

**Month 2021
New FM Channel 202A
Bellingham, WA
Allocation Study**

The attached spacing study shows the co-channel and adjacent channel spacing between stations and demonstrates that the proposed operation meets the IF channel spacing requirements as prescribed in §73.207 of the Commission's Rules.

Individual stations were examined to confirm the lack of prohibited contour overlap as prescribed in §73.509 of the Commission's Rules. The attached allocation study exhibits demonstrate requisite contour protection for the following domestic stations:

First-adjacent:	KNKX	203C	Tacoma
Third-adjacent:	KPLK	205A	Sedro-Woolley

International (Canada)

The attached spacing study indicates that the proposed facility is short-spaced to the following Canadian stations or allotments:

- Vancouver 201C (first-adjacent)
- Abbotsford 203B1 (first-adjacent)
- Chilliwack 203A (first-adjacent)
- Harrison Hot Springs 203A (first-adjacent)
- Victoria 205C1 (third-adjacent)

However, as demonstrated by the attached allocation study map exhibit, neither the 48 dBu F(50,10) nor the 94 dBu F(50,10) interfering contours from the proposed facility overlap any Canadian land areas. Therefore, this proposal satisfies the requirements of the *Working Arrangement for the Allotment and Assignment of FM Broadcasting Channels Under the Agreement Between the Government of Canada and the Government of the United States of America Relating to the FM Broadcasting Service*, as amended in 1997, with respect to the short-spaced Canadian stations or allotments..

TV Channel 6

Section 73.525 of the Commission's Rules specifies a threshold distance of 257 kilometers for FM stations operating on Channel 202. There is no domestic TV Channel 6 station located within this threshold distance.

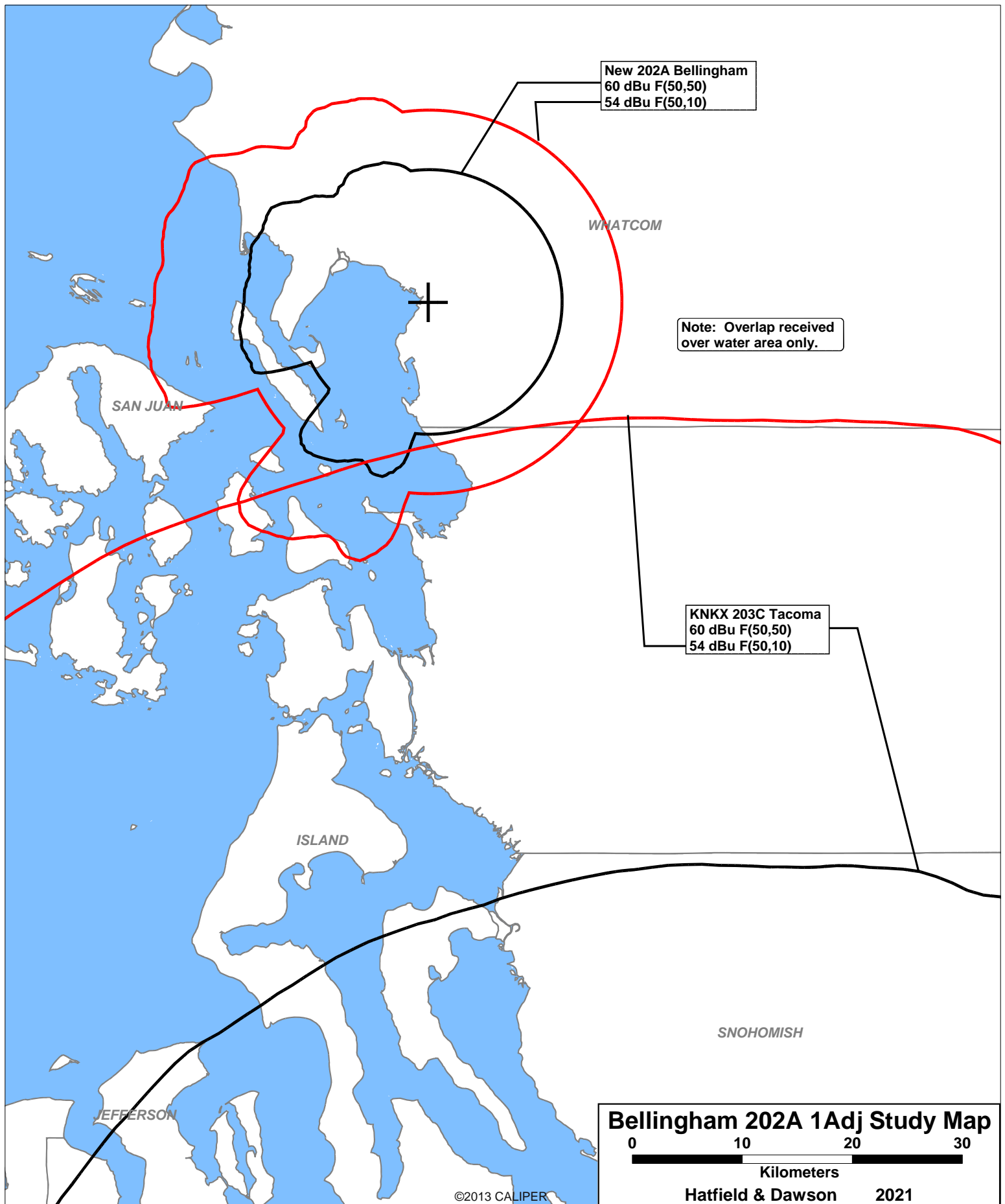
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SEARCH PARAMETERS                               FM Database Date: 20210806
Channel: 202A      88.3 MHz                      Page 1
Latitude: 48 44 50.6 (NAD83)
Longitude: 122 28 44.6
Safety Zone: 50 km
Job Title: BELLINGHAM 202A

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Call Status	City St	FCC File No.	Channel Freq.	ERP(kW) HAAT(m)	Latitude Longitude	Bearing deg-True	Dist (km)	Req (km)
ALC	VANCOUVER BC		201C 88.1	0.000 0.0	49 21 11.4 122 57 22.7	332.9	75.87 -106.13	182 SHORT
KWAO LIC	VASHON WA 0000144029		201C 88.1	65.000 667.0	DA 47 18 45.6 123 22 19.5	202.9	172.87 7.87	165 CLOSE
K201EN LIC	EVERETT WA BLFT-20050314AAR		201D 88.1	0.005 0.0	DA 48 3 5.3 121 51 41.4	149.3	89.89 0.00	0 TRANS
K202DS LIC	PORT ANGELES WA BLFT-20111102ADK		202D 88.3	0.045 0.0	DA 48 6 18.3 123 28 22.7	226.1	102.53 0.00	0 TRANS
K202ED LIC	MOUNT VERNON WA BLFT-20170314AAO		202D 88.3	0.004 0.0	DA 48 21 54.3 122 16 7.5	159.9	45.26 0.00	0 TRANS
K202DV LIC	BELLINGHAM WA BLFT-20081029ADG		202D 88.3	0.007 0.0	DA 48 46 56.4 122 22 9.6	64.2	8.95 0.00	0 TRANS
KNKX LIC	TACOMA WA BLED-20080715ADJ		203C 88.5	68.000 707.0	DA 47 30 13.4 121 58 33.4	164.7	143.27 -21.73	165 SHORT
CP	CHILLIWACK BC		203A 88.5	0.000 0.0	49 6 35.5 121 50 51.5	48.6	61.37 -36.63	98 SHORT
NEW ALC	PARKSVILLE BC		203A 88.5	0.000 0.0	49 17 39.3 124 19 29.9	295.0	148.08 50.08	98 CLEAR
ALC	HARRISON HOT SPRING BC		203A 88.5	0.000 0.0	49 17 37.5 121 46 39.5	39.8	79.52 -18.48	98 SHORT
ALC	CHILLIWACK BC		203A 88.5	0.000 0.0	49 6 35.5 121 50 51.5	48.6	61.37 -36.63	98 SHORT
K204BI LIC	BELLINGHAM WA BLFT-20100219AAT		204D 88.7	0.030 0.0	DA 48 48 3.4 122 27 44.6	11.6	6.08 0.00	0 TRANS
KPLK LIC	SEDRO-WOOLLEY WA BLED-20131017CGN		205A 88.9	4.200 47.0	DA 48 32 29.4 122 17 47.6	149.6	26.55 -4.45	31 SHORT
NEW ALC	VICTORIA BC		205C1 88.9	0.000 0.0	48 35 40.3 123 32 41.7	258.1	80.33 -9.67	90 SHORT
K255DC LIC	BELLINGHAM WA BLFT-20161020AAZ		255D 98.9	0.250 0.0	DA 48 46 33.4 122 26 29.6	40.9	4.21 0.00	0 TRANS

===== END OF FM SPACING STUDY FOR CHANNEL 202 =====



CANADA

New 202A Bellingham
60 dBu F(50,50)
100 dBu F(50,10)

WHATCOM

KPLK 205A Sedro-Woolley
60 dBu F(50,50)
100 dBu F(50,10)

SAN JUAN

SKAGIT

ISLAND

SNOHOMISH

JEFFERSON

Bellingham 202A 3Adj Study Map

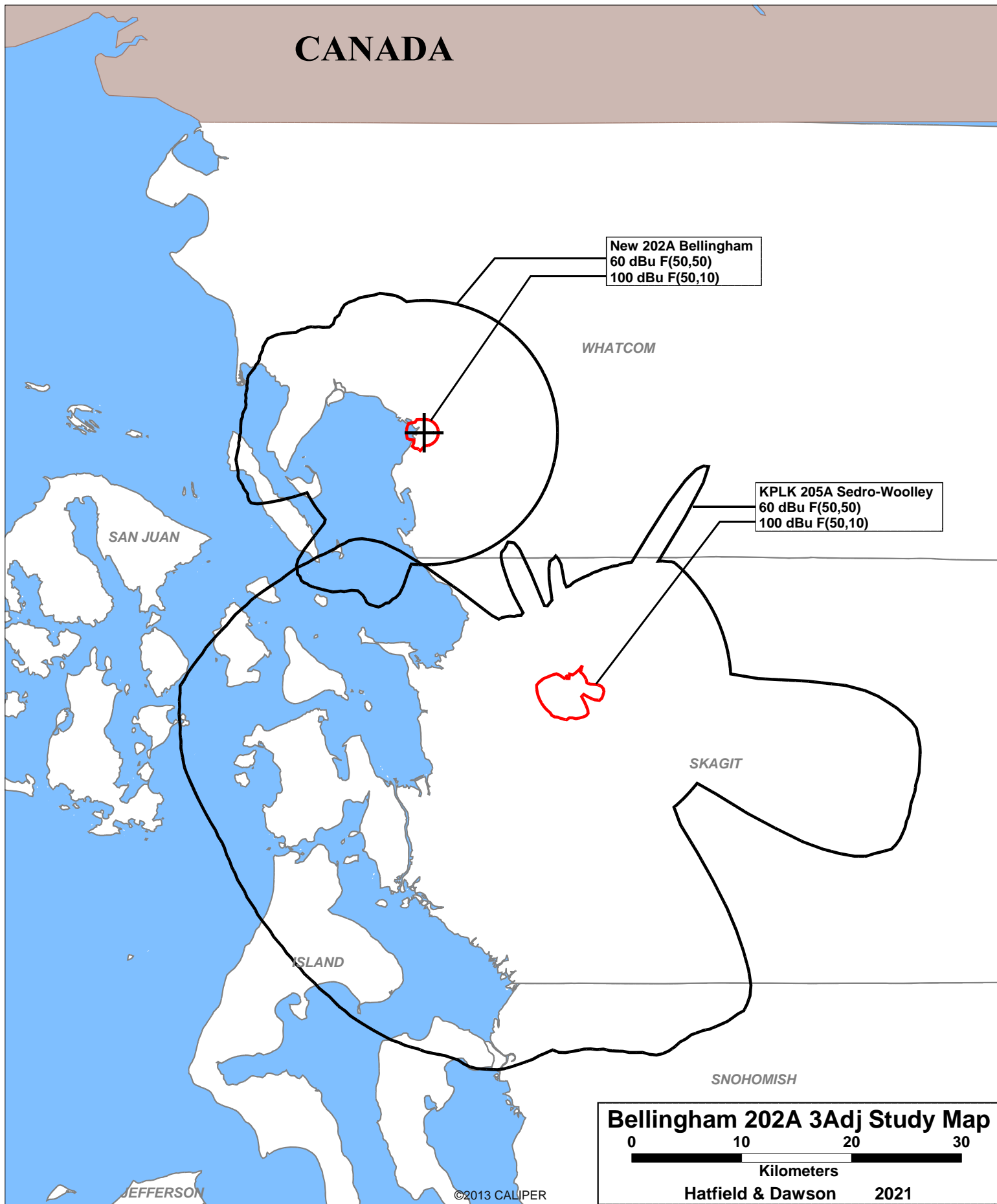
0 10 20 30

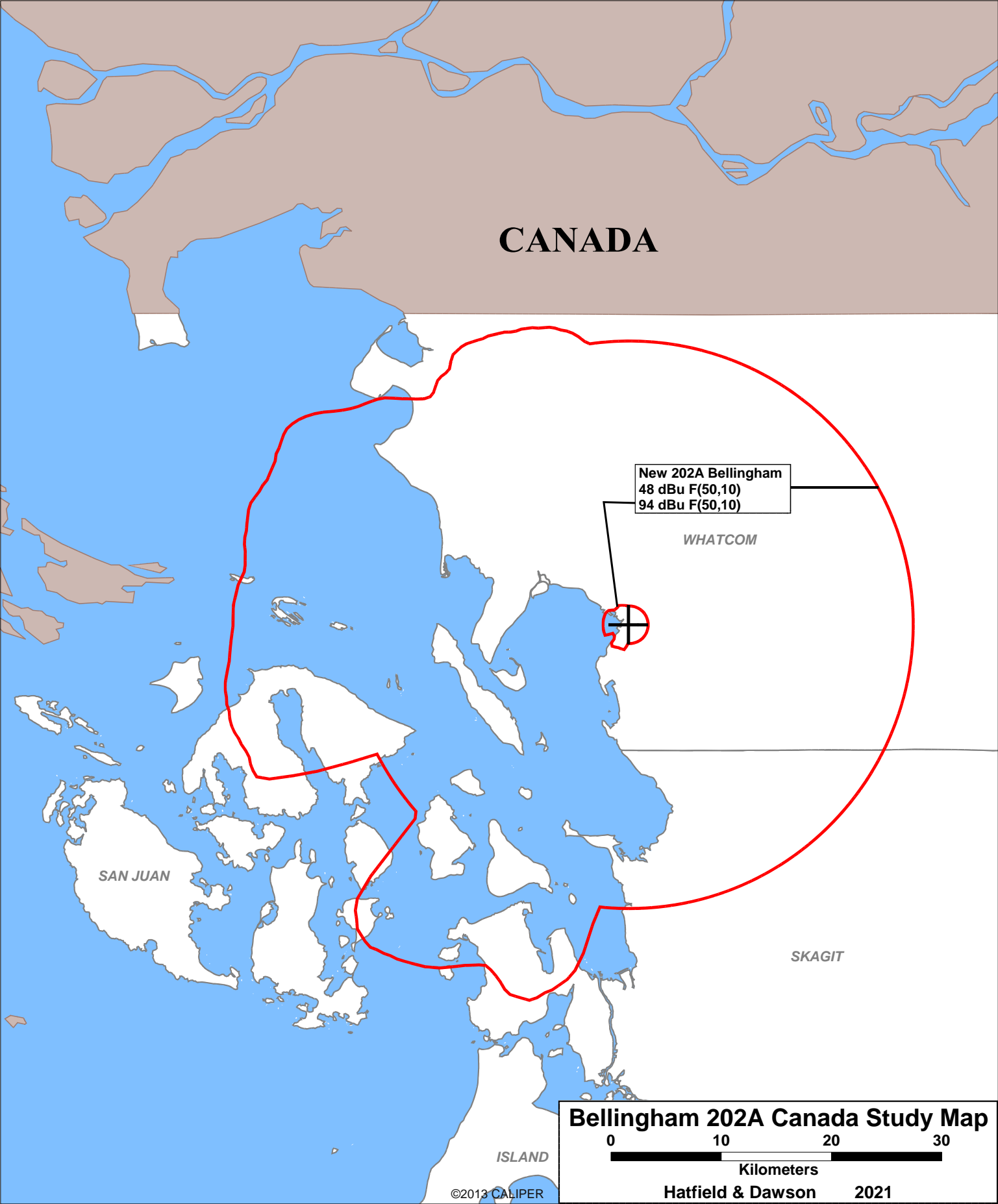
Kilometers

Hatfield & Dawson

2021

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**August 2021
New FM Channel 202A
Bellingham, WA
RF Exposure Study**

Facilities Proposed

The proposed operation will be on Channel 202A (88.3 MHz) with an effective radiated power of 2 kilowatts. Operation is proposed with a 2-element circularly-polarized omni-directional half-wave-spaced antenna.

The proposed antenna support structure (a tower on top of an existing building) 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.

DETERMINATION Results							
PASS SLOPE(100:1)NO FAA REQ - 5868.0 Meters (19251.7 Feet)away & below slope by 43.0 Meters (141.069 Feet)							
Type	C/R	Latitude	Longitude	Name	Address	Lowest Elevation (m)	Runway Length (m)
AIRP	R	48-47-0.00N	122-32-15.00W	BELLINGHAM INTL	WHATCOM BELLINGHAM, WA	49.8	2042.2
Your Specifications							
NAD83 Coordinates							
Latitude						48-44-50.6 north	
Longitude						122-28-44.6 west	
Measurements (Meters)							
Overall Structure Height (AGL)						38.1	
Support Structure Height (AGL)						38.1	
Site Elevation (AMSL)						27.0	
Structure Type							
POLE - Any type of Pole							

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 Bellingham 202A antenna system assume a Type 2 element pattern, which is the element pattern for the “double V” antenna proposed for use. The highest calculated ground level power density occurs at a distance of 66 meters from the base of the antenna support structure. At this point the power density is calculated to be 11.2 $\mu W/cm^2$.

Rooftop Level Exposure

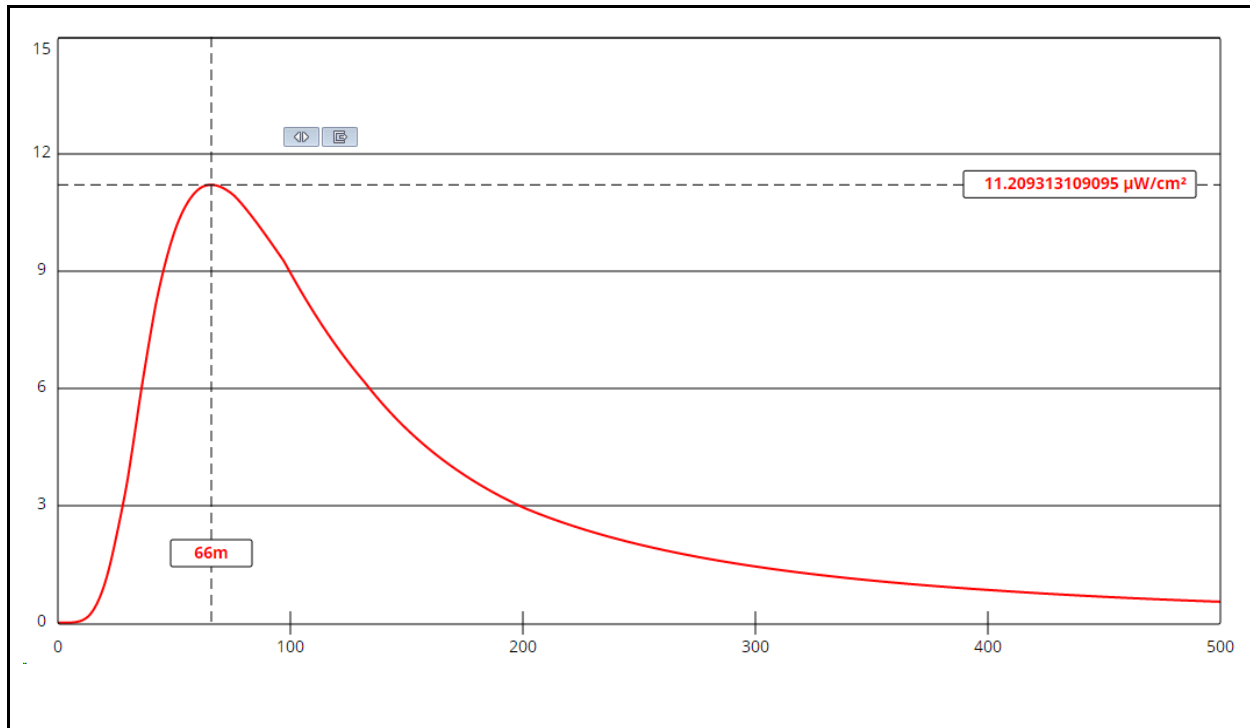
The proposed Bellingham 202A antenna will be installed on a tower section extending above a building rooftop. The tower will be attached to the elevator penthouse, and the antenna will be installed 11.3 meters above the main building rooftop. The antennas for KMRE-LP and KZAX-LP are also located this site, and are installed at 12.1 and 9.1 meters above the main building rooftop, respectively.

Calculations of the power density produced by the proposed Bellingham 202A antenna system assume a Type 2 element pattern, which is the element pattern for the “double V” antenna proposed for use. The highest calculated rooftop-level power density occurs at a distance of 17 meters from the base of the antenna support structure. At this point the power density is calculated to be 162.7 $\mu W/cm^2$.

Since these three stations will all operate from a single site, an analysis has been performed which sums the individual contributions from Bellingham 202A, KMRE-LP, and KZAX-LP at 1-meter increments from the base of the tower. The results of this analysis are depicted on the attached

table and graph, which demonstrate that the maximum calculated rooftop-level power density is $199.1 \mu\text{W}/\text{cm}^2$, which is 99.6% of $200 \mu\text{W}/\text{cm}^2$ (the FCC standard for uncontrolled environments).

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

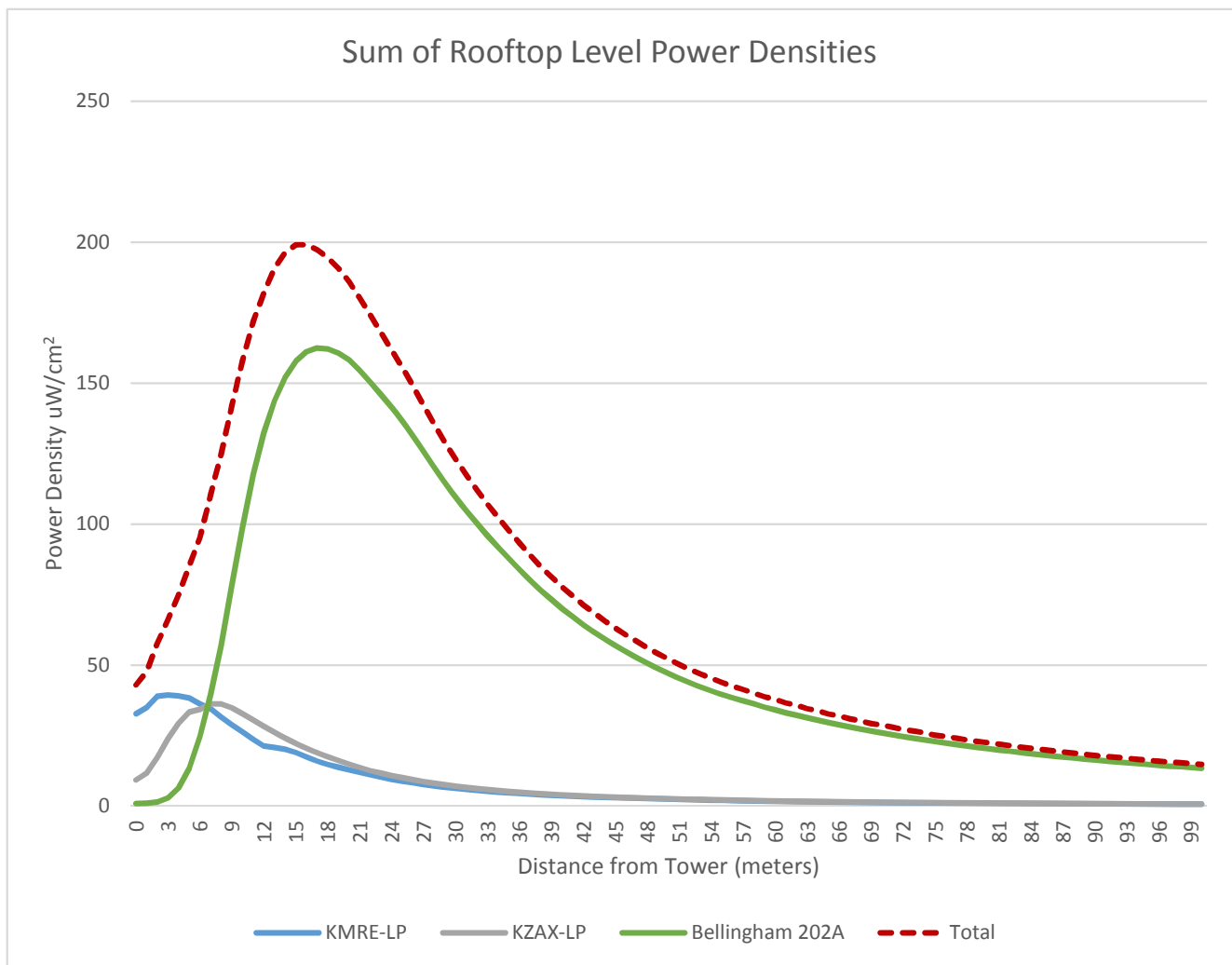
Bellingham 202A

Antenna Type: Type 2
No. of Elements: 2
Element Spacing: 0.5 wavelength

Distance: 500 meters
Horizontal ERP: 2 kW
Vertical ERP: 2 kW

Antenna Height: 37.4 meters AGL

Maximum Calculated Power Density is $11.2 \mu\text{W}/\text{cm}^2$ at 66 meters from the antenna structure.



Distance (meters)	KMRE-LP uW/cm²	KZAX-LP uW/cm²	Bellingham 202A uW/cm²	Total uW/cm²
0	32.8	9.3	0.9	43.0
1	35	11.7	1	47.7
2	39	17.3	1.5	57.8
3	39.4	24	2.9	66.3
4	39.1	29.4	6.4	74.9
5	38.4	33.4	13.4	85.2
6	36.3	34.3	24.7	95.3
7	34.6	36.3	39.7	110.6
8	31.6	36.2	57	124.8
9	28.8	34.9	78.4	142.1
10	26.3	32.8	99	158.1
11	23.7	30.5	117.8	172.0
12	21.3	28.3	132.3	181.9
13	20.8	26.2	143.8	190.8
14	20.2	24.1	152.1	196.4
15	19	22.3	157.8	199.1
16	17.4	20.5	161.2	199.1

17	16	18.9	162.5	197.4
18	14.8	17.5	162.2	194.5
19	13.8	16.2	160.7	190.7
20	12.8	14.9	158.2	185.9
21	12	13.7	154.5	180.2
22	11.2	12.6	150.3	174.1
23	10.3	11.7	145.9	167.9
24	9.5	10.8	141.3	161.6
25	8.9	10.1	136.6	155.6
26	8.3	9.4	131.4	149.1
27	7.7	8.7	125.6	142.0
28	7.2	8.1	120	135.3
29	6.7	7.6	114.7	129.0
30	6.3	7.1	109.6	123.0
31	6	6.6	104.8	117.4
32	5.6	6.2	100.2	112.0
33	5.3	5.9	95.9	107.1
34	5	5.5	91.8	102.3
35	4.7	5.2	87.8	97.7
36	4.5	4.9	83.8	93.2
37	4.3	4.7	80	89.0
38	4	4.4	76.5	84.9
39	3.9	4.2	73.2	81.3
40	3.7	4	70	77.7
41	3.5	3.8	67.1	74.4
42	3.4	3.6	64.3	71.3
43	3.3	3.5	61.7	68.5
44	3.1	3.3	59.2	65.6
45	3	3.2	56.9	63.1
46	2.9	3.1	54.7	60.7
47	2.8	3	52.6	58.4
48	2.7	2.8	50.6	56.1
49	2.6	2.7	48.7	54.0
50	2.5	2.6	47	52.1
51	2.4	2.5	45.3	50.2
52	2.3	2.4	43.7	48.4
53	2.2	2.4	42.2	46.8
54	2.1	2.3	40.9	45.3
55	2.1	2.2	39.6	43.9
56	2	2.1	38.4	42.5
57	1.9	2.1	37.3	41.3
58	1.9	2	36.2	40.1
59	1.8	1.9	35.1	38.8
60	1.8	1.9	34.1	37.8
61	1.7	1.8	33.1	36.6
62	1.7	1.8	32.2	35.7
63	1.6	1.7	31.3	34.6

64	1.6	1.7	30.5	33.8
65	1.5	1.6	29.6	32.7
66	1.5	1.6	28.8	31.9
67	1.4	1.5	28.1	31.0
68	1.4	1.5	27.3	30.2
69	1.3	1.4	26.6	29.3
70	1.3	1.4	26	28.7
71	1.3	1.4	25.3	28.0
72	1.2	1.3	24.7	27.2
73	1.2	1.3	24.1	26.6
74	1.2	1.3	23.5	26.0
75	1.1	1.2	22.9	25.2
76	1.1	1.2	22.4	24.7
77	1.1	1.2	21.8	24.1
78	1.1	1.1	21.3	23.5
79	1	1.1	20.8	22.9
80	1	1.1	20.4	22.5
81	1	1.1	19.9	22.0
82	1	1	19.5	21.5
83	0.9	1	19	20.9
84	0.9	1	18.6	20.5
85	0.9	1	18.2	20.1
86	0.9	0.9	17.8	19.6
87	0.9	0.9	17.4	19.2
88	0.8	0.9	17.1	18.8
89	0.8	0.9	16.7	18.4
90	0.8	0.8	16.4	18.0
91	0.8	0.8	16	17.6
92	0.8	0.8	15.7	17.3
93	0.8	0.8	15.4	17.0
94	0.7	0.8	15.1	16.6
95	0.7	0.8	14.8	16.3
96	0.7	0.7	14.5	15.9
97	0.7	0.7	14.2	15.6
98	0.7	0.7	14	15.4
99	0.7	0.7	13.7	15.1
100	0.7	0.7	13.4	14.8

August 2021
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Bellingham, WA
Area and Population Calculation Methodology

Calculation of the area within the 60 dBu contour was performed by the mapping program Maptitude, which includes a function which automatically calculates the area within irregular polygons. In cases where the 60 dBu contour included any large water areas, those were excluded by using a related tool in the program which allows the user to “clip” to the land area within the contour. The software returns the area of the land area.

Total area inside 60 dBu contour:	583 sq km
Water area excluded:	188 sq km
Total land area inside 60 dBu contour:	395 sq km

Population was calculated by summing the individual populations of each of the census blocks from the 2010 Census whose centroids are encompassed by the proposed 60 dBu contour.

Population inside 60 dBu contour:	116,226
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