

**CONSOLIDATED ENGINEERING STATEMENT**  
**PREPARED IN SUPPORT OF APPLICATION**  
**FOR CONSTRUCTION PERMIT**  
**METRO RADIO, INC.**  
**WKDV(AM) FCC ID 8672**  
**0.06/0.5 kW LS ND-U 1460 kHz**  
**CHANTILLY, VIRGINIA**

**OCTOBER 31, 2023**

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FCC Form 301-AM    LMS filing

**ENGINEERING STATEMENT**

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- II. FCC sinusoidal and NEC 4.2 elevation pattern plot tabulation and comparison.

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**SUMMARY**

The following consolidated engineering statement has been prepared in support of an Application for Construction Permit by **Metro Radio, Inc. (“Metro”)** which proposes to implement new permanent, fulltime, standard broadcast facilities for WKDV(AM), 1460 kHz. The station was last licensed for 5 kW day and night directional operation under FCC File number BL-11403 and has been operating under STA for an extended period. The station has now found an engineering solution to allow the current STA site to be specified in an application for CP for permanent ND facilities.

The site proposed herein has been in use as an STA site and is currently authorized in LMS file No. 0000220928 with 0.144 kW ND unlimited. This application proposes new Class D facilities to replace the previously licensed Class B facilities.

The proposed permanent tower location is FCC Registration #1035359, a 93.3 meter tall, 3 sided, self-supporting tower located in Fairfax, Virginia. It is necessary to file for a new city of license which is described fully herein. The station submits NEC 4.2 computations to confirm the pattern shape and radiation efficiency as part of the application filing for a shunt fed self-supporting tower. Shunt feeding of the tower has been proposed based on the successful implementation of an internal shunt feed system, on a self-supporting tower of electrical height near a half wave, for WSHU(AM) as specified in license application Filing, 0000222809. As was the case for WSHU, this antenna system has proven stable under STA operation and is believed suitable for licensed operation.

Exhibit I is a NEC 4.2 analysis of the proposed internal shunt excited tower which employs a vertical wire, #158 in the model, which is fed 10 feet above ground, is located in the center of the tower, runs straight up the center of the tower where it connects with wires 165 – 167 which go to each tower leg. A capacitor will

be installed at the base of the vertical feed to tune out positive reactance and lower circuit voltages at the antenna tuning unit.

Because of the inability to implement a traditional ground system there was concern that a stable antenna system, which would meet FCC minimum efficiency of 107.5 mV/m @ 1 kM, as required in FCC Rule Section 73.21(a)(3) could be developed. The fact that the tower electrical height approaches a half wave, and the current distribution mimics that of a 163.5 degree tall tower, led to the conclusion that the FCC efficiency requirement was indeed achievable. The tower base pier dimensions are 15.2 meters on a side (50'). An existing buried ground loop surrounds the tower and appears to provide stability as the system has been operational under varying weather conditions and proven stable.

Modeling of a few radials within the tower base and ground rods showed no improvement in efficiency and were therefore not employed in the final model.

The front to back ratio of the horizontal plane radiation pattern is less than 0.1 dB in full compliance with 1.30002(a) of the rules. The calculated horizontal plane radiation pattern field values at one kilometer have been input in 10 degree steps to obtain the RMS field intensity which is 356.6 mV/m at 1 kM for 1 kilowatt.

Examination of the NEC 4.2 model shows current flow in the entire 93.3 meter structure, 163.5 electrical degrees at 1460 kHz.

The FCC calculated field column of Exhibit II uses the vertical plane radiation characteristics formula in 73.160 (b)(1) to calculate the sinusoidal elevation pattern for a simple 163.5 degree radiator. The NEC 4.2 elevation pattern relative field corresponds, with an unusually high degree of accuracy, with the 163.5 degree tower height as the maximum deviation is less than 0.8 dB over the range of elevation angles from 0 to 90 degrees.

It is herein requested that in lieu of a special formula the FCC note that nighttime skywave calculations are to be undertaken using formula (b)(1) with an electrical height of 163.5 degrees and an inverse field strength of 356.6 mV/m @ 1 kM for 1 kW and 87.3 mV/m @ 1 kM for the proposed 0.06 kW nighttime power.

This application is complete with the Forms, Exhibits and Figures found in the Table of Contents above and is believed to comply with all applicable FCC Rules, Regulations and Policies unless stated otherwise herein.

### **FCC FORM 301-AM**

FCC Form 301-AM has been completed. Questions requiring a narrative response are addressed below:

The proposed structure is existing and carries FCC tower registration #1035359. The NAD 83 tower coordinates have been specified.

Antenna system physical configuration data appears on Exhibit I. Critical hours operation is not proposed.

*Section 73.24(g)* compliance is achieved due to the nature of the site. Population in the proposed 1 V/m daytime contour is 0 persons. See Figure 3. The applicant pledges to comply fully with *Rule Section 73.88*.

Figure 4 depicts the proposed daytime 5, 2 and 0.5 mV/m contours.

Figure 5 depicts the licensed 5 mV/m contour plotted in green and the proposed 5 mV/m contour plotted in blue. The proposed 5 mV/m contour covers 100% of the population of Chantilly CDP, based on U.S. Census data, in compliance with section 73.24(i). The April 1, 2020 census pop is 24,301 persons and the 2010 census pop was 23,039 persons. Chantilly is in the western portion of Fairfax County which is part of the Washington – Arlington, DC-VA-MD statistical area as is Manassas, Virginia.

WKDV(AM) is involved in grandfathered overlap on the Co and 1<sup>st</sup> adjacent channels as depicted on Figures 1 & 2. The licensed daytime facility has grandfathered overlap with:

Co-CH

WKHZ	1460 kHz Easton, MD
WTKT	1460 kHz Harrisburg, PA

1<sup>st</sup> Adj. CH

WOL	1450 kHz Washington, DC
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The proposed facility does not create new overlap or increased overlap.

The co-ch facility overlaps are as follows:

WKDV(AM) to WKHZ	5,012.7 sq. km enveloping 467,853 persons.
Proposed to WKHZ	4,562.8 sq. km enveloping 462,517 persons
WKHZ to WKDV	484.4 sq. km. enveloping 297,619 persons
WKHZ to Proposed	104.6 sq. km. enveloping 76,485 persons
WKDV(AM) to WTKT	0 sq. km enveloping 0 persons
Proposed to WTKT	0 sq. km enveloping 0 persons
WTKT to WKDV	24.2 sq. km enveloping 12,057 persons
WTKT to Proposed	22.32 sq. km enveloping 4,820 persons

The 1<sup>st</sup> adj ch facility overlap is as follows:

WKDV(AM) to WOL	845.2 sq. km enveloping 1,962,066 persons.
Proposed to WOL	562.8 sq. km enveloping 1,054,552 persons
WOL to WKDV	442.7 sq. km. enveloping 585,374 persons
WOL to Proposed	386.5 sq. km. enveloping 521,491 persons

The WKDV(AM) night allocation study has been undertaken and Class B station WBNS(AM) Columbus, Ohio is the deepest protection. It may be seen from the screen shot on the following page that WKDV is the last station in the WBNS 25% RSS and that the WKDV 60 watt proposed facility contribution is out of the 25% RSS. No other nighttime allocation restraints were observed.

Call	Freq	Country	City	St.	Use	Class	Dist	Azimuth	Radiation on Gnd	Min Elev	Max Elev	Max Radiation	SkyWave	Interf Limitation	RSS Lim 50%	RSS Lim 25%
WHIC	1460	US	ROCHESTER	NY	On	B	559.1	049.78 / 233.27	170.4	13.2	21.9	166.4	0.090497	3.011	3.011	3.011
WABQ	1460	US	PAINESVILLE	OH	On	B	243.3	034.72 / 215.81	78.2	30.1	43.9	58.3	0.247134	2.884	4.169	4.169
WPON	1460	US	WALLED LAKE	MI	On	B	293.4	349.48 / 169.05	99.6	25.5	38.5	68.3	0.205830	2.813	5.030	5.030
WMBA	1460	US	AMBRIDGE	PA	On	B	239.9	072.05 / 253.79	143.6	30.4	44.3	47.2	0.252072	2.379	0.000	5.564
WXEM	1460	US	BUFORD	GA	On	B	655.2	188.66 / 008.01	144.9	10.9	18.6	139.7	0.080502	2.250	0.000	6.001
WBCU	1460	US	UNION	SC	On	B	592.0	168.91 / 349.67	121.0	12.3	20.6	120.6	0.092499	2.231	0.000	6.403
KXND	1460	US	DES MOINES	IA	On	B	913.7	285.33 / 098.38	248.4	6.9	12.6	241.0	0.043096	2.077	0.000	6.731
WQOP	1460	US	JACKSONVILLE	FL	On	B	1075.1	174.03 / 354.70	255.6	5.2	10.1	254.0	0.038674	1.965	0.000	7.012
WKAM	1460	US	GOSHEN	IN	On	B	305.3	307.50 / 125.59	84.2	24.5	37.4	49.0	0.199360	1.955	0.000	7.279
WKDV	1460	US	MANASSAS	VA	On	B	482.4	104.35 / 287.77	123.0	15.5	25.3	81.1	0.117729	1.911	0.000	7.526
WMCJ	1460	US	CULLMAN	AL	On	B	731.5	209.91 / 027.52	141.5	9.5	16.4	133.7	0.068434	1.830	0.000	0.000
PROP.	1460	US			On	B	490.6	102.62 / 286.13	88.4	15.2	24.9	79.0	0.114972	1.817	0.000	0.000
WHTY	1460	US	PHENIX CITY/COIAL		On	B	855.8	192.99 / 011.78	161.9	7.6	13.7	152.7	0.054665	1.669	0.000	0.000
WLQA	1470	US	FARRELL	PA	On	B	244.4	054.65 / 236.21	425.3	29.9	43.8	337.6	0.247029	1.668	0.000	0.000

*Supplement A, Edition 97-01 to OET Bulletin No. 65*, has been referenced concerning appropriate fencing distances.

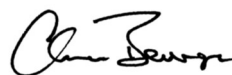
The proposed tower and associated infrastructure are located on a site that is enclosed in a fence whose minimum distance to a tower leg is 2 meters. This separation meets the OET-65, Supplement A, Tables 2 & 3 maximum predicted distance for compliance of 2 meters for 1 kW. Since the maximum power is 0.5 kW, the applicant believes that OET-65 public exposure and worker exposure guidelines are met. Power will be reduced, or transmission terminated when workers are on or near the tower.

### **CITY OF LICENSE CHANGE**

Manassas, Virginia, the current WKDV(AM) community of license, has FM stations WJFK-FM and WWWT-FM, both Class B FM stations, licensed to it. Removing WKDV(AM) leaves the community with these two fulltime services. Chantilly, VA, A Census CDP, with a 2020 population of 24,301 persons, has no AM or FM stations licensed to it. Both communities are part of the 2020 Washington – Arlington, DC-VA-MD statistical area.

**CONCLUSION**

The foregoing was prepared on behalf of **Metro Radio, Inc.** by Clarence M. Beverage of *Communications Technologies*, Medford, New Jersey, whose qualifications are a matter of record with the Federal Communications Commission. The undersigned certifies, under penalty of perjury, that the statements herein are true and correct of his own knowledge, except such statements made on information and belief, and as to these statements he believes them to be true and correct.



By \_\_\_\_\_

**Clarence M. Beverage**

*for* Communications Technologies

Medford, New Jersey

October 31, 2023

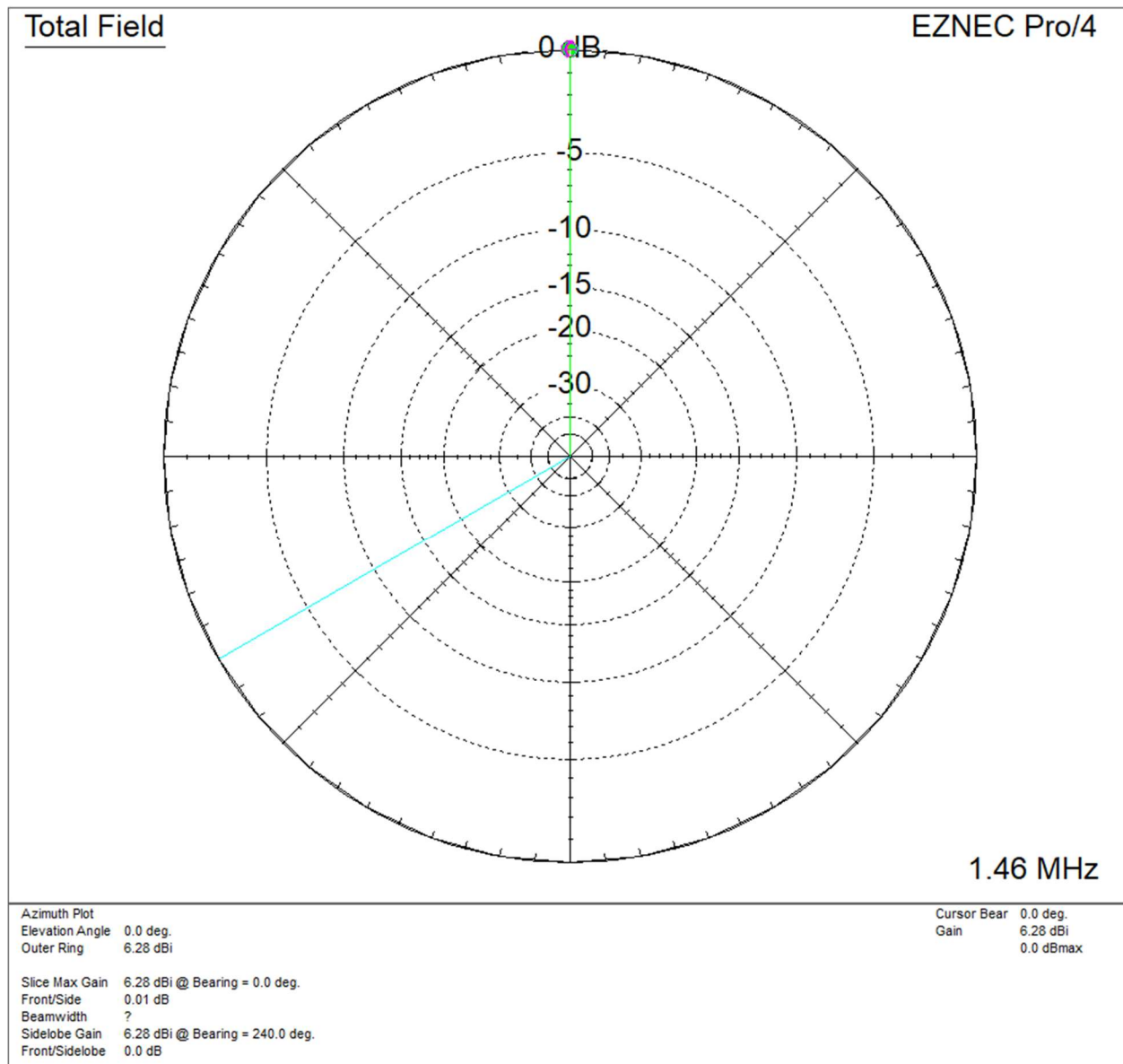
## **EXHIBIT I**

**PHYSICAL DESCRIPTION OF ANTENNA SYSTEM**  
**And NEC 4.2 Calculated Horizontal Plane Radiation Pattern**  
**WKDV(AM) 1460 kHz 0.06/0.5 kW LS ND-U**  
**CHANTILLY, VIRGINIA**  
**OCTOBER 2023**

TRANSMITTER SITE: (NAD 83)	North Latitude: 38° 51' 18.0" West Longitude: 77° 22' 27.0"
TOWER: 1	Electrical 163.5° 93.3 meters - tower steel without appurtenances.
FCC REGISTRATION:	#1035359. The tower is not owned by the applicant. The overall height with appurtenances is made up of VHF and UHF antennas not considered to be radiators.
RADIATOR TYPE:	Vertical, shunt fed, 3 sided, tapered tower.
PATTERN ASSUMPTION:	Sinusoidal current distribution in tower 163.5 degrees for nighttime – see narrative
GROUND SYSTEM:	The tower is shunt excited with an internal feed. The tower electrical height of 163.5 degrees is accurate based on the current distribution of the tower submitted herein.
FIELD STRENGTH:	NEC-4.2 perfect earth 356.6 mV/m @ 1 km for 1 kW for the electric tower height with buried ground loop around tower base.



## EXHIBIT I – Page 2

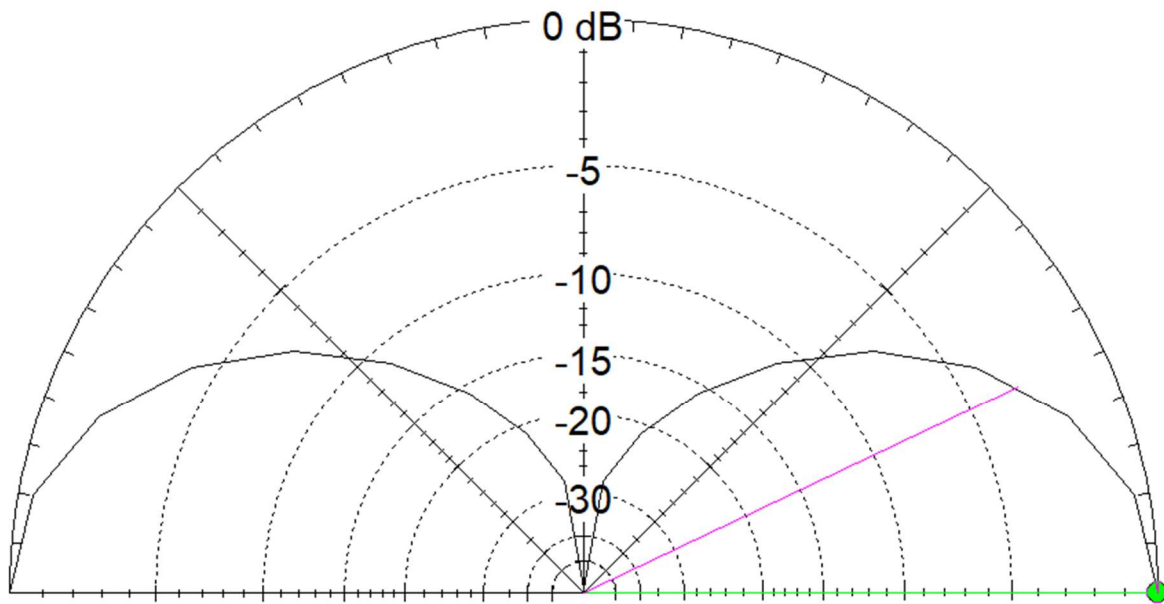


**BASED ON PERFECT EARTH**

EXHIBIT I – Page 3

Total Field

EZNEC Pro/4



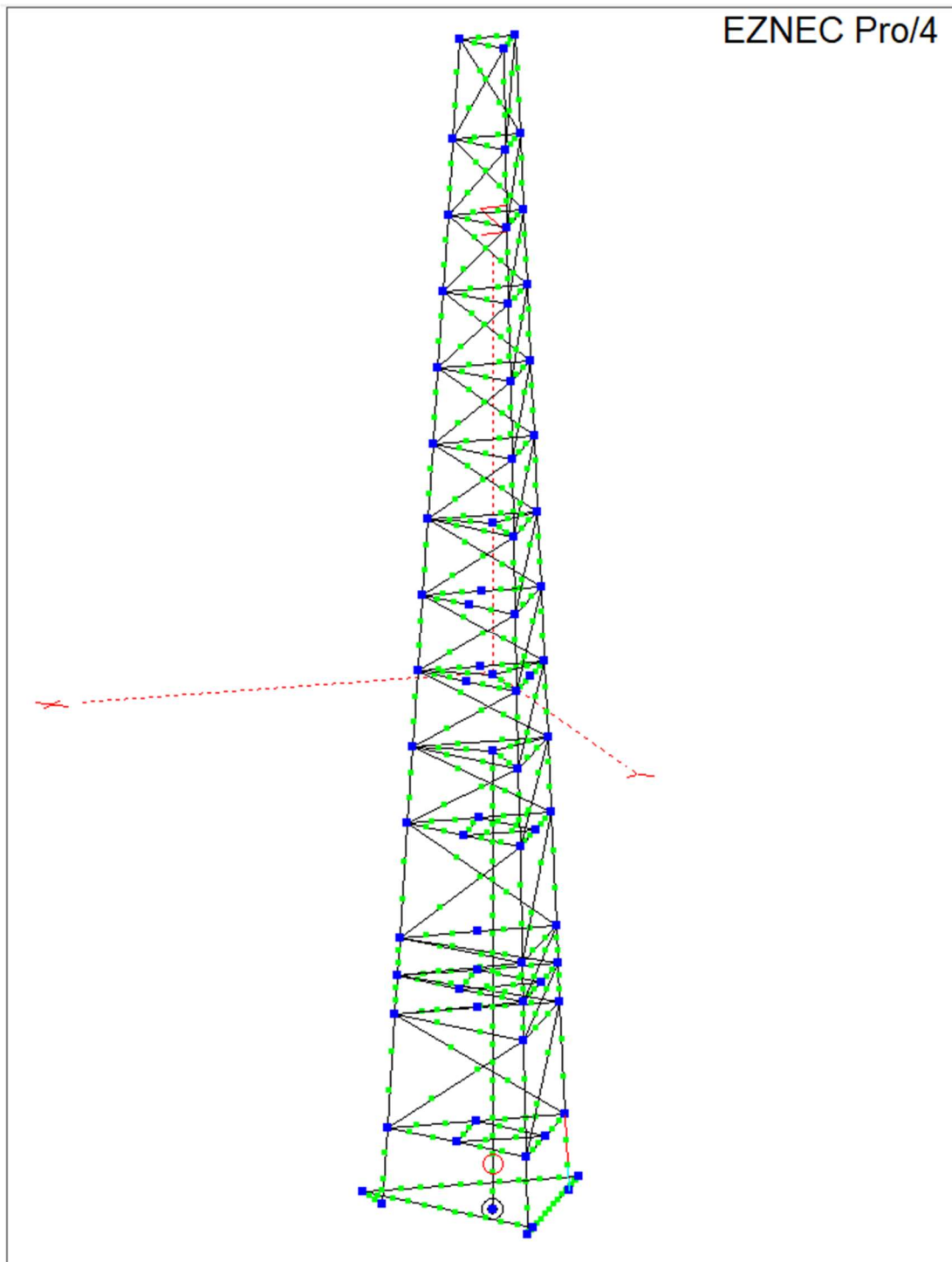
1.46 MHz

Elevation Plot  
Bearing 90.0 deg.  
Outer Ring 6.27 dBi  
  
Slice Max Gain 6.27 dBi @ Elev Angle = 0.0 deg.  
Beamwidth ?; -3dB @ 25.3 deg.  
Sidelobe Gain < -100 dBi  
Front/Sidelobe > 100 dB

Cursor Elev 0.0 deg.  
Gain 6.27 dBi  
0.0 dBmax

**BASED ON PERFECT EARTH**

WIRE MODEL



# EXHIBIT I – Page 5

## WIRE FILE

EZNEC Pro/4 ver. 6.0

WKDV NEC 4.2 Shunt Self Support Tower

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### ----- WIRES -----

No.	End 1 Coord. (ft)			End 2 Coord. (ft)			Dia (in) Segs		Insulation			
	Conn.	X	Y	Z	Conn.	X	Y	Z			Diel C	Thk(in) Loss Tan
1	GND	-25,	-14.4,	0	W2E1	-23.9,	-13.8,	20	2 3	1	0	0
2	W46E1	-23.9,	-13.8,	20	W3E1	-22.1,	-12.8,	50	2 3	1	0	0
3	W47E1	-22.1,	-12.8,	50	W4E1	-21.6,	-12.5,	60	2 3	1	0	0
4	W49E1	-21.6,	-12.5,	60	W5E1	-21,	-12.1,	70	2 3	1	0	0
5	W51E1	-21,	-12.1,	70	W6E1	-19.3,	-11.1,	100	2 3	1	0	0
6	W53E1	-19.3,	-11.1,	100	W7E1	-18.1,	-10.5,	120	2 3	1	0	0
7	W54E1	-18.1,	-10.5,	120	W8E1	-17,	-9.8,	140	2 3	1	0	0
8	W55E1	-17,	-9.8,	140	W9E1	-15.8,	-9.2,	160	2 3	1	0	0
9	W56E1	-15.8,	-9.2,	160	W10E1	-14.7,	-8.5,	180	2 3	1	0	0
10	W57E1	-14.7,	-8.5,	180	W11E1	-13.6,	-7.8,	200	2 3	1	0	0
11	W58E1	-13.6,	-7.8,	200	W12E1	-12.4,	-7.2,	220	2 3	1	0	0
12	W59E1	-12.4,	-7.2,	220	W13E1	-11.3,	-6.5,	240	2 3	1	0	0
13	W60E1	-11.3,	-6.5,	240	W14E1	-10.1,	-5.8,	260	2 3	1	0	0
14	W61E1	-10.1,	-5.8,	260	W15E1	-9,	-5.2,	280	2 3	1	0	0
15	W62E1	-9,	-5.2,	280	W63E1	-7.5,	-4.3,	306	2 3	1	0	0
16	GND	25,	-14.4,	0	W17E1	23.9,	-13.8,	20	2 3	1	0	0
17	W64E1	23.9,	-13.8,	20	W18E1	22.1,	-12.8,	50	2 3	1	0	0
18	W48E2	22.1,	-12.8,	50	W19E1	21.6,	-12.5,	60	2 3	1	0	0
19	W50E2	21.6,	-12.5,	60	W20E1	21,	-12.1,	70	2 3	1	0	0
20	W52E2	21,	-12.1,	70	W21E1	19.3,	-11.1,	100	2 3	1	0	0
21	W68E1	19.3,	-11.1,	100	W22E1	18.1,	-10.5,	120	2 3	1	0	0
22	W54E2	18.1,	-10.5,	120	W23E1	17,	-9.8,	140	2 3	1	0	0
23	W70E1	17,	-9.8,	140	W24E1	15.8,	-9.2,	160	2 3	1	0	0
24	W71E1	15.8,	-9.2,	160	W25E1	14.7,	-8.5,	180	2 3	1	0	0
25	W57E2	14.7,	-8.5,	180	W26E1	13.6,	-7.8,	200	2 3	1	0	0
26	W58E2	13.6,	-7.8,	200	W27E1	12.4,	-7.2,	220	2 3	1	0	0
27	W59E2	12.4,	-7.2,	220	W28E1	11.3,	-6.5,	240	2 3	1	0	0
28	W60E2	11.3,	-6.5,	240	W29E1	10.1,	-5.8,	260	2 3	1	0	0
29	W61E2	10.1,	-5.8,	260	W30E1	9,	-5.2,	280	2 3	1	0	0
30	W62E2	9,	-5.2,	280	W63E2	7.5,	-4.3,	306	2 3	1	0	0
31	GND	0,	28.9,	0	W32E1	0,	27.5,	20	2 3	1	0	0
32	W79E1	0,	27.5,	20	W33E1	0,	25.6,	50	2 3	1	0	0
33	W65E2	0,	25.6,	50	W34E1	0,	24.9,	60	2 3	1	0	0
34	W81E1	0,	24.9,	60	W35E1	0,	24.2,	70	2 3	1	0	0
35	W67E2	0,	24.2,	70	W36E1	0,	22.3,	100	2 3	1	0	0
36	W83E1	0,	22.3,	100	W37E1	0,	20.9,	120	2 3	1	0	0
37	W69E2	0,	20.9,	120	W38E1	0,	19.6,	140	2 3	1	0	0
38	W85E1	0,	19.6,	140	W39E1	0,	18.3,	160	2 3	1	0	0
39	W86E1	0,	18.3,	160	W40E1	0,	17,	180	2 3	1	0	0
40	W72E2	0,	17,	180	W41E1	0,	15.7,	200	2 3	1	0	0
41	W73E2	0,	15.7,	200	W42E1	0,	14.3,	220	2 3	1	0	0
42	W74E2	0,	14.3,	220	W43E1	0,	13,	240	2 3	1	0	0
43	W75E2	0,	13,	240	W44E1	0,	11.7,	260	2 3	1	0	0
44	W76E2	0,	11.7,	260	W45E1	0,	10.4,	280	2 3	1	0	0
45	W77E2	0,	10.4,	280	W78E2	0,	8.7,	306	2 3	1	0	0
46	W94E1	-23.9,	-13.8,	20	W136E1	0,	-13.8,	20	2 3	1	0	0
47	W80E2	-22.1,	-12.8,	50	W48E1	0,	-12.8,	50	2 3	1	0	0

# EXHIBIT I – Page 6

48	W47E2	0, -12.8,	50	W65E1	22.1, -12.8,	50	2 3	1	0	0
49	W96E1	-21.6, -12.5,	60	W50E1	0, -12.5,	60	2 3	1	0	0
50	W145E2	0, -12.5,	60	W66E1	21.6, -12.5,	60	2 3	1	0	0
51	W82E2	-21, -12.1,	70	W52E1	0, -12.1,	70	2 3	1	0	0
52	W51E2	0, -12.1,	70	W67E1	21, -12.1,	70	2 3	1	0	0
53	W98E1	-19.3, -11.1,	100	W147E1	0, -11.1,	100	2 3	1	0	0
54	W84E2	-18.1, -10.5,	120	W69E1	18.1, -10.5,	120	2 3	1	0	0
55	W100E1	-17, -9.8,	140	W153E1	0, -9.8,	140	2 3	1	0	0
56	W86E2	-15.8, -9.2,	160	W157E1	0, -9.2,	160	2 3	1	0	0
57	W87E2	-14.7, -8.5,	180	W72E1	14.7, -8.5,	180	2 3	1	0	0
58	W88E2	-13.6, -7.8,	200	W73E1	13.6, -7.8,	200	2 3	1	0	0
59	W89E2	-12.4, -7.2,	220	W74E1	12.4, -7.2,	220	2 3	1	0	0
60	W90E2	-11.3, -6.5,	240	W75E1	11.3, -6.5,	240	2 3	1	0	0
61	W91E2	-10.1, -5.8,	260	W76E1	10.1, -5.8,	260	2 3	1	0	0
62	W92E2	-9, -5.2,	280	W77E1	9, -5.2,	280	2 3	1	0	0
63	W93E2	-7.5, -4.3,	306	W78E1	7.5, -4.3,	306	2 3	1	0	0
64	W108E1	23.9, -13.8,	20	W138E1	11.95, 6.85,	20	2 3	1	0	0
65	W94E2	22.1, -12.8,	50	W80E1	0, 25.6,	50	2 3	1	0	0
66	W95E2	21.6, -12.5,	60	W143E1	10.8, 6.2,	60	2 3	1	0	0
67	W96E2	21, -12.1,	70	W82E1	0, 24.2,	70	2 3	1	0	0
68	W97E2	19.3, -11.1,	100	W149E1	9.65, 5.6,	100	2 3	1	0	0
69	W98E2	18.1, -10.5,	120	W84E1	0, 20.9,	120	2 3	1	0	0
70	W99E2	17, -9.8,	140	W154E1	8.5, 4.9,	140	2 3	1	0	0
71	W100E2	15.8, -9.2,	160	W156E2	7.9, 4.55,	160	2 3	1	0	0
72	W101E2	14.7, -8.5,	180	W87E1	0, 17,	180	2 3	1	0	0
73	W102E2	13.6, -7.8,	200	W88E1	0, 15.7,	200	2 3	1	0	0
74	W103E2	12.4, -7.2,	220	W89E1	0, 14.3,	220	2 3	1	0	0
75	W104E2	11.3, -6.5,	240	W90E1	0, 13,	240	2 3	1	0	0
76	W105E2	10.1, -5.8,	260	W91E1	0, 11.7,	260	2 3	1	0	0
77	W106E2	9, -5.2,	280	W92E1	0, 10.4,	280	2 3	1	0	0
78	W107E2	7.5, -4.3,	306	W93E1	0, 8.7,	306	2 3	1	0	0
79	W122E1	0, 27.5,	20	W137E1	-11.95, 6.85,	20	2 3	1	0	0
80	W108E2	0, 25.6,	50	W95E1	-22.1, -12.8,	50	2 3	1	0	0
81	W109E2	0, 24.9,	60	W142E1	-10.8, 6.2,	60	2 3	1	0	0
82	W110E2	0, 24.2,	70	W97E1	-21, -12.1,	70	2 3	1	0	0
83	W111E2	0, 22.3,	100	W148E1	-9.65, 5.6,	100	2 3	1	0	0
84	W112E2	0, 20.9,	120	W99E1	-18.1, -10.5,	120	2 3	1	0	0
85	W113E2	0, 19.6,	140	W155E1	-8.5, 4.9,	140	2 3	1	0	0
86	W114E2	0, 18.3,	160	W101E1	-15.8, -9.2,	160	2 3	1	0	0
87	W115E2	0, 17,	180	W102E1	-14.7, -8.5,	180	2 3	1	0	0
88	W116E2	0, 15.7,	200	W103E1	-13.6, -7.8,	200	2 3	1	0	0
89	W117E2	0, 14.3,	220	W104E1	-12.4, -7.2,	220	2 3	1	0	0
90	W118E2	0, 13,	240	W105E1	-11.3, -6.5,	240	2 3	1	0	0
91	W119E2	0, 11.7,	260	W106E1	-10.1, -5.8,	260	2 3	1	0	0
92	W120E2	0, 10.4,	280	W107E1	-9, -5.2,	280	2 3	1	0	0
93	W121E2	0, 8.7,	306	W135E2	-7.5, -4.3,	306	2 3	1	0	0
94	W137E2	-23.9, -13.8,	20	W109E1	22.1, -12.8,	50	2 3	1	0	0
95	W122E2	-22.1, -12.8,	50	W110E1	21.6, -12.5,	60	2 3	1	0	0
96	W123E2	-21.6, -12.5,	60	W111E1	21, -12.1,	70	2 3	1	0	0
97	W124E2	-21, -12.1,	70	W112E1	19.3, -11.1,	100	2 3	1	0	0
98	W125E2	-19.3, -11.1,	100	W113E1	18.1, -10.5,	120	2 3	1	0	0
99	W126E2	-18.1, -10.5,	120	W114E1	17, -9.8,	140	2 3	1	0	0
100	W127E2	-17, -9.8,	140	W115E1	15.8, -9.2,	160	2 3	1	0	0
101	W128E2	-15.8, -9.2,	160	W116E1	14.7, -8.5,	180	2 3	1	0	0
102	W129E2	-14.7, -8.5,	180	W117E1	13.6, -7.8,	200	2 3	1	0	0
103	W130E2	-13.6, -7.8,	200	W118E1	12.4, -7.2,	220	2 3	1	0	0
104	W131E2	-12.4, -7.2,	220	W119E1	11.3, -6.5,	240	2 3	1	0	0
105	W132E2	-11.3, -6.5,	240	W120E1	10.1, -5.8,	260	2 3	1	0	0
106	W133E2	-10.1, -5.8,	260	W121E1	9, -5.2,	280	2 3	1	0	0

# EXHIBIT I – Page 7

107	W134E2	-9,	-5.2,	280	W30E2	7.5,	-4.3,	306	2	3	1	0	0
108	W136E2	23.9,	-13.8,	20	W123E1	0,	25.6,	50	2	3	1	0	0
109	W17E2	22.1,	-12.8,	50	W124E1	0,	24.9,	60	2	3	1	0	0
110	W18E2	21.6,	-12.5,	60	W125E1	0,	24.2,	70	2	3	1	0	0
111	W19E2	21,	-12.1,	70	W126E1	0,	22.3,	100	2	3	1	0	0
112	W147E2	19.3,	-11.1,	100	W127E1	0,	20.9,	120	2	3	1	0	0
113	W167E1	18.1,	-10.5,	120	W128E1	0,	19.6,	140	2	3	1	0	0
114	W153E2	17,	-9.8,	140	W129E1	0,	18.3,	160	2	3	1	0	0
115	W157E2	15.8,	-9.2,	160	W130E1	0,	17,	180	2	3	1	0	0
116	W160E2	14.7,	-8.5,	180	W131E1	0,	15.7,	200	2	3	1	0	0
117	W25E2	13.6,	-7.8,	200	W132E1	0,	14.3,	220	2	3	1	0	0
118	W26E2	12.4,	-7.2,	220	W133E1	0,	13,	240	2	3	1	0	0
119	W27E2	11.3,	-6.5,	240	W134E1	0,	11.7,	260	2	3	1	0	0
120	W28E2	10.1,	-5.8,	260	W135E1	0,	10.4,	280	2	3	1	0	0
121	W29E2	9,	-5.2,	280	W45E2	0,	8.7,	306	2	3	1	0	0
122	W138E2	0,	27.5,	20	W2E2	-22.1,	-12.8,	50	2	3	1	0	0
123	W32E2	0,	25.6,	50	W142E2	-21.6,	-12.5,	60	2	3	1	0	0
124	W143E2	0,	24.9,	60	W4E2	-21,	-12.1,	70	2	3	1	0	0
125	W34E2	0,	24.2,	70	W148E2	-19.3,	-11.1,	100	2	3	1	0	0
126	W149E2	0,	22.3,	100	W166E1	-18.1,	-10.5,	120	2	3	1	0	0
127	W165E1	0,	20.9,	120	W155E2	-17,	-9.8,	140	2	3	1	0	0
128	W154E2	0,	19.6,	140	W8E2	-15.8,	-9.2,	160	2	3	1	0	0
129	W156E1	0,	18.3,	160	W161E2	-14.7,	-8.5,	180	2	3	1	0	0
130	W159E1	0,	17,	180	W10E2	-13.6,	-7.8,	200	2	3	1	0	0
131	W40E2	0,	15.7,	200	W11E2	-12.4,	-7.2,	220	2	3	1	0	0
132	W41E2	0,	14.3,	220	W12E2	-11.3,	-6.5,	240	2	3	1	0	0
133	W42E2	0,	13,	240	W13E2	-10.1,	-5.8,	260	2	3	1	0	0
134	W43E2	0,	11.7,	260	W14E2	-9,	-5.2,	280	2	3	1	0	0
135	W44E2	0,	10.4,	280	W15E2	-7.5,	-4.3,	306	2	3	1	0	0
136	W140E2	0,	-13.8,	20	W16E2	23.9,	-13.8,	20	0.5	3	1	0	0
137	W139E2	-11.95,	6.85,	20	W1E2	-23.9,	-13.8,	20	0.5	3	1	0	0
138	W139E1	11.95,	6.85,	20	W31E2	0,	27.5,	20	0.5	3	1	0	0
139	W141E2	11.95,	6.85,	20	W140E1	-11.95,	6.85,	20	2	3	1	0	0
140	W79E2	-11.95,	6.85,	20	W141E1	0,	-13.8,	20	2	3	1	0	0
141	W46E2	0,	-13.8,	20	W64E2	11.95,	6.85,	20	2	3	1	0	0
142	W144E2	-10.8,	6.2,	60	W3E2	-21.6,	-12.5,	60	2	3	1	0	0
143	W144E1	10.8,	6.2,	60	W33E2	0,	24.9,	60	2	3	1	0	0
144	W146E2	10.8,	6.2,	60	W145E1	-10.8,	6.2,	60	2	3	1	0	0
145	W81E2	-10.8,	6.2,	60	W146E1	0,	-12.5,	60	2	3	1	0	0
146	W49E2	0,	-12.5,	60	W66E2	10.8,	6.2,	60	2	3	1	0	0
147	W150E1	0,	-11.1,	100	W20E2	19.3,	-11.1,	100	2	3	1	0	0
148	W150E2	-9.65,	5.6,	100	W5E2	-19.3,	-11.1,	100	2	3	1	0	0
149	W151E2	9.65,	5.6,	100	W35E2	0,	22.3,	100	2	3	1	0	0
150	W152E2	0,	-11.1,	100	W151E1	-9.65,	5.6,	100	2	3	1	0	0
151	W83E2	-9.65,	5.6,	100	W152E1	9.65,	5.6,	100	2	3	1	0	0
152	W68E2	9.65,	5.6,	100	W53E2	0,	-11.1,	100	2	3	1	0	0
153	W55E2	0,	-9.8,	140	W163E1	17,	-9.8,	140	2	3	1	0	0
154	W70E2	8.5,	4.9,	140	W162E1	0,	19.6,	140	2	3	1	0	0
155	W85E2	-8.5,	4.9,	140	W164E1	-17,	-9.8,	140	2	3	1	0	0
156	W38E2	0,	18.3,	160	W71E2	7.9,	4.55,	160	2	2	1	0	0
157	W56E2	0,	-9.2,	160	W23E2	15.8,	-9.2,	160	2	3	1	0	0
158	W165E2	0,	0,	120	GND	0,	0,	0	0.5	25	1	0	0
159	W39E2	0,	17,	180	W160E1	0,	0,	180	2	3	1	0	0
160	W161E1	0,	0,	180	W24E2	14.7,	-8.5,	180	2	3	1	0	0
161	W159E2	0,	0,	180	W9E2	-14.7,	-8.5,	180	2	3	1	0	0
162	W37E2	0,	19.6,	140	W163E2	0,	0,	140	2	3	1	0	0
163	W22E2	17,	-9.8,	140	W164E2	0,	0,	140	2	3	1	0	0
164	W7E2	-17,	-9.8,	140	W162E2	0,	0,	140	2	3	1	0	0
165	W36E2	0,	20.9,	120	W166E2	0,	0,	120	2	3	1	0	0

## EXHIBIT I – Page 8

166	W6E2	-18.1,	-10.5,	120	W167E2	0,	0,	120	2	3	1	0	0
167	W21E2	18.1,	-10.5,	120	W158E1	0,	0,	120	2	3	1	0	0
168	W169E1	-29,	-18.4,	2.5	W170E1	29,	-18.4,	2.5	0.5	11	1	0	0
169	W171E1	-29,	-18.4,	2.5	W170E2	0,	32.9,	2.5	0.5	11	1	0	0
170	W172E1	29,	-18.4,	2.5	W173E1	0,	32.9,	2.5	0.5	11	1	0	0
171	W168E1	-29,	-18.4,	2.5	GND	-25,	-14.4,	0	0.5	3	1	0	0
172	W168E2	29,	-18.4,	2.5	GND	25,	-14.4,	0	0.5	3	1	0	0
173	W169E2	0,	32.9,	2.5	GND	0,	28.9,	0	0.5	3	1	0	0

## Calculated Source Impedance

EZNEC Pro/4 ver. 6.0

WKDV Shunt on Self Support

10/31/2023

----- SOURCE DATA -----

Frequency = 1.46 MHz

Source 1      Voltage = 4736 V at 87.55 deg.  
                 Current = 4.94 A at 0.0 deg.  
                 Impedance = 40.98 + J 957.9 ohms  
                 Power = 1000 watts

## EXHIBIT I – Page 9

EZNEC Pro/4 ver. 6.0

WKDV Shunt on Self Support

10/31/2023

12:03:47 PM

----- FAR FIELD PATTERN DATA -----

Frequency = 1.46 MHz

mV/m for 1 kW at 1 km

Azimuth Pattern      Elevation angle = 0 deg.

Bear	V Fld	H Fld	Tot Fld
0	356.63	2.18E-14	356.63
10	356.61	1.52E-14	356.61
20	356.57	1.56E-14	356.57
30	356.51	8.97E-15	356.51
40	356.45	9.32E-15	356.45
50	356.41	2.12E-14	356.41
60	356.39	5.42E-15	356.39
70	356.41	1.22E-14	356.41
80	356.45	2.28E-14	356.45
90	356.51	9.88E-15	356.51
100	356.56	2.41E-14	356.56
110	356.61	2.32E-14	356.61
120	356.62	1.43E-14	356.62
130	356.6	2.31E-14	356.6
140	356.56	1.84E-14	356.56
150	356.5	7.29E-15	356.5
160	356.44	1.04E-14	356.44
170	356.4	1.79E-14	356.4
180	356.38	4.56E-14	356.38
190	356.4	8.93E-15	356.4
200	356.44	4.26E-15	356.44
210	356.5	4.44E-14	356.5
220	356.56	8.36E-15	356.56
230	356.61	1.88E-14	356.61
240	356.63	6.18E-15	356.63
250	356.61	1.20E-14	356.61
260	356.57	1.13E-14	356.57
270	356.51	1.38E-14	356.51
280	356.45	1.42E-14	356.45
290	356.41	6.39E-15	356.41
300	356.39	2.99E-15	356.39
310	356.41	2.26E-14	356.41
320	356.45	1.80E-14	356.45
330	356.51	1.65E-14	356.51
340	356.57	3.89E-15	356.57
350	356.61	3.09E-14	356.61



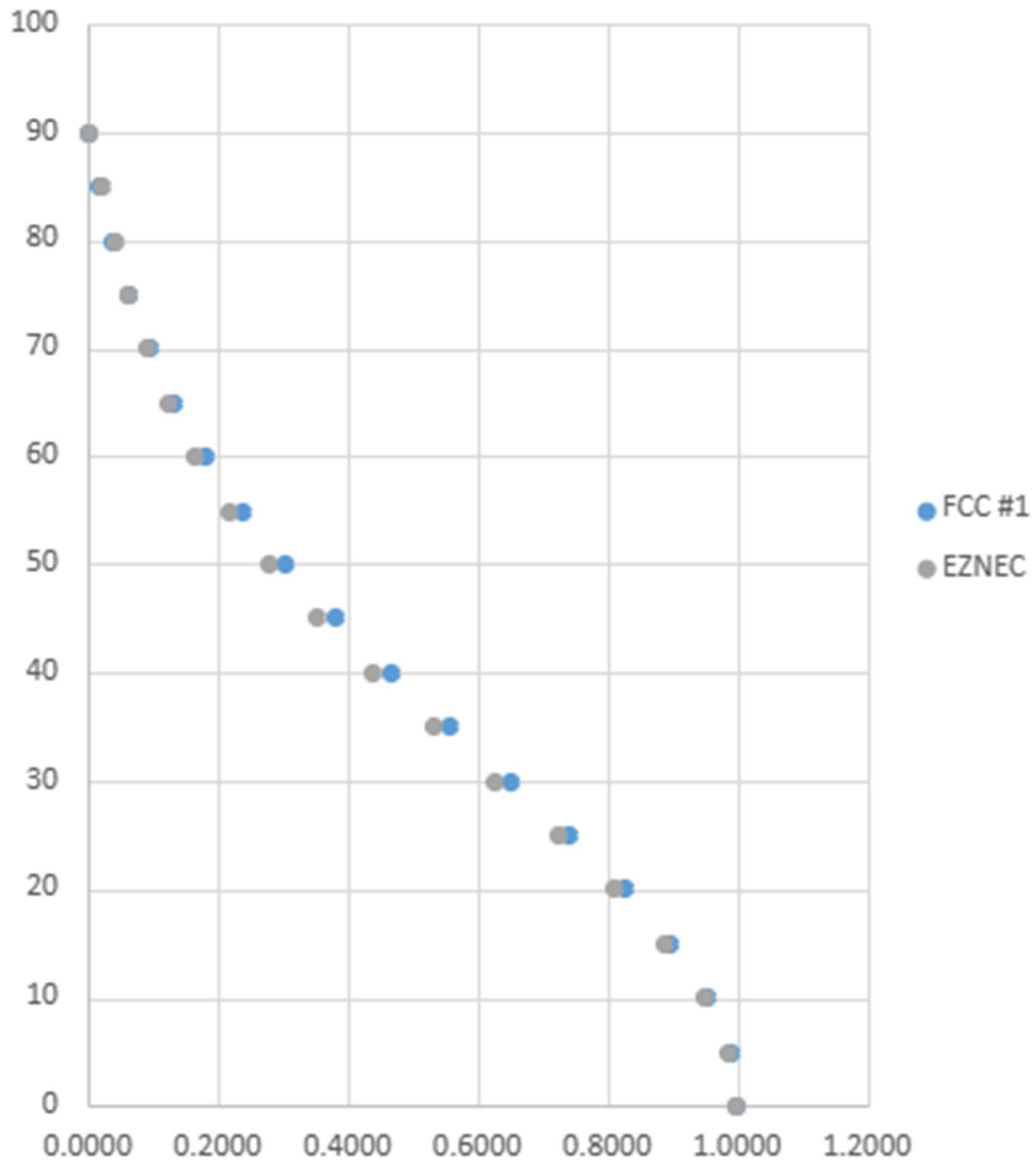
EXHIBIT II – Page 1

FCC CALCULATED AND NEC 4.2 ELEVATION PATTERN COMPARISON

Elevation Pattern Comparison					
WKDV 163.5° Tower					
Elevation Angle	FCC #1	EZNEC			
	Calculated Field	Calculated Field	Relative Field	Relative / FCC	Relative / FCC, dB
<b>FCC Electrical:</b>	163.5				
0	1.0000	227.39	1.0000	1.00000	0
5	0.9881	224.45	0.9871	0.99901	-0.00863
10	0.9531	215.83	0.9492	0.99589	-0.03573
15	0.8976	202.22	0.8893	0.99081	-0.08022
20	0.8253	184.63	0.8120	0.98380	-0.14188
25	0.7411	164.27	0.7224	0.97485	-0.22126
30	0.6498	142.49	0.6266	0.96435	-0.31533
35	0.5565	120.54	0.5301	0.95261	-0.42167
40	0.4654	99.52	0.4377	0.94035	-0.53417
45	0.3802	80.284	0.3531	0.92875	-0.64198
50	0.3032	63.394	0.2788	0.91964	-0.72765
55	0.2359	49.111	0.2160	0.91561	-0.76583
60	0.1789	37.416	0.1645	0.91996	-0.72462
65	0.1318	28.048	0.1233	0.93595	-0.57494
70	0.0937	20.571	0.0905	0.96510	-0.30856
75	0.0633	14.471	0.0636	1.00506	0.043815
80	0.0388	9.2533	0.0407	1.04783	0.405811
85	0.0184	4.5243	0.0199	1.08159	0.681292
90	0.0000	0.010961	0.0000	#DIV/0!	#DIV/0!

## EXHIBIT II – Page 2

### FCC CALCULATED AND NEC 4.2 ELEVATION PATTERN COMPARISON



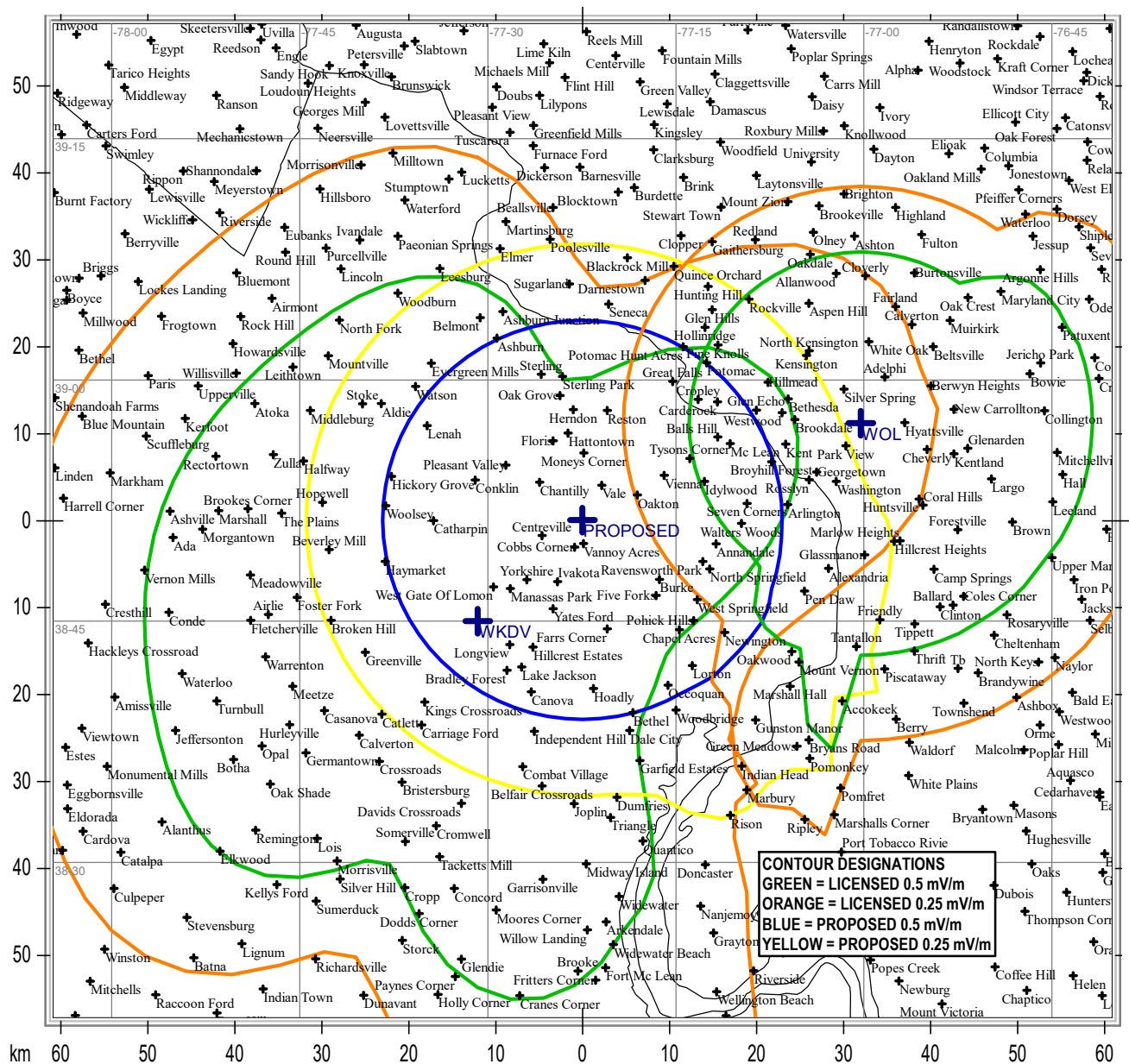
The map displays the Washington, D.C. metropolitan area and surrounding regions, including parts of Maryland, Virginia, and Delaware. It features a grid of latitude and longitude coordinates. The map is overlaid with several colored contour lines representing radio frequency interference levels. A legend in the bottom left corner explains the contour designations:

- GREEN = LICENSED 0.5 mV/m
- RED = LICENSED 0.025 mV/m
- BLUE = PROPOSED 0.5 mV/m
- PURPLE = PROPOSED 0.025 mV/m

Key locations marked on the map include Washington, D.C., Silver Spring, Gaithersburg, Rockville, and various other cities in the region. The map also shows the Potomac River and the Chesapeake Bay. The axes are labeled in kilometers (km) and degrees of latitude and longitude.

 State Borders
  Lat/Lon Grid

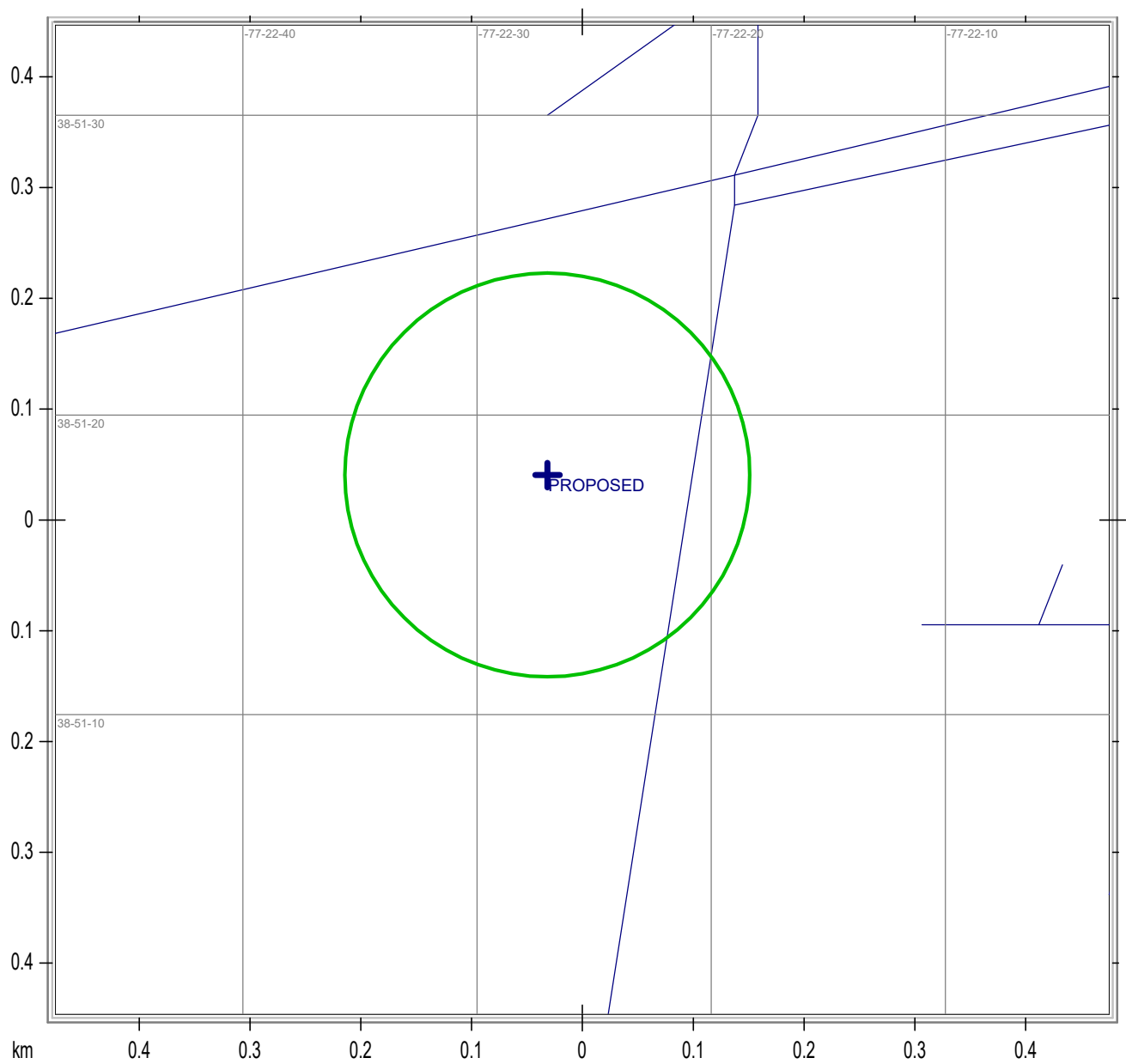
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Communications Technologies Medford, New Jersey

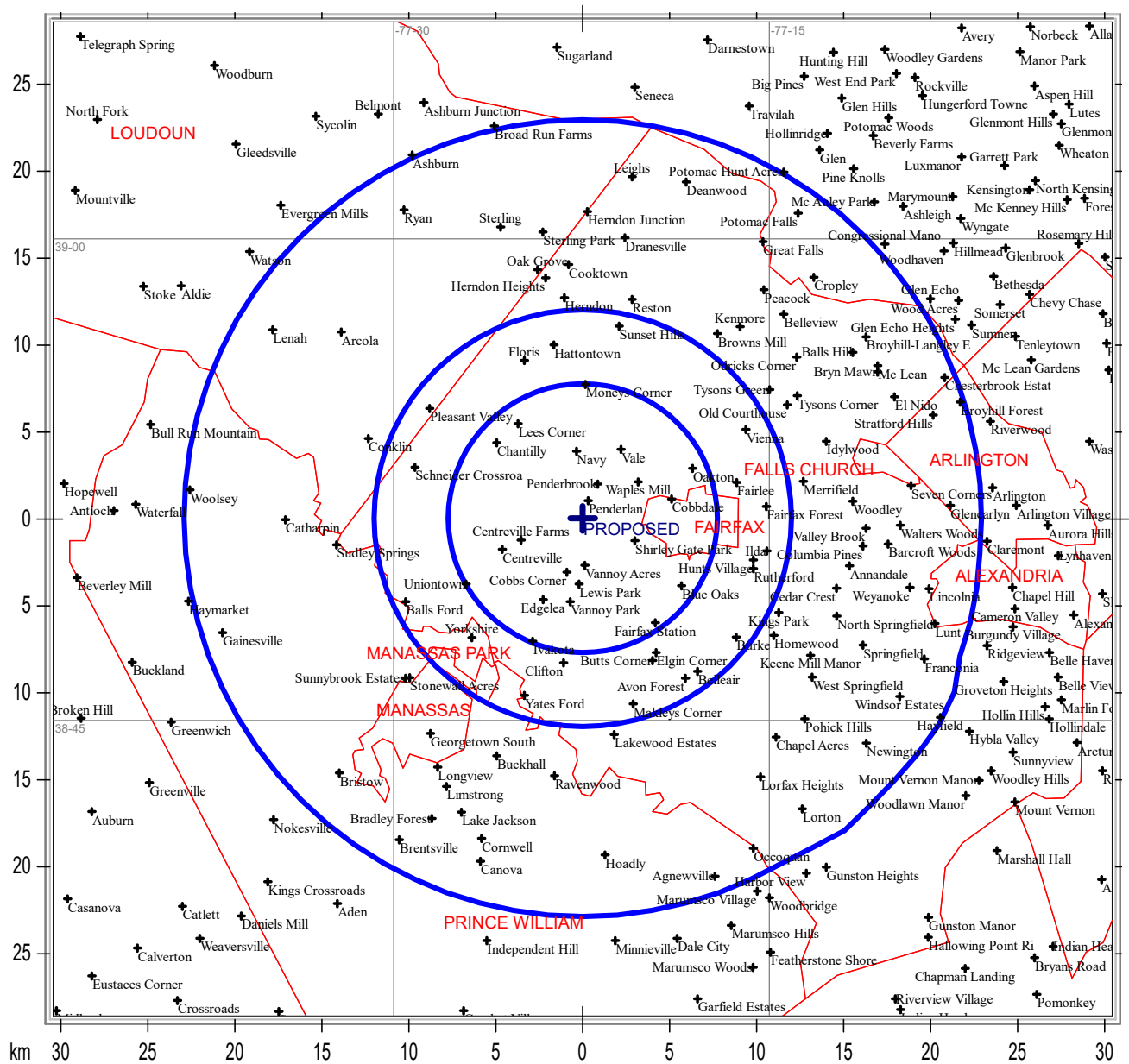
State Borders      Lat/Lon Grid

## WKDV(AM) 1460 kHz 0.5 kW ND DAY CHANTILLY, VIRGINIA

*Communications Technologies Medford, New Jersey*

State Borders      Streets      Lat/Lon Grid

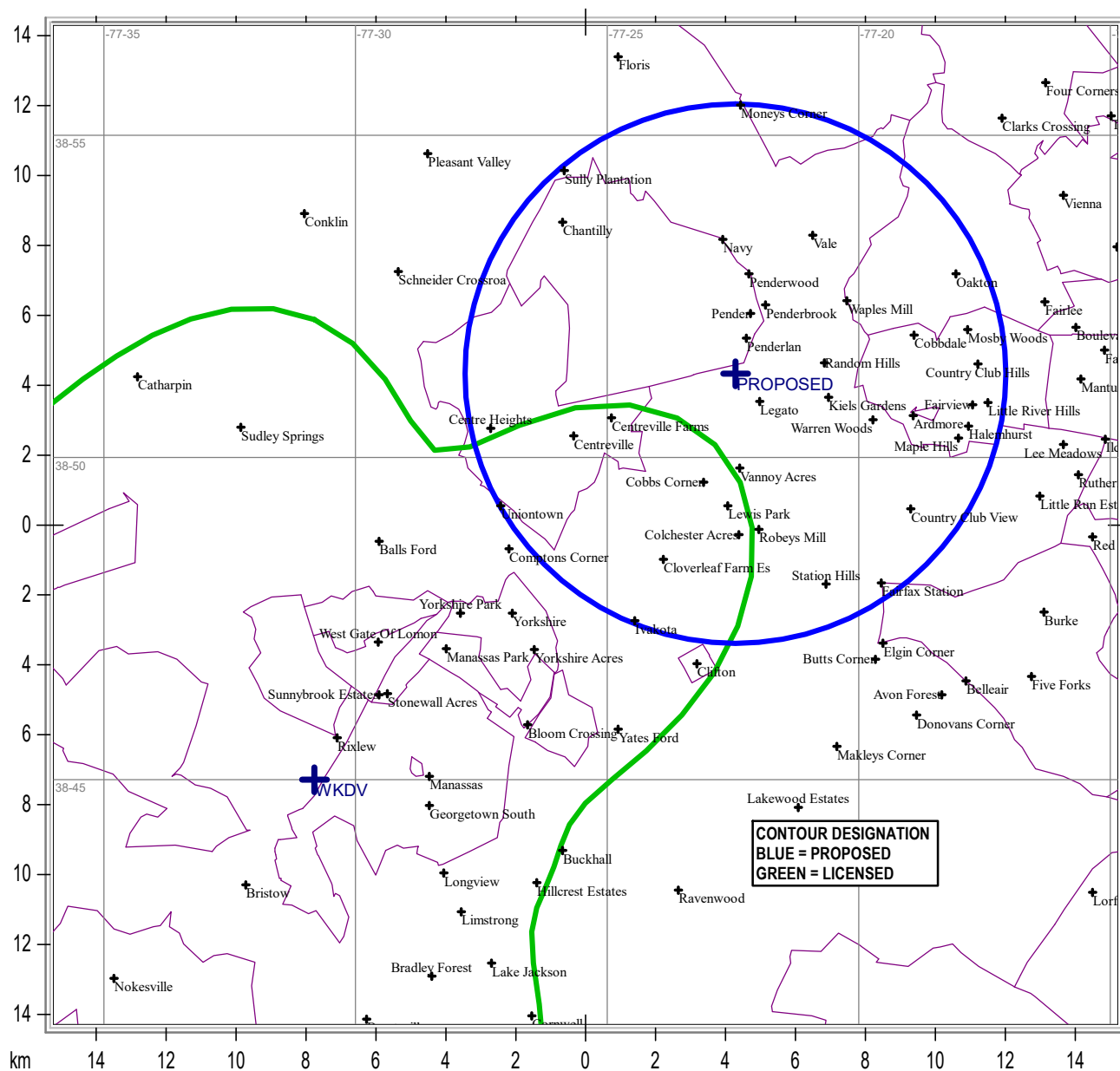
## WKDV(AM) 1460 kHz 0.5 kW ND DAY CHANTILLY, VIRGINIA



Communications Technologies Medford, New Jersey

County Borders      Lat/Lon Grid

## WKDV 1460 kHz 0.5 kW ND DAY CHANTILLY, VIRGINIA



Communications Technologies Medford, New Jersey

State Borders
  City Borders
  Lat/Lon Grid