OWL ENGINEERING & EMC TEST LABS, INC.

CONSULTING COMMUNICATIONS ENGINEERS · EMC TEST LABORATORIES

5844 Hamline Avenue North, Shoreview, MN 55126
651-784-7445 • Fax 651-784-7541

# ENGINEERING EXHIBIT FOR AN APPLICATION FOR A CONSTRUCTION PERMIT FOR A MINOR CHANGE TO TRANSLATOR K287AD (BLFT-20140514AAK) FACILITY ID# 49542 CHANNEL 287D 105.3 MHZ LEECH LAKE BAND OF OJIBWE

**CHANNEL 201D 0.25 KW (H&V) 141 METERS HAAT**

**May 11, 2022**

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## ENGINEERING STATEMENT

This engineering exhibit, of which this Statement is a part, was prepared in accordance with the Rules and Regulations of the Federal Communications Commission and pursuant to the provisions of Section III-B of FCC Form 349 on behalf of Leech Lake Band of Ojibwe. (Hereafter ("**Lake Band**") in support of an application for authority to modify an existing FM Translator. The purpose of this application is to modify the site location using a power output of 250 watts ERP and 65 meters HAAT. This power/height combination is an allowable Class D facility permitted under the current rules and regulations. This change is proposed to eliminate interference to a WRLN in Red Lake, MN that requires that k287AD be removed to prevent interference to this new station.

**Lake Band** proposes to operate from a site uniquely described by the geographic coordinates:

**(NAD 83)**
47° 33' 26.09" North Latitude
94° 48' 4.9" West Longitude

The proposed facility will be located on an existing tower (ASR# 1255741). Engineering Figure 1 is a portion of the Turtle River, MN 7.5 minute USGS map that shows the exact location of the proposed new tower. Figure 2 is an aerial view of the site. The applicant is aware of the provisions of §74.1203 of the FCC's Rules and the requirement for satisfying all complaints of interference that are received.

## ALLOCATION CONSIDERATIONS

A review of allotments and assignments on channel 201, on the three immediately upper adjacent, the three immediately lower adjacent channels and the two channels removed by 53 and 54 channels (254 & 255) shows that the site proposed has a short-spaced condition with KRCB. The results of the allocation study are shown in Figure 3.

The authorized KRCB 80.6 dBu contours passes through the reference site. Using the FCC sanctioned U/D method of establishing translator interference to full-service FM stations, the interfering signal of the proposed translator to second-adjacent channel KRCB is 120.6 dBu. Based on the antenna pattern having no vertical directivity (a single bay antenna). The 120.6 dBu contour distance is predicted to be 103.8 meters. The proposed antenna will be mounted with a center of radiation of 137 meters and the contour will not contact the ground. Therefore the interference is eliminated.

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## COVERAGE CONTOURS

The three-to-sixteen-kilometer average terrain elevations were derived from the NGDC 30-second terrain database.

DISTANCES TO CONTOURS (Kilometers):
Antenna COR elevation (AMSL):557 meters  Average HAAT:141 meters
Frequency:  88.1 MHz
Coordinates: N 47°  33' 26.00"  W 94°  48' 5.00"
F(50,50) Curves  Number of Contours:  2

| AZ (degs) | HAAT (m) | ERPd (kW) | CONTOUR LEVELS (dBuV): 70.0 | 60.0 |
|---|---|---|---|---|
| 0.0 | 140 | 0.2500 | 8.7 | 15.4 |
| 30.0 | 137 | 0.2500 | 8.5 | 15.2 |
| 60.0 | 145 | 0.2500 | 8.8 | 15.7 |
| 90.0 | 151 | 0.2500 | 9.0 | 16.0 |
| 120.0 | 145 | 0.2500 | 8.8 | 15.7 |
| 150.0 | 147 | 0.2500 | 8.9 | 15.8 |
| 180.0 | 133 | 0.2500 | 8.4 | 15.0 |
| 210.0 | 149 | 0.2500 | 8.9 | 15.9 |
| 240.0 | 141 | 0.2500 | 8.7 | 15.5 |
| 270.0 | 130 | 0.2500 | 8.3 | 14.8 |
| 300.0 | 136 | 0.2500 | 8.5 | 15.2 |
| 330.0 | 142 | 0.2500 | 8.7 | 15.5 |

The effective antenna radiation center height for each of the twelve standard 30-degree spaced radials was used in conjunction with the F (50, 50) metric curves of Figure 1 of §73.333 of the Rules to determine the distances to the coverage contours. Figure 4 shows the proposed 70 and 60 dBuV signal contours.

## ANSI Power Density Calculations

The power density at the base of the tower was calculated using the following formula from OST Bulletin Number 65, August, 1997:

$$S = \frac{0.64 \times 1.64 \times ERP}{\pi\left(R^2\right)}$$

Where:
S = power density in μW/ centimeter$^2$
ERP = effective radiated power in watts
R = distance to radiation source in centimeters
π = 3.14

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The site is considered to be a controlled site since access to the tower area is restricted. Access to RF circuitry is restricted by a property fence that surrounds the tower and limits access to the public. Signs are posted warning of the potential danger. When persons require access to the site, tower or antenna for maintenance purposes, the transmitter power will be reduced or completely eliminated to comply with ANSI guidelines. Hence, the conditions of §1.1306(b) (3) would not be involved.

Using:

ERP = 0.25 KW Vertical & 0.25 KW Horizontal
R = 13,700 cm.

Using this formula and the values shown below, a power density of less than 1.0 μW/cm$^2$ is found to exist at the base of the tower. This predicted value is 0.1% of the controlled exposure maximum limit of 1,000 μW/cm$^2$ or 0.45% of the General Population exposure limit.

## ENVIRONMENTAL IMPACT STATEMENT

The instant proposal is categorically excluded from environmental processing since none of the conditions of §1.1306(b)(2) and (3) would be involved for the following reasons:

1) The site proposed is not in or near any location referenced in §1.1306(b)(1) as being of environmental interest.

2) The provisions of §1.1306(b)(2) relating to the use of high intensity strobe lighting do not apply since this tower is not utilizing this type of lighting.

3) Compliance to §1.1306(b)(3) regarding human exposure to RF radiation was examined for multiple sources. A search was made about the proposed site coordinates to locate any additional sources of RF radiation and none were found.

## CONCLUSIONS

Based on the engineering studies provided, the proposal is in complete conformance with all technical rules of the Federal Communications Commission.

Garrett G. Lysiak, P.E.
May 11, 2022

TURTLE RIVER QUADRANGLE
MINNESOTA
TOPOGRAPHIC SERIES

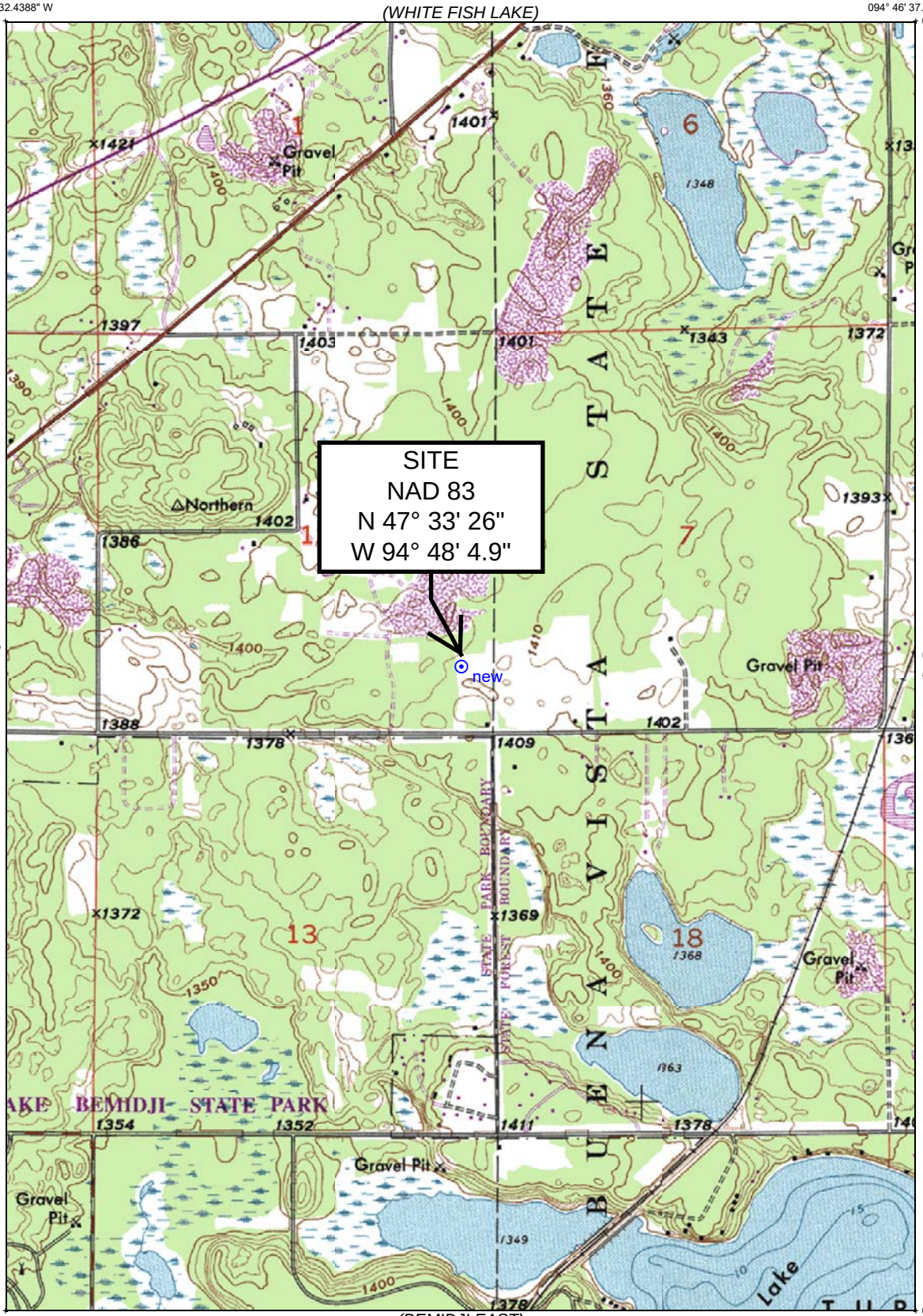
(PUPOSKY LAKE)

(TENSTRIKE)

094° 49' 32.4388" W
047° 34' 49.6328" N

(WHITE FISH LAKE)

094° 46' 37.1401" W
047° 34' 49.6328" N




(PETERSON LAKE)

(TURTLE RIVER LAKE)

047° 32' 02.0466" N
094° 49' 32.4388" W

(BEMIDJI EAST)

047° 32' 02.0466" N
094° 46' 37.1401" W

(BEMIDJI WEST)

(ANDRUSIA LAKE)

SCALE 1:24000

Declination
MN
GN

0 1
Mile

0 1000
Yards

0 1
Kilometer

GN 1° 20' W
MN 1° 04' E

CONTOUR INTERVAL 10 FT
[BASE MAP VERTICAL DATUM]

TURTLE RIVER, MN
JAN 1, 1994

**FIGURE 1 - SITE MAP**


**FIGURE 2 - AERIAL VIEW**

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# FIGURE 3 ALLOCATION STUDY

Leech Lake Band Of Ojibwe

REFERENCE — CH# 201D - 88.1 MHz, Pwr= 0.25 kW, HAAT= 64.6 M, COR= 481 M — DISPLAY DATES
47 33 26.0 N. — Average Protected F(50-50)= 10.5 km — DATA 05-02-22
94 48 05.0 W. — Omni-directional — SEARCH 05-09-22

| CH / CITY | CALL / STATE | TYPE | ANT / <-- | AZI. / FILE # | DIST / LAT. / LNG. | Pwr(kW) / HAAT(M) | INT(km) / COR(M) | PRO(km) / LICENSEE | *IN* (Overlap in km) | *OUT* |
|---|---|---|---|---|---|---|---|---|---|---|
| 203C1 | KCRB-FM | LIC | CN | 54.9 | 28.88 | 47 42 20.80 | 83.000 | 9.6 | 70.4 | 8.4 | -42.6* |
| Bemidji | MN | | 235.2 | BLED20030429AAO | 94 29 09.90 | 301 | 720 | Minnesota Public Radio | | | |
| 201C3 | 763944 | CP | CN | 111.3 | 101.90 | 47 13 05.50 | 24.000 | 107.7 | 33.5 | -17.0* | 30.6 |
| Grand Rapids | MN | | 292.2 | 0000166960 | 93 32 50.80 | 55 | 458 | University Of Northwestern | | | |
| 201A | AL1964 | DEL | | 337.9 | 179.25 | 49 02 49.96 | 6.000 | 133.7 | 38.0 | 35.1 | 89.2 |
| Cat Hills | MB | | 157.2 | | 95 43 29.94 | 100 | 1022 | From CDBS | | | |
| 201AA | AL02774 | ALO | | 337.9 | 179.25 | 49 02 50.00 | 6.000 | 133.7 | 38.0 | 35.1 | 89.2 |
| Cat Hills | MB | | 157.2 | | 95 43 29.90 | 100 | 1022 | | | | |
| 201D | K201IX | LIC | CN | 111.3 | 101.90 | 47 13 05.80 | 0.250 | 37.6 | 11.1 | 53.1 | 53.1 |
| Grand Rapids | MN | | 292.2 | BLFT20161031ADP | 93 32 50.80 | | 458 | University Of Northwestern | | | |

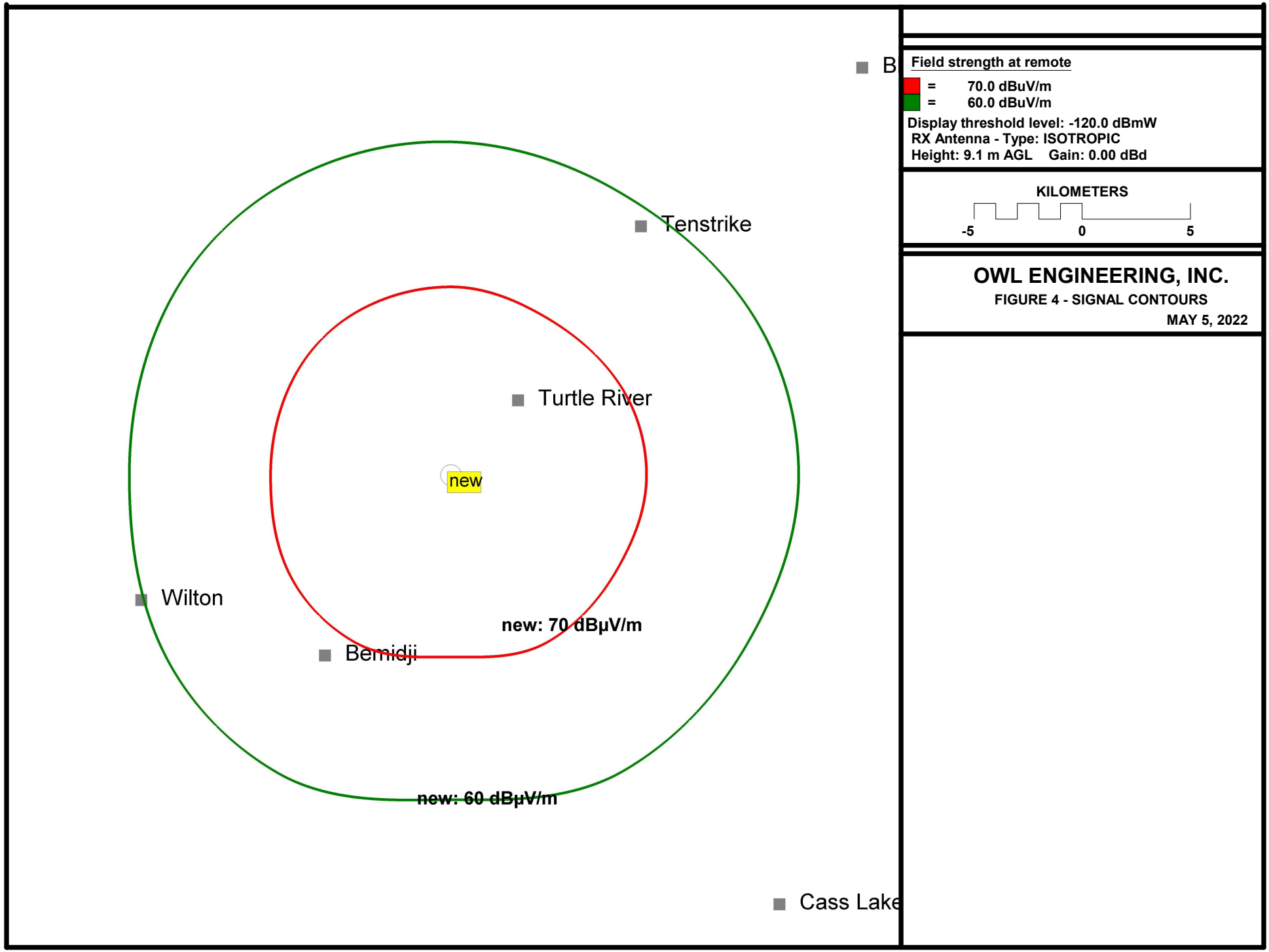
B
Tenstrike
Turtle River
new
Wilton
Bemidji
new: 70 dBµV/m
new: 60 dBµV/m
Cass Lake
Field strength at remote
= 70.0 dBuV/m
= 60.0 dBuV/m
Display threshold level: -120.0 dBmW
RX Antenna - Type: ISOTROPIC
Height: 9.1 m AGL Gain: 0.00 dBd
KILOMETERS
-5
0
5
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FIGURE 4 - SIGNAL CONTOURS
MAY 5, 2022

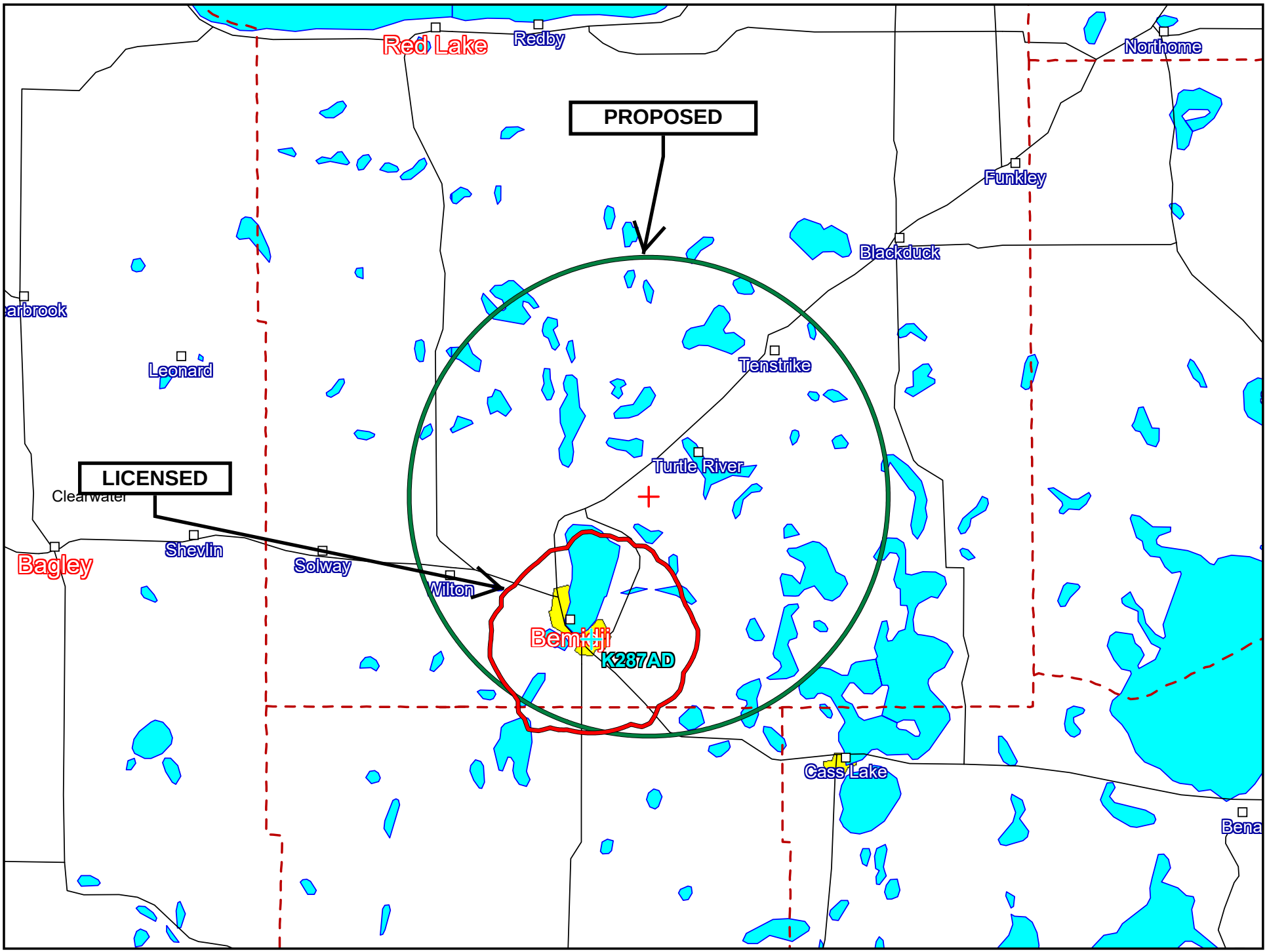


FIGURE 5 - 60 DB CONTOURS