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Louisville, KY
WFMP-LP
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Fellowship of Reconciliation Louisville Chapter
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CONSOLIDATED

ENGINEERING EXHIBIT

FCC Form 318 - Section VI - LPFM Engineering, Tech Box

BROWN BROADCAST SERVICES
INCORPORATED

Michael D. Brown

3740 S.W. Comus St. Portland, Oregon 97219-7418

503-245-6065

**ENGINEERING STATEMENT
AMENDMENT TO BMPL-20170224AAY
PROPOSED MINOR CHANGE
TO CONSTRUCTION PERMIT BNPL-20131112AZF
WFMP-LP, LOUISVILLE, KY
Fellowship of Reconciliation Louisville Chapter**

SUMMARY:

This proposal is a minor-amendment to an application for a minor change to the original Construction Permit for WFMP-LP, Louisville, KY. This application is for a tower-on-building installation. This amendment changes the tower height and corrects the building height. The tower extends 5.7m above the uppermost point of the building, so it is exempt from FAA processing and FCC tower registration requirements.

When compared to the original CP, this application seeks a move to a different tower located atop the same building. In short:

- antenna rad center increased one meter
- coordinates changed by 1 second latt and 1 second long
- tower height increased 2.7m

This proposal is fully spaced to all co-channel and first-adjacent stations. It is short-spaced to one second-adjacent station. Contour protection is provided by the D/U method, in compliance with 73.807(e)(1). **See Exhibit 11.** A waiver of second-adjacent spacing is hereby requested.

PERTINENT SPECIFICATIONS NOT INCLUDED IN SECTION VI - TECH BOX:

HAAT:	66 meters
ERP:	20 watts
DATA SOURCES:	V-Soft FMCommander with HAAT Method 0(zero); FCC 30- Second Terrain; 72 radials FCC HAAT Calculator; 72 radials
SUPPORT STRUCTURE:	tower on building

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HAAT ISSUES:

As allowed by the 1984 FCC Public Notice¹, the antenna HAAT is determined herein by using more than the customary 8 cardinal radials.

NAD 27 Coordinates: 38:14:45N; 085:45:29W
Antenna Rad Center: 215m AMSL

METHOD 1: FCC Antenna Height Above Average Terrain (HAAT) Calculator

36 radials: 66m HAAT
72 radials: 66m HAAT
180 radials: 66m HAAT
360 radials: 66m HAAT

METHOD 2: V-Soft FM Commander, v6.3.157

Settings; FCC 30 Second Terrain, HAAT Method 0 (zero). This combination is said to have “outstanding” agreement with FCC calculation methods.

36 radials 66m HAAT
72 radials 66m HAAT

66m HAAT results in a maximum ERP of 20 watts. The applicant hereby requests that the ERP for this application be determined using the HAAT methods above.

¹USE OF COMPUTER GENERATED TERRAIN DATA FOR DETERMINING ANTENNA HEIGHT ABOVE AVERAGE TERRAIN, FCC 84-341, July 13, 1984, Interim Procedure per Gneral Docket 84-705

Antenna Height Above Average Terrain Calculations -- Results

Input Data

Latitude **38° 14' 45" North**

Longitude **85° 45' 29" West (NAD 27)**

These coordinates convert to NAD 83 coordinates of
38° 14' 45.26", North, 85° 45' 28.86" West (NAD 83).

Height of antenna radiation center above mean sea level: **216 meters AMSL**

Number of Evenly Spaced Radials = **72** 0° is referenced to True North

Results

Calculated HAAT = **66 meters**

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

Individual "Radial HAAT" Values, in meters

0°	80.1 m	120°	58.6 m	240°	85.5 m
5°	80.6 m	125°	60.0 m	245°	81.4 m
10°	78.9 m	130°	62.3 m	250°	68.3 m
15°	73.3 m	135°	65.2 m	255°	60.9 m
20°	70.9 m	140°	65.8 m	260°	59.5 m
25°	70.7 m	145°	68.5 m	265°	53.0 m
30°	73.6 m	150°	71.2 m	270°	46.6 m
35°	77.4 m	155°	75.1 m	275°	50.1 m
40°	83.0 m	160°	78.0 m	280°	40.1 m
45°	93.3 m	165°	76.3 m	285°	33.0 m
50°	90.0 m	170°	81.5 m	290°	36.1 m
55°	73.7 m	175°	86.1 m	295°	42.4 m
60°	64.7 m	180°	85.0 m	300°	37.4 m
65°	59.5 m	185°	78.5 m	305°	33.5 m
70°	57.0 m	190°	73.9 m	310°	34.9 m
75°	53.6 m	195°	69.5 m	315°	39.2 m
80°	52.7 m	200°	67.1 m	320°	44.0 m
85°	54.0 m	205°	65.2 m	325°	49.0 m
90°	55.8 m	210°	70.6 m	330°	52.7 m
95°	54.9 m	215°	92.2 m	335°	60.2 m
100°	51.9 m	220°	92.7 m	340°	71.4 m
105°	52.3 m	225°	92.9 m	345°	81.3 m
110°	53.9 m	230°	94.2 m	350°	80.7 m
115°	54.6 m	235°	94.4 m	355°	80.6 m

[Print Results?](#)

[New Calculation?](#)

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FAA ISSUES:

This amendment reduces the height of the tower so that it is 5.7 meters above the highest point of the building - the roof parapet of the equipment penthouse. See attached **Exhibit E-1**. It is therefore exempt from FAA processing or FCC tower registration requirements.

TOWAIR Determination Results***** NOTICE *****

TOWAIR's findings are not definitive or binding, and we cannot guarantee that the data in TOWAIR are fully current and accurate. In some instances, TOWAIR may yield results that differ from application of the criteria set out in 47 C.F.R. Section 17.7 and 14 C.F.R. Section 77.13. A positive finding by TOWAIR recommending notification should be given considerable weight. On the other hand, a finding by TOWAIR recommending either for or against notification is not conclusive. It is the responsibility of each ASR participant to exercise due diligence to determine if it must coordinate its structure with the FAA. TOWAIR is only one tool designed to assist ASR participants in exercising this due diligence, and further investigation may be necessary to determine if FAA coordination is appropriate.

DETERMINATION Results

Structure does not require registration. The structure meets the 6.10-meter (20-foot) Rule criteria.

Your Specifications**NAD83 Coordinates**

Latitude	38-14-44.8 north
Longitude	085-45-28.5 west

Measurements (Meters)

Overall Structure Height (AGL)	218.7
Support Structure Height (AGL)	213
Site Elevation (AMSL)	139

Structure Type

BTWR - Building with Tower

Tower Construction Notifications

Notify Tribes and Historic Preservation Officers of your plans to build a tower.

CLOSE WINDOW

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EXHIBIT E-1

ELEVATION DRAWING

(not to scale)

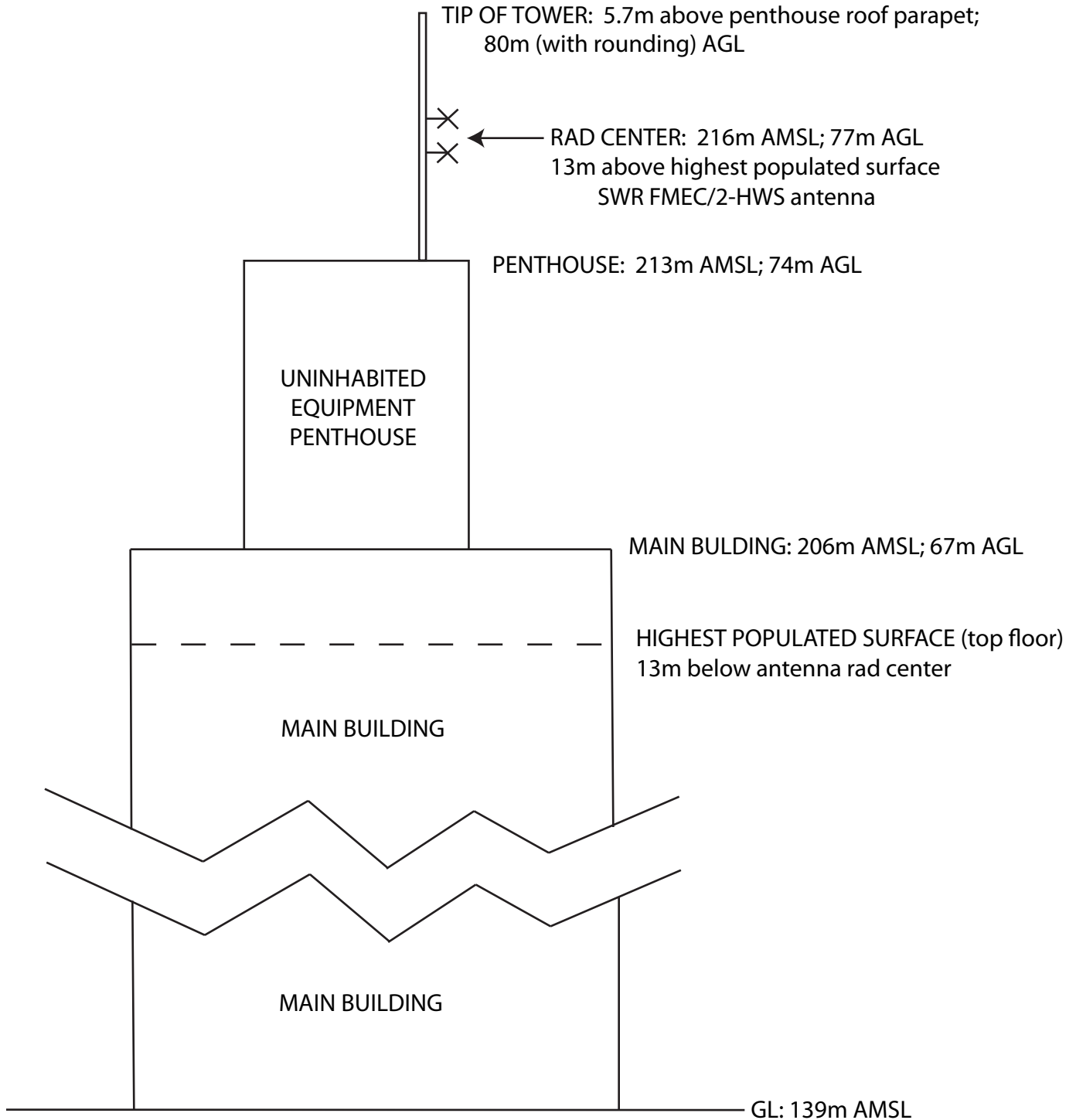


EXHIBIT 11 INTERFERENCE

WFMP-LP AMEND

Fellowship Of Reconciliation, Louisville Chapter, Inc.

REFERENCE		DISPLAY DATES
38 14 45.0 N.	CLASS = L1	DATA 03-21-17
85 45 29.0 W.	Current Spacings to 2nd Adj.	SEARCH 03-22-17
----- Channel 293 - 106.5 MHz -----		

Call	Channel	Location	Azi	Dist	FCC	Margin
WVEZ	LIC 295B	St. Matthews	KY 337.2	15.20	67.0	-51.8
AL9833	RSV-A 295B	St. Matthews	KY 337.2	15.20	67.0	-51.8
reallot from Louisville, KY.						
WFMP-LP	APP 293L1	Louisville	KY 0.0	0.00	24.0	-24.0
WFMP-LP	CP 293L1	Louisville	KY 141.5	0.04	24.0	-24.0
WIOP-LP	LIC 292L1	Shepherdsville	KY 154.0	28.17	14.0	14.2
WWBL	LIC 293B	Washington	IN 290.6	130.82	112.0	18.8
WWVY	LIC 291B	North Vernon	IN 3.0	91.30	67.0	24.3

RSV-R = reserved - needs protection, RSV-A = allocation.

CONTOUR PROTECTION TO 2ND-ADJACENT STATIONS:

Contour protection to 2nd-adjacent station WVEZ is provided using the ratio method. The F(50/50) contour of WVEZ is 85.6dBu at the proposed site. Using the appropriate U/D ratio of 40dB vs WVEZ, the corresponding interfering contour of the proposed station is 125.6dBu. At 20 watts ERP, this contour would extend to a distance of 16.45 meters from the antenna. However, the field strength of the proposed antenna system falls quickly at depression angles below the horizon.

The proposed 2-bay, ½ wave-spaced SWR FMEC/2-HWS antenna would be mounted on a rooftop tower, with a center of radiation of 13 meters above the uppermost populated surface. See **Exhibit E-1**.

Using elevation pattern data provided by SWR, the distance to the 125.6dBu contour at various depression angles is tabulated in **Exhibit 11a**. This exhibit shows that the 2nd adjacent interfering contour extends no closer than 7.9 meters above the uppermost populated area.

Therefore, there are no populated areas within the interference zone.

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PROTECTED ZONES REPORT:

Protected zones report for WFMP-LP on channel 293L1 03-21-2017

Lat. 38 14 45.0 Lng. 85 45 29.0, ERP= 0.02 kw, HAAT= 66.2 m

Facility is okay with respect to AM station towers.

Closest AM Facility is WJIE, LOUISVILLE, KY, L, ND2 at 60.0° at a distance of 4.5 km

Facility is okay with respect to FCC monitoring stations.

Closest FCC Monitoring Station is 484.4 km= Allegan, MI

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Exhibit 11a

2nd ADJACENT INTERFERENCE PROTECTION TO POPULATED AREAS

CALL LETTERS OR FILE NUMBER	WFMP-LP
PROPOSED COMMUNITY OF LICENSE	Louisville, KY
INTERFERING CONTOUR OF PROPOSAL - dBu	125.60
INTERFERING CONTOUR OF PROPOSAL - <V/m	1.9055
2nd-ADJ STN REQUIRING INTERFERENCE PROT.	WVEZ
PROP. ERP (W)	20
ANTENNA MODEL	SWR FMEC/2-HWS
NOTES	

Depression Angle Below Horizon (dg)	Relative Field	ERP (W)	Angular Dist. to IX Contour (m)	Vertical Dist. to IX (below antenna)(m)	Horiz Dist. to IX Contour (m)	Vertical Dist Below Antenna to Uppermost Populated Area (m)	Clearance of IX Above Populated Areas (m)
0	1	20.00	16.45	0.0	16.5	13	13.0
5	0.987	19.48	16.24	1.4	16.2	13	11.6
10	0.95	18.05	15.63	2.7	15.4	13	10.3
15	0.89	15.84	14.64	3.8	14.1	13	9.2
20	0.812	13.19	13.36	4.6	12.6	13	8.4
25	0.721	10.40	11.86	5.0	10.8	13	8.0
30	0.622	7.74	10.23	5.1	8.9	13	7.9
35	0.52	5.41	8.56	4.9	7.0	13	8.1
40	0.42	3.53	6.91	4.4	5.3	13	8.6
45	0.327	2.14	5.38	3.8	3.8	13	9.2
50	0.244	1.19	4.01	3.1	2.6	13	9.9
55	0.173	0.60	2.85	2.3	1.6	13	10.7
60	0.115	0.26	1.89	1.6	0.9	13	11.4
65	0.07	0.10	1.15	1.0	0.5	13	12.0
70	0.039	0.03	0.64	0.6	0.2	13	12.4
75	0.018	0.01	0.30	0.3	0.1	13	12.7
80	0.006	0.00	0.10	0.1	0.0	13	12.9
85	0.001	0.00	0.02	0.0	0.0	13	13.0
90	0	0.00		0.0	0.0	13	13.0

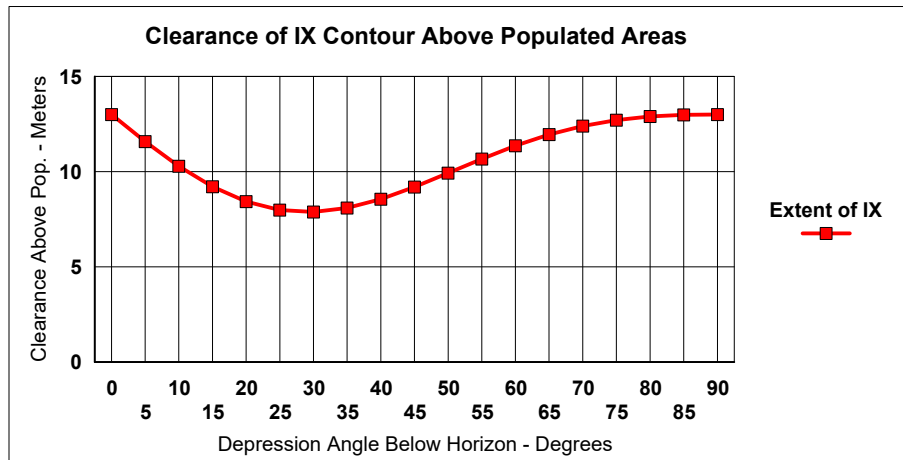
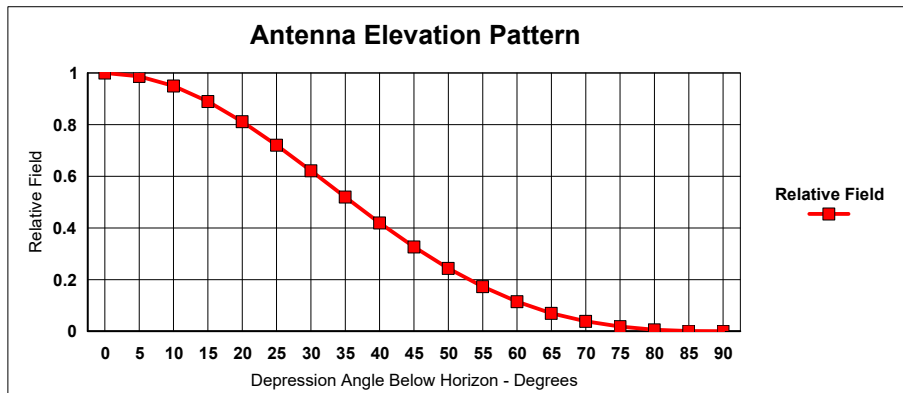


EXHIBIT 14

ENVIRONMENTAL PROTECTION ACT / NIER ANALYSIS

The applicant proposes mounting a two bay, 0.5-wave-spaced, SWR FMEC/2-HWS antenna on a tower that extends 5.7 meters above the top of the an equipment penthouse. The radiation center would be 13 meters above the highest populated area - the building's uppermost floor. **See Exhibit E-1.**

RF exposures were calculated using FM Model (online version), using the "EPA Type 2: Opposed V Dipole" setting. FM Model predicted a peak exposure of $1.2\mu\text{W}/\text{cm}^2$ at 20.5 meters from the tower base, for persons on the uppermost populated floor. This represents 0.6% of the Maximum Permissible Exposure (MPE) of $200\mu\text{W}/\text{cm}^2$ for uncontrolled environments. 47 CFR §1.1307(b)(3) exempts applicants from preparing an Environmental Assessment when the predicted exposure levels would be less than 5% of the FCC limits.

The roof and penthouse are controlled/occupational areas. Access is strictly controlled by a locked door, and these areas are only accessed for maintenance. For the main roof area, FM Model predicted a peak exposure on the roof of $2.2\mu\text{W}/\text{cm}^2$ at 14.9 meters from the tower base. This represents 0.2% of the Maximum Permissible Exposure (MPE) of $1000\mu\text{W}/\text{cm}^2$ for controlled/occupational environments.

If tower climbing by authorized personnel becomes necessary, or if any work involves being above roof level, the transmitter power will be reduced or operation will cease, as necessary, so as to not exceed the RF exposure limits. RF warning signs will be posted at appropriate locations.