

## **Broadcast Engineering Services of Bonny Doon, Inc.**

---

Donald E. Mussell Jr. NCE-CBT  
Consulting Engineer  
740 Front Street Suite 305  
Santa Cruz, Ca 95060

Hawaii Office:  
P.O. Box 983  
Kilauea, Hi 96754

(808) 828-0209 Office  
(831) 588-9463 Cell  
dmsml@well.com  
[www.well.com/user/dmsml](http://www.well.com/user/dmsml)

### **Engineering Statement in support of an application In support of a petition for reconsideration for a New LPFM Broadcast station Philadelphia, Pennsylvania BNPL-20131106ASU**

Philadelphia Public Access Corporation (PPAC) is requesting a construction permit for a new LPFM broadcast station to be located in Philadelphia, Pennsylvania on Ch 293. The antenna site specified is located atop an existing office building at 444 North 3<sup>rd</sup> Street, and will cover an estimated 561,000 persons. This location is .14 KM west of the previous proposed site.

An allocation study for Ch. 293 (106.5 MHz) was performed to verify clearances to other authorized facilities surrounding the proposed site. The use of Ch 293 causes no overlap with any other existing, permitted or proposed facility except WKVP (Ch. 295) and WISX (Ch. 291), both of which are second adjacent to the proposed LPFM station. However, the small amount of 2<sup>nd</sup> adjacent overlap does not affect any populated areas. Based on the information presented, the applicant submits that the proposed station will not create any interference to existing or potential listeners of second adjacent channel stations WKVP and WSIX.

WKVP has a predicted field strength of 97.6 dbu at the proposed site. An interfering FM second adjacent signal must be 40 dB stronger, and the proposed LPFM produces a 137.5 dbu (50/10) contour in relation, and the interference extends 8 meters from the proposed antenna. With regard to WISX, it has predicted field strength of 86.1 dbu at the proposed site. An interfering FM second adjacent signal must be 40 dB stronger, and the proposed LPFM antenna produces a 126.1 dbu (50/10) contour in relation. The worst case of the two is 126.1 dbu, and the proposed LPFM station will operate from a radiation center of 33.1 meters above ground.

The proposed LPFM station could operate at the full power of 0.1 kW ERP, however we are proposing to operate the station at 0.09 kW. Using the U/D method, the proposed LPFM station is predicted to produce an undesired interference overlap in respect to WSIX to the proposed LPFM station's 126.1. 50/10 interference contour ("overlap zone"). The 126.1 dBu contour would be just under 35 meters from the radiation center of the antenna. The applicant is proposing to use a two bay antenna with half-wave spacing. Based on manufacturer's data using the depression angle method, a 90 watt signal would produce a 126.1 dBu contour at 27 degrees below the horizon at an artificial plane of 3 meters below the roof level. Because the ceiling of the nearest occupied space (Sixth floor) is 8 meters below the antenna, the interference

contour will penetrate 1 meter below the ceiling of the occupied areas. The 6<sup>th</sup> floor is 3.6 meters in height (floor to ceiling) and this would leave 2.6 meters of clearance to occupied areas of the structure.

The building is a six-story office building, 27.1 meters in height. The proposed LPFM antenna is 33.1 meters above ground. The applicant proposes a two-bay antenna,  $\frac{1}{2}$  wave spaced. The fire escape enclosure structure atop the roof is 3 meters in height, and the proposed antenna will be mounted on a 6 meter pole, side-mounted to the fire escape structure. This places the proposed antenna 8 meters above the ceiling of the sixth (top) floor. Directly below the proposed antenna is the fire escape emergency stairwell, which is not office space, and is unoccupied.

Because the 126.1 (50/10) dbu contour does not extend into the occupied area of the building below the ceiling of the sixth floor, no population is affected. The closest adjacent building is across the street below, and 40 meters from the proposed antenna, and outside of the overlap zone.

Based upon these mitigating factors, the applicant respectfully requests a waiver of C.F.R. 73.807(e)(1) of the Commission's rules to the extent required, based on the fact that there is no population within the area of predicted overlap. A detailed allocation study with drawings and map exhibits is attached to this engineering statement.

The proposed antenna system is a 2-bay antenna,  $\frac{1}{2}$  wave-spaced circularly polarized, and producing 90 watts (.09 KW) ERP. This antenna and power combination, rooftop-mounted at 33.1 meters above ground, will produce a calculated worst-case RFR energy field of .54 microwatts per squared centimeter at a distance of 56 meters from the base of the tower support structure, and significantly less at angles below the antenna. This is well below 1% of the public limit, and is therefore compliant with the FCC rules concerning RFR both on and adjacent to the proposed tower location. There are no other broadcast emitters on this building.

Based upon these calculations and studies, the applicant is ready to build this LPFM facility as soon as a construction permit is issued, and will make all efforts to expedite the beginning of broadcast as soon as possible.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Donald E. Mussell Jr.', written in a cursive style.

Donald E. Mussell Jr. NCE-CBT  
Consulting Engineer  
January 5, 2014

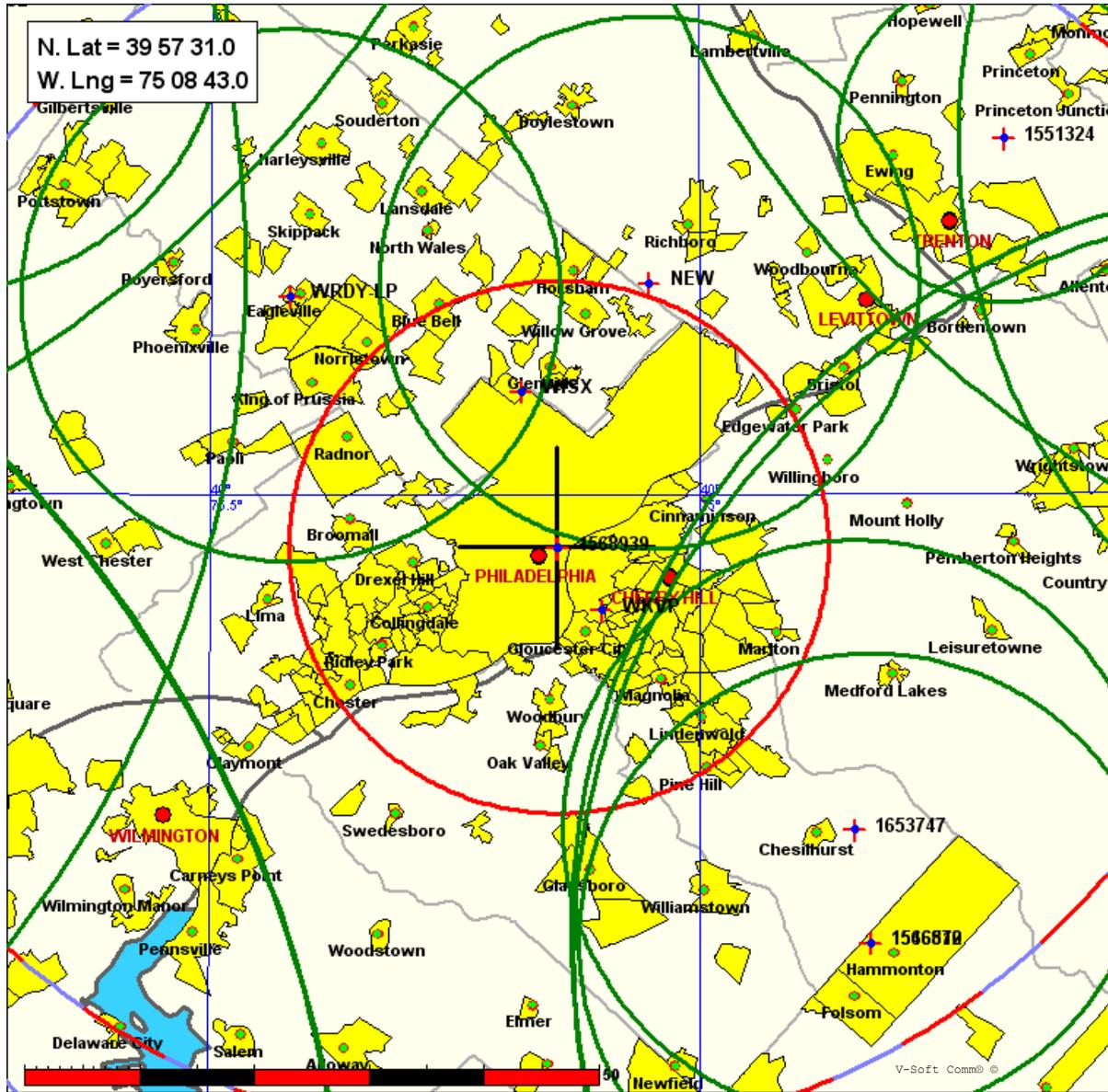


CH 293 L1 106.5 MHz

Current Spacings to 2nd Adj.

New LPFM

Philadelphia Public Access Corporation



Data Date:01-05-15 Job Date:01-05-15

Call	CH#	Type	Location	Azi	D-KM	FCC	Margin
WKVP	295B	LIC	Camden NJ	144.9	6.71	67.0	-60.3
WISX	291B	LIC	Philadelphia PA	347.4	14.13	67.0	-52.9
1568939	293L1	APP	Philadelphia PA	90.0	0.14	24.0	-23.9
NEW.C	293L1	CP	Warminster PA	19.0	24.69	24.0	0.7
WRDY-LP.C	293L1	CP	Eagleville PA	313.8	32.12	24.0	8.1
AL7841	293A	RSV-A	Bass River Towns NJ	116.7	75.81	67.0	8.8
WTHJ	293A	LIC	Bass River Towns NJ	118.0	76.94	67.0	9.9
1653747	293D	APP-D	Hammonton NJ	133.7	35.97	26.0	10.0
1546810	293D	APP-D	Hammonton NJ	141.8	44.33	26.0	18.3
1566572	293D	APP-D	Hammonton NJ	141.8	44.33	26.0	18.3
WZCY-FM	294B	LIC	Hershey PA	281.3	126.10	97.0	29.1
WMMX	293B	LIC	Baltimore MD	242.2	146.46	112.0	34.5
WMMX	293B	LIC	Baltimore MD	242.2	146.63	112.0	34.6
WLTW	294B	LIC	New York NY	47.8	131.86	97.0	34.9
1551324	292D	APP-D	Trenton NJ	47.1	53.15	15.0	38.2
WKMK	292A	LIC-N	Eatontown NJ	68.2	97.42	56.0	41.4
WFYY	293B	LIC	Bloomsburg PA	315.5	153.82	112.0	41.8

Call	CH#	Type	Location		Azi	D-KM	FCC	Margin
W293CL.C	293D	CP	Reading	PA	311.4	72.49	26.0	46.5
W293CL.C	293D	CP	Reading	PA	311.4	72.49	26.0	46.5

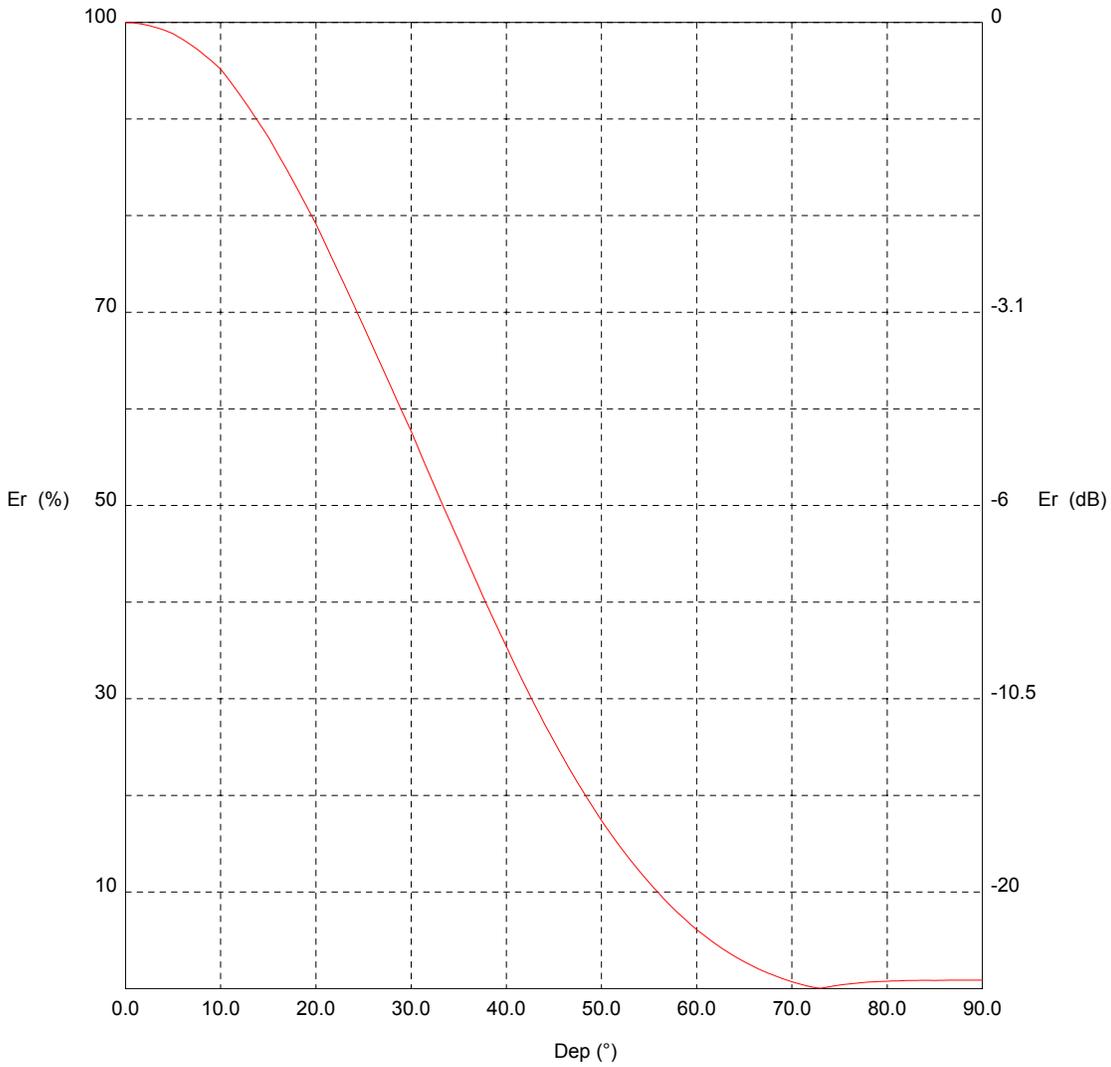
RSV-R, reserved, needs protection, RSV-A, allocation, does not if a CP or LIC has been granted.

TX station: BKG77/2 GENERIC

Site name: 1/2 WAVE SEPARATION

Frequency: 98.10 MHz

### Vertical diagram



— 0.0° Az. (Total antenna)

NicomUsa, Inc

TX station: BKG77/2 GENERIC

Site name: 1/2 WAVE SEPARATION

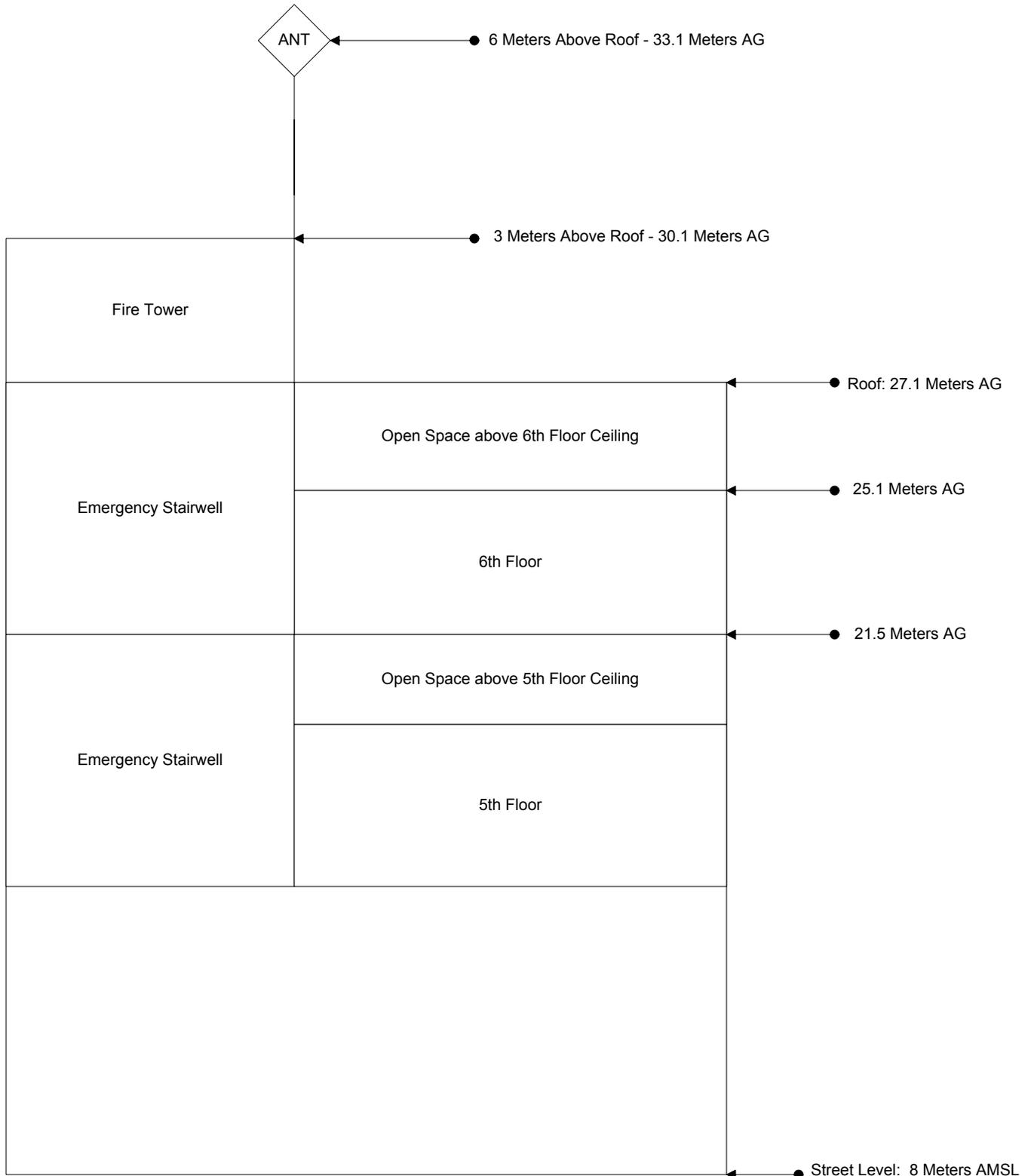
Frequency: 98.10 MHz

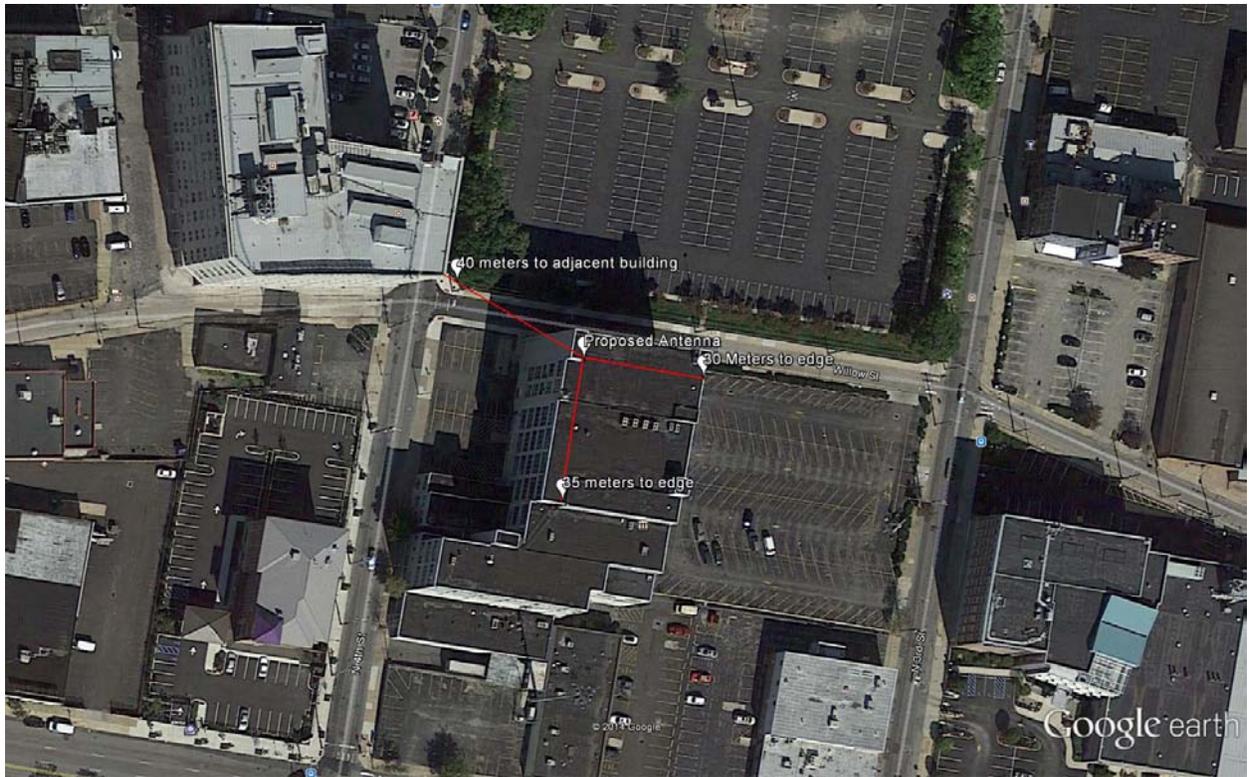
Vertical diagram at an azimuth of 0° degrees

Dep (°)	Er (%)	ERP (W)	Dep (°)	Er (%)	ERP (W)	Dep (°)	Er (%)	ERP (W)
0.0	100.0	914.2	30.0	57.7	304.2	60.0	6.1	3.4
0.5	100.0	913.7	30.5	56.5	292.0	60.5	5.7	3.0
1.0	99.9	912.9	31.0	55.3	280.1	61.0	5.3	2.6
1.5	99.9	911.6	31.5	54.2	268.5	61.5	5.0	2.3
2.0	99.8	910.0	32.0	53.0	257.2	62.0	4.6	1.9
2.5	99.7	908.1	32.5	51.9	246.3	62.5	4.3	1.7
3.0	99.5	905.7	33.0	50.8	235.6	63.0	3.9	1.4
3.5	99.4	903.0	33.5	49.6	225.3	63.5	3.6	1.2
4.0	99.2	899.9	34.0	48.5	215.3	64.0	3.3	1.0
4.5	99.0	896.5	34.5	47.4	205.5	64.5	3.1	0.9
5.0	98.8	892.7	35.0	46.3	196.1	65.0	2.8	0.7
5.5	98.5	887.7	35.5	45.2	186.5	65.5	2.5	0.6
6.0	98.2	882.4	36.0	44.0	177.3	66.0	2.3	0.5
6.5	97.9	876.7	36.5	42.9	168.4	66.5	2.0	0.4
7.0	97.6	870.7	37.0	41.8	159.8	67.0	1.8	0.3
7.5	97.2	864.3	37.5	40.7	151.5	67.5	1.6	0.2
8.0	96.9	857.7	38.0	39.6	143.5	68.0	1.4	0.2
8.5	96.5	850.8	38.5	38.5	135.8	68.5	1.2	0.1
9.0	96.1	843.5	39.0	37.5	128.5	69.0	1.0	0.1
9.5	95.6	836.0	39.5	36.4	121.4	69.5	0.9	0.1
10.0	95.2	828.2	40.0	35.4	114.6	70.0	0.7	0.0
10.5	94.5	817.1	40.5	34.4	107.9	70.5	0.6	0.0
11.0	93.9	805.8	41.0	33.3	101.5	71.0	0.4	0.0
11.5	93.2	794.4	41.5	32.3	95.4	71.5	0.3	0.0
12.0	92.5	782.7	42.0	31.3	89.5	72.0	0.2	0.0
12.5	91.8	770.9	42.5	30.3	84.0	72.5	0.1	0.0
13.0	91.1	759.0	43.0	29.3	78.7	73.0	0.0	0.0
13.5	90.4	746.9	43.5	28.4	73.6	73.5	0.1	0.0
14.0	89.6	734.6	44.0	27.4	68.8	74.0	0.2	0.0
14.5	88.9	722.3	44.5	26.5	64.3	74.5	0.3	0.0
15.0	88.1	709.8	45.0	25.6	59.9	75.0	0.4	0.0
15.5	87.3	696.2	45.5	24.7	55.8	75.5	0.4	0.0
16.0	86.4	682.5	46.0	23.8	51.9	76.0	0.5	0.0
16.5	85.5	668.7	46.5	23.0	48.2	76.5	0.5	0.0
17.0	84.6	655.0	47.0	22.1	44.7	77.0	0.6	0.0
17.5	83.8	641.2	47.5	21.3	41.5	77.5	0.6	0.0
18.0	82.8	627.4	48.0	20.5	38.4	78.0	0.7	0.0
18.5	81.9	613.7	48.5	19.7	35.4	78.5	0.7	0.0
19.0	81.0	599.9	49.0	18.9	32.7	79.0	0.7	0.0
19.5	80.1	586.2	49.5	18.2	30.1	79.5	0.7	0.1
20.0	79.1	572.5	50.0	17.4	27.7	80.0	0.8	0.1
20.5	78.1	557.6	50.5	16.7	25.5	80.5	0.8	0.1
21.0	77.1	542.9	51.0	16.0	23.4	81.0	0.8	0.1
21.5	76.0	528.2	51.5	15.3	21.4	81.5	0.8	0.1
22.0	75.0	513.7	52.0	14.6	19.6	82.0	0.8	0.1
22.5	73.9	499.3	52.5	14.0	17.9	82.5	0.8	0.1
23.0	72.8	485.1	53.0	13.3	16.3	83.0	0.8	0.1
23.5	71.8	471.1	53.5	12.7	14.8	83.5	0.9	0.1
24.0	70.7	457.2	54.0	12.1	13.4	84.0	0.9	0.1
24.5	69.6	443.5	54.5	11.5	12.2	84.5	0.9	0.1
25.0	68.6	429.9	55.0	11.0	11.0	85.0	0.8	0.1
25.5	67.5	416.4	55.5	10.4	9.9	85.5	0.9	0.1
26.0	66.4	403.0	56.0	9.9	8.9	86.0	0.9	0.1
26.5	65.3	389.8	56.5	9.3	8.0	86.5	0.9	0.1
27.0	64.2	376.9	57.0	8.8	7.1	87.0	0.9	0.1
27.5	63.1	364.2	57.5	8.3	6.4	87.5	0.9	0.1
28.0	62.0	351.7	58.0	7.9	5.6	88.0	0.9	0.1
28.5	60.9	339.4	58.5	7.4	5.0	88.5	0.9	0.1
29.0	59.8	327.4	59.0	7.0	4.4	89.0	0.9	0.1
29.5	58.8	315.7	59.5	6.5	3.9	89.5	0.9	0.1

NicomUsa, Inc

# 444 3rd Street Building Detail





**View of antenna site building and surrounding buildings**



**Fire Escape Rooftop Enclosure**

