



Engineering Exhibit

***Minor Change Application to Modify
Construction Permit BMP-20070119AFM
Throw Fire Project
KYES(AM), 1180 KHz
Rockville, Minnesota***

February 2008

Prepared by:

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ENGINEERING STATEMENT

APPLICATION TO MODIFY CONSTRUCTION PERMIT THROW FIRE PROJECT KYES(AM), ROCKVILLE, MINNESOTA

1180 KHz 50 KW-D / 5 KW-N / 8 KW-CH DA-3

This Engineering Statement and attached exhibits have been prepared on behalf of Throw Fire Project, permittee of a new AM station, KYES, to operate on 1180 KHz at Rockville, Minnesota. The purpose of this FCC Form 301 application is to request authority to increase the authorized daytime power from 35 KW to 50 KW.

PROPOSED FACILITIES

The proposed antenna array will consist of seven uniform cross section guyed radiating towers arranged in a rectangular-like configuration with the long sides oriented northwest to southeast (see attached Figure 4). Towers 1 and 7 will be used for both the daytime and critical hours operations. Towers 1 through 6 will be used for the nighttime operation. All towers will be 84.6 degrees in radiating height, and 199 feet overall AGL.

The operating power will be 50 kilowatts daytime, 5.0 kilowatts nighttime, and 8.0 KW critical hours. Separate radiation patterns for day and night operation will be used, and the day pattern will be used during critical hours at the reduced power of 8 KW.

SIGNAL COVERAGE

The proposed KYES facility will easily serve Rockville with a 5 mV/m daytime signal (see attached Figure 8-A).

The nighttime interference-free signal for KYES, calculated in accordance with FCC rules, is 8.86 mV/m, limited by the interfering signal of WHAM, 1180 KHz in Rochester, NY. As seen in attached Figure 14, under this proposal, the proposed station will cover at least 80% of Rockville at night with the predicted 8.86 mV/m contour, thus meeting the requirement of §73.24(i) of FCC rules.



Engineering Statement - Page 2
KYES, Rockville, MN

The proposed KYES daytime 1000 mV/m contour encompasses only 141 residents. The nighttime 1000 mV/m contour is wholly contained within the day 1000 mV/m contour, so it does not encompass any more residents. Thus, this proposal is in compliance with §73.24(g) of the FCC Rules.

DAYTIME ALLOCATIONS

The proposed KYES facility will observe all daytime contour protection requirements with respect to both existing and proposed operations within 30 KHz of 1180 KHz in accordance with §73.37 of the FCC Rules (see Figure 7). All daytime contours shown in the attachments have been determined using M-3 conductivities.

NIGHTTIME ALLOCATIONS

The proposed KYES nighttime facility will not cause prohibited skywave interference to the service area of any other co- or adjacent-channel station. Based upon the 25% exclusion method for calculating RSS limits of domestic stations, the proposed nighttime facility will not raise the RSS limit of any station already experiencing an RSS limit in excess of normal protection (see attached Figure 16).

WHAM in Rochester, NY is the domestic Class A station on 1180 KHz. The facility proposed herein will protect WHAM's nighttime 0.5 mV/m 50% skywave contour within U.S. land area (see Figure 16).

CRITICAL HOURS PROTECTION OF THE CLASS A STATION

The proposed KYES facility will operate at the reduced power of 8.0 KW using the daytime pattern, so as to protect the 0.1 mV/m groundwave signal of WHAM, the Class A station in Rochester, NY, during critical hours.

Using the methods described in §73.187, it has been determined that the proposed KYES facility will not exceed the maximum permissible radiation at any azimuth where the WHAM 0.1 mV/m contour encompasses U.S. land area (see Figure 16-A for critical hours calculations).



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KYES, Rockville, MN

TOWER FENCES

Fences will be erected around each tower to prevent persons from traveling or standing in areas where the RF radiation levels may exceed the FCC maximum exposure limits. The distances to these fences will comply with Supplement A of OET Bulletin 65, Edition 97-01, dated August 1997, or RFR measurements will be taken on the constructed facility to demonstrate that smaller-radius fences would be adequate.

ENVIRONMENTAL MATTERS

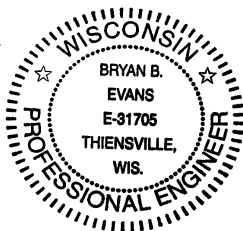
The proposed facility is not deemed to be a major environmental action as defined in §1.1306 of the FCC Rules. The proposed site is not in any area described in §1.1307(a)(1) through (7) of the FCC Rules. The tower fences as described above will assure that the levels of RF exposure in areas accessible to the public will be below FCC maximum exposure limits. Therefore, this proposal is excluded from environmental processing.

This statement and attached figures are true and accurate to the best of my knowledge and belief.

A handwritten signature in black ink, appearing to read "B. Benjamin Evans".

B. Benjamin Evans, P.E.
Consulting Engineer for Throw Fire Project

February 14, 2008





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KYES, Rockville, MN

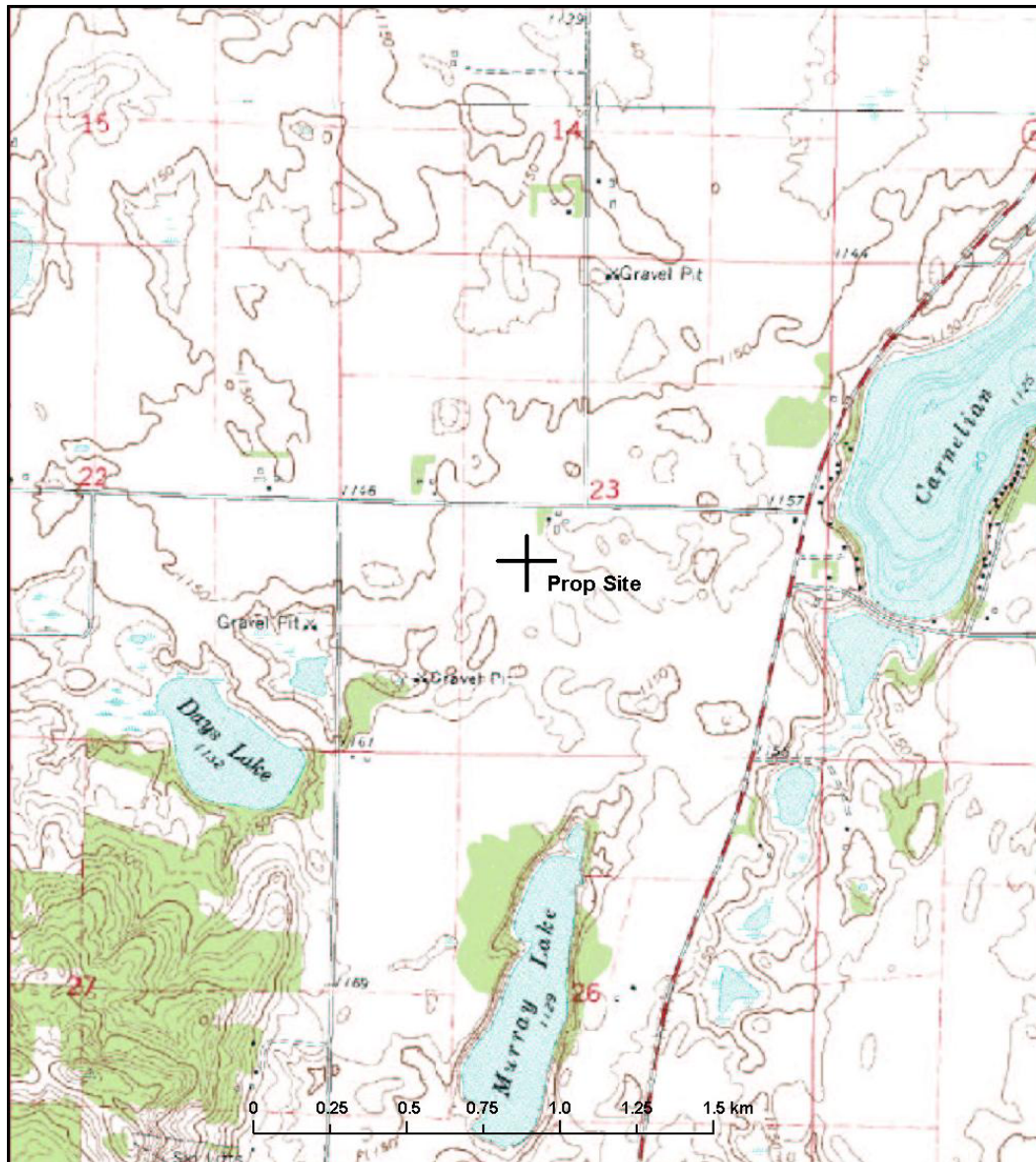
ATTACHED FIGURES:

- Figure 1 - - - Topographic Map Showing Proposed Site
- Figure 2 - - - Aerial Photograph of Proposed Site
- Figure 3 - - - Vertical Plan Tower Sketch
- Figure 4 - - - Tower Layout & Ground System Sketch
- Figure 5 - - - Daytime Directional Standard Pattern Polar Plot
- Figure 6 - - - Specifications of Proposed Daytime Pattern
- Figure 7 - - - Daytime Allocation Study
- Figure 8 - - - Proposed Daytime Service Contours
- Figure 9 - - - Critical Hours Directional Standard Pattern Polar Plot
- Figure 10 - - Specifications of Proposed Critical Hours Pattern
- Figure 11 - - Proposed Critical Hours Service Contours
- Figure 12 - - Nighttime Directional Standard Pattern Polar Plot
- Figure 13 - - Specifications of Proposed Nighttime Pattern
- Figure 14 - - Proposed Nighttime Service Contours
- Figure 15 - - Proposed 1000 mV/m Contours
- Figure 16 - - Nighttime Radiation Limit Calculations
- Figure 16-A - Critical Hours Study

FIGURE 1

Topographic Map Showing Proposed Transmitter Site

**New AM Station, 1180 KHz
Rockville, MN**



**7.5 Minute Series USGS Topo Map
Kimball Quadrangle**

Site Coordinates: 45°-21'-42" N. Lat.; 94°-17'-39" W. Long.

FIGURE 2

Aerial Photograph of Proposed Transmitter Site

**New AM Station, 1180 KHz
Rockville, MN**

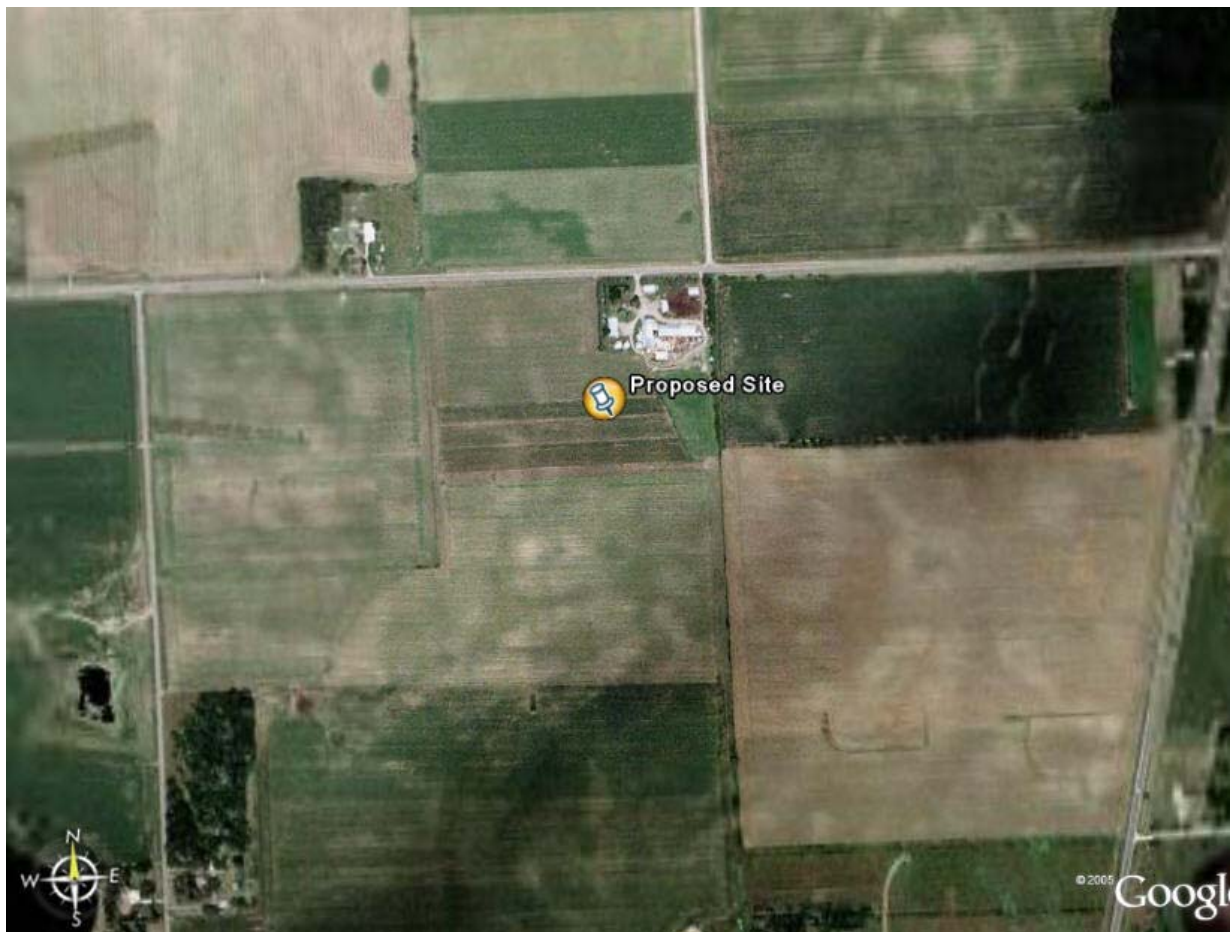


FIGURE 3

Vertical Plan Sketch of Antenna Structure

**New AM Station, 1180 KHz
Rockville, MN**

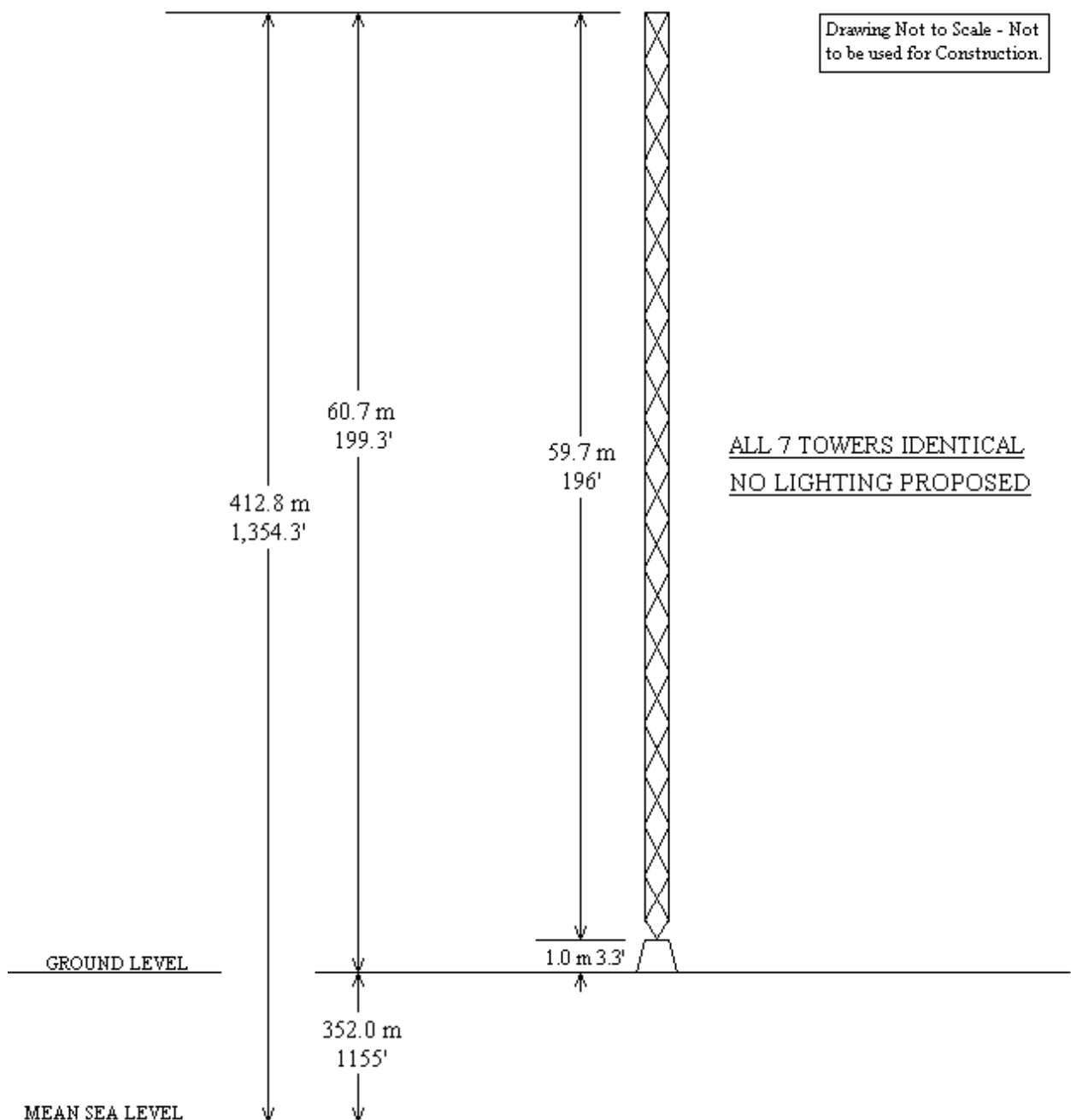
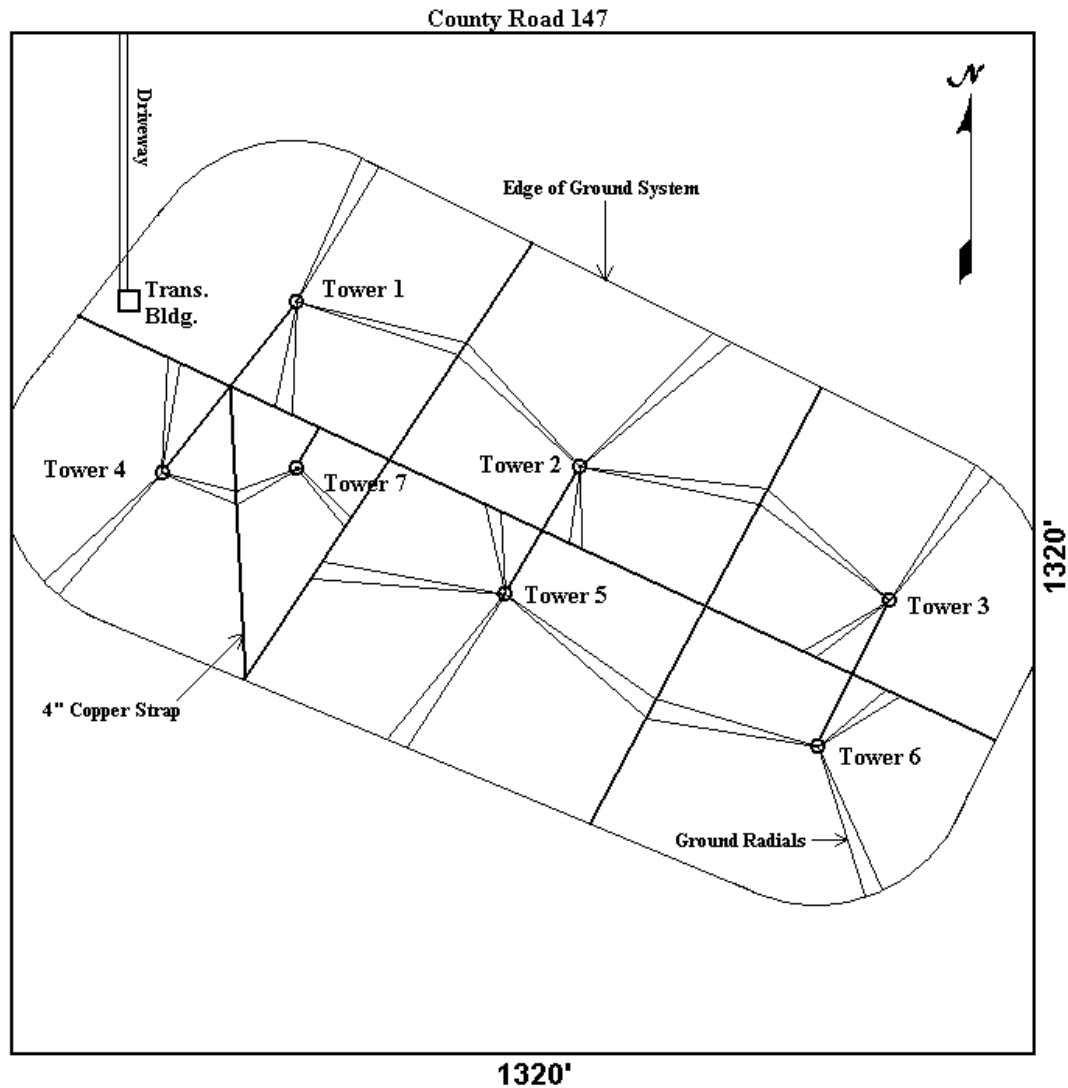


FIGURE 4

Proposed Tower Layout & Ground System

**New AM Station, 1180 KHz
Rockville, MN**



Ground Radials will consist of 240 #10 bare copper wires, buried 4 to 6 inches below ground, extending at least 208 feet or to intersecting 4-inch copper strap, or to property boundary.

This is a plan drawing only, and should not be used for construction.

FIGURE 5

*Proposed Daytime Standard Pattern
New AM Station, 1180 KHz, Rockville, MN*

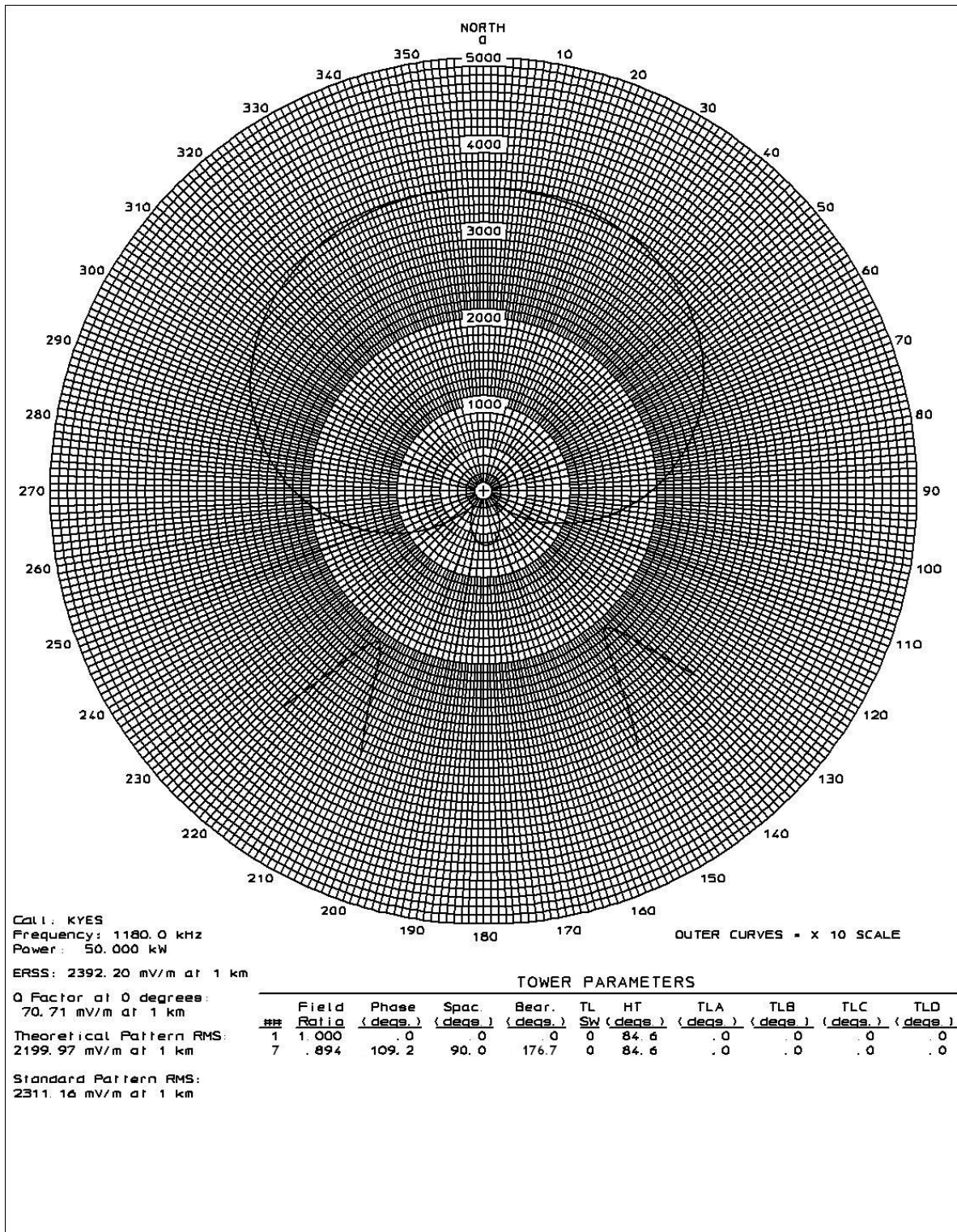




FIGURE 6

SPECIFICATIONS OF PROPOSED DAYTIME PATTERN

Station: NEW AM, ROCKVILLE MN

Frequency: 1180.0 kHz

Power: 50.000 kW

ERSS: 2392.20 mV/m at 1 km

Multiplying Constant (K factor): 1783.42 mV/m at 1 km

Q Factor (elevation angle = 0 degrees): 70.71

Theoretical Pattern RMS: 2199.97 mV/m at 1 km

Standard Pattern RMS: 2311.16 mV/m at 1 km

ANTENNA TOWER PARAMETERS:

Field	Phase	Spac.	Bear.	TL	HT	TLA	TLB	TLC	TLD
Ratio	(deg.)	(deg.)	(deg.)	SW	(deg.)	(deg.)	(deg.)	(deg.)	(deg.)
1 1.000	.0	.0	.0	0	84.6	.0	.0	.0	.0
7 .894	109.2	90.0	176.7	0	84.6	.0	.0	.0	.0

CALCULATED STANDARD PATTERN RADIATIONS (in mV/m at 1 km)							
Elevation Angle = 0°							
Az.(°T)	Rad.(mV/m)	Az.(°T)	Rad.(mV/m)	Az.(°T)	Rad.(mV/m)	Az.(°T)	Rad.(mV/m)
.0	3497.19	90.0	1930.42	180.0	623.15	270.0	2189.94
5.0	3492.99	95.0	1724.65	185.0	600.45	275.0	2374.17
10.0	3484.77	100.0	1514.12	190.0	558.63	280.0	2545.45
15.0	3471.80	105.0	1301.97	195.0	498.70	285.0	2702.21
20.0	3453.09	110.0	1091.53	200.0	422.80	290.0	2843.38
25.0	3427.37	115.0	886.34	205.0	335.95	295.0	2968.43
30.0	3393.22	120.0	690.43	210.0	252.15	300.0	3077.28
35.0	3349.13	125.0	509.03	215.0	211.99	305.0	3170.35
40.0	3293.56	130.0	351.31	220.0	267.81	310.0	3248.45
45.0	3225.02	135.0	239.38	225.0	398.29	315.0	3312.68
50.0	3142.25	140.0	216.05	230.0	565.08	320.0	3364.42
55.0	3044.19	145.0	276.97	235.0	751.84	325.0	3405.16
60.0	2930.18	150.0	364.39	240.0	951.20	330.0	3436.44
65.0	2799.95	155.0	448.61	245.0	1158.47	335.0	3459.77
70.0	2653.70	160.0	519.75	250.0	1369.84	340.0	3476.53
75.0	2492.16	165.0	574.05	255.0	1581.82	345.0	3487.88
80.0	2316.54	170.0	609.82	260.0	1791.16	350.0	3494.75
85.0	2128.57	175.0	626.29	265.0	1994.79	355.0	3497.76

Daytime Allocation Study - New AM Station, 1180 KHz, Rockville, MN

Figure 7-A

ROCKV-P

Rockville MN
Latitude: 45-21-42 N
Longitude: 094-17-39 W
Power: 50.0 kW
Frequency: 1180 KHz
Horiz. Pattern: DA
Prop Model: FCC

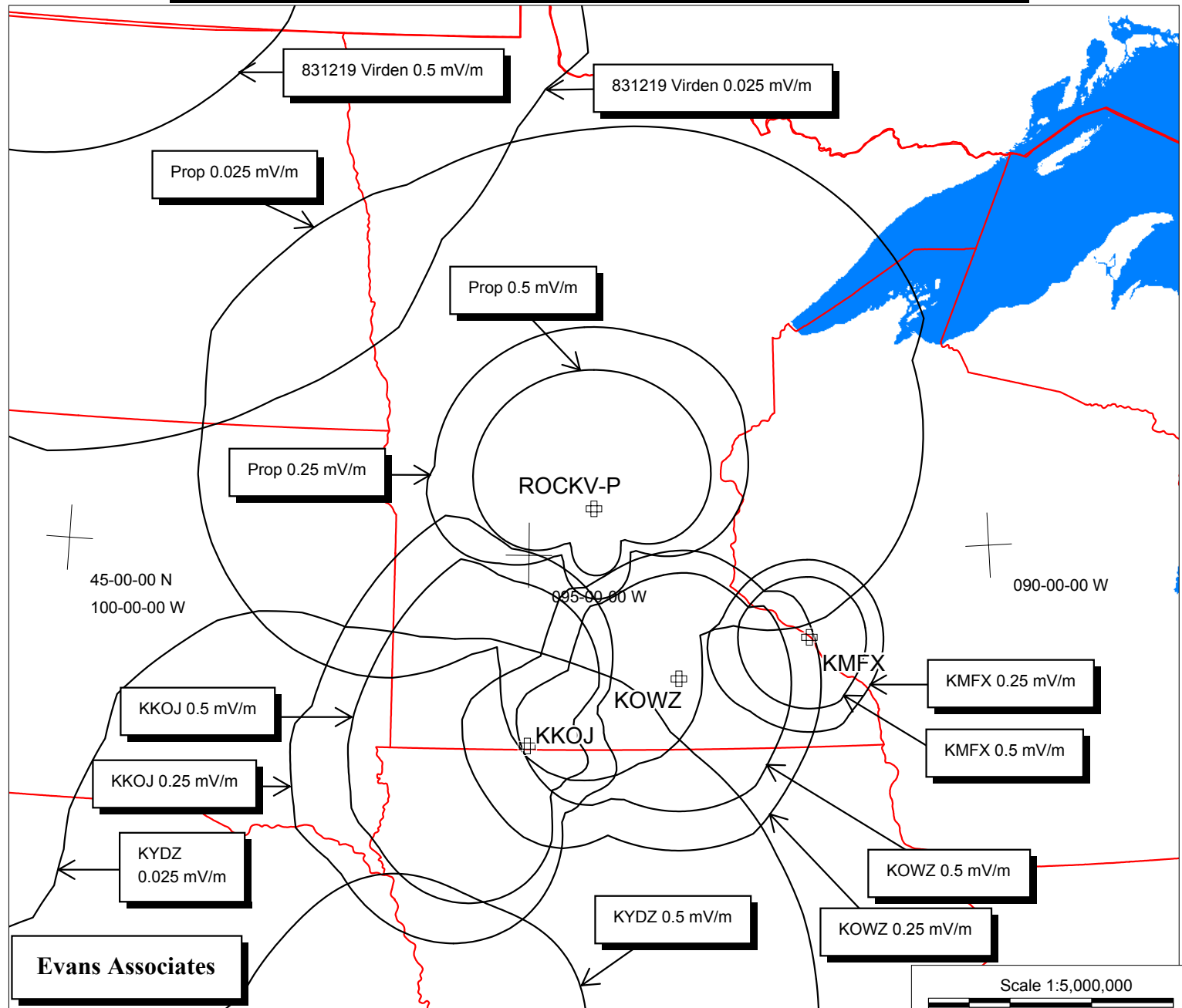
KOWZ Waseca MN
1170 KHz
BL-20050531BZB
2.5 KW ND

KYDZ Bellevue NE
1180 KHz
BL-19960522AA
25 KW DA

831219 App
Virden MB CA
1180 KHz
10 KW ND

KKOJ Jackson MN
1190 KHz
BL-19940418AD
5.0 KW DA

KMFX Wabasha MN
1190 KHz
BL-20061116AFG
1.0 KW ND



Daytime Allocation Study - New AM Station, 1180 KHz, Rockville, MN

Figure 7-B

ROCKV-P

Rockville MN
Latitude: 45-21-42 N
Longitude: 094-17-39 W
Power: 50.0 kW
Frequency: 1180 KHz
Horiz. Pattern: DA
Prop Model: FCC

KASM Albany MN
1150 KHz
BL-19930917AC
2.1 KW ND

NEW Braham MN
1160 KHz
BNP-20040130AUA
4.4 KW DA

NEW Wyoming MN
1160 KHz
BNP-20040130BCQ
1.4 KW DA

NEW Bethel MN
1200 KHz
BNP-20040128APK
25 KW DA

NEW Chanhassen MN
1200 KHz
BNP-20071228AAE
1.3 KW ND

NEW Rockford MN
1200 KHz
BNP-20040130ARC
0.25 KW ND

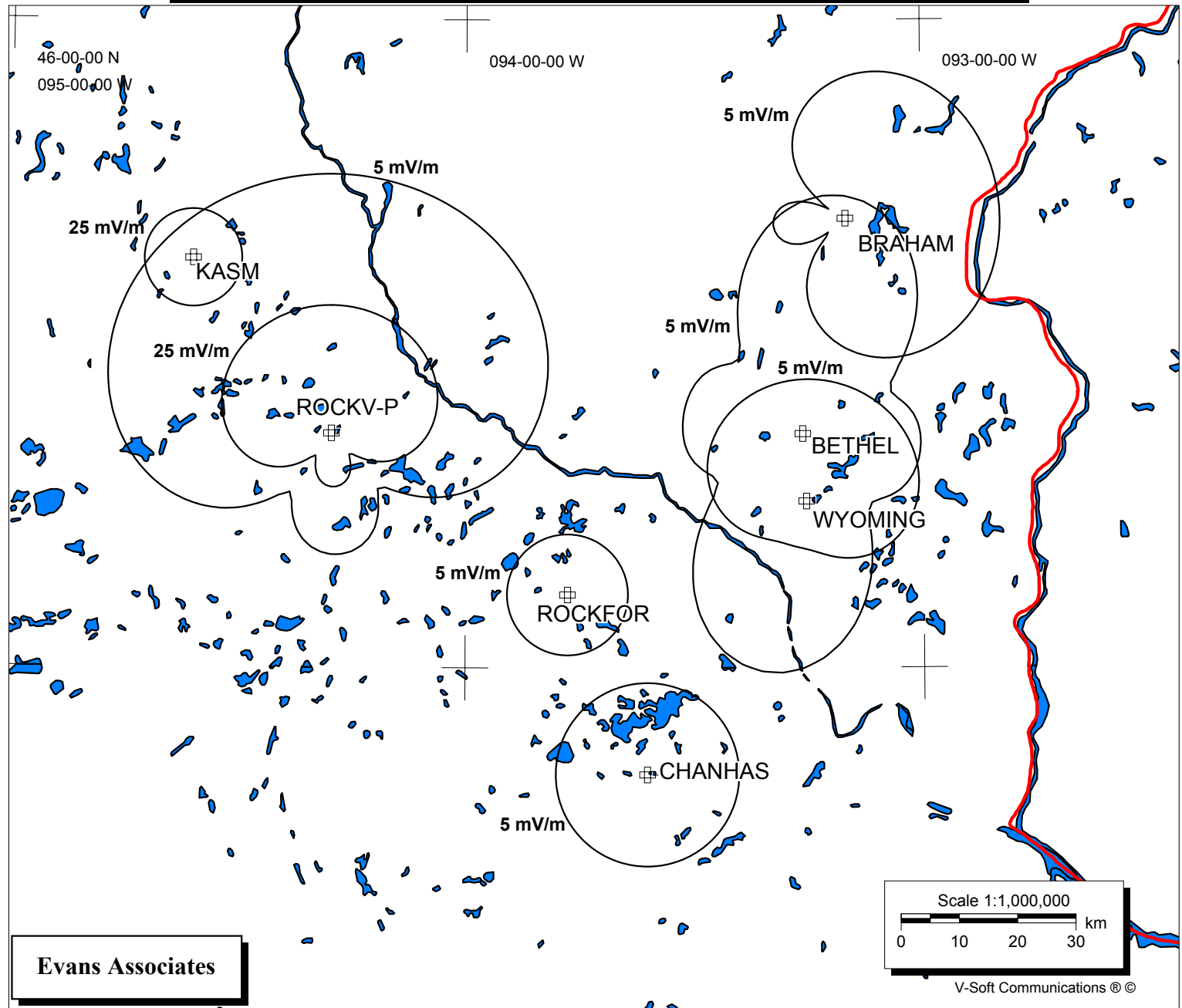


FIGURE 8-A

Proposed Daytime Service Contours - New AM, 1180 KHz, Rockville MN

1180
Latitude: 45-21-42 N
Longitude: 094-17-39 W
Power: 50.0 kW
Frequency: 1180 KHz
Horiz. Pattern: DA
Prop Model: FCC

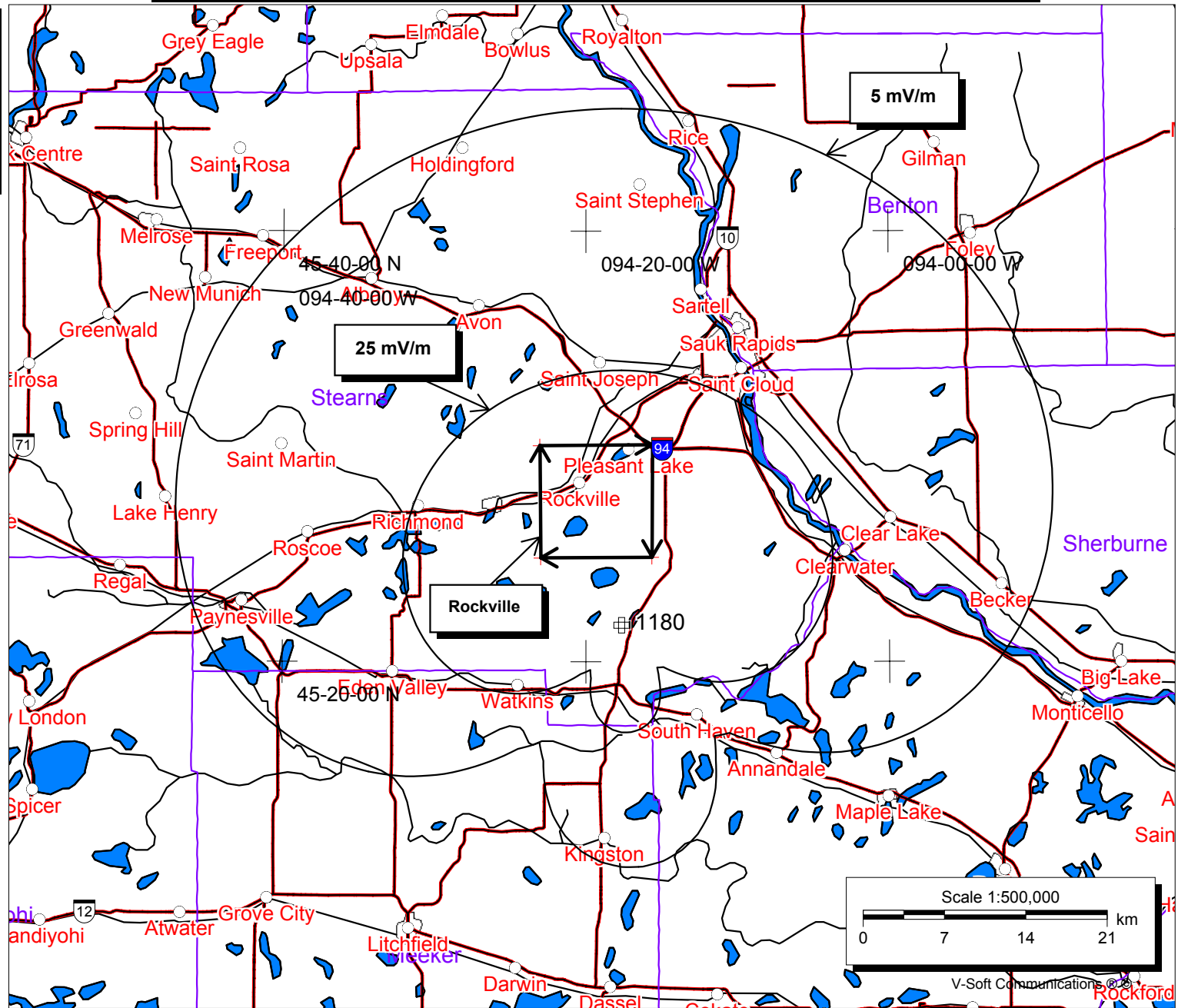
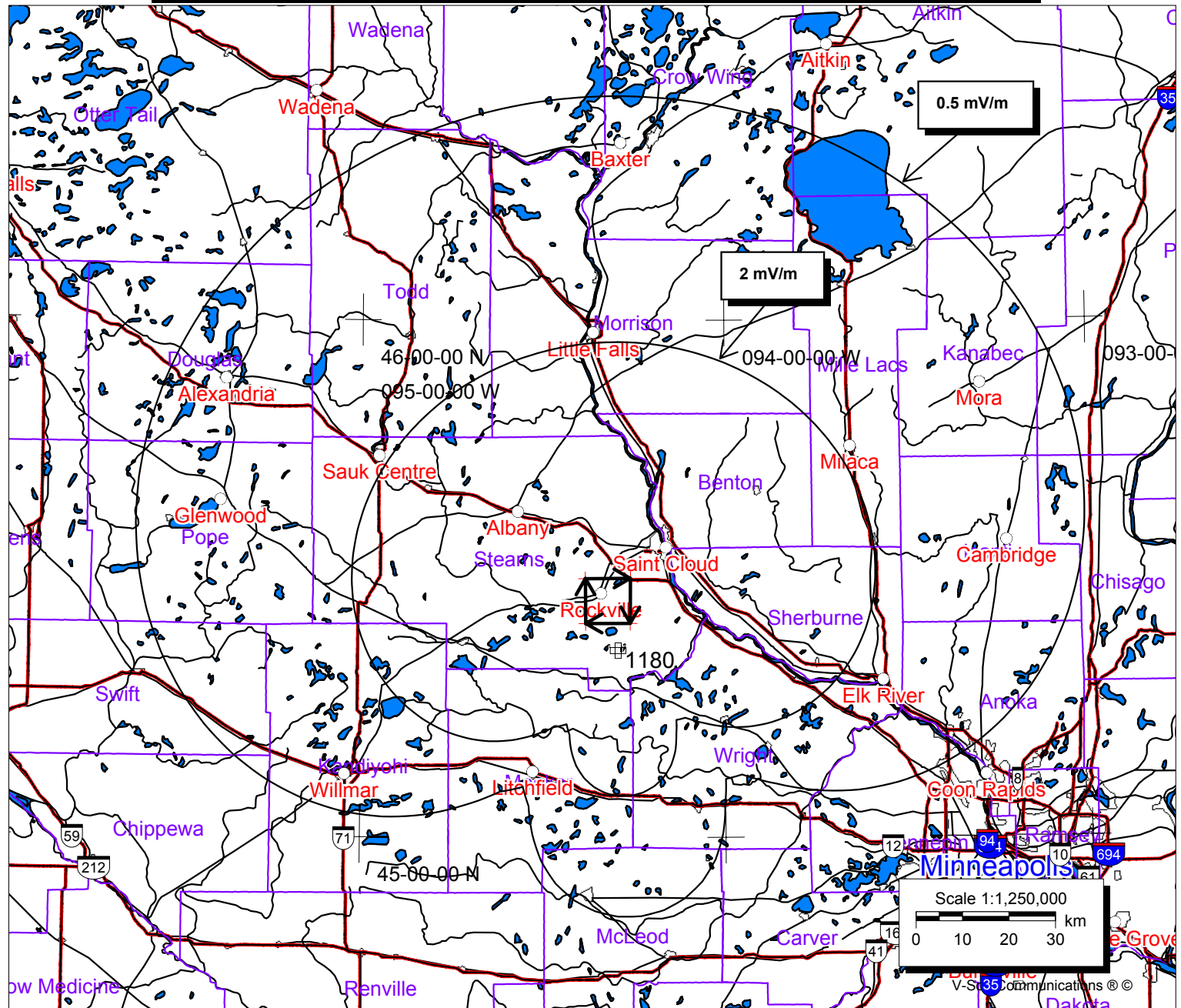


FIGURE 8-B

Proposed Daytime Service Contours - New AM, 1180 KHz, Rockville MN

1180

Latitude: 45-21-42 N
Longitude: 094-17-39 W
Power: 50.0 kW
Frequency: 1180 KHz
Horiz. Pattern: DA
Prop Model: FCC



Evans Associates

FIGURE 9

*Proposed Critical Hours Standard Pattern
New AM Station, 1180 KHz, Rockville, MN*

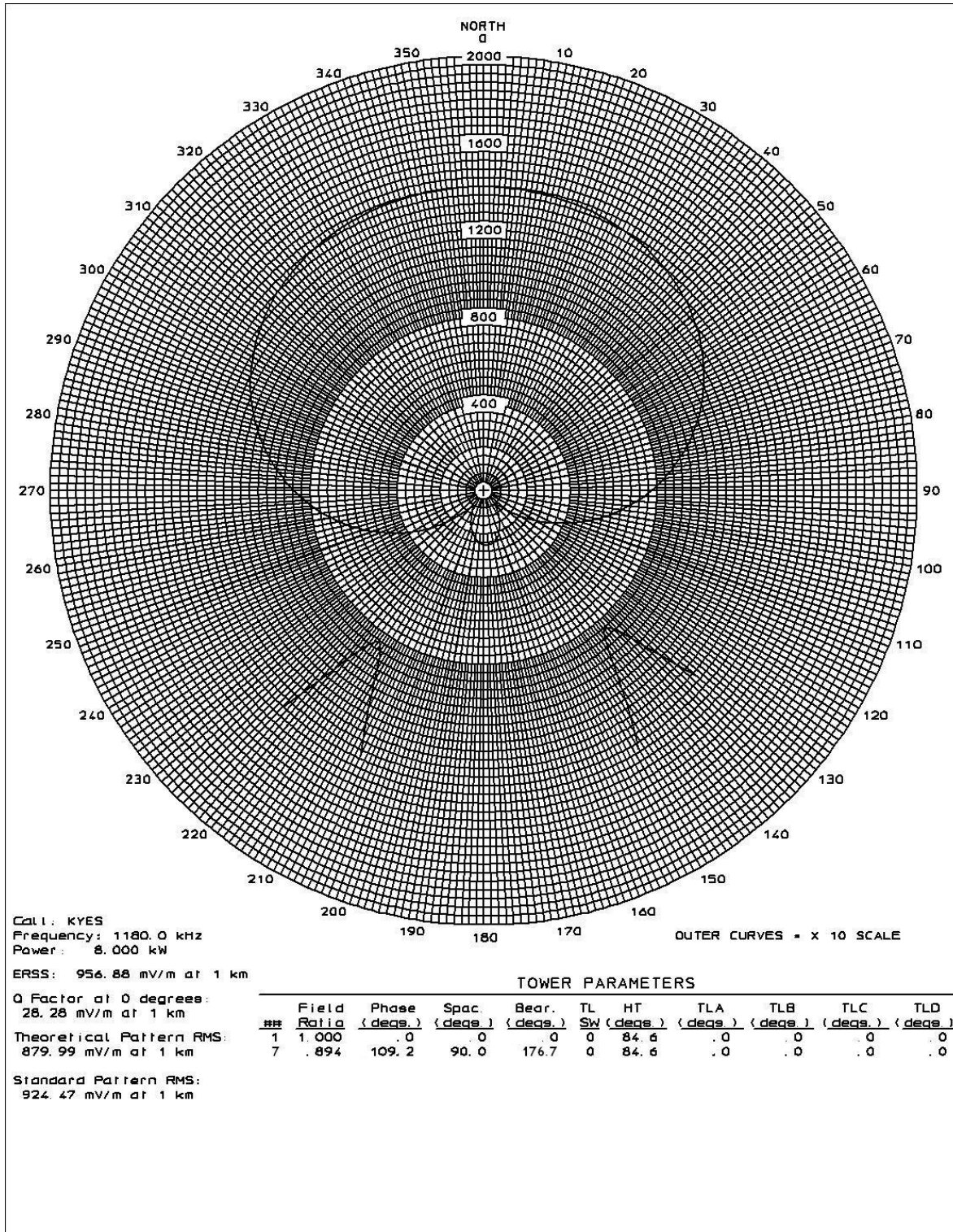




FIGURE 10

SPECIFICATIONS OF PROPOSED CRITICAL HOURS PATTERN

Station: NEW AM, ROCKVILLE MN

Frequency: 1180.0 kHz

Power: 8.000 kW

ERSS: 956.88 mV/m at 1 km

Multiplying Constant (K factor): 713.37 mV/m at 1 km

Q Factor (elevation angle = 0 degrees): 28.28

Theoretical Pattern RMS: 879.99 mV/m at 1 km

Standard Pattern RMS: 924.47 mV/m at 1 km

ANTENNA TOWER PARAMETERS:

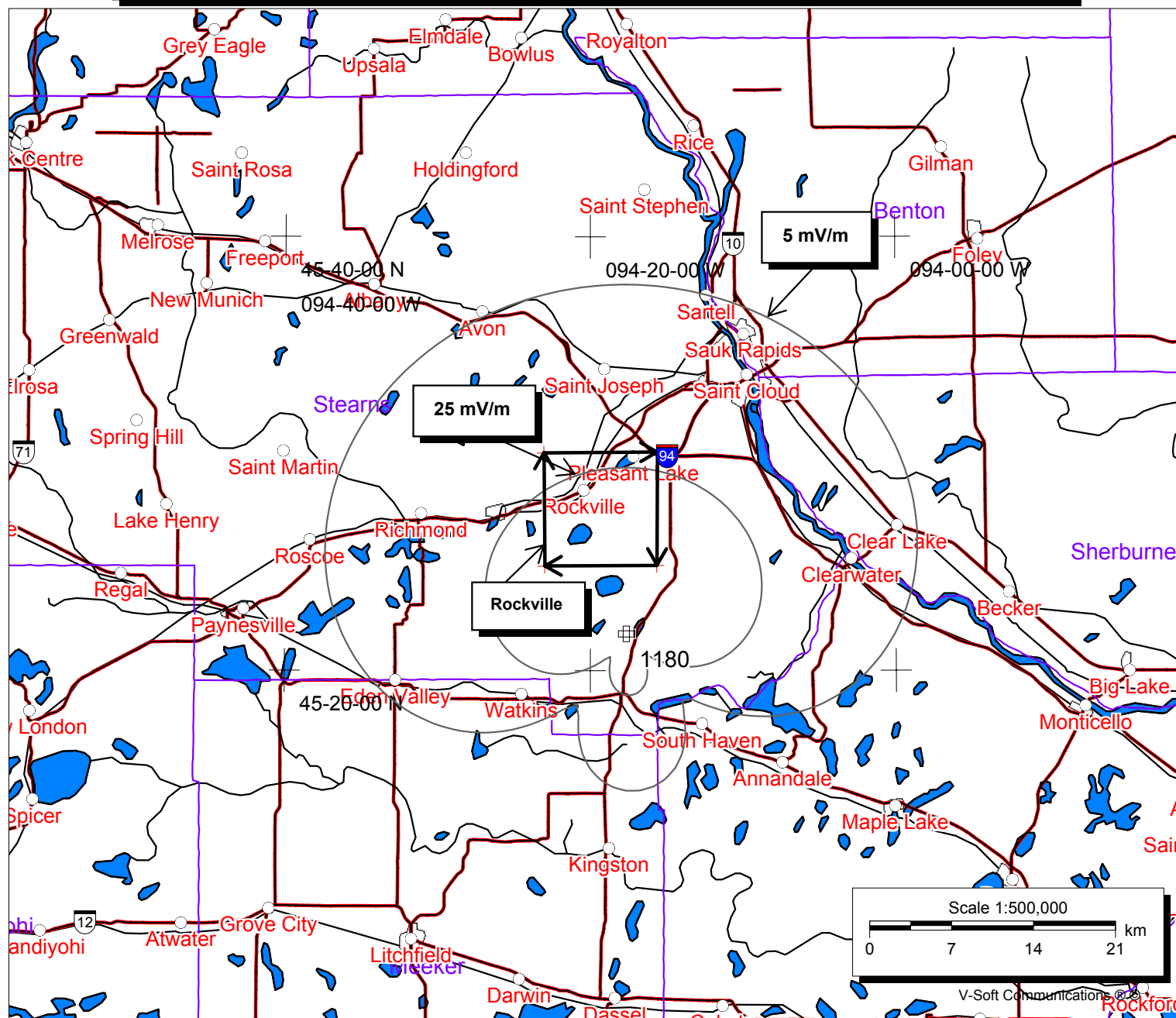
Field	Phase	Spac.	Bear.	TL	HT	TLA	TLB	TLC	TLD
Ratio	(deg.)	(deg.)	(deg.)	SW	(deg.)	(deg.)	(deg.)	(deg.)	(deg.)
1 1.000	.0	.0	.0	0	84.6	.0	.0	.0	.0
7 .894	109.2	90.0	176.7	0	84.6	.0	.0	.0	.0

CALCULATED STANDARD PATTERN RADIATIONS (in mV/m at 1 km)							
Elevation Angle = 0°							
Az.(°T)	Rad.(mV/m)	Az.(°T)	Rad.(mV/m)	Az.(°T)	Rad.(mV/m)	Az.(°T)	Rad.(mV/m)
.0	1398.88	90.0	772.17	180.0	249.26	270.0	875.98
5.0	1397.20	95.0	689.86	185.0	240.18	275.0	949.67
10.0	1393.91	100.0	605.65	190.0	223.45	280.0	1018.18
15.0	1388.72	105.0	520.79	195.0	199.48	285.0	1080.88
20.0	1381.24	110.0	436.61	200.0	169.12	290.0	1137.36
25.0	1370.95	115.0	354.54	205.0	134.38	295.0	1187.37
30.0	1357.29	120.0	276.17	210.0	100.86	300.0	1230.92
35.0	1339.66	125.0	203.61	215.0	84.80	305.0	1268.14
40.0	1317.43	130.0	140.52	220.0	107.12	310.0	1299.38
45.0	1290.01	135.0	95.75	225.0	159.32	315.0	1325.08
50.0	1256.90	140.0	86.42	230.0	226.03	320.0	1345.77
55.0	1217.68	145.0	110.79	235.0	300.73	325.0	1362.07
60.0	1172.07	150.0	145.75	240.0	380.48	330.0	1374.58
65.0	1119.98	155.0	179.45	245.0	463.39	335.0	1383.91
70.0	1061.48	160.0	207.90	250.0	547.94	340.0	1390.61
75.0	996.86	165.0	229.62	255.0	632.73	345.0	1395.15
80.0	926.62	170.0	243.93	260.0	716.46	350.0	1397.90
85.0	851.43	175.0	250.52	265.0	797.92	355.0	1399.11

Proposed Critical Hours Service Contours - New AM, 1180 KHz, Rockville MN

1180

Latitude: 45-21-42 N
 Longitude: 094-17-39 W
 Power: 8.0 kW
 Frequency: 1180 KHz
 Horiz. Pattern: DA
 Prop Model: FCC



Proposed Critical Hours Service Contours - New AM, 1180 KHz, Rockville MN

FIGURE 11-B

1180
 Latitude: 45-21-42 N
 Longitude: 094-17-39 W
 Power: 8.0 kW
 Frequency: 1180 KHz
 Horiz. Pattern: DA
 Prop Model: FCC

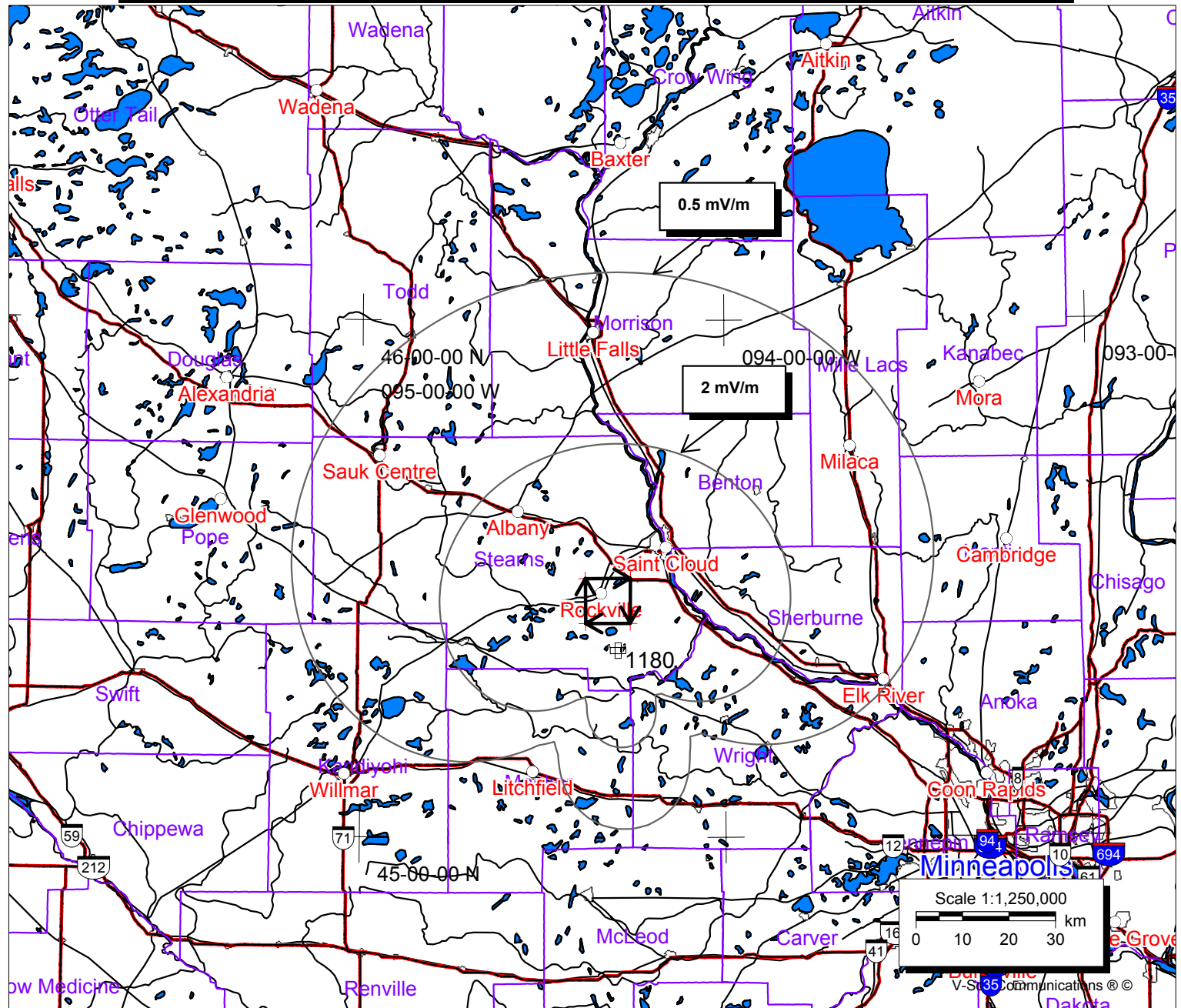


FIGURE 12

***Proposed Nighttime Standard Pattern
New AM Station, 1180 KHz, Rockville, MN***

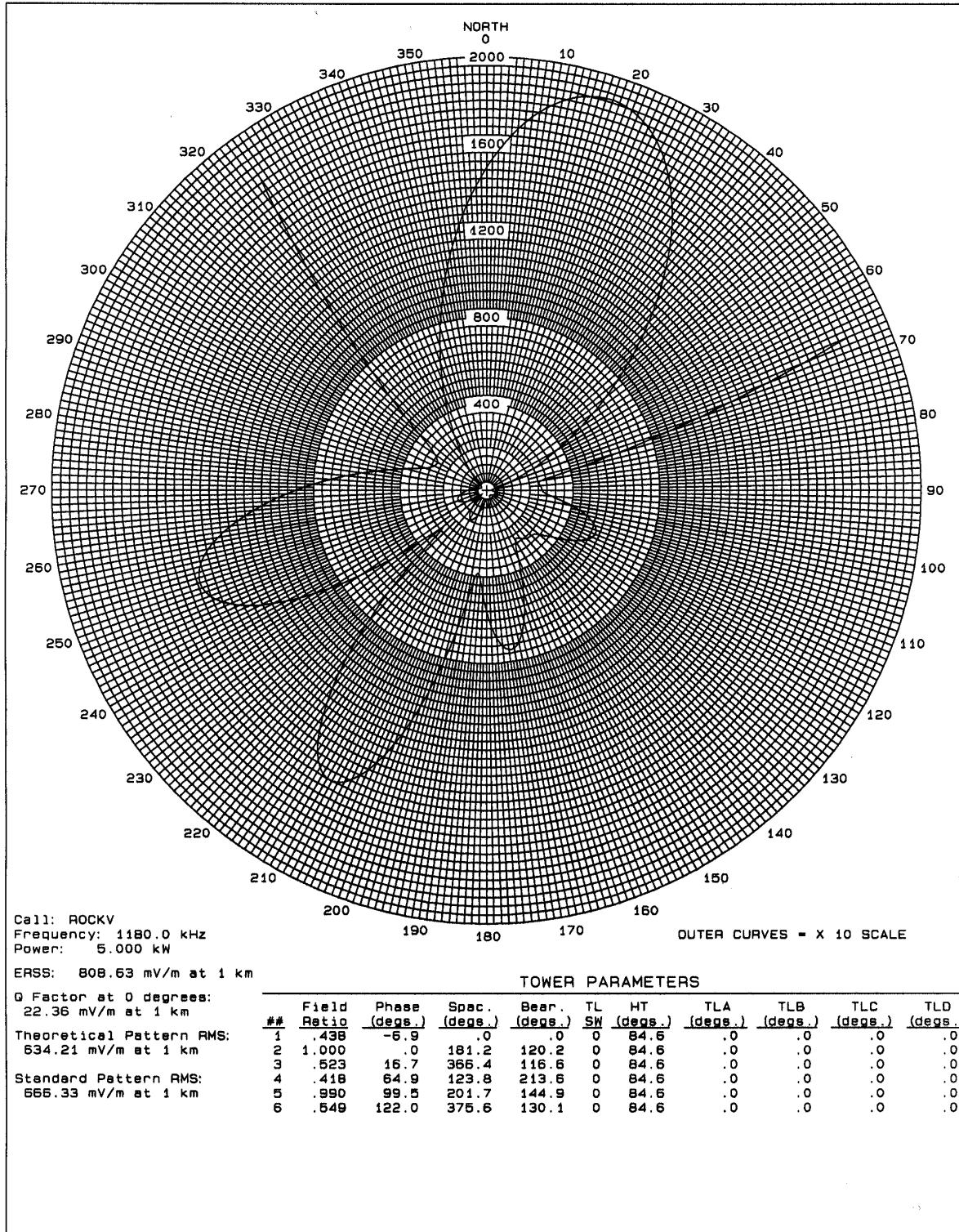


FIGURE 13

SPECIFICATIONS OF PROPOSED NIGHTTIME PATTERN

Station: NEW AM, ROCKVILLE MN

Frequency: 1180.0 kHz

Power: 5.000 kW

ERSS: 808.63 mV/m at 1 km

Multiplying Constant (K factor): 473.09 mV/m at 1 km

Q Factor (elevation angle = 0 degrees): 22.36

Theoretical Pattern RMS: 634.21 mV/m at 1 km

Standard Pattern RMS: 666.33 mV/m at 1 km

ANTENNA TOWER PARAMETERS:

##	Field Ratio	Phase (degs.)	Spac. (degs.)	Bear. (degs.)	TL SW	HT (degs.)	TLA (degs.)	TLB (degs.)	TLC (degs.)	TLD (degs.)
1	.438	-6.9	.0	.0	0	84.6	.0	.0	.0	.0
2	1.000	.0	181.2	120.2	0	84.6	.0	.0	.0	.0
3	.523	16.7	366.4	116.6	0	84.6	.0	.0	.0	.0
4	.418	64.9	123.8	213.6	0	84.6	.0	.0	.0	.0
5	.990	99.5	201.7	144.9	0	84.6	.0	.0	.0	.0
6	.549	122.0	375.6	130.1	0	84.6	.0	.0	.0	.0

CALCULATED STANDARD PATTERN RADIATIONS (in mV/m at 1 km)

-----Elevation Angles (°):-----

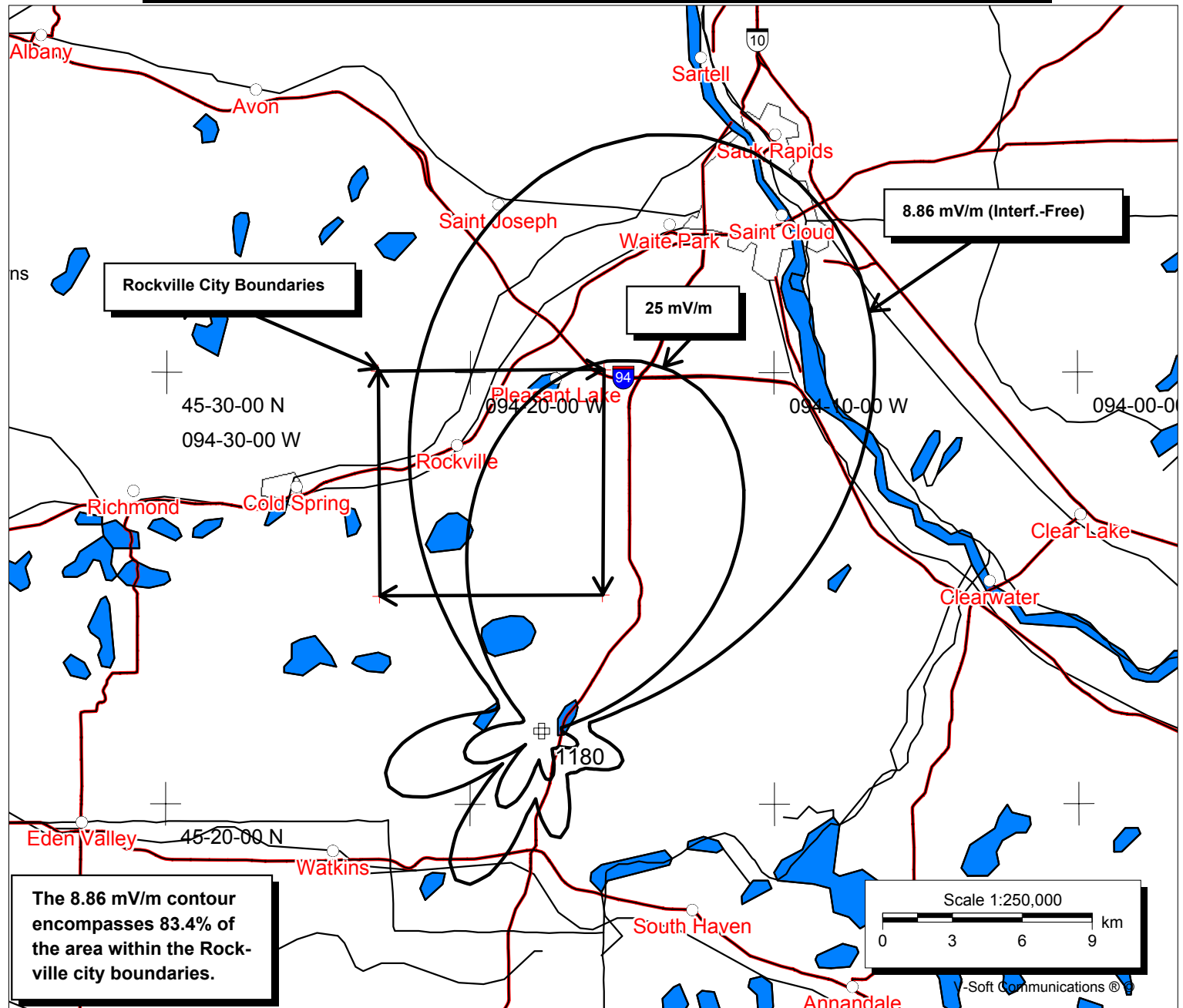
Az.(°T)	0	5	10	15	20	25	30	35	40
.0	1491.48	1486.82	1472.68	1448.67	1414.20	1368.56	1311.03	1241.04	1158.34
5.0	1675.43	1668.51	1647.74	1613.06	1564.43	1501.88	1425.60	1336.03	1233.94
10.0	1810.51	1801.80	1775.74	1732.59	1672.80	1597.06	1506.31	1401.82	1285.19
15.0	1882.96	1873.13	1843.80	1795.44	1728.85	1645.15	1545.81	1432.64	1307.76
20.0	1884.78	1874.66	1844.47	1794.79	1726.55	1641.05	1539.96	1425.28	1299.29
25.0	1815.00	1805.43	1776.88	1729.88	1665.27	1584.27	1488.40	1379.50	1259.66
30.0	1679.82	1671.55	1646.85	1606.08	1549.85	1479.01	1394.65	1298.13	1191.04
35.0	1491.70	1485.29	1466.09	1434.23	1389.95	1333.59	1265.63	1186.72	1097.68
40.0	1267.60	1263.34	1250.53	1229.06	1198.77	1159.45	1110.87	1052.88	985.42
45.0	1026.67	1024.59	1018.24	1007.33	991.36	969.64	941.31	905.44	861.06
50.0	787.85	787.70	787.12	785.71	782.78	777.34	768.09	753.44	731.65
55.0	567.69	569.02	572.89	578.93	586.47	594.44	601.35	605.27	603.87
60.0	378.69	380.92	387.54	398.36	412.92	430.39	449.39	467.94	483.38
65.0	228.46	230.96	238.51	251.20	269.01	291.59	318.01	346.55	374.55
70.0	119.79	121.96	128.68	140.43	157.81	181.19	210.36	244.14	280.16
75.0	52.10	53.38	57.59	65.76	79.28	99.49	127.12	161.77	201.52
80.0	25.48	25.44	25.64	27.25	32.69	45.26	67.21	98.85	138.61
85.0	25.02	24.79	24.29	23.52	21.96	21.06	29.70	53.84	90.41
90.0	25.73	25.20	24.65	25.60	26.90	25.15	19.72	25.90	55.39
95.0	30.06	28.15	24.35	23.71	27.73	30.68	27.06	18.42	32.10
100.0	39.80	36.57	28.66	22.47	25.61	32.21	32.92	24.08	20.06
105.0	49.25	45.34	35.12	24.27	23.86	31.94	35.83	29.52	17.94

CALCULATED STANDARD PATTERN RADIATIONS (in mV/m at 1 km)									
-----Elevation Angles (°):-----									
Az.(°T)	0	5	10	15	20	25	30	35	40
110.0	54.00	49.93	39.11	26.70	23.86	31.81	37.13	32.61	19.75
115.0	52.67	48.87	38.84	27.62	25.26	32.59	37.73	33.70	21.19
120.0	46.30	43.16	35.18	27.40	27.54	34.04	37.77	33.12	21.45
125.0	37.91	35.81	30.97	27.82	30.29	35.35	36.84	30.96	21.21
130.0	31.61	30.72	29.21	29.56	32.55	35.42	34.36	27.54	22.36
135.0	29.50	29.44	29.73	31.04	32.88	33.30	30.20	24.39	27.49
140.0	28.95	29.08	29.53	30.21	30.45	29.15	26.09	25.72	37.73
145.0	27.07	27.12	27.26	27.32	26.99	26.39	27.53	35.15	52.34
150.0	26.64	26.75	27.09	27.77	29.10	32.09	38.69	51.02	70.00
155.0	34.82	35.12	36.10	38.01	41.35	47.03	56.25	70.17	89.25
160.0	50.35	50.75	52.07	54.59	58.83	65.55	75.66	89.90	108.51
165.0	65.62	66.09	67.60	70.47	75.24	82.59	93.28	107.80	126.14
170.0	73.94	74.53	76.42	79.96	85.68	94.24	106.19	121.79	140.71
175.0	70.80	71.64	74.30	79.16	86.80	97.74	112.31	130.37	151.19
180.0	55.73	56.79	60.24	66.81	77.26	91.98	110.79	132.96	157.20
185.0	39.12	39.14	40.44	46.10	58.59	77.84	102.31	130.06	159.07
190.0	52.40	49.29	40.96	32.39	36.59	58.32	89.01	123.28	157.89
195.0	89.04	84.19	70.10	48.61	27.62	38.37	74.21	114.98	155.28
200.0	124.58	118.66	101.34	74.04	40.34	24.65	61.64	107.87	153.04
205.0	147.35	140.79	121.61	91.24	52.63	20.92	54.57	104.39	152.83
210.0	151.16	144.46	124.82	93.71	54.04	20.58	55.04	106.18	155.82
215.0	134.31	127.95	109.31	79.80	42.71	22.77	63.69	113.81	162.43
220.0	99.57	94.00	77.71	52.26	24.46	37.15	79.90	126.70	172.32
225.0	54.49	50.24	38.34	24.26	31.71	62.68	101.56	143.26	184.45
230.0	26.84	27.43	31.69	43.90	64.78	92.65	125.53	161.25	197.33
235.0	61.39	63.59	70.38	82.20	99.32	121.59	148.30	178.19	209.33
240.0	99.51	101.15	106.21	115.01	127.95	145.28	166.83	191.88	218.94
245.0	125.73	126.91	130.57	137.13	147.12	161.01	179.02	200.76	225.09
250.0	137.79	138.72	141.68	147.09	155.57	167.72	183.95	204.12	227.30
255.0	136.77	137.67	140.50	145.71	153.93	165.84	181.90	202.12	225.67
260.0	125.66	126.64	129.72	135.36	144.20	156.93	174.07	195.64	220.84
265.0	108.23	109.34	112.83	119.18	129.06	143.23	162.23	186.06	213.85
270.0	88.20	89.42	93.28	100.33	111.34	127.17	148.40	175.01	205.99
275.0	68.63	69.91	74.00	81.55	93.55	110.99	134.54	164.15	198.63
280.0	51.71	52.98	57.08	64.89	77.64	96.56	122.42	155.09	193.15
285.0	38.82	39.98	43.88	51.69	65.02	85.36	113.53	149.28	190.90
290.0	30.60	31.58	35.09	42.76	56.70	78.61	109.25	148.12	193.18
295.0	26.77	27.56	30.73	38.51	53.52	77.48	110.91	153.00	201.31
300.0	26.19	27.02	30.57	39.55	56.69	83.47	120.11	165.45	216.64
305.0	29.21	30.64	36.00	47.81	68.30	98.62	138.73	187.14	240.59
310.0	40.89	43.37	51.54	67.07	91.51	125.63	169.09	219.97	274.60
315.0	68.73	72.18	82.95	101.97	130.12	167.65	213.70	265.86	320.04
320.0	118.48	122.67	135.44	157.18	188.16	227.96	275.09	326.61	378.03
325.0	195.17	199.82	213.83	237.14	269.40	309.53	355.38	403.51	449.20
330.0	303.23	308.00	322.20	345.41	376.69	414.36	455.73	497.01	533.41
335.0	445.33	449.75	462.77	483.67	511.06	542.79	575.83	606.26	629.48
340.0	620.90	624.42	634.66	650.69	670.86	692.78	713.35	728.79	734.99
345.0	825.09	827.14	832.94	841.49	851.10	859.44	863.60	860.30	846.15
350.0	1048.24	1048.31	1048.22	1047.04	1043.26	1034.90	1019.56	994.71	957.89
355.0	1276.18	1273.94	1266.97	1254.56	1235.61	1208.68	1172.15	1124.43	1064.15

CALCULATED STANDARD PATTERN RADIATIONS (in mV/m at 1 km)									
-----Elevation Angles (°)-----					-----Elevation Angles (°)-----				
Az.(°T)	45	50	55	60	Az.(°T)	45	50	55	60
.0	1063.18	956.40	839.60	715.09	180.0	181.73	204.29	222.23	232.63
5.0	1120.53	997.50	867.05	731.83	185.0	187.08	211.65	230.15	239.90
10.0	1158.36	1023.64	883.63	741.19	190.0	190.12	217.32	236.91	246.47
15.0	1173.58	1032.75	888.06	742.43	195.0	191.83	221.84	242.78	252.43
20.0	1164.55	1023.75	879.69	735.20	200.0	193.35	225.86	248.07	257.90
25.0	1131.21	996.65	858.55	719.53	205.0	195.73	229.98	253.07	262.99
30.0	1075.19	952.58	825.39	695.89	210.0	199.70	234.63	258.02	267.82
35.0	999.57	893.69	781.59	665.11	215.0	205.58	240.02	263.04	272.46
40.0	908.62	822.90	729.07	628.35	220.0	213.19	246.09	268.14	276.92
45.0	807.33	743.72	670.11	586.99	225.0	221.94	252.55	273.20	281.18
50.0	700.97	659.84	607.16	542.53	230.0	230.94	258.91	278.01	285.18
55.0	594.58	574.89	542.66	496.52	235.0	239.17	264.64	282.34	288.87
60.0	492.57	492.13	478.90	450.42	240.0	245.74	269.27	285.99	292.20
65.0	398.49	414.30	417.84	405.54	245.0	249.97	272.44	288.84	295.18
70.0	314.78	343.41	361.04	362.99	250.0	251.59	274.05	290.89	297.85
75.0	242.84	280.80	309.64	323.63	255.0	250.70	274.21	292.27	300.36
80.0	183.08	227.11	264.33	288.10	260.0	247.76	273.29	293.27	302.92
85.0	135.10	182.39	225.43	256.77	265.0	243.56	271.85	294.29	305.82
90.0	97.95	146.27	192.92	229.82	270.0	239.07	270.63	295.86	309.39
95.0	70.39	118.07	166.57	207.25	275.0	235.40	270.44	298.56	314.02
100.0	51.07	96.96	145.96	188.94	280.0	233.67	272.18	303.03	320.12
105.0	38.67	82.06	130.62	174.68	285.0	235.04	276.74	309.90	328.10
110.0	31.90	72.55	120.03	164.21	290.0	240.63	285.02	319.83	338.37
115.0	29.44	67.69	113.71	157.21	295.0	251.58	297.91	333.42	351.29
120.0	30.25	66.85	111.19	153.39	300.0	268.99	316.22	351.22	367.16
125.0	33.92	69.59	112.06	152.43	305.0	293.97	340.73	373.69	386.21
130.0	40.53	75.52	115.93	154.01	310.0	327.53	372.08	401.16	408.56
135.0	50.19	84.33	122.42	157.80	315.0	370.54	410.71	433.80	434.19
140.0	62.80	95.66	131.13	163.46	320.0	423.58	456.81	471.53	462.90
145.0	77.96	109.04	141.61	170.62	325.0	486.75	510.16	513.99	494.33
150.0	94.98	123.89	153.36	178.92	330.0	559.55	570.08	560.47	527.87
155.0	112.96	139.50	165.86	187.97	335.0	640.67	635.30	609.89	562.70
160.0	130.82	155.11	178.56	197.39	340.0	727.88	703.93	660.81	597.81
165.0	147.45	169.96	190.93	206.83	345.0	818.02	773.51	711.40	631.97
170.0	161.88	183.38	202.52	215.99	350.0	907.08	841.03	759.57	663.84
175.0	173.39	194.89	213.02	224.63	355.0	990.44	903.15	803.07	692.01

Proposed Nighttime Service Contours - New AM, 1180 KHz, Rockville MN

1180
 Latitude: 45-21-42 N
 Longitude: 094-17-39 W
 Power: 5.00 kW
 Frequency: 1180 KHz
 Horiz. Pattern: DA
 Prop Model: FCC



The 8.86 mV/m contour encompasses 83.4% of the area within the Rockville city boundaries.

FIGURE 15

Proposed 1000 mV/m Contours - New AM, 1180 KHz, Rockville MN

ROCKV

Latitude: 45-21-42 N
 Longitude: 094-17-39 W
 Power: 50/8/5 kW
 Frequency: 1180 KHz
 Horiz. Pattern: DA
 Prop Model: FCC

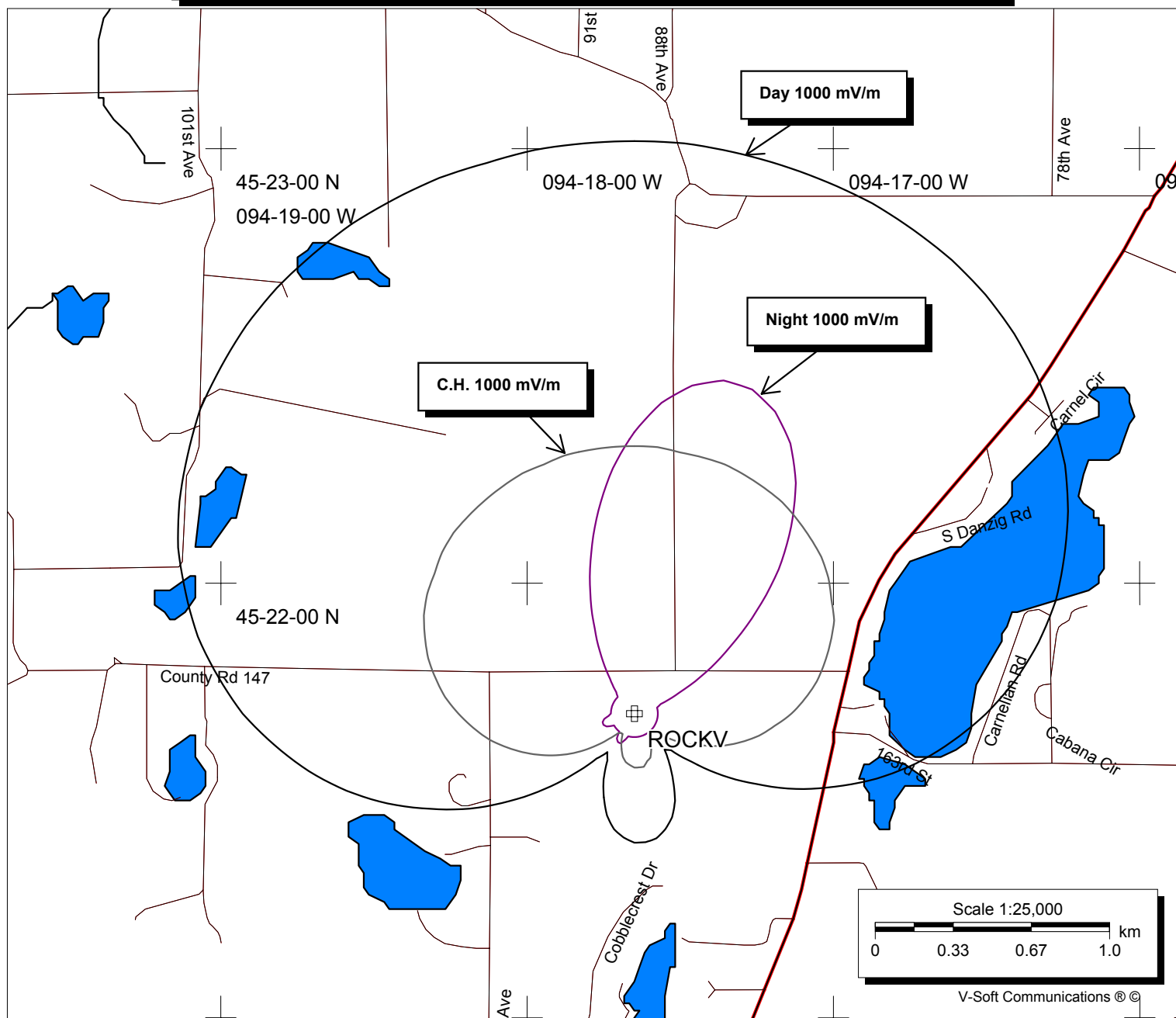


FIGURE 16

**NIGHTTIME SKYWAVE SITE-TO-SITE
RADIATION LIMIT CALCULATIONS
NEW AM, 1180 KHz, ROCKVILLE, MN**

Coordinates: 45°-21'-42" N., 94°-17'-39" W.

Point	Distance (km)	Bearing (degs)	Theta Min. (degs)	Theta Max. (degs)	RSS Limit (mV/m)	Reqd. Prot. (mV/m)	Skywv. Mult. (uV/m)	Allowed Radiation (mV/m @ 1 km)	Proposed Radiation (mV/m @ 1 km)
KFAQ *	1032.3	187.6	5.6	10.7	3.30	5.00	36.04	693.6	
KJOC *	536.8	144.0	13.8	22.8	2.65	6.62	93.04	355.8	27.9
NEW	2179.8	147.8	.0	1.3	9.09	2.27	10.14	1120.6	
NEW	2026.8	145.1	.0	2.1	10.45	2.61	11.28	1158.0	
960805A	1850.9	148.8	.3	3.2	10.79	2.70	13.31	1013.4	
NEW	1751.8	156.8	.7	3.8	12.20	3.00	14.95	1004.0	
NEW	1753.2	156.8	.7	3.8	12.23	2.98	14.93	998.5	
KGOL	1694.7	183.3	1.0	4.2	9.70	2.43	16.43	738.1	
NEW	1642.1	207.2	1.3	4.6	10.98	2.74	17.07	804.2	
NEW	1659.8	143.7	1.2	4.4	14.21	3.55	15.61	1138.1	
WJNT	1496.6	164.7	2.1	5.7	9.15	2.29	19.63	582.4	64.9
NEW	1248.5	198.6	3.8	8.0	14.96	3.70	26.65	694.5	
KYET	1880.0	239.6	.1	3.0	8.26	2.06	12.32	837.6	96.8
KERI	2366.8	251.4	.0	.4	7.62	1.90	7.65	1244.4	
NEW	1219.4	229.0	4.0	8.3	9.64	2.41	26.37	457.0	26.2
KYDZ	470.6	195.4	15.9	25.9	8.26	2.06	113.51	90.9	46.2
STURGIS	727.1	264.9	9.6	16.5	5.48	1.37	55.67	123.1	122.1
CASPER	999.4	257.9	5.9	11.2	7.35	1.84	33.43	275.0	136.3
LINCOLN	537.3	200.5	13.8	22.8	14.70	3.67	94.87	193.6	83.7
WHAM225	1189.1	131.8	4.2	8.7	27.06	.50	26.08	95.9	30.0
WHAM230	1118.8	131.7	4.8	9.5	27.24	.50	28.89	86.5	30.0
WHAM235	1049.6	131.3	5.4	10.5	27.43	.50	32.11	77.9	30.0
WHAM240	982.4	130.4	6.1	11.5	27.63	.50	35.74	69.9	30.2
WHAM245	918.1	129.0	6.8	12.5	27.84	.50	39.81	62.8	30.6
WHAM250	857.7	127.0	7.6	13.6	28.07	.50	44.26	56.5	31.6
WHAM255	802.5	124.4	8.4	14.8	28.29	.50	48.98	51.0	33.2
WHAM260	753.7	121.2	9.1	15.9	28.53	.50	53.75	46.5	35.6
WHAM265	712.7	117.2	9.8	16.9	28.77	.50	58.21	42.9	38.0
WHAM270	680.9	112.6	10.4	17.8	29.01	.50	61.93	40.4	38.5
WHAM275	659.3	107.5	10.8	18.4	29.25	.50	64.40	38.8	35.6
WHAM280	648.7	102.1	11.0	18.8	29.48	.50	65.22	38.3	29.4
WHAM285	649.1	96.7	11.0	18.7	29.69	.50	64.25	38.9	25.7
WHAM290	660.3	91.5	10.8	18.4	29.89	.50	61.60	40.6	27.0
WHAM295	681.0	86.7	10.4	17.8	30.09	.50	57.67	43.4	24.8
WHAM300	710.0	82.4	9.9	17.0	30.27	.50	52.93	47.2	23.4
WHAM305	745.8	78.8	9.2	16.1	30.45	.50	47.87	52.2	34.2
WHAM310	787.1	75.8	8.6	15.1	30.61	.50	42.85	58.3	57.3
KOFI	1547.1	288.9	1.8	5.3	1.94	.48	11.63	208.5	33.2
VIRDEN	696.5	317.7	13.8	13.8	6.38	3.19	99.73	159.9	123.2
KRFT *	838.2	155.3	7.9	14.0	5.26	13.15	48.61	1353.2	
KPHN *	700.4	181.5	10.0	17.3	6.13	15.32	65.02	1178.3	
NEW *	604.9	151.3	12.0	20.2	7.12	17.81	79.01	1127.2	

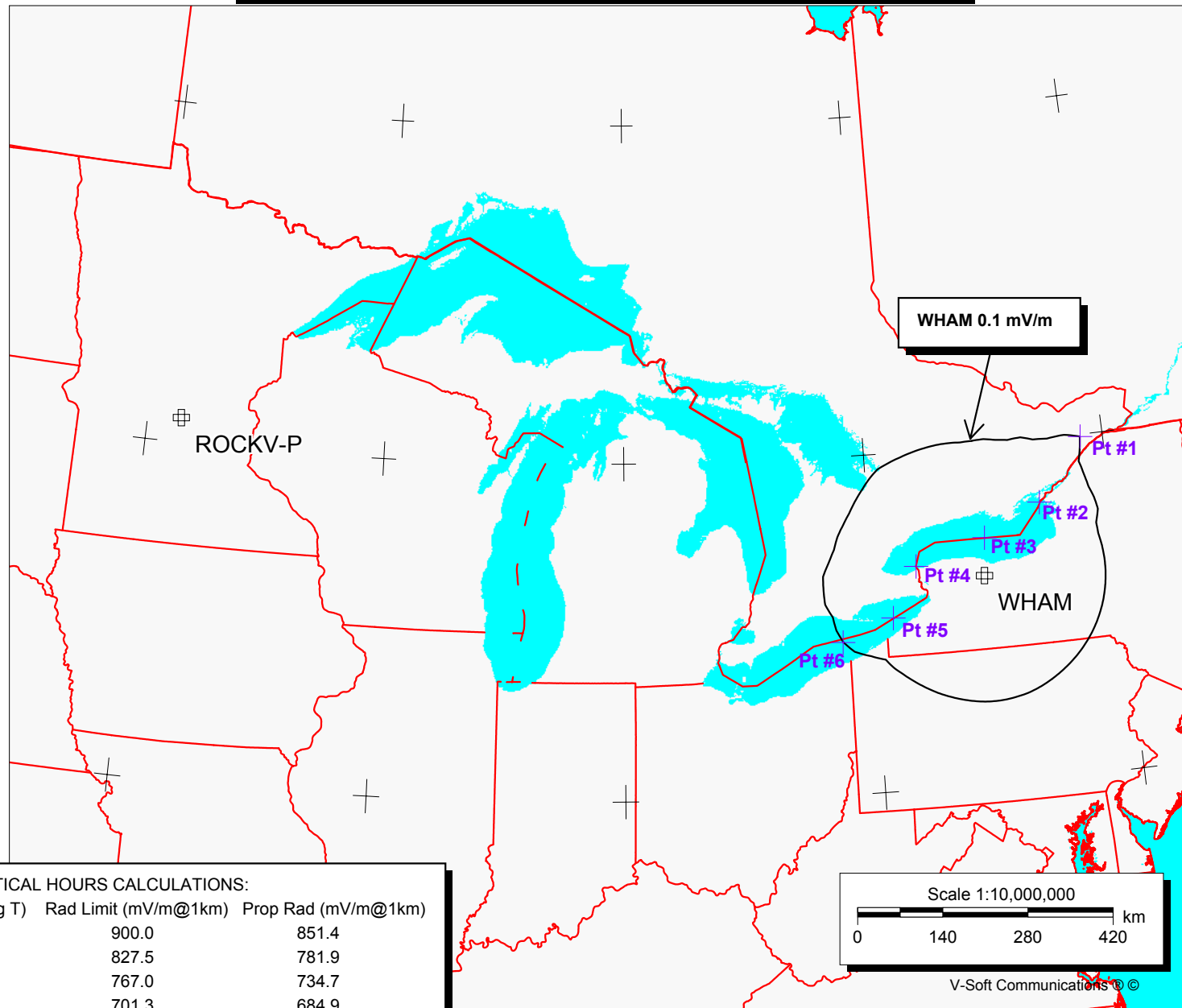
* - indicates an adjacent channel station.

Critical Hours Study - New AM, 1180 KHz, Rockville, MN

FIGURE 16-A

ROCKV-P

Latitude: 45-21-42 N
Longitude: 094-17-39 W
Power: 8.0 kW
Frequency: 1180 KHz
Prop Model: FCC



CRITICAL HOURS CALCULATIONS:

Point#	Dist(km)	Azimuth(deg T)	Rad Limit (mV/m@1km)	Prop Rad (mV/m@1km)
1	1473.4	85.0	900.0	851.4
2	1413.1	89.4	827.5	781.9
3	1331.1	92.3	767.0	734.7
4	1228.8	95.3	701.3	684.9
5	1212.6	99.6	688.9	612.4
6	1146.1	102.7	663.0	554.7