

[Exhibit 13]

## **Non-Interference Compliance**

Regarding Facility id 152811

Channel 256

### **Description of Exhibit 13 Contents**

This exhibit demonstrates that the proposed facility complies with contour overlap and interference protection provisions in all of the applicable rule sections and that this application for a construction permit is in full compliance with 47 C.F.R. § 74.1204.

**Let it be noted that should any actual real world interference occur, the applicant acknowledges that it will promptly suspend operation of this translator in accordance with 47 C.F.R. § 74.1203.**

Page 2 of this exhibit is an explanation of the method used to demonstrate compliance with contour overlap and interference provisions based on 47 C.F.R. § 74.1204(d), which states:

*[A]n application otherwise precluded by this section will be accepted if it can be demonstrated that no actual interference will occur due to intervening terrain, lack of population or such other factors as may be applicable.*

Page 3 contains a tabulation of the vertical radiation pattern of the proposed antenna and the minimum ground clearance of the interfering contour based on this pattern.

Pages 4 through 5 include a tabulation of the vertical radiation pattern for the proposed antenna provided by the antenna manufacturer.

Page 6 of this exhibit contains the tabulated data from the interference analysis, which shows all stations whose protected contours come within 50 km of the 34 dBμ F(50,10) contour of the proposed translator. These tabulated values were calculated using data from the FCC's CDBS files and 30 arc second terrain data. The column labeled "Adj" shows the number of channels difference between the entry and the proposed translator. The column labeled "Dist" shows the distance in km. The column labeled "Overlap" shows the area of contour overlap in square kilometers.

Page 7 of this exhibit is a portion of a USGS 1:24,000 scale 7.5 minute quadrangle at full scale with the calculated area of interference overlaid. The sheet includes the quadrangle name and measurement scale at the bottom-left corner (note: "Mt" refers to meters). The area of interference was calculated using the free space equation and 120 radials.

Page 8 of this exhibit is an aerial photo of the vicinity surrounding the proposed translator's tower site.

## Compliance with 47 C.F.R. § 74.1204(d)

All authorized second and third adjacent stations with which the proposed translator has contour overlap are tabulated below. Column four show the station's signal level at the proposed translator's tower site, and column five gives the minimum value within the entire standard interfering contour of the proposed translator (100 dB $\mu$  for most classes, 94 for class B, 97 for class B1). The minimum second or third adjacent F(50,50) contour within the proposed translator's standard interfering contour was used to calculate the proposed translator's actual "worst-case" interfering contour.

<b>Application_id</b>	<b>File Number</b>	<b>Callsign</b>	<b>Contour at Tower</b>	<b>Min. Contour</b>
1308678	BMLH20090415AAX	WFMT	65.2	64.5
666945	BLH20030611AAT	WUSN	62.8	62.8
Minimum F(50,50) Contour of Adjacent Station within Proposed Translator's Standard Interfering Contour				<b>62.8</b>

FCC 02-244 at Section II.A.5 states that "when demonstrating that 'no actual interference will occur due to . . . other factors,' pursuant to Section 74.1204(d), an applicant may use the undesired-to-desired signal ratio method." The undesired-to-desired ratio for second and third adjacent stations required by § 74.1204(a) is 40 dB. Since the minimum protected contour strength within the proposed translator's standard interference contour is **62.8 dB $\mu$** , this makes the proposed translator's worst-case interfering contour **102.8 dB $\mu$** . By the free-space equation, this contour is calculated to extend a maximum of **409.7 m** from the transmit antenna.

The maximum horizontal plane of the interfering contour was calculated for 120 radials and plotted on the pertinent portion of a USGS quadrangle (page 7 of this exhibit). However, the field strength of the proposed translator's antenna varies with angle of depression from horizontal. The antenna relative fields are tabulated on the following page at 5 degree increments, starting at 5 degrees below horizontal. Antenna relative field strength data was provided and certified by the manufacturer of the proposed antenna. Using a free-space calculation that neglects any loss due to reflection, the vertical ground clearance of the proposed translator's interference contour has been tabulated. As shown on the following page, the area of interference clears the tower ground level (TGL) by **7.2 m** at the lowest point. The applicant has taken into account USGS quadrangles and relevant aerial photography in stating that no structures, except possibly tower support structures, puncture the area of interference. Hence, in accordance with 47 C.F.R. § 74.1204(d) and the clarification provided by the FCC in the decision *Re: Living Way Ministries* (FCC 02-244), a lack of population has been demonstrated within the area of interference and this application is therefore in full compliance with 47 C.F.R. § 74.1204.

<b>Antenna Manufacturer:</b>	<b>PSI</b>
<b>Antenna Model:</b>	<b>FML</b>
<b>Antenna Bays:</b>	<b>8</b>
<b>Antenna Spacing:</b>	<b>0.75</b>
<b>CORAGL:</b>	<b>32 m</b>
<b>Maximum ERP:</b>	<b>0.065 kW</b>
<b>Interfering Contour:</b>	<b>102.8 dB<math>\mu</math></b>
<b>Max Int. Contour Distance:</b>	<b>409.7 m</b>
<b>Min Ground Clearance:</b>	<b>7.2 m</b>

The following table shows how the interfering contour ground clearance was calculated.

The formula used to calculate the vertical radiation pattern for the multi-bay antenna array is the exact formula used by the FCC's Office of Engineering and Technology in the FM Model program used to calculate ground-level power density for multi-bay antenna arrays for purposes of compliance with OET65. According to the source code of FM Model, this formula was "derived from Kraus (eqn 4-51 & 5-52), Gailey and Tell, and material from Ben Dawson, Hatfield and Dawson."

- The *Depression Angle* is the angle below horizontal for the radial.
- The *Single-Bay Relative Field* value is the relative field value for the depression angle either provided by the antenna manufacturer or interpolated from the values provided by the manufacturer.
- The *Relative Field Multiplier* is equal to  $\text{Sin}(N * \pi \text{Sin}\phi) / (N * \text{Sin}(\pi \text{Sin}\phi))$ , where N is the number of antenna elements in the array, S is the spacing between elements,  $\pi$  is the ratio of a circle's circumference to its diameter, and  $\phi$  is the Depression Angle.
- The *Relative Field Value for the Array* is the absolute value of the product of the Relative Field Factor and the Single-Bay Relative Field value for that radial.
- The *ERP on the Radial* is the square of the *Relative Field Value for the Array* multiplied by the maximum ERP.
- The *Contour Direct Distance* is found by using the free space equation.
- The *Horizontal and Vertical Contour Distances* are calculated from the *Direct Distance* using trigonometry.
- The *Contour Ground Clearance* is the *Vertical Contour Distance* subtracted from the overall antenna height above the ground.

Depression Angle (degree)	Single-Bay Relative Field	Relative Field Multiplier	Relative Field for Array	ERP on Radial (W)	Contour Direct Distance (m)	Contour Horizontal Distance (m)	Contour Vertical Distance (m)	Contour Ground Clearance (m)
5	0.996	0.6114	0.609	24.1	249.5	248.5	21.7	10.3
10	0.985	-0.0412	0.041	0.1	16.6	16.4	2.9	29.1
15	0.966	-0.2152	0.208	2.8	85.2	82.3	22.0	10.0
20	0.940	0.0282	0.027	0.0	10.9	10.2	3.7	28.3
25	0.906	0.1480	0.134	1.2	54.9	49.8	23.2	8.8
30	0.866	0.0000	0.000	0.0	0.0	0.0	0.0	32.0
35	0.819	-0.1259	0.103	0.7	42.2	34.6	24.2	7.8
40	0.766	-0.0545	0.042	0.1	17.1	13.1	11.0	21.0
45	0.707	0.0867	0.061	0.2	25.1	17.8	17.8	14.2
50	0.643	0.1227	0.079	0.4	32.3	20.8	24.8	7.2
55	0.573	0.0353	0.020	0.0	8.3	4.7	6.8	25.2
60	0.500	-0.0810	0.041	0.1	16.6	8.3	14.4	17.6
65	0.423	-0.1452	0.061	0.2	25.2	10.6	22.8	9.2
70	0.342	-0.1417	0.048	0.2	19.9	6.8	18.7	13.3
75	0.259	-0.0983	0.025	0.0	10.4	2.7	10.1	21.9
80	0.174	-0.0482	0.008	0.0	3.4	0.6	3.4	28.6
85	0.087	-0.0126	0.001	0.0	0.4	0.0	0.4	31.6
90	0.001	0.0000	0.000	0.0	0.0	0.0	0.0	32.0
<b>Min Ground Clearance (m):</b>								<b>7.2</b>



Relative Field Elevation Pattern  
Model: PSIFML-1  
Type: 1-Bay FM Antenna  
Polarization: Circular  
Gain: .46 (-3.37 dB)





**Propagation Systems Inc.**  
 Elevation Pattern Tabulation  
 Antenna: PSIFML-1

Angle	Field	dB	Angle	Field	dB	Angle	Field	dB
-90.00	0.001	-60.000	-50.00	0.643	-3.839	-10.00	0.985	-0.134
-89.00	0.017	-35.177	-49.00	0.656	-3.663	-9.00	0.988	-0.109
-88.00	0.035	-29.156	-48.00	0.669	-3.490	-8.00	0.990	-0.086
-87.00	0.052	-25.634	-47.00	0.682	-3.325	-7.00	0.992	-0.066
-86.00	0.070	-23.136	-46.00	0.695	-3.166	-6.00	0.994	-0.049
-85.00	0.087	-21.198	-45.00	0.707	-3.012	-5.00	0.996	-0.034
-84.00	0.104	-19.626	-44.00	0.719	-2.862	-4.00	0.997	-0.022
-83.00	0.122	-18.286	-43.00	0.731	-2.719	-3.00	0.998	-0.013
-82.00	0.139	-17.134	-42.00	0.743	-2.580	-2.00	0.999	-0.007
-81.00	0.156	-16.117	-41.00	0.755	-2.445	-1.00	1.000	-0.003
-80.00	0.174	-15.207	-40.00	0.766	-2.316	0.00	1.000	0.000
-79.00	0.191	-14.390	-39.00	0.777	-2.190	1.00	1.000	-0.003
-78.00	0.208	-13.644	-38.00	0.788	-2.071	2.00	0.999	-0.007
-77.00	0.225	-12.962	-37.00	0.798	-1.955	3.00	0.998	-0.013
-76.00	0.242	-12.330	-36.00	0.809	-1.842	4.00	0.997	-0.022
-75.00	0.259	-11.741	-35.00	0.819	-1.733	5.00	0.996	-0.034
-74.00	0.276	-11.194	-34.00	0.829	-1.630	6.00	0.994	-0.049
-73.00	0.292	-10.684	-33.00	0.839	-1.529	7.00	0.992	-0.066
-72.00	0.309	-10.203	-32.00	0.848	-1.432	8.00	0.990	-0.086
-71.00	0.325	-9.750	-31.00	0.857	-1.339	9.00	0.988	-0.109
-70.00	0.342	-9.320	-30.00	0.866	-1.251	10.00	0.985	-0.134
-69.00	0.358	-8.914	-29.00	0.875	-1.164	11.00	0.982	-0.162
-68.00	0.375	-8.530	-28.00	0.883	-1.082	12.00	0.978	-0.193
-67.00	0.391	-8.165	-27.00	0.891	-1.003	13.00	0.974	-0.227
-66.00	0.407	-7.815	-26.00	0.899	-0.928	14.00	0.970	-0.263
-65.00	0.423	-7.482	-25.00	0.906	-0.855	15.00	0.966	-0.301
-64.00	0.438	-7.164	-24.00	0.913	-0.786	16.00	0.961	-0.344
-63.00	0.454	-6.860	-23.00	0.920	-0.720	17.00	0.956	-0.389
-62.00	0.469	-6.569	-22.00	0.927	-0.657	18.00	0.951	-0.436
-61.00	0.485	-6.291	-21.00	0.933	-0.598	19.00	0.945	-0.487
-60.00	0.500	-6.023	-20.00	0.940	-0.542	20.00	0.940	-0.540
-59.00	0.515	-5.764	-19.00	0.945	-0.487	21.00	0.933	-0.598
-58.00	0.530	-5.517	-18.00	0.951	-0.437	22.00	0.927	-0.657
-57.00	0.545	-5.279	-17.00	0.956	-0.389	23.00	0.920	-0.720
-56.00	0.559	-5.050	-16.00	0.961	-0.344	24.00	0.913	-0.786
-55.00	0.573	-4.830	-15.00	0.966	-0.301	25.00	0.906	-0.855
-54.00	0.588	-4.616	-14.00	0.970	-0.263	26.00	0.899	-0.927
-53.00	0.602	-4.413	-13.00	0.974	-0.227	27.00	0.891	-1.003
-52.00	0.616	-4.214	-12.00	0.978	-0.193	28.00	0.883	-1.082
-51.00	0.629	-4.024	-11.00	0.982	-0.162	29.00	0.875	-1.164
						30.00	0.866	-1.251

file: FML 1-bay elevation tabulation

revision: A

Date: 1/28/08

**Adjacent Channel Study  
For Station W256CL, Facility\_id: 152811**

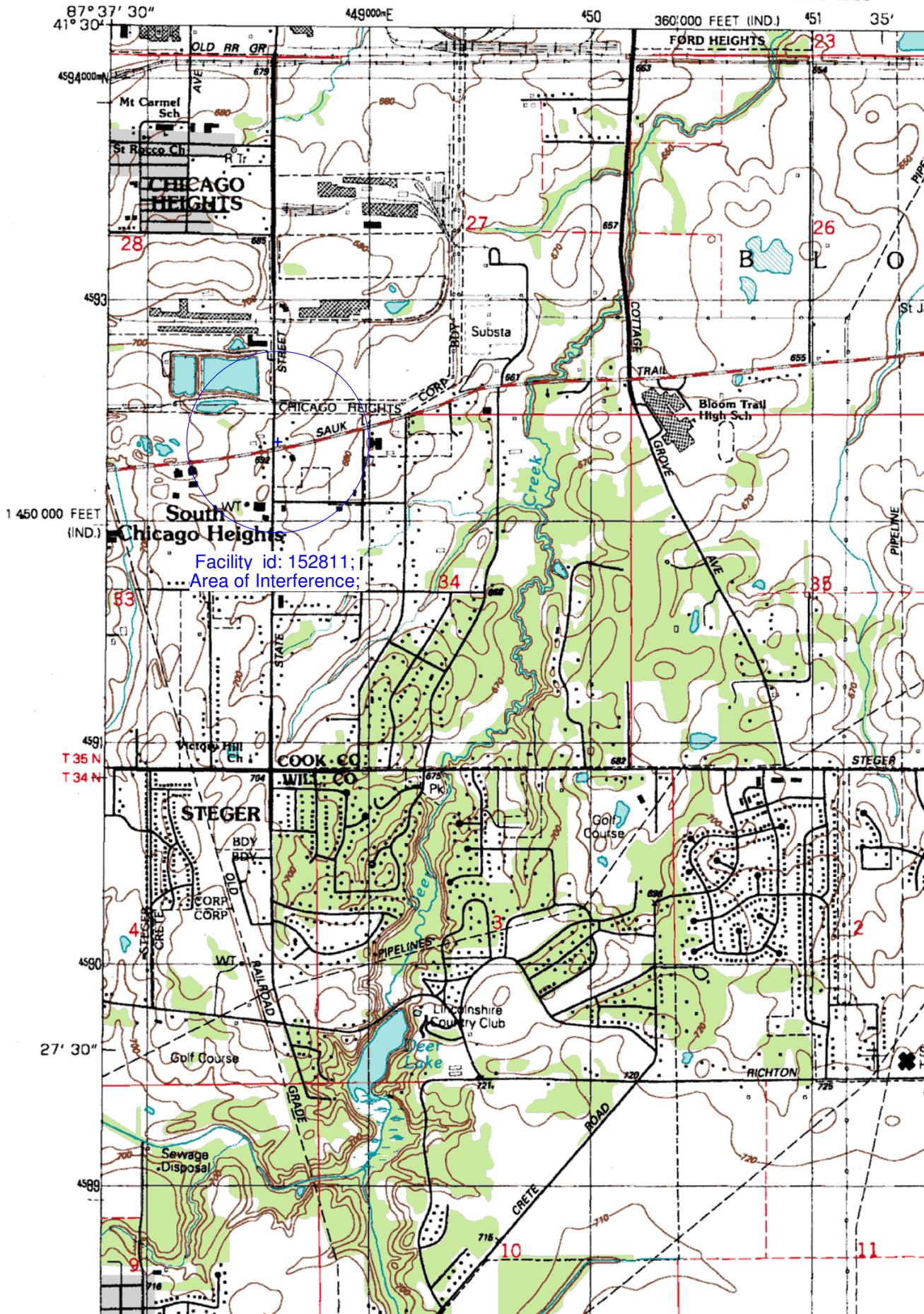
**Co-channel through third adjacent:**

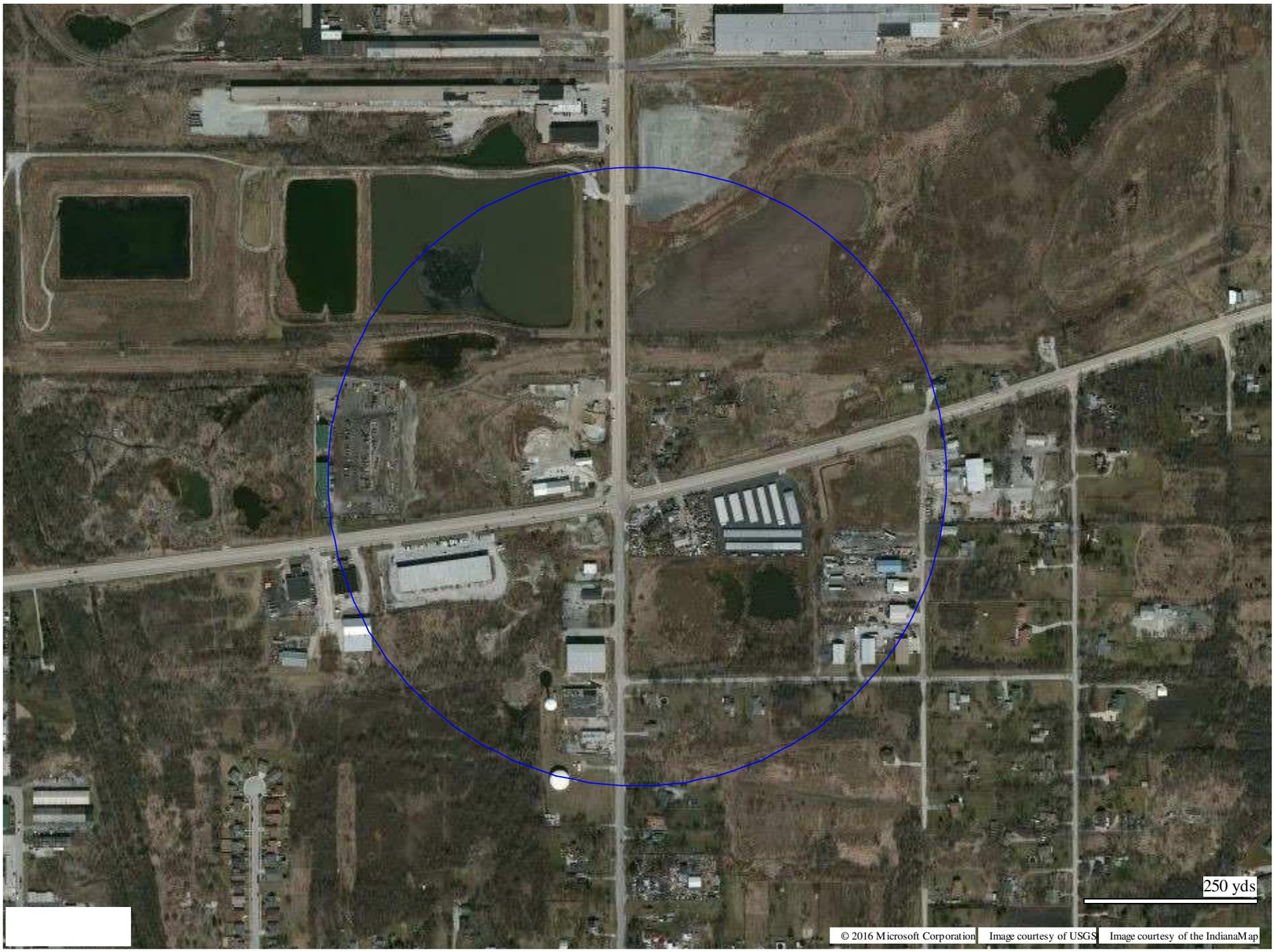
App_id	Fac_id	File_Number	Call	Licensee	Class	City	State	Status	ERP	RCAMSL	Chan	Adj	Dist	Overlap
1308678	10801	BMLH-20090415AAX	WFMT	WINDOW TO THE WORLD COMMUNICATIONS	B	CHICAGO	IL	LIC	6	651	254	2	44	3.9993
666945	28620	BLH-20030611AAT	WUSN	CBS RADIO OF CHICAGO LLC	B	CHICAGO	IL	LIC	5.7	606	258	2	46.2	3.9993
1683700	145160	BPFT-20150724ABH	W256CA	EDUCATIONAL MEDIA FOUNDATION	D	JOLIET	IL	CP	0.01	328	256	0	35.5	0
1565334	145160	BLFT-20130724AEI	W256CA	EDUCATIONAL MEDIA FOUNDATION	D	JOLIET	IL	LIC	0.01	328	256	0	35.5	0
1663718	193259	BNPL-20131114ADR	WJPC-LP	URBANMEDIA ONE	L1	CHICAGO	IL	CP	0	234	256	0	37.1	0
1663860	192949	BNPL-20131114ABC	NEW	MORTON COLLEGE	L1	CICERO	IL	CP	0	224	256	0	40.3	0
1594388	197052	BNPL-20131114ALZ	WJRY-LP	JERSHARE	L1	WHEATON	IL	CP	0	259	256	0	56.4	0
273451	19211	BLH-19980901KE	WJEZ	CUMULUS LICENSING LLC	A	DWIGHT	IL	LIC	1.3	352	255	1	84.8	0
1682387	33328	BPH-20151023AII	WKVI-FM	KANKAKEE VALLEY B/CING. CO., INC.	A	KNOX	IN	CP	3.3	294.7	257	1	86.1	0
158865	33328	BMLH-19910401KB	WKVI-FM	KANKAKEE VALLEY B/CING. CO., INC.	A	KNOX	IN	LIC	3.3	306	257	1	86.2	0

3467 11 SW  
(HARVEY)



U.S. DEPARTMENT OF THE INTERIOR  
U.S. GEOLOGICAL SURVEY





250 yds