

**December 2019  
FM Translator K233DR  
Bozeman, Montana Channel 236D  
Allocation Study**

**Background**

This application is being filed as a minor modification of the original construction permit BNPFT-20171215AAC for FM translator K233DR at Bozeman. K233DR was authorized on January 23, 2018 as a new FM translator for AM station KMMS. The licensee of KMMS and permittee of K233DR is Townsquare Media Bozeman License, LLC (“Townsquare”).

On August 14, 2019, Townsquare filed an application for minor modification of KMMS-FM 236C1 Bozeman, proposing a change in transmitter site, channel, and class such that KMMS-FM will ultimately operate on Channel 234C3. (KMMS-FM is changing channel because it is losing the use of its current licensed transmitter site, and its current channel will not fit at the new transmitter site.) The KMMS-FM application is pending as BPH-20190814ABJ, and will displace Townsquare’s construction permit for K233DR at Bozeman as the two facilities cannot operate on the first-adjacent channel to each other without extensive areas of interference.

Therefore Townsquare is filing this application which modifies the K233DR construction permit to its third-adjacent Channel 236D, also with a change of transmitter site. Townsquare recognizes and acknowledges that K233DR cannot operate on Channel 236D unless and until KMMS-FM commences operation on Channel 234C3 as proposed in BPH-20190814ABJ. And while FM translator construction permits are not typically conditioned on actions by full-power FM stations, this particular situation is relatively unique in that Townsquare is the licensee of both the translator and the full-power station in question. Consequently, Townsquare can and will exercise full control over the timing of the buildouts of KMMS-FM and K233DR.

KMMS-FM and K233DR will both operate from a new tower being constructed at the High Flat communications site. As noted elsewhere in this application, coordination of the tower proposal with State and Tribal Historic Preservation Offices is in its final stages. The Environmental Effect question of Schedule 301 has been answered “Yes” solely because this process is not yet completed. This application will be amended to indicate a “No” answer (i.e. “no significant environmental effect”) upon successful and favorable completion of the Section 106 process.

## Allocation Study

The attached spacing study shows the spacing between the proposed translator site and the location of cochannel and adjacent channel stations and proposals. This study was made with the Commission's Class A spacing requirements, and individual situations were examined to determine the lack of prohibited contour overlap per the requirements of §74.1204 of the Rules. The attached allocation study map demonstrates compliance with the Commission's Rules for protection of FM broadcast stations and FM translators as outlined in §74.1204. *Please see the preceding page for a discussion regarding the KMMS-FM licensed facility on Channel 236C1.*

The proposed facility will operate with an ERP of less than 100 watts. Therefore there are no spacing requirements regarding spacing restrictions to stations which are 53 or 54 channels removed from the proposed operation (specifically KKQX 289C2 Manhattan).

### ***KMMS-FM 234C3 Bozeman (application)***

The proposed translator transmitter site is located within the 60 dBu protected contour of second-adjacent channel station KMMS-FM 234C3 Bozeman (application facility). The following calculation, performed using the *Living Way* methodology, demonstrates interference protection to that station. Two notes:

- A) KMMS-FM and the translator will be located on the same tower; a distance of 0.01 km between the two facilities has been assumed in order to avoid a “divide by zero” error.
- B) An amendment is being filed to the pending KMMS-FM application, to locate at this site.

Protected Station	Distance & Bearing to Proposal	Station ERP and HAAT on that azimuth	Station Field Strength at Proposal	Corresponding Translator Interfering Contour	Distance to Translator Interfering Contour
KMMS-FM 234C3	0.01 km assumed	5.3 kW dna	154.2 dBu Free Space	194.2 dBu	<0.1 meters Free Space

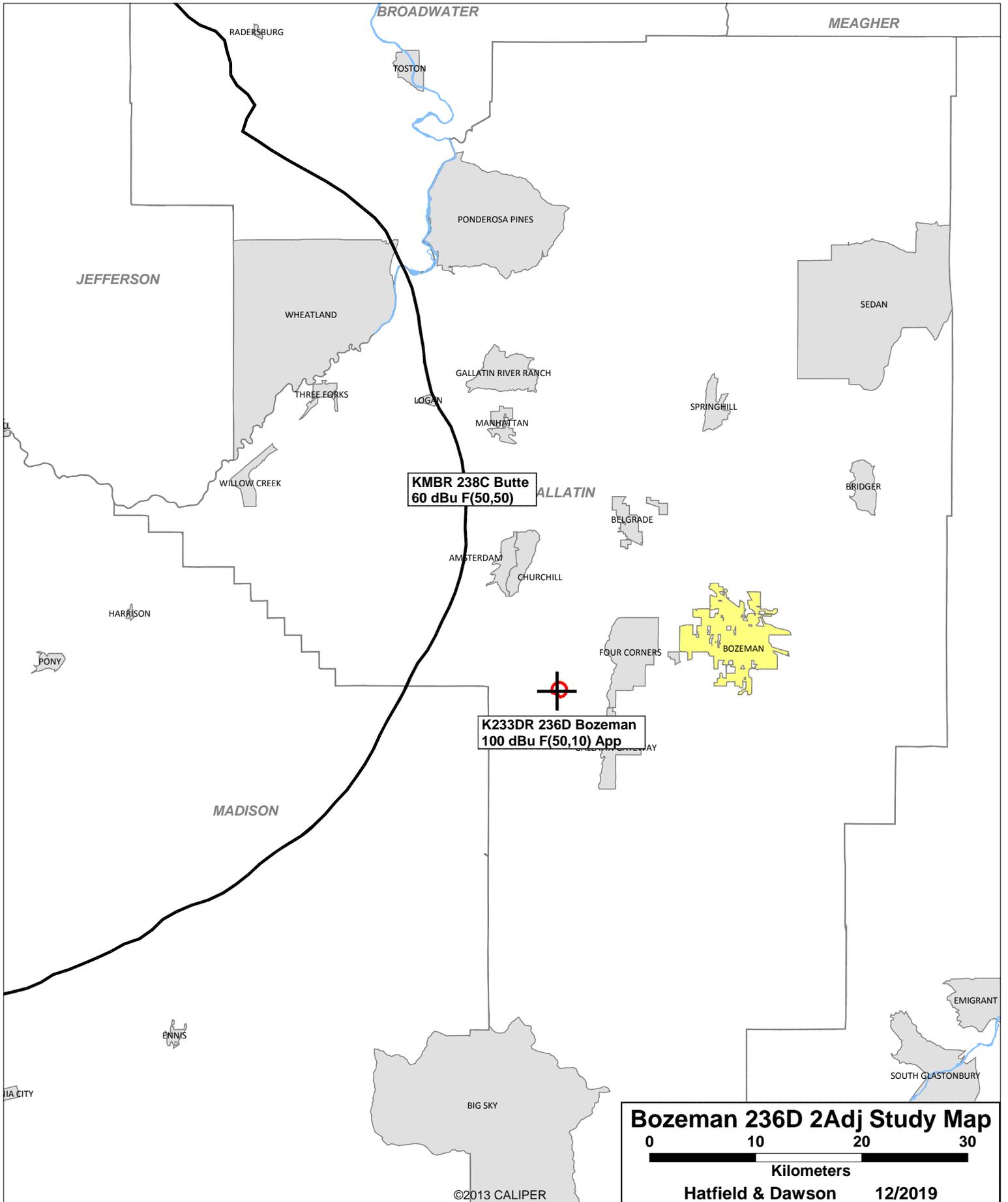
The 194.2 dBu application from the proposed translator facility will extend less than 0.1 meters from the antenna and will not reach ground level. There is no population within this contour. Therefore, the proposed facility is believed to satisfy the requirements of §74.1204(d) with respect to KMMS-FM.

SEARCH PARAMETERS

Channel: 236A 95.1 MHz Page 1  
 Latitude: 45 38 20.1 (NAD27)  
 Longitude: 111 15 54.7  
 Safety Zone: 50 km  
 Job Title: K233DR ON 236 AT HIGH FLAT

Call Status	City St	FCC File No.	Channel Freq.	ERP(kW) HAAT(m)	Latitude Longitude	Bearing deg-True	Dist (km)	Req (km)
K233DR CP	BOZEMAN MT	BNPFT-71215AAC	233D 94.5	0.250 558.0	45-40-24 110-52-02	82.8	31.26 0.00	0 TRANS
KMMS-FM APP	BOZEMAN MT	BPH-90814ABJ	234C3 94.7	5.300 221.0	45-38-16 111-16-05	240.2	0.25 -41.75	42 SHORT
KMMS-FM RSV	BOZEMAN MT	-	234C3 94.7	0.000 0.0	45-38-16 111-16-05	240.2	0.25 -41.75	42 SHORT
KHWC-LP LIC	HARRISON MT	BLL-50720ACF	234L1 94.7	0.100 -13.8	45-40-23 111-50-47	275.0	45.45 0.00	0 LPFM
KMMS-FM LIC	BOZEMAN MT	BLH-860825KA	236C1 95.1	100.000 238.0	45-40-24 110-52-02	82.8	31.26 -168.74	200 SHORT
BEING MODIFIED TO 234C3, PLEASE SEE TEXT FOR DISCUSSION								
KMBR LIC	BUTTE MT	BLH-800128AE	238C 95.5	50.000 555.0	46-00-29 112-26-30	294.7	100.21 5.21	95 CLOSE
KKQX LIC	MANHATTAN MT	BLH-60223AAF	289C2 105.7	12.300 208.0	45-38-16 111-16-05	240.2	0.25 -14.75	15 SHORT

==== END OF FM SPACING STUDY FOR CHANNEL 236 =====



**December 2019**  
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**Bozeman, Montana Channel 236D**  
**RF Exposure Study**

**Facilities Proposed**

The proposed operation will be on Channel 236D (95.1 MHz) with an effective radiated power of 99 watts.

**RF Exposure Calculations**

The power density calculations shown below were made using the techniques outlined in OET Bulletin No. 65. "Ground level" calculations in this report have been made at a reference height of 2 meters above ground to provide a worst-case estimate of exposure for persons standing on the ground in the vicinity of the tower. The equation shown below was used to calculate the ground level power density figures from each antenna.

$$S(\mu W / cm^2) = \frac{33.40981 \times AdjERP(Watts)}{D^2}$$

Where: *AdjERP(Watts)* is the maximum lobe effective radiated power times the element pattern factor times the array pattern factor.

*D* is the distance in meters from the center of radiation to the calculation point.

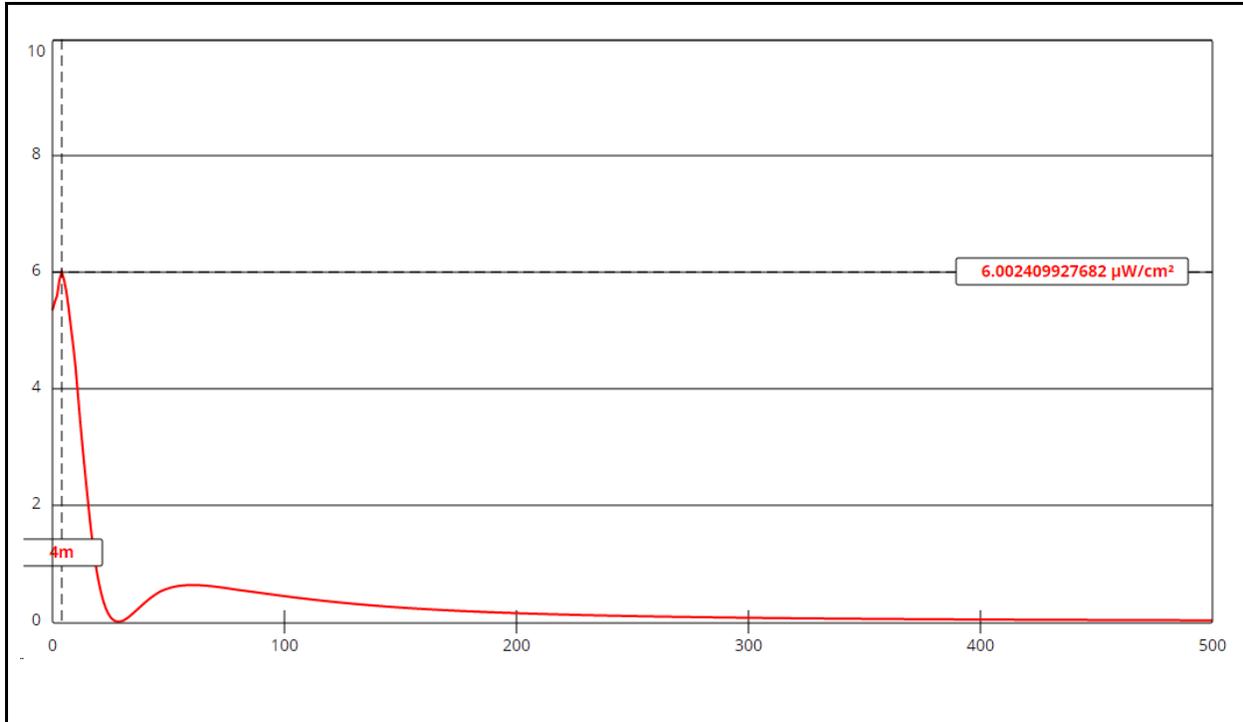
Ground level power densities have been calculated for locations extending from the base of the tower to a distance of 500 meters. Values past this point are increasingly negligible.

Calculations of the power density produced by the proposed antenna system assume a Type 1 element pattern, which is the element pattern for the Sira FMC-01/02 antenna proposed for use. The highest calculated ground level power density occurs at a distance of 4 meters from the base of the antenna support structure. At this point the power density is calculated to be 6.0  $\mu W/cm^2$ , which is 3% of 200  $\mu W/cm^2$  (the FCC standard for uncontrolled environments).

These calculations show that the maximum calculated power density produced at two meters above ground level by the proposed operation alone is less than 5% of the applicable FCC exposure limit

at all locations between 1 and 500 meters from the base of the antenna support structure. Section 1.1307(b)(3) of the Commission's Rules excludes applications for new facilities or modifications to existing facilities from the requirement of preparing an environmental assessment when the calculated emissions from the applicants proposed facility are predicted to be less than 5% of the applicable FCC exposure limit. Therefore, the proposed facility is in compliance with Section 1.1301 *et seq* and no further analysis of RF exposure at this site is required in this application.

The permittee/licensee in coordination with other users of the site must reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency exposure in excess of FCC guidelines.



**Ground-Level RF Exposure**

**OET FMModel**

**Bozeman 236D**

Antenna Type: Sira FMC-01/02  
 No. of Elements: 2  
 Element Spacing: 0.83 wavelength

Distance: 500 meters  
 Horizontal ERP: 0.099 kW  
 Vertical ERP: 0.099 kW

Antenna Height: 23.5 meters AGL

Maximum Calculated Power Density is 6.0 μW/cm<sup>2</sup> at 4 meters from the antenna structure.

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**Environmental Effects**

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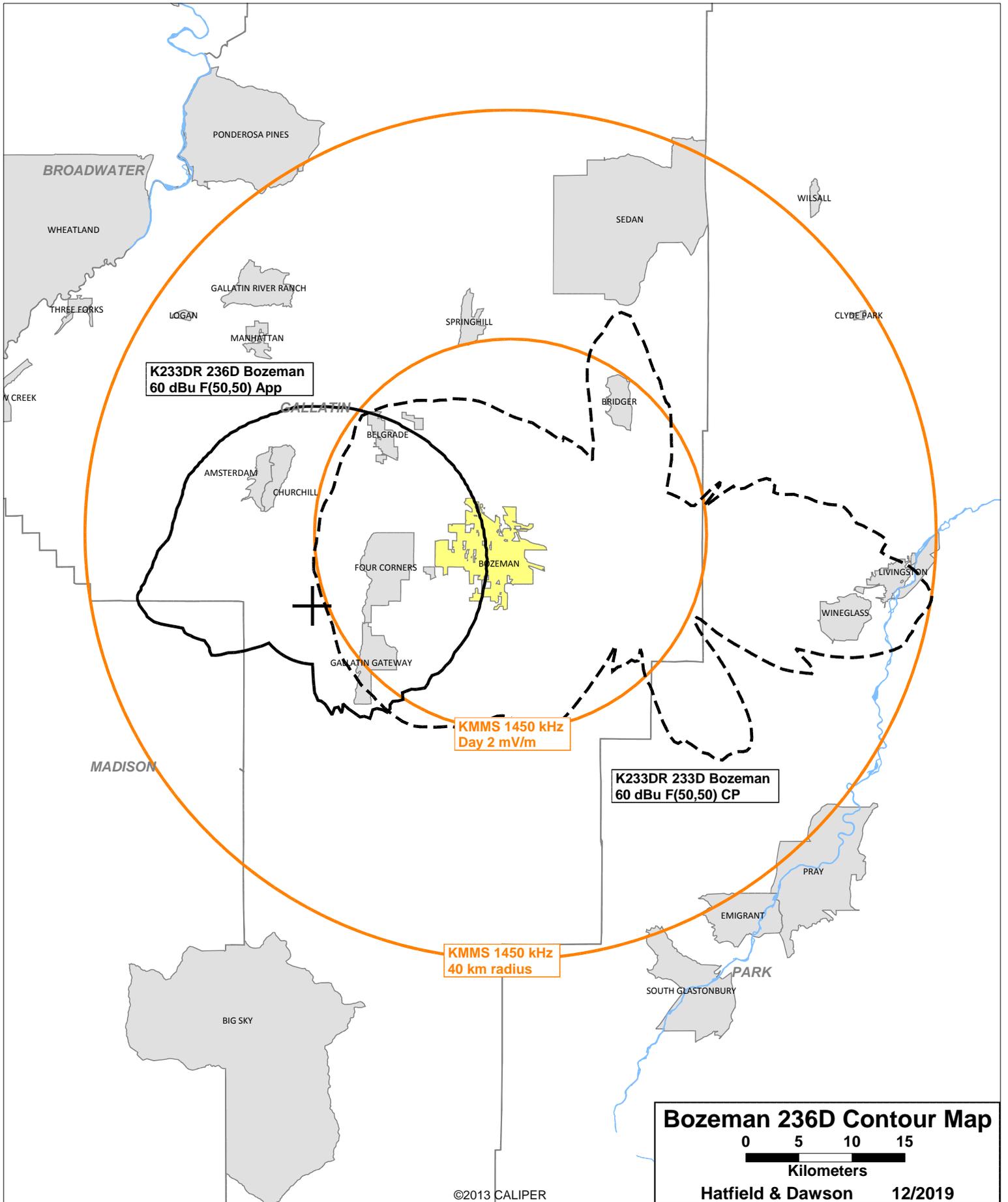
Coordination of the tower proposal with State and Tribal Historic Preservation Offices is in its final stages. The Environmental Effect question of Schedule 301 has been answered “Yes” solely because this process is not yet completed. No adverse effects are anticipated, considering that this tower will be located at an established communications site. This application will be amended to indicate a “No” answer (i.e. “no significant environmental effect”) upon successful and favorable completion of the Section 106 process.

**Antenna Tower**

The antenna support structure will not exceed 60.96 meters (200 feet) above ground and does not require notification to the Federal Aviation Administration. Therefore, this structure does not require an Antenna Structure Registration Number.

**RF Exposure**

Please see the attached Engineering Statement for detailed RF exposure calculations.





Mercator Projection  
 WGS84  
 USNG Zone 12TVR  
 SARTopo

