Gillespie, Prudhon & Associates
Telecommunications Engineers

May 2, 2022

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City of Portland OMF Bureau of Technology Services
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Subject: Proposed Bull Run Filtration Tower NIER Study

Dear Scott:

The proposed facility noted above will operate with the following Point-to-Multipoint and microwave Radios at the antenna heights, frequencies, azimuths, duty cycles and Effective Isotropic Radiated Power (EiRP) are listed in the table below:

Table 1: Summary of Proposed Transmitting Antennas

ANT. #	PATH	ACL	TOWER MNTG LOCATION	AZIMUTH	TILT <	FRE--QUENCY	MODEL #	DIA.	GAIN	EiRP	Duty Cycle
		FT-AGL		DEG-TN	DEG	(MHz)		Ft	(dBi)	dBm	
1	Prune Hill 1	170	NLEG	321.6	0.07	960.0	TY900	0.532	12.2	45.7	50%
2	Prune Hill 2	170	NLEG	321.6	0.07	959.0	TY900	0.532	12.2	45.7	50%
3	Willalatin	187	NLEG	288.5	-0.01	958.0	TY900	0.532	12.2	45.5	50%
4	Council Crest 1	170	SWLEG	276.9	0.27	957.0	TY900	0.532	12.2	45.8	50%
5	Council Crest 2	170	SWLEG	276.9	0.27	956.0	TY900	0.532	12.2	45.8	50%
6	Mt. Scott 1	180	SWLEG	267.0	0.26	955.5	TY900	0.532	12.2	45.6	50%
7	Mt. Scott 2	180	SWLEG	267.0	0.26	955.0	TY900	0.532	12.2	45.6	50%
8	Microwave Link	165	SELEG	80.3	2.30	11000.0	VHLP4-107	4.00	40.4	63.9	100%

Results

A computer model using the guidelines provided in the reference OET65[1] paper was employed to determine the power density (Pd) levels at 6-ft above ground level (AGL) along the paths of the eight links identified in Table 1 above. The total accumulated power density from each of the proposed transmitters was calculated as a function of distance from the proposed tower out to a distance of 1000 meters, where the Pd levels were significantly reduced.

At specific points along each path route at 6-ft above ground level the calculated Pd levels were compared to the maximum permitted exposure levels for the General and the Occupational populations permitted by the regulations provided by the Federal Communications Commission[2].

The results, published in graphical form, provided in Appendix A of this document, show that the MPE limits for both the General and Occupational populations do not exceed their respective safety levels.

The highest NIER level, which is located 374 feet (114 m) from the Filtration Tower on the path to Prune Hill, is only 33.0% of the Allowed MPE for the General Population and less than 6.6% of the Occupational Population limit. The NIER levels drop off to substantially lower levels inside and outside the property line.

[1] OET65 Edition 97-01 August 1997
[2] See 47CFR1.1307 – 1.1310

Conclusion

From our analysis of the predicted NIER levels of the Filtration site communications tower we draw the final conclusions:

1. The predicted Power density level from each individual transmitter is less than 5% of the maximum FCC exposure levels.
2. The combined NIER levels from all transmitters do not exceed the Allowed MPE levels for either the General Population or the Occupational Population within and outside the property line of the City of Portland Filtration site.
3. The Power density values inside buildings on-site will be substantially lower than outdoors.
4. The operation of the Filtration communications tower meets and exceeds the non-ionizing electromagnetic radiation (NIER) emission standards as set forth by the Federal Communications Commission (FCC) in Bulletin OET-65 and FCC regulations 47CFR1.1306 - 1.1310.

I certify this information is true to the best of my knowledge.

E. Robin Smyth, P.E.

REGISTERED PROFESSIONAL ENGINEER 15,180 OREGON OCT. 2, 1990 E. ROBIN SMYTH

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APPENDIX A - SUPPORTING DATA

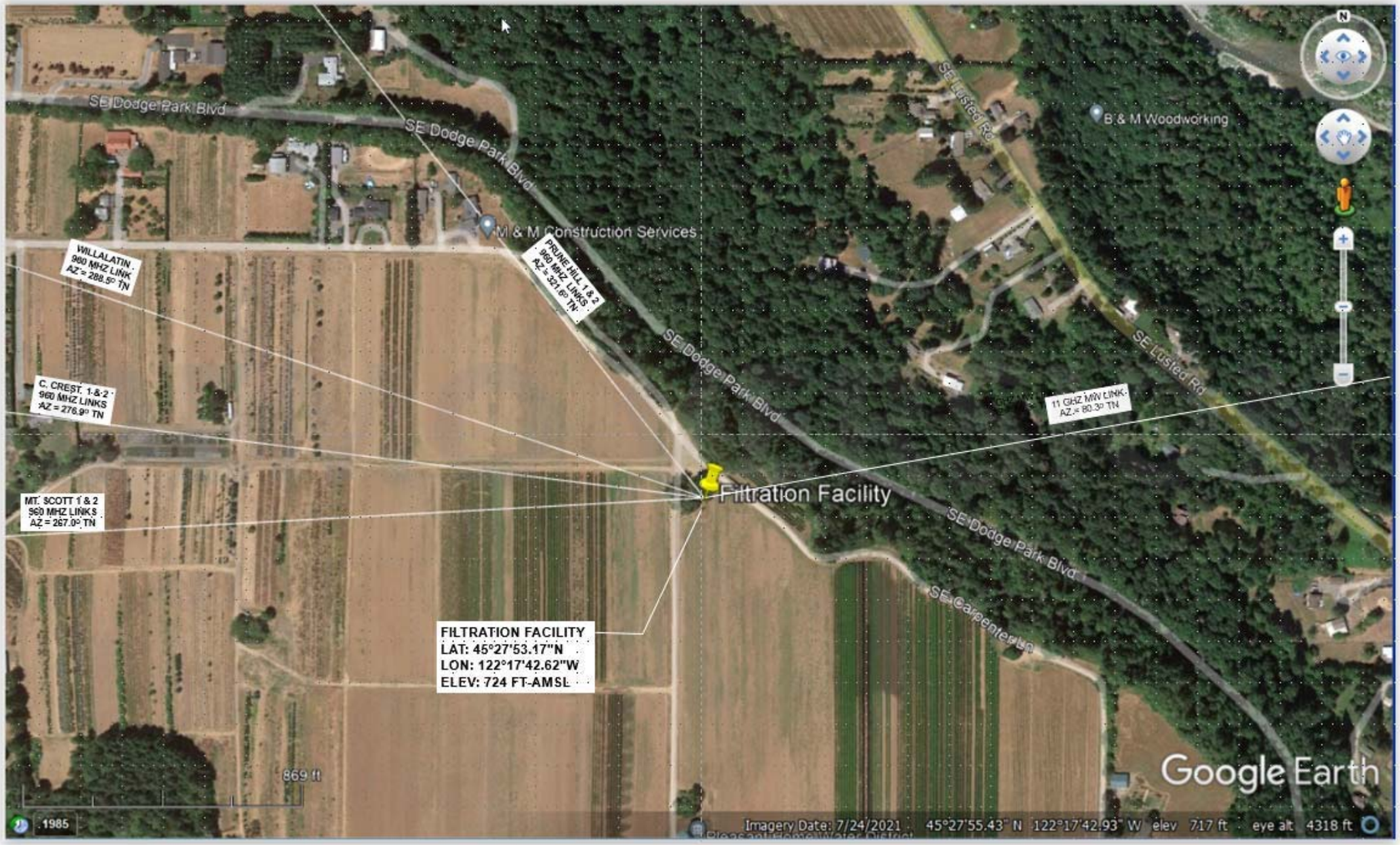

Figure 1: RF Communications Links Operating from the Proposed City of Portland Bull Run Water Filtration Site

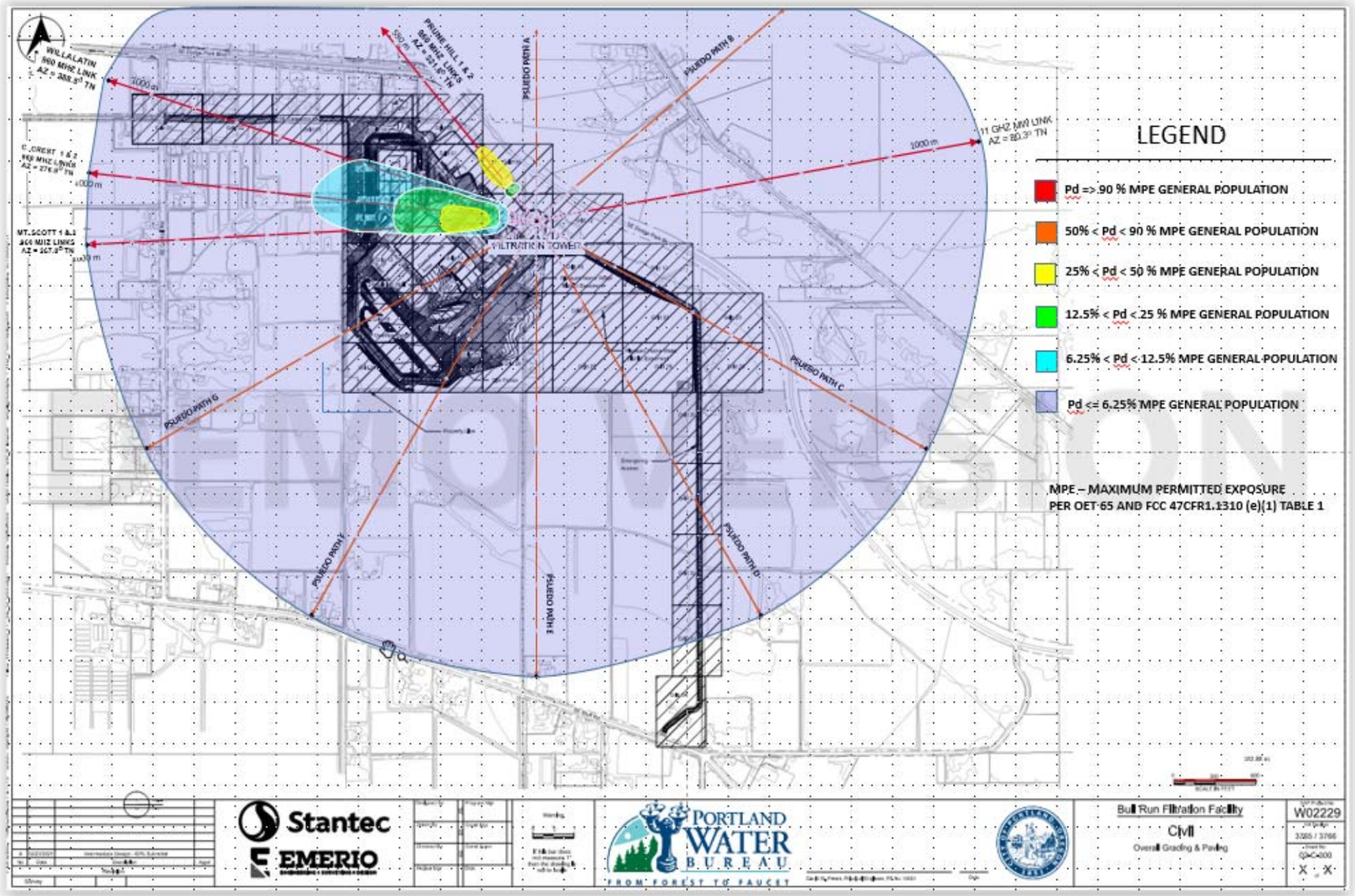

Figure 2: Predicted Percentage of the Allowed Maximum Permitted Exposure (MPE) to the General Population To P2MP 960 MHz and 11 GHz Microwave Links at 6-ft (1.83 m) Above Ground Level

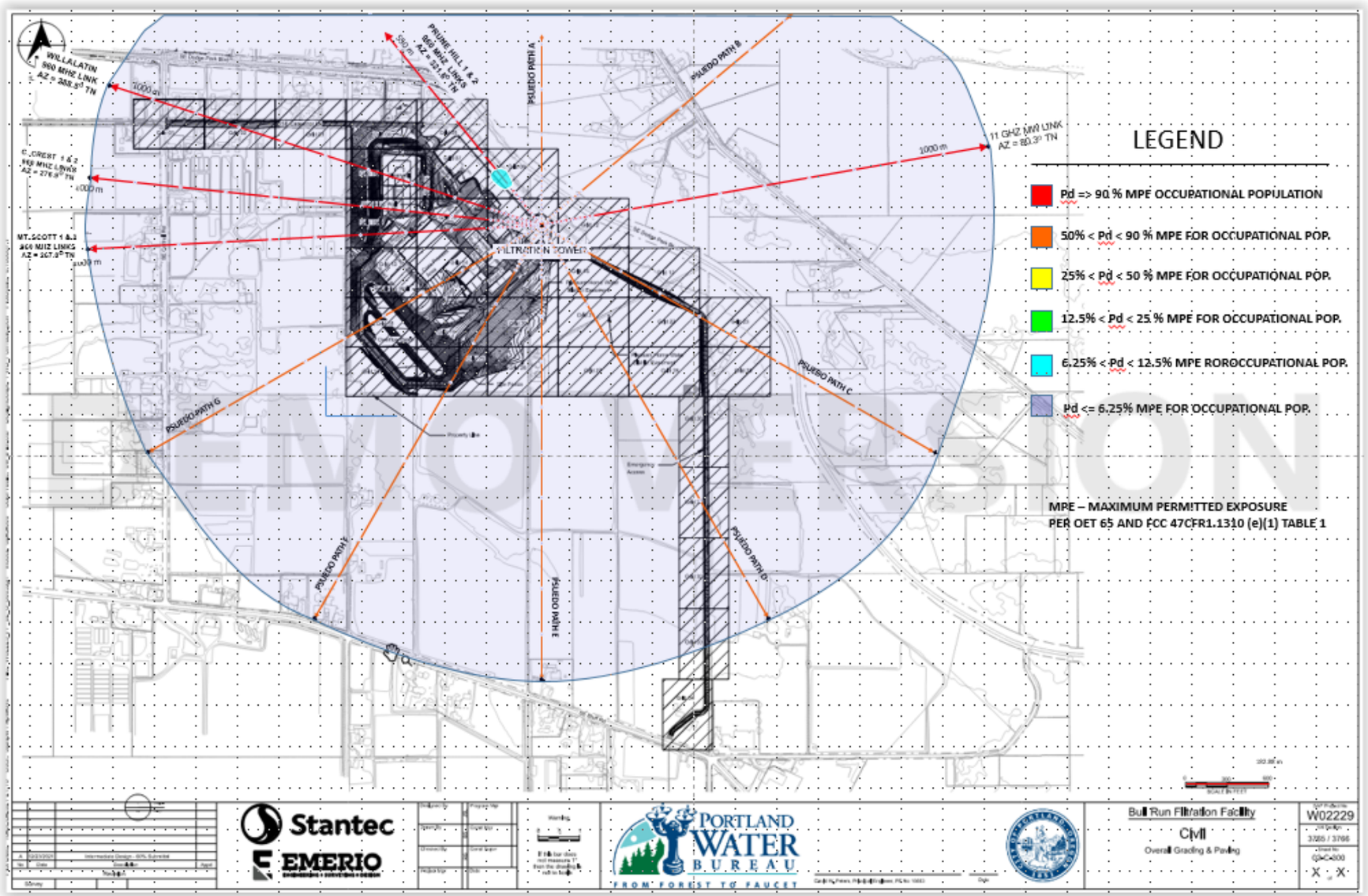

Figure 3: Predicted Percentage of the Allowed Maximum Permitted Exposure (MPE) to the Occupational Population To P2MP 960 MHz and 11 GHz Microwave Links at 6-ft (1.83 m) Above Ground Level

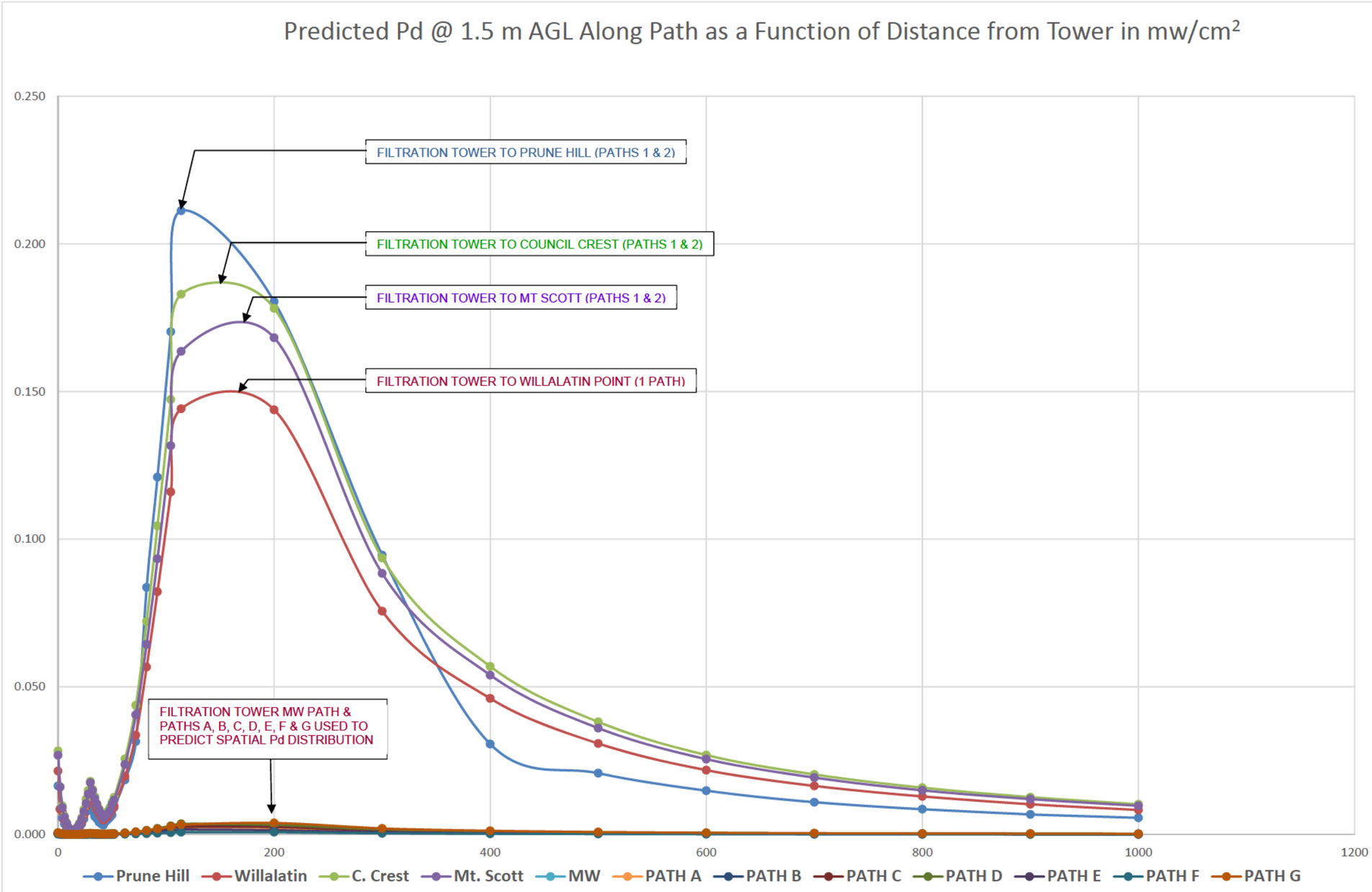

Figure 4: Power Density (mw/cm²) as a Function of Distance of Path at 1.83 m Above Ground Level (Accumulative Contribution from All Transmitters Along Each Path Route)

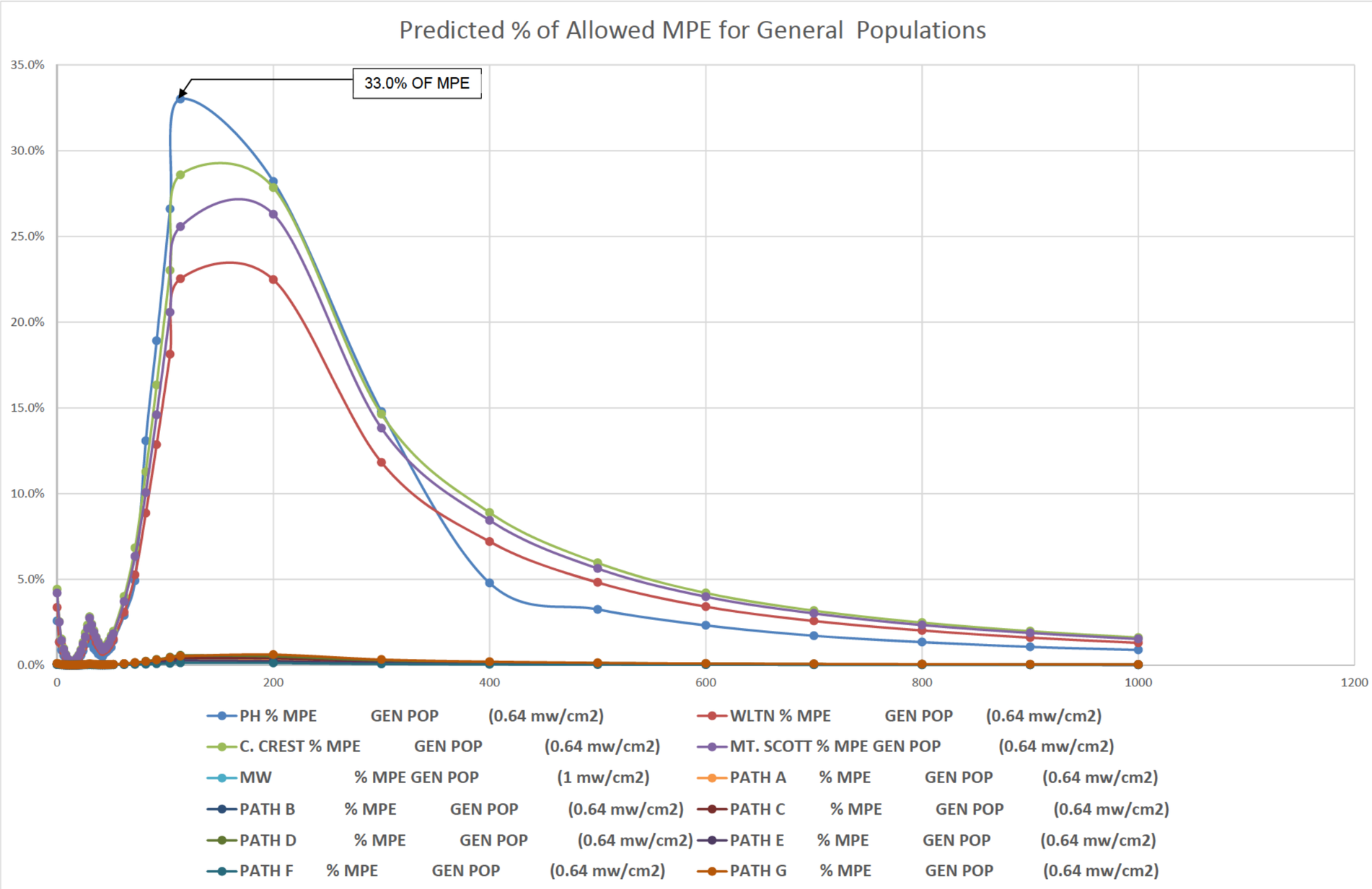

Figure 5: Percentage of Allowed MPE for the General Population as a Function of Distance of Path at 6-Ft (1.83 m) Above Ground Level (Accumulative Contribution from All Transmitters Along Each Path Route)

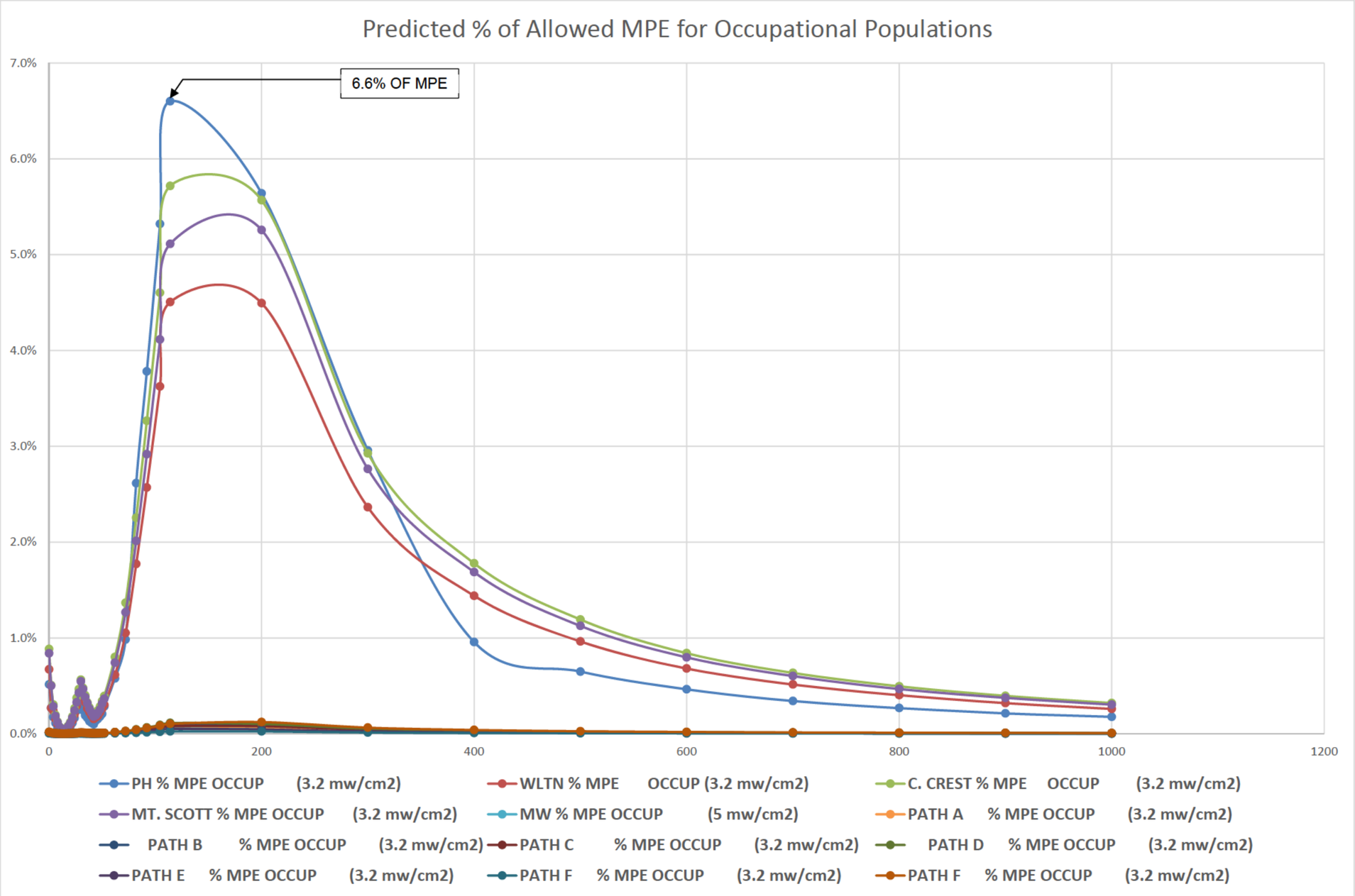

Figure 6: Percentage of Allowed MPE for the Occupational Population as a Function of Distance of Path at 6-Ft (1.83 m) Above Ground Level (Accumulative Contribution from All Transmitters Along Each Path Route)