

## Engineering Statement and Methodology Summary

### Introduction

The showing herein is provided on behalf of *Lutheran Church-Missouri Synod* to demonstrate the answers provided in the Fair Distribution of Service section of the application for a new NCE FM facility on Channel 209 for Troy, Missouri. The total population within the proposed 60 dB $\mu$  contour is 63,065 persons covering a land mass of 1,715.3 km<sup>2</sup>.

### Tribal Applicant

*Lutheran Church-Missouri Synod* is not a tribal applicant.

### First Aural Service

**Figure 1** is provided to demonstrate that there is no first aural service for the proposed facility.

### First and Second NCE Service

**Figure 2** is provided to demonstrate the areas where a first NCE and a second NCE service will be provided by the proposed facility. First NCE service will be provided to 32,486 persons (51.51% of the proposed contour population), and Second NCE service will be provided to 1,606 persons (2.55% of the proposed contour population), for a combined aggregate of 34,092 persons (54.06% of the proposed contour population). See discussion below for details on how the area and population statistics were derived.

### Point System Factors / Tiebreakers – Technical Parameters

Contour coverage area and population were derived from the same map used to answer the questions for first non-commercial aural or second non-commercial aural service areas. See related discussion below.

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### **Stations identified to determine 1st aural, 1<sup>st</sup> non-commercial aural or 2<sup>nd</sup> non-commercial aural service area of proposed facility**

The FCC maintains and makes available to the public engineering parameter data for each licensed, authorized or proposed full service FM station. The data is available via the Commission's Licensing, and Management System ("LMS"). Using a "radius" search query, all identifiable licensed full service FM stations in the area of the instant proposal were identified and pertinent parameters were copied to local software used to generate contour data for all conceivably relevant stations.

### **Contour Data**

Predicted 60 dB $\mu$  signal contours of the proposed and licensed stations considered herein were calculated by using pertinent data, including the antenna elevation above mean sea level, geographic coordinates, effective radiated power, and, where appropriate, directional antenna patterns. The requisite 1.0 mV/m (60 dB $\mu$  F(50,50)) contours were determined using digitized 3 arc-second U.S.G.S. terrain data along radials spaced every degree from the transmitter site and an implementation of the Commission's TVFMFS computer program which simulates the FM F(50,50) propagation curves. The detailed distances to the contours were then used with a GIS mapping program to generate the attached maps.

### **Determination of 1st aural, 1<sup>st</sup> non-commercial aural or 2<sup>nd</sup> non-commercial aural service areas.**

Using contour data derived as described above along with commercially available Geographic Information System ("GIS") software, contour data was mapped geospatially. Queries to identify levels of overlapping service to identify underserved area were executed. The software is suitable for calculation of area or areas within contours or portions of contours. Significant water area within contour areas, based on U.S. Census TIGER Water boundary files was considered to

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adjust areas exclude significant water bodies to report land area. The software is also suitable for juxtaposing U.S. Census block level centroids over contour data to identify and tally population block totals within contours or portions of contours.

### **Population Data Utilized Is 2010 U.S. Census Block Level File**

The population estimates in the instant application are based on 2010 U.S. Census SF1 data at the block level. These files contain information including Census Block Centroid point location and population totals per block. Census Block data is the finest level of resolution for Census data available for mapping purposes.

### **Conclusion**

As discussed herein, consistent with FCC rules regarding contour prediction, area calculation, and estimates of areas and population, were performed following prescribed good and established engineering practices.

**FIGURE 1**  
**1ST AURAL SERVICE STUDY**

*prepared November 2021 for*

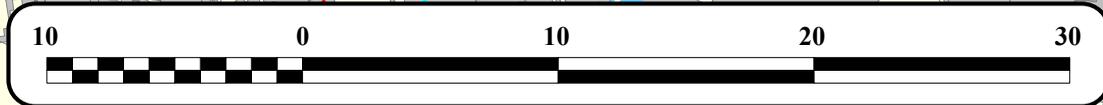
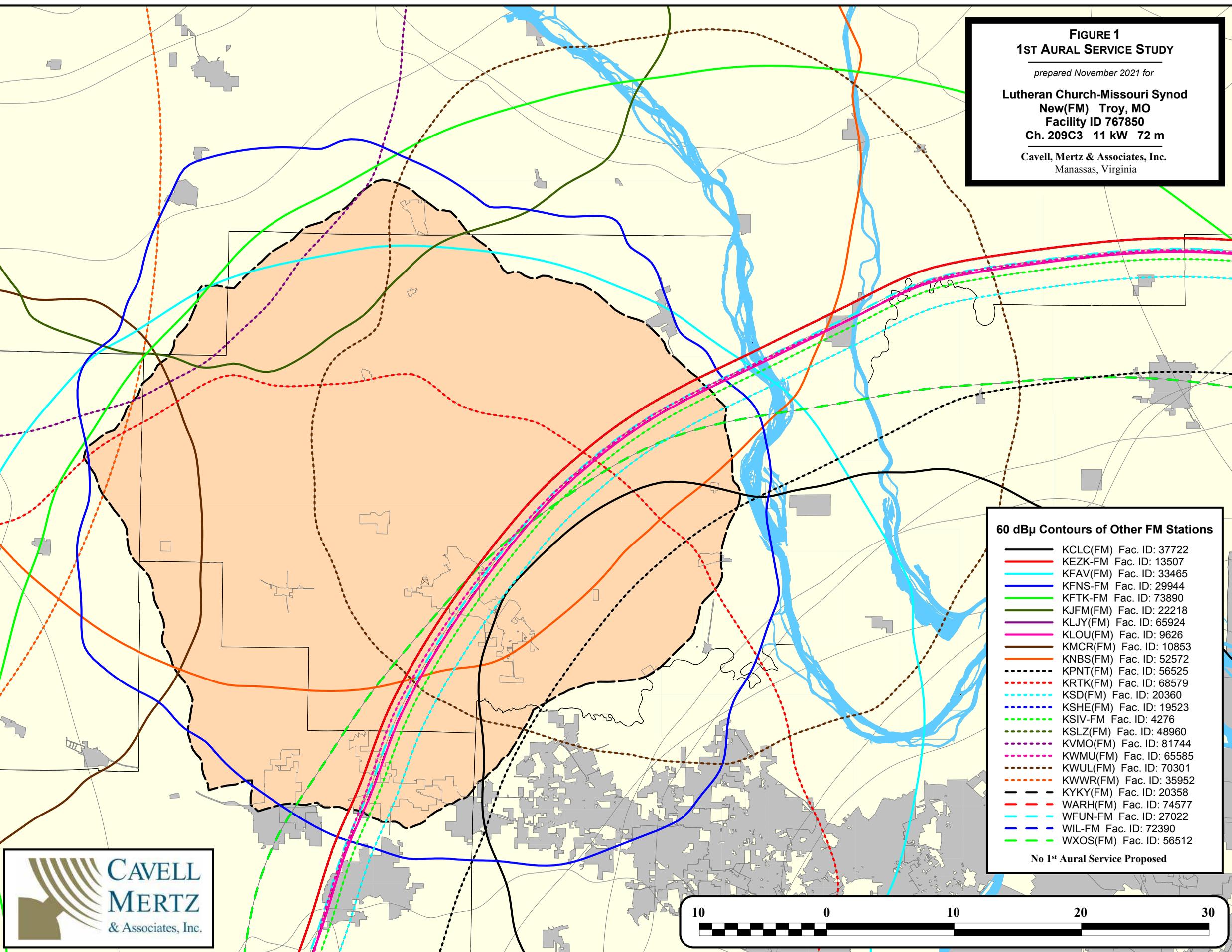
**Lutheran Church-Missouri Synod**  
**New(FM) Troy, MO**  
**Facility ID 767850**  
**Ch. 209C3 11 kW 72 m**

**Cavell, Mertz & Associates, Inc.**  
 Manassas, Virginia

**60 dBμ Contours of Other FM Stations**

- KCLC(FM) Fac. ID: 37722
- KEZK-FM Fac. ID: 13507
- KFAV(FM) Fac. ID: 33465
- KFNS-FM Fac. ID: 29944
- KFTK-FM Fac. ID: 73890
- KJFM(FM) Fac. ID: 22218
- KLJY(FM) Fac. ID: 65924
- KLOU(FM) Fac. ID: 9626
- KMCR(FM) Fac. ID: 10853
- KNBS(FM) Fac. ID: 52572
- - - KPNT(FM) Fac. ID: 56525
- - - KRTK(FM) Fac. ID: 68579
- - - KSD(FM) Fac. ID: 20360
- - - KSHE(FM) Fac. ID: 19523
- - - KSIV-FM Fac. ID: 4276
- - - KSLZ(FM) Fac. ID: 48960
- - - KVMO(FM) Fac. ID: 81744
- - - KWMU(FM) Fac. ID: 65585
- - - KWUL(FM) Fac. ID: 70301
- - - KWWR(FM) Fac. ID: 35952
- - - KYKY(FM) Fac. ID: 20358
- - - WARH(FM) Fac. ID: 74577
- - - WFUN-FM Fac. ID: 27022
- - - WIL-FM Fac. ID: 72390
- - - WXOS(FM) Fac. ID: 56512

**No 1<sup>st</sup> Aural Service Proposed**



**FIGURE 2**  
**1ST & 2ND NCE SERVICE STUDY**  
*prepared November 2021 for*  
**Lutheran Church-Missouri Synod**  
**New(FM) Troy, MO**  
**Facility ID 767850**  
**Ch. 209C3 11 kW 72 m**  
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 Manassas, Virginia

**Area Color Legend**

- (White) First Service
- (Gray) Second Service
- (Orange) 2 or More Services

**New(FM) Proposed**  
 Ch 209C3 11 kW  
 60 dBμ F(50,50)

**First NCE Area**

**Second NCE Area**

**NCE FM 60 dBμ Contours**

- KCLC(FM) Fac. ID: 37722
- KSIV-FM Fac. ID: 4276
- KWMU(FM) Fac. ID: 65585

