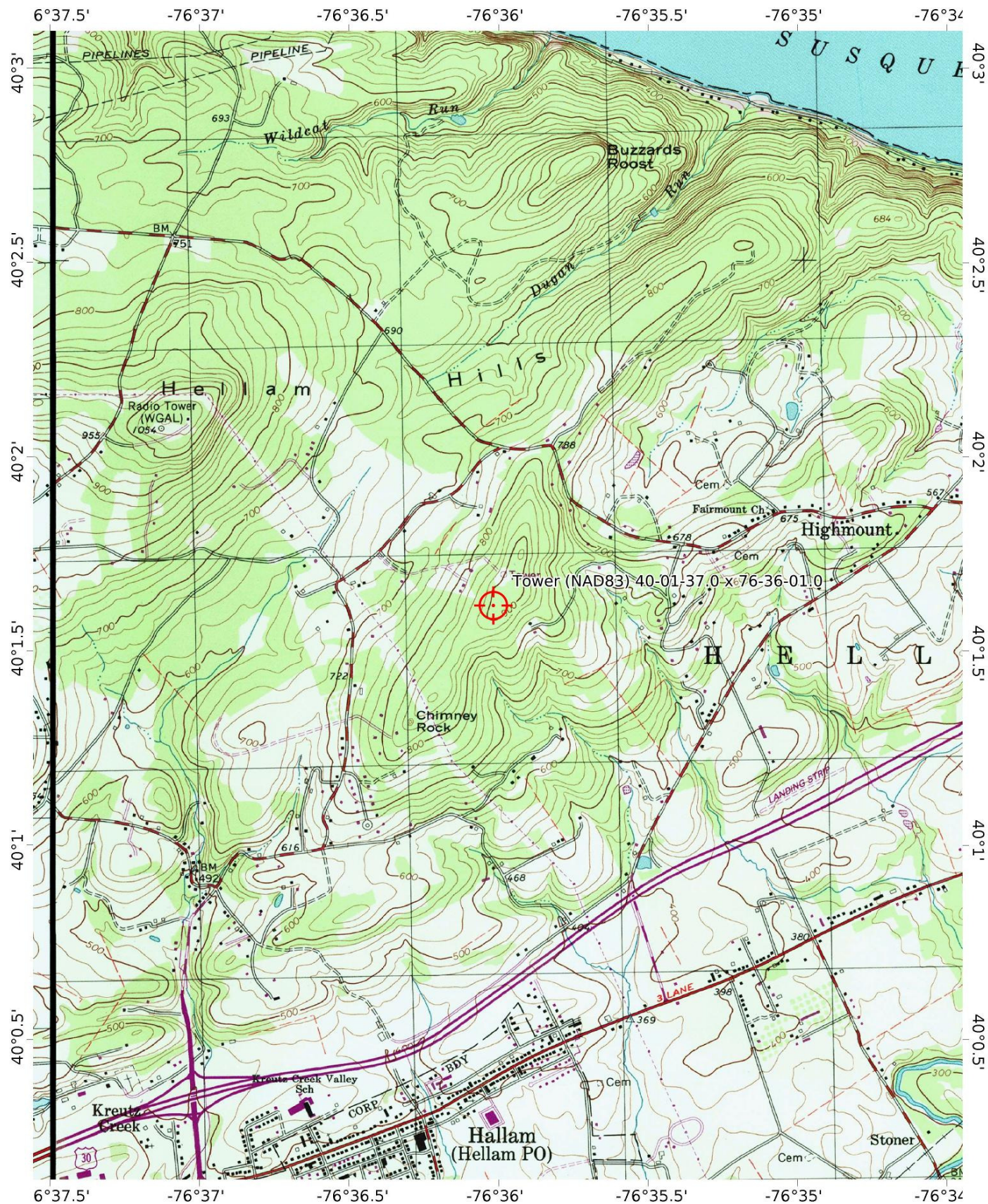
Horizontal ERP: 250 W

Vertical ERP: 250 W

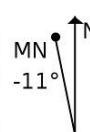
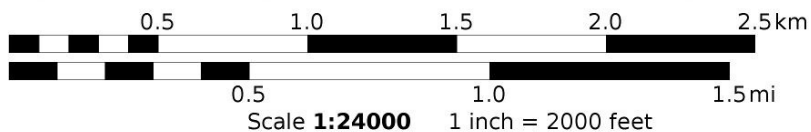
Antenna Height: 106.7 meters AGL

Maximum Calculated Power Density is 0.05  $\mu\text{W}/\text{cm}^2$  at 116 meters from the antenna structure.





Mercator Projection  
WGS84  
USNG Zone 18TUK



Hatfield & Dawson Consulting Engineers



