

**MINOR  
MODIFICATION TO  
WVKM (FM) AN FM  
CONSTRUCTION  
PERMITTED STATION  
HAVING FACILITY ID  
67039 AND FCC FILE  
NO.:  
BPED20150916ADZ  
MATEWAN, WV**

February 3, 2016

*Prepared For:*

West Virginia Educational  
Broadcasting Authority  
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## **1.0 PURPOSE OF FM MODIFICATION APPLICATION**

It is herein proposed to move the construction permitted transmitter site to a new location as the present site is no longer feasible.

## **2.0 STATION TRANSMITTER SITE LOCATION**

The proposed transmitter site shall be re-located from a tower site to a water tank.

### **2.1 Change in Transmitter Site Physical Address**

The transmitter site shall be modified from the following location:

0.9 Mi. Up Dirt Road on Buffalo Mountain off Highway 52, 1.4 Miles East of the intersection of Highway 52 and Route 1

To the following address:

North Side of King Coal Hwy Across Mingo Central High School in Matewan, WV

### **2.2 Change in Transmitter Site Geographic Coordinates (NAD27)**

The transmitter site shall be modified from the following site coordinates:

N. Latitude 37° 42' 15.6"  
W. Longitude 82° 12' 49.1"

To the following site coordinates:

N. Latitude 37° 38' 29.1"  
W. Longitude 82° 04' 40.1"

### **2.3 Antenna Structure Registration**

The proposed structure consists of a 36.6 meter tall water tank with a 6.1 mast erected from the side of the tank. The combined structure and mast height does not require an Antenna Structure Registration "ASR" number since the mast atop the tank meets the 6.1 meter (20-foot) rule criteria. Output resulting from the FCC's TOWAIR program is demonstrated in Appendix A.

### **3.0 ANTENNA AND SITE ELEVATIONS**

The applicant proposes to use an existing water tank to erect a mast in which to mount the 1 bay FM antenna. The pertinent elevations are as described below and as illustrated in Appendix B:

- 3.1 Height of Site above Mean Sea Level (AMSL): 679.4m
- 3.2 Overall Height of Water Tank Above Ground Level (AGL): 36.6m
- 3.3 Overall Height of mast above the top of the water tank: 6.1m
- 3.4 Overall Height of Mast (AGL) 42.7m
- 3.5 FM antenna height above the top of the tank: 1.6m
- 3.6 FM antenna height (AGL): 41.1m
- 3.7 FM antenna height (AMSL): 720.5m
- 3.8 FM antenna Height Above Average Terrain (HAAT): 297m

Refer to Appendix C for HAAT Calculations produced from the FCC's Website.

### **4.0 EFFECTIVE RADIATED POWER**

Pursuant to 47 C.F.R. Section 73.211(b) entitled "Maximum limits", Class A FM stations will be authorized to operate with maximum facilities of 6kW ERP at 100 meters HAAT. An FM station with a HAAT that exceeds 100 meters will not be permitted to operate with an ERP greater than that which would result in a 60 dBu contour of 28 kilometers.

Since the calculated HAAT is 297m as demonstrated in Appendix C, the applicant shall employ 670 Watts ERP as illustrated in Appendix D in order to keep its contour within the class distance threshold.

### **5.0 FREQUENCY ALLOCATION ANALYSIS**

Appendix E is a long form channel study which demonstrates the distance separation requirements of 47 C.F.R. Section 73.207. As demonstrated the proposed FM facility is not short spaced with any existing, permitted, or pending FM Broadcast stations.

## **6.0 FM TRANSMITTER LOCATION AND COVERAGE REQUIREMENTS**

Appendix F demonstrates that the transmitter location has been chosen so that, on the basis of the effective radiated power and antenna height above average terrain employed, a minimum field strength of 70 dB above one uV/m (dBu), or 3.16 mV/m, will be provided over the entire principal community of Matewan, WV.

## **7.0 AM STATION PROXIMITY**

Pursuant to 47 C.F.R. Section 1.30002(e), the addition of an antenna-supporting structure on a building or water tank in this case shall be considered construction subject to the analysis and notification requirement only if the height of the antenna-supporting structure ALONE exceeds the 60 and 36 electrical degree threshold in Section 1.30002(a) and 1.30002(b) for a non-directional and directional AM facility respectively.

The proposed support structure or "mast" in this instance extends 6.1 meters above the top of the water tank. A worst case proposed support structure height in electrical degrees shall be calculated using the highest frequency on the AM band of 1600 kHz which subsequently has the highest wavelength and thus is the most prone to vertical radiators. As such the worst case proposed structure height in electrical degrees is as follows:

AM Wavelength =  $300/1.6 = 187.5$  meters

Prop. Support Structure. Ht. in elec. Deg. =  $(6.1/187.5)(360) = 11.7$  electrical degrees

As demonstrated the calculated height in electrical degrees is well below the 60 and 36 electrical degree thresholds for non-directional and directional AM facilities respectively. As such, the proposed FM facility and its support structure are not subject to the moment method analysis and 30 day advance notification of the commencement of construction of the proposed mast atop the water tank structure.

## **8.0 INTERNATIONAL COORDINATION**

The proposed facility is not within 320km of any international borders and is not subject to international coordination.

## **9.0 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)**

### **9.1 General Environmental Requirements**

The proposed support structure and antenna will not:

- Require high intensity white lighting.
- Is not located in an official designated wilderness area or wildlife preserve.
- Does not threaten the existence or habitat of endangered species.
- Does not affect districts, sites, buildings, structures or objects significant in American history, architecture, archaeology, engineering or culture that are listed in the National Register of Historic Places or are eligible for listing.
- Does not affect Indian religious sites.
- Is not located in a floodplain
- Does not require construction that involves significant changes in surface features (e.g., wetland fill, deforestation or water diversion).

### **9.2 Radio Frequency Radiation (RFR) Compliance.**

Appendix G is a RFR analysis which demonstrates that the peak RFR exposure is less than 5% of the most restrictive permissible exposure threshold standing anywhere at ground level and in any proximity to the proposed support structure. Pursuant to OET Bulletin 65, since the proposed operation does not exceed 5% of the most permissible exposure at any location 2 meters above the ground, it is not considered a significant contributor to RFR and other sources of RFR need not be taken into consideration for a net effect. The instant application is compliant with the FCC limits for human exposure to RFR and thus is excluded from further environmental processing.

## **10.0 CERTIFICATION**

The foregoing statement and the report regarding the aforementioned engineering work are true and correct to the best of my knowledge. Executed on February 3 2016.

KESSLER AND GEHMAN ASSOCIATES, INC.



Ryan Wilhour  
Consulting Engineer

**APPENDIX A – FCC Towair Study**

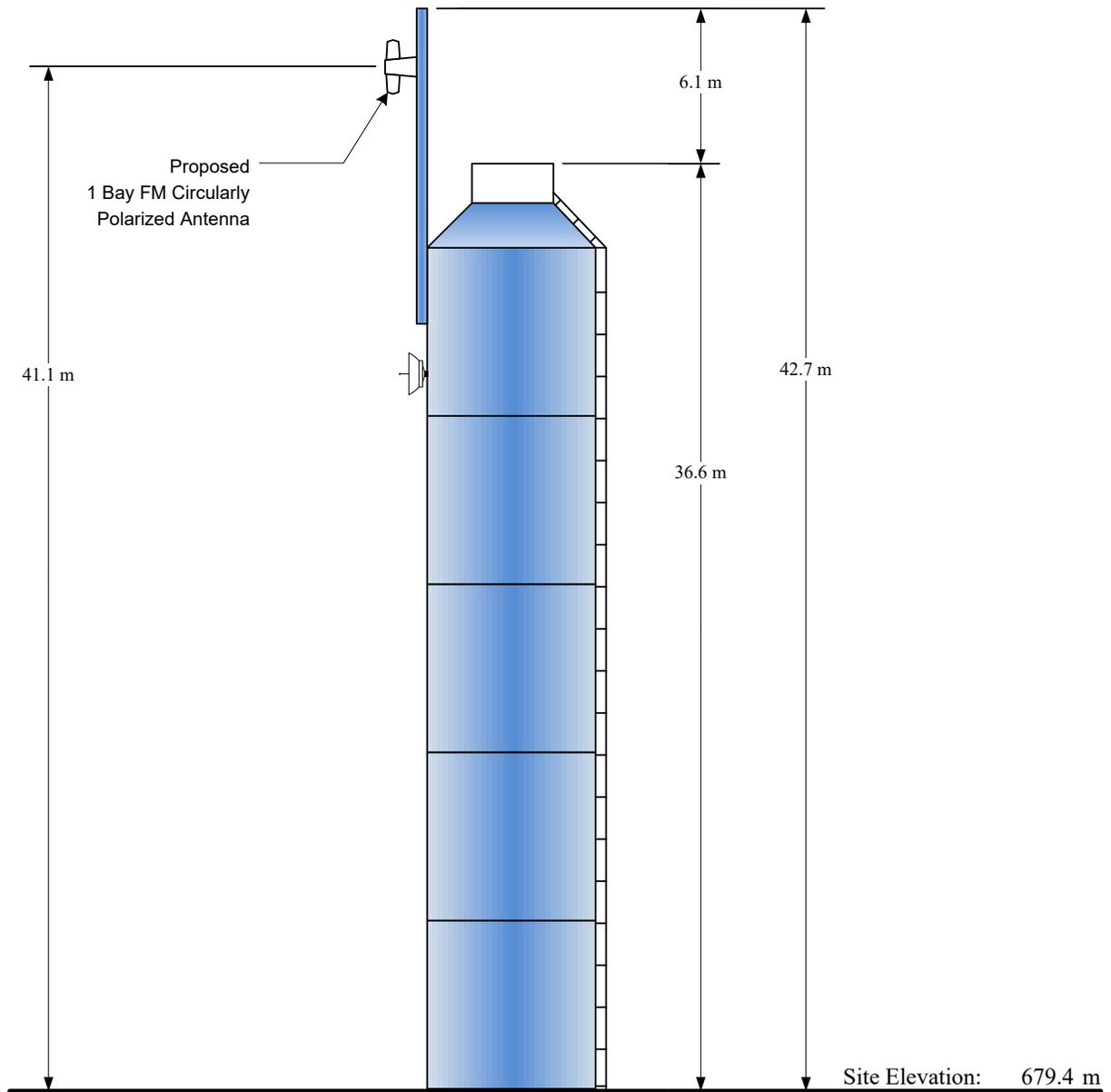
Antenna Structure Registration (ASR) filing determination was calculated from the FCC's structure registration tool:

<http://wireless2.fcc.gov/UlsApp/AsrSearch/towairSearch.jsp>

Results are as follows:

<b>DETERMINATION Results</b>	
<b>Structure does not require registration. The structure meets the 6.10-meter (20-foot) Rule criteria.</b>	
<b>Your Specifications</b>	
<b>NAD83 Coordinates</b>	
Latitude	37-38-29.5 north
Longitude	082-04-39.6 west
<b>Measurements (Meters)</b>	
Overall Structure Height (AGL)	42.7
Support Structure Height (AGL)	36.6
Site Elevation (AMSL)	679.4
<b>Structure Type</b>	
TANK - Any type of Tank (Water, Gas, etc)	

**APPENDIX B – Water Tower Elevation Profile and Photo**



Overall Height AGL:	42.7 m	NAD 27 Coordinates:
Overall Height AMSL:	722.1 m	N. Latitude: 37° 38' 29.1"
Radiation Center AGL:	41.1 m	W. Longitude: 82° 04' 40.1"
Radiation Center AMSL:	720.5 m	ASR No.: N/A
Radiation Center HAAT:	297 m	FAA Study No.: N/A
NOTE: NOT TO SCALE		



Illustration of the tower without the proposed 6.1 meter mast installed.

## **APPENDIX C - Height Above Average Terrain Calculation**

The Height Above Average Terrain (HAAT) was calculated from the FCC's HAAT Calculator tool:

<https://www.fcc.gov/media/radio/haat-calculator>

Results are as follows:

### **Antenna Height Above Average Terrain Calculations -- Results**

#### **Input Data**

Latitude **37° 38' 29.1" North**

Longitude **82° 4' 40.1" West (NAD 27)**

These coordinates convert to NAD 83 coordinates of  
37° 38' 29.48", North, 82° 04' 39.56" West (NAD 83).

Height of antenna radiation center above mean sea level: **720.5 meters AMSL**

Number of Evenly Spaced Radials = **8**    0° is referenced to True North

#### **Results**

**Calculated HAAT = 297 meters**

Antenna Height Above Average Terrain calculated  
using FCC 30 second terrain database (continental USA only)

#### **Individual "Radial HAAT" Values, in meters**

0°	244.2 m
45°	220.8 m
90°	248.2 m
135°	278.9 m
180°	304.2 m
225°	335.8 m
270°	389.7 m
315°	352.0 m

## APPENDIX D – Class A Equivalent Power Determination

The ERP was calculated from the FCC's "FMPOWER" tool:

<https://www.fcc.gov/media/radio/fmpower>

Results are as follows:

### FMpower Results

**6 kW ERP Class A facilities for equivalency determination:**

Reference ERP = 6.000 kW ERP

Reference HAAT= 100 meters HAAT

F(50,50) 60 dBu protected contour at 28.3 km distance

**Equivalent ERP = 0.670 kilowatts (kW)**  
(rounded per 47 CFR 73.212)

Unrounded ERP = 0.672 kW for 297 meters HAAT

Class A FM stations are authorized throughout the United States.

**APPENDIX E – Allocation Studies and Map**

REFERENCE 37 38 29.1 N. CLASS = A DISPLAY DATES  
 82 04 40.1 W. Current Spacings to 3rd Adj. DATA 01-27-16  
 ----- Channel 294 - 106.7 MHz ----- SEARCH 02-01-16

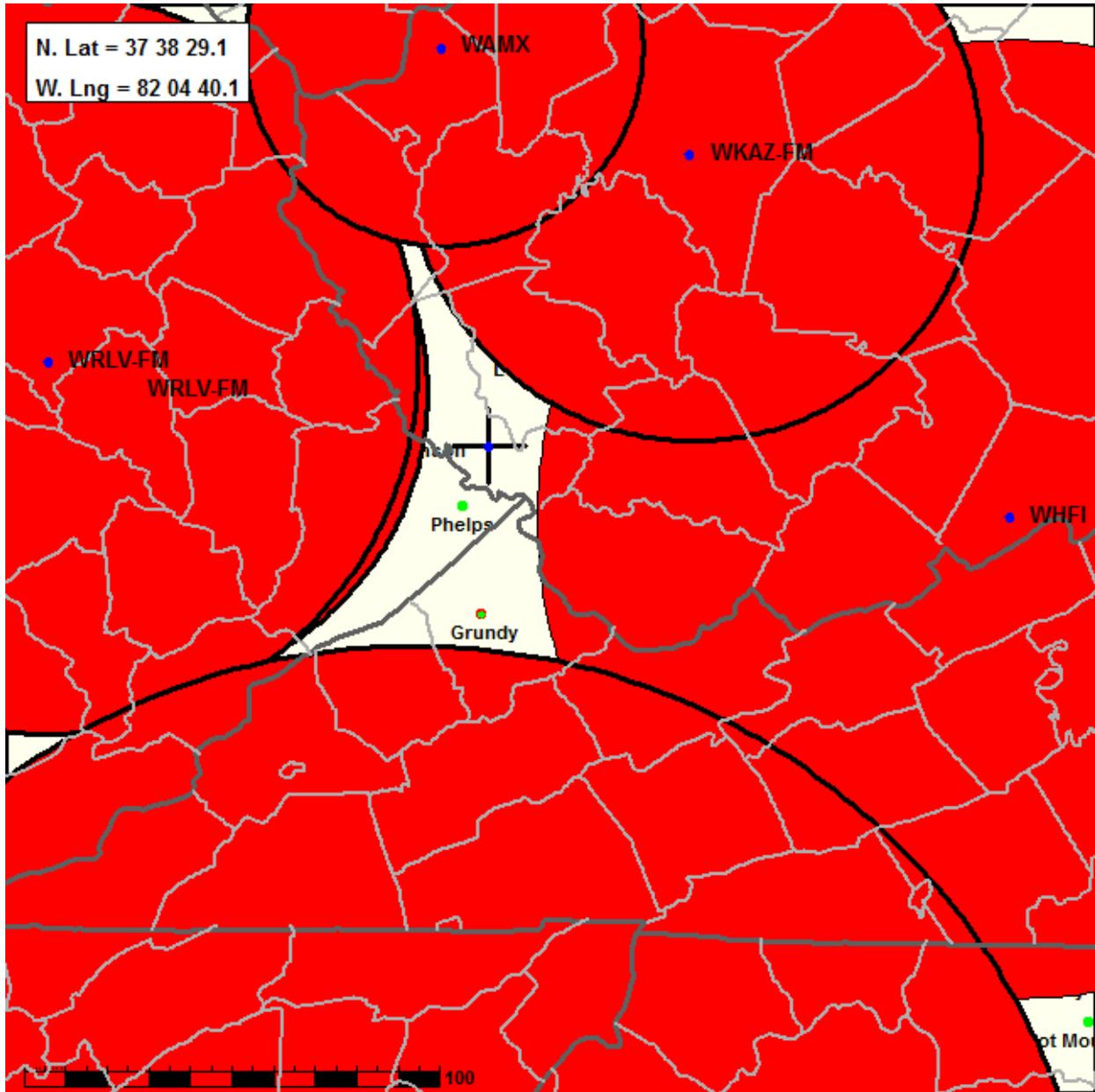
Call	Channel	Location	Azi	Dist	FCC	Margin
WHFI	LIC 294A	Lindside WV	97.6	126.41	114.5	11.9
WRLV-FM	LIC-Z 293A	Salyersville KY	278.8	87.91	71.5	16.4
WKAZ-FM	LIC 297B	Miami WV	34.5	85.38	68.5	16.9
WRLV-FM	RSV-A 293C3	Salyersville KY	280.9	108.09	88.5	19.6
9/8/2003: From Channel 247C3 to 293C3 pursuant to R&O, Docket 00-79, effective 4/29/2002; downgraded to Class A by grant of Class A CP BPH-20050815A AX.						
WMIT	LIC 295C	Black Mountain NC	185.1	212.37	164.5	47.9
WAMX	LIC-N 292B1	Milton WV	353.2	96.63	47.5	49.1

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 RSV-R = reserved - needs protection, RSV-A = allocation.  
 All separation margins include rounding

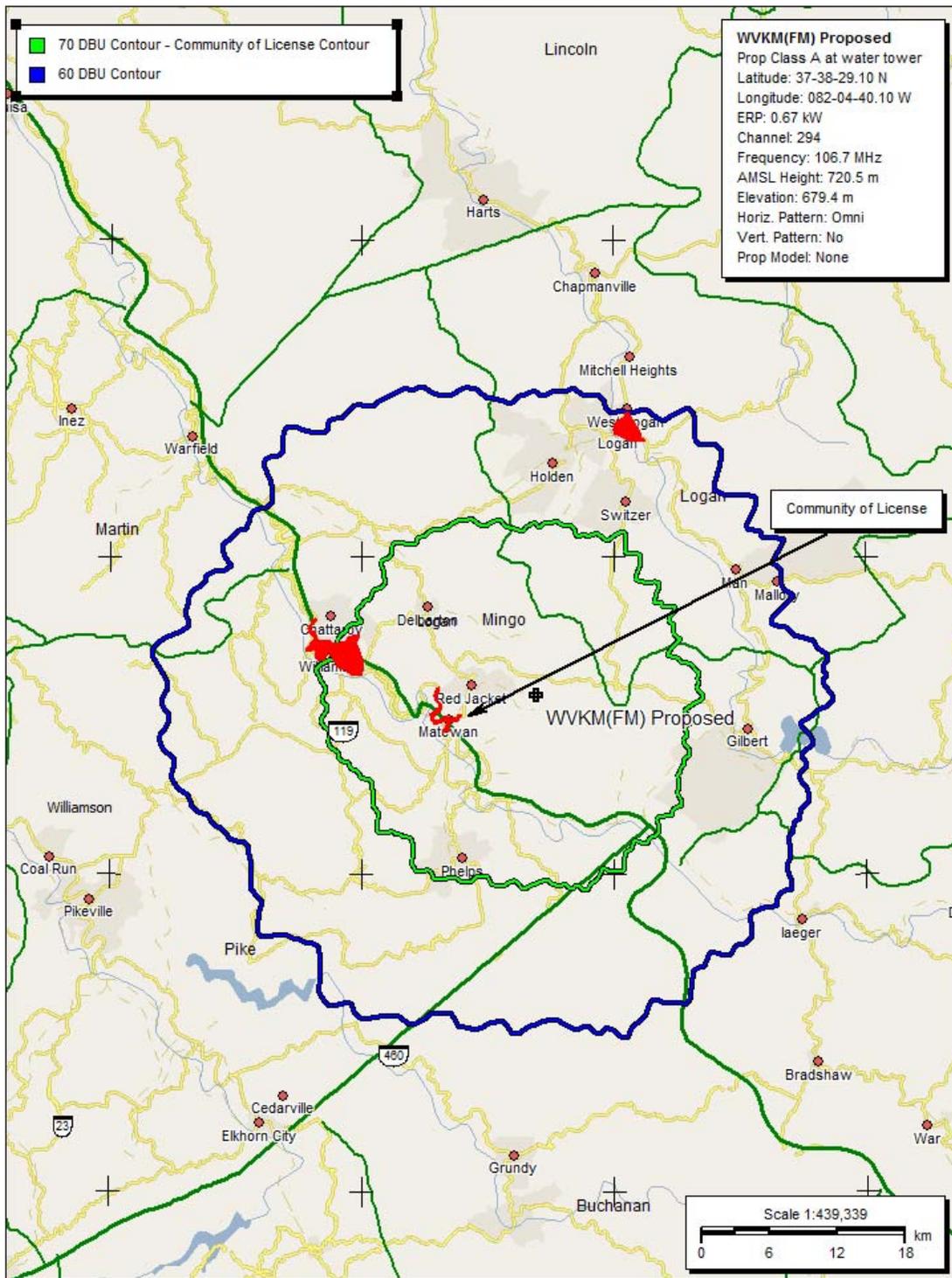
**APPLICATION FOR MINOR MODIFICATION TO WVKM(FM)**

West Virginia Educational Broadcasting Authority ("WVEBA")

February 3, 2016



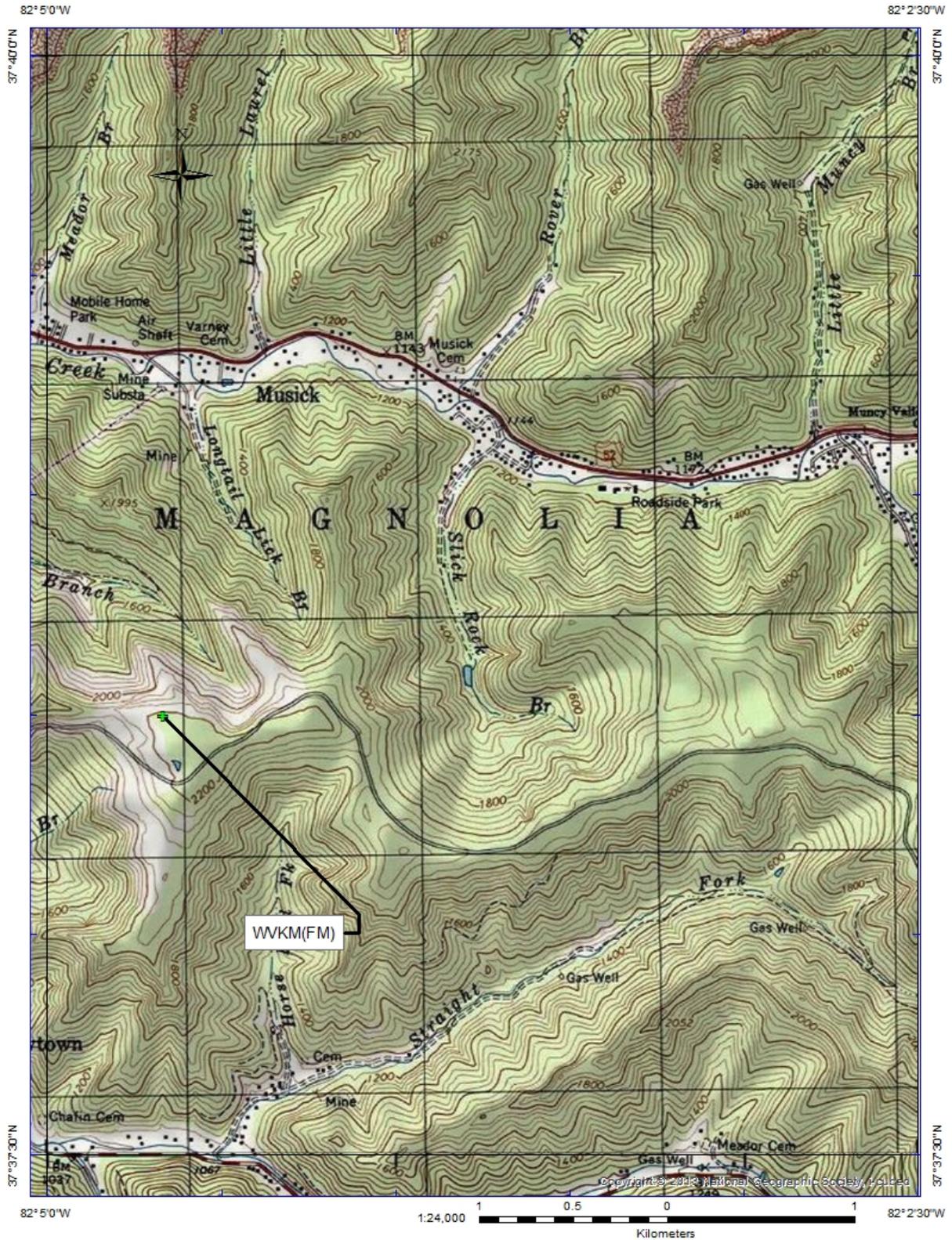
APPENDIX F – FM Transmitter Coverage Contours and Location Map



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## **APPENDIX G - Far Field Exposure to RF Emissions**

A theoretical analysis has been conducted of the human exposure to radio frequency radiation ("RFR") using the calculation methodology described in OET Bulletin 65, Edition 97-01. The RFR analysis is conducted pursuant to the following methodology:

Terrain<sup>1</sup> extraction is compiled from the support structure site, if the support structure is on a rooftop with no higher elevations (e.g., elevator shaft) then flat terrain is compiled. Terrain is extracted using radial lengths of 0.25 miles in 0.001 mile increments for 360 radials. The power density is calculated for each terrain point at 6 feet above ground level using the elevation and azimuth pattern of the proposed broadcast antenna. The power density calculations are conducted using the lower edge of the proposed channel frequency. To account for ground reflections, a coefficient of 1.6 was included in the calculation.

The resulting cylindrical polar analysis is then summarized into a coordinate plane graph using the following methodology:

Starting from the origin the maximum calculated RFR value is determined among the 360 degree radials for each 0.001 mile increment, the value is then converted into a percentage of the maximum allowable general population or uncontrolled exposure and plotted as a function of perpendicular distance from the tower.

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<sup>1</sup> Terrain extraction is based upon a 3 arc second point spacing terrain database.

