

**ENGINEERING EXHIBIT
APPLICATION FOR
MODIFICATION OF EXPERIMENTAL
RADIO STATION CONSTRUCTION PERMIT
AND LICENSE
DISTRICT OF COLUMBIA,
OFFICE OF THE CHIEF TECHNOLOGY OFFICER
STATION WD2XHO
WASHINGTON, D.C.**

ENGINEERING STATEMENT

INTRODUCTION

The engineering exhibit, of which this statement is part, was prepared for the District of Columbia, Office of the Chief Technology Officer (OCTO), in support of an application to modify the experimental radio station construction permit and license for WD2XHO (FCC File No. 0013-EX-PL-2004). The existing WD2XHO construction permit (CP) and license authorizes OCTO to build and operate ten base stations and associated mobile units within the geographic boundaries of the District of Columbia.

The WD2XHO CP and license authorizes base stations to operate over the range of frequencies from 800.65 megahertz (MHz) to 804.00 MHz

and the mobile units to operate over the range of frequencies from 752.65 MHz to 756.00 MHz. After the FCC granted the WD2XHO authorization, OCTO learned that the available Flarion Technologies, Inc. (Flarion) radio equipment to be used in the experimental operation would be available sooner if the base stations operate in the lower range of frequencies from 752.65 MHz to 756.00 MHz and the mobile units operate in the upper range of frequencies from 800.65 to 804.00 MHz. Accordingly, the instant application seeks to modify the existing WD2XHO authorization to specify operation of the base stations over the range of frequencies from 752.65 MHz to 756.00 MHz and operation of the mobile units over the range of frequencies from 800.65 MHz to 804.00 MHz. No other changes to the authorized WD2XHO facilities are proposed.

INTERFERENCE CONCERNS

Proposed Base Station Operation

The range of frequencies requested for base station operation, 752.65 MHz to 756.00 MHz, is located within television (TV) channel 61 (752-758 MHz), and base station operation must not cause interference to TV stations operating on channels 60, 61, and 62. A study submitted with the

original WD2XHO application identified only one TV station within 180 kilometers of Washington, DC that is close enough for concern, and that station is WFPT(TV), channel 62, Frederick, Maryland.

Figure 1 of this exhibit is a map showing the predicted Grade B contour for the licensed WFPT facility (FCC File No. BLET-19931014KE) together with a Longley-Rice field strength prediction for the licensed WFPT facility. Due to terrain obstructions between the licensed WFPT site and the District of Columbia more at distances greater than 16.1 kilometers from the WFPT transmitter site, 35 percent of the land area within the District of Columbia is not predicted to receive Grade B or better signal strength from WFPT.

Figure 2 of this exhibit is a map similar to that of Figure 1 except the impact of land use (clutter) has been taken into account. When clutter losses are taken into account, only five percent of the District of Columbia is predicted to receive Grade B or better signal strength from WFPT. The signal strength prediction of Figure 2 is consistent with informal WFPT field strength measurements made by Flarion that show that there is virtually no

usable WFPT signal strength available within the geographic boundaries of the District of Columbia.

As a final check on the potential for the WD2XHO base stations to cause interference to the reception of WFPT, an interference study was made using a desired-to-undesired ratio (D/U) of -15 dB. Section 74.705(d)(4) of the FCC rules states that an application for a low power TV (LPTV), TV translator, or TV booster station will not be accepted if the ratio in dB of the proposed facility to that of the TV broadcast station at the protected contour (of the TV station) fails to meet 15 dB when the protected TV station operates on a UHF channel that is one channel above or below the proposed channel. If the above criterion, which is used to determine adjacent channel interference to full service TV stations in LPTV proposals, were applied to the case of the proposed WD2XHO base stations, then interference would be predicted at those locations where the ratio of the desired field strength from

WFPT to the undesired aggregate field strength of the ten WD2XHO base stations is less than -15 dB.¹

Figure 3 of this exhibit shows that the aggregate field strength from the proposed WD2XHO base stations does not exceed the WFPT field strength by 15 dB at any location outside the geographic boundaries of the District of Columbia where the WFPT field strength is Grade B or better. Within the geographic boundaries of the District of Columbia where WFPT is predicted to provide Grade B or better signal strength, the -15 dB D/U is satisfied at all locations except for a few localized pockets in proximity to the WD2XHO base station antennas.

Land use (clutter) losses were not used in predicting the field strengths used in deriving the D/Us shown in the study of Figure 3. Had the field strength calculations included land use (clutter) losses, the -15 dB D/U would have been satisfied at all locations where WFPT is predicted to provide

¹ In the instant case, the interference criterion would be met at those locations where the aggregate WD2XHO field strength did not exceed the WFPT field strength by more than 15 dB.

Grade B or better field strength.

For the purposes of the D/U study, the base station antennas were assumed to be operating with their main lobes of radiation in the vertical plane at the horizontal plane. The base station antennas typically will be deployed with some degree of mechanical down tilt, and this will reduce actual base station radiation in the horizontal plane and further decrease the aggregate base station field strength in many locations.

Proposed Mobile Operation

The range of frequencies requested for mobile operation, 800.65 MHz to 804.00 MHz, is located within television (TV) channel 69 (800-806 MHz), and mobile operation must not cause interference to TV stations operating on channels 68 and 69. A study submitted with the original WD2XHO application showed that the closest full service TV station to the proposed mobile operation within the geographic boundaries of the District of Columbia is WJAL(TV), channel 68, Hagerstown, Maryland. WJAL is 137.8 kilometers from the reference geographic coordinates for Washington, D.C. The closest authorized low power facility to the proposed mobile

operation is W68EH, channel 69, Salisbury, Maryland. The authorized W69EH site is 102.5 kilometers from the reference geographic coordinates for Washington, D.C. Since the authorized base station operation within channel 69 was not predicted to cause interference to any authorized TV or LPTV facility, it is axiomatic that mobile operation within channel 69 as proposed herein will not cause interference either since the mobile units operate with less power and lower antenna height than do the base stations.

MARYLAND PUBLIC BROADCASTING

Maryland Public Broadcasting (MPB) is the licensee of noncommercial educational television station WFPT(TV), channel 62, Frederick, Maryland. WFPT was identified hereinabove as the only television station sufficiently close to the District of Columbia to warrant careful study of the potential for receiving interference from the proposed base station operation on frequencies within channel 61. As the field strength and interference studies contained in this exhibit show, the base station operation proposed herein will not cause interference to the reception of WFPT at any location outside the geographic boundaries of the District of Columbia. The potential for interference to the reception of WFPT from this

proposal does not exist at any location not in proximity to a WD2XHO base station, and all WD2XHO base stations are located well inside the geographic boundaries of the District of Columbia.

In a letter to OCTO dated June 19, 2003, MPB states that it does not object to the District of Columbia's application for an experimental license. MPB's acceptance of the initial OCTO proposal was predicated on there being no interference caused to WFPT by OCTO's proposed operation. As was the case with the authorized experimental mobile operation and as the studies presented herein for the proposed experimental base station operation show, base station operation on the proposed frequencies within channel 61 will not result in interference to the reception of WFPT outside the geographic boundaries of the District of Columbia. No interference would have been predicted at any location had clutter losses been included in the calculation of WFPT field strength. OCTO also continues to agree to MPB's condition that OCTO immediately correct any problem or cease operation if the experimental facilities are found to cause interference to the reception of WFPT.

The base stations will operate in a 1.25 MHz wide channel using a digital, spread-spectrum type of modulation. The highest modulating frequency used by OCTO will be a minimum of 2 MHz below the lower edge of TV channel 62. All of the base stations are located within the geographic boundaries of the District of Columbia, and the final base station deployment will utilize substantial antenna mechanical down tilt which will reduce radiation in the horizontal plane.

The only difference between the instant proposal and that previously authorized is that the proposed base stations will operate on the frequencies previously authorized for mobile use and the proposed mobile units will operate on the frequencies previously authorized for base station use. The potential for this proposal causing interference to the reception of WFPT is no greater than with the authorized facilities because the -15 dB D/U is met or exceeded at all locations outside the geographic boundaries of the District of Columbia. Because this proposal presents no increased potential for interference to WFPT and because OCTO continues to agree to the conditions of MPB's original acceptance concerning the resolution of all problems with the proposed operation that result in interference to the

reception of WFPT, formal acceptance by MPB of the instant proposal should not be required.

BASE STATION TRANSMITTER OUTPUT FILTERING

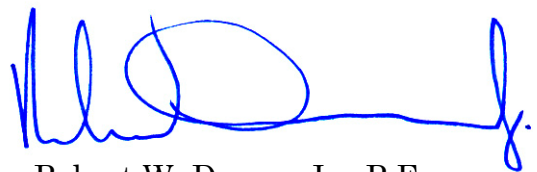
The Flarion base station transmitter emission mask shows that emissions removed from the center of the channel by between 1.98 MHz and 2.25 MHz more are attenuated by at least 46 dB relative to the base station transmitter's in-band average power, and emissions removed by more than 2.25 MHz are attenuated by 54 dB or more. In addition to the standard emission mask, a proprietary filter will be used that will further attenuate base station emissions at 758 MHz, the lower edge of adjacent TV channel 62, by an additional 20 dB for a total attenuation of 64 dB. The slope of the filter skirt outside of the filter pass band is approximately 10 dB/MHz. The combination of the base station transmitter emission mask and the proprietary filter response characteristics are expected to reduce out-of-band emissions from the base stations sufficiently to prevent interference to adjacent channel stations.

LOCAL FREQUENCY COORDINATION

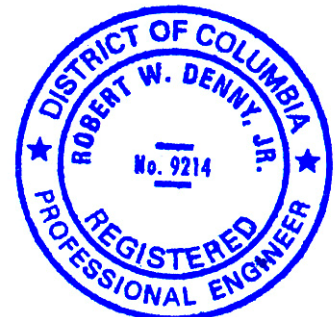
The undersigned serves as the frequency coordinator for WEBE Frequency Coordinators, Inc. (WEBE), the broadcast frequency coordinating entity for the Washington, D.C. market. OCTO has agreed to cooperate fully with WEBE to resolve any interference problems that may arise as a result of the operation proposed herein. Accordingly, WEBE does not object to the frequency change proposed herein.

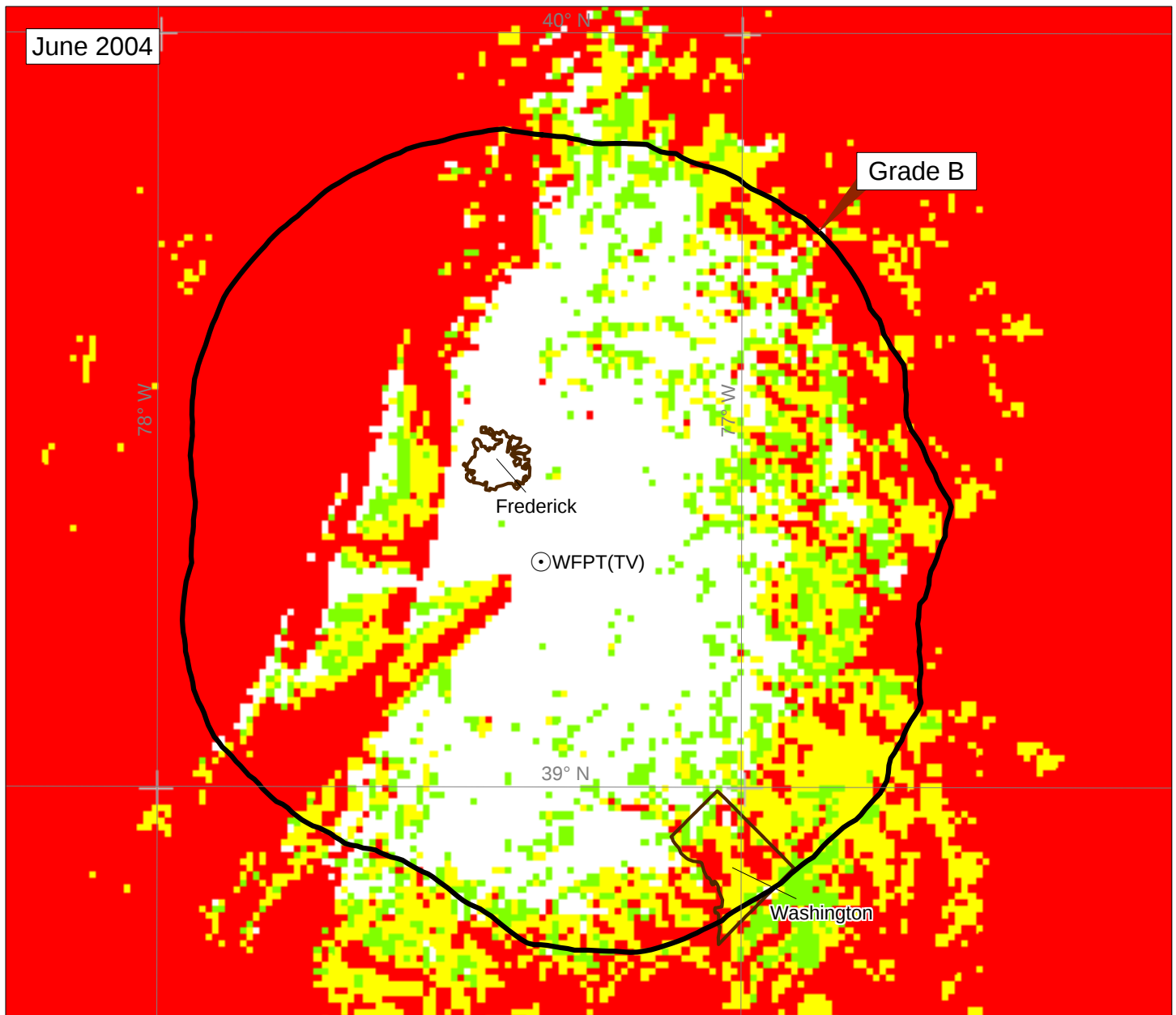
CERTIFICATION

I certify under penalty of perjury that the foregoing is true and correct. Executed on July 6, 2004.



Robert W. Denny, Jr., P.E.

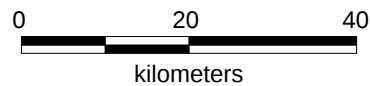




Key to Longley-Rice Study

Predicted F(50,50) field strength:

- City Grade or better
- Between Grade A and City Grade
- Between Grade B and Grade A
- Less than Grade B

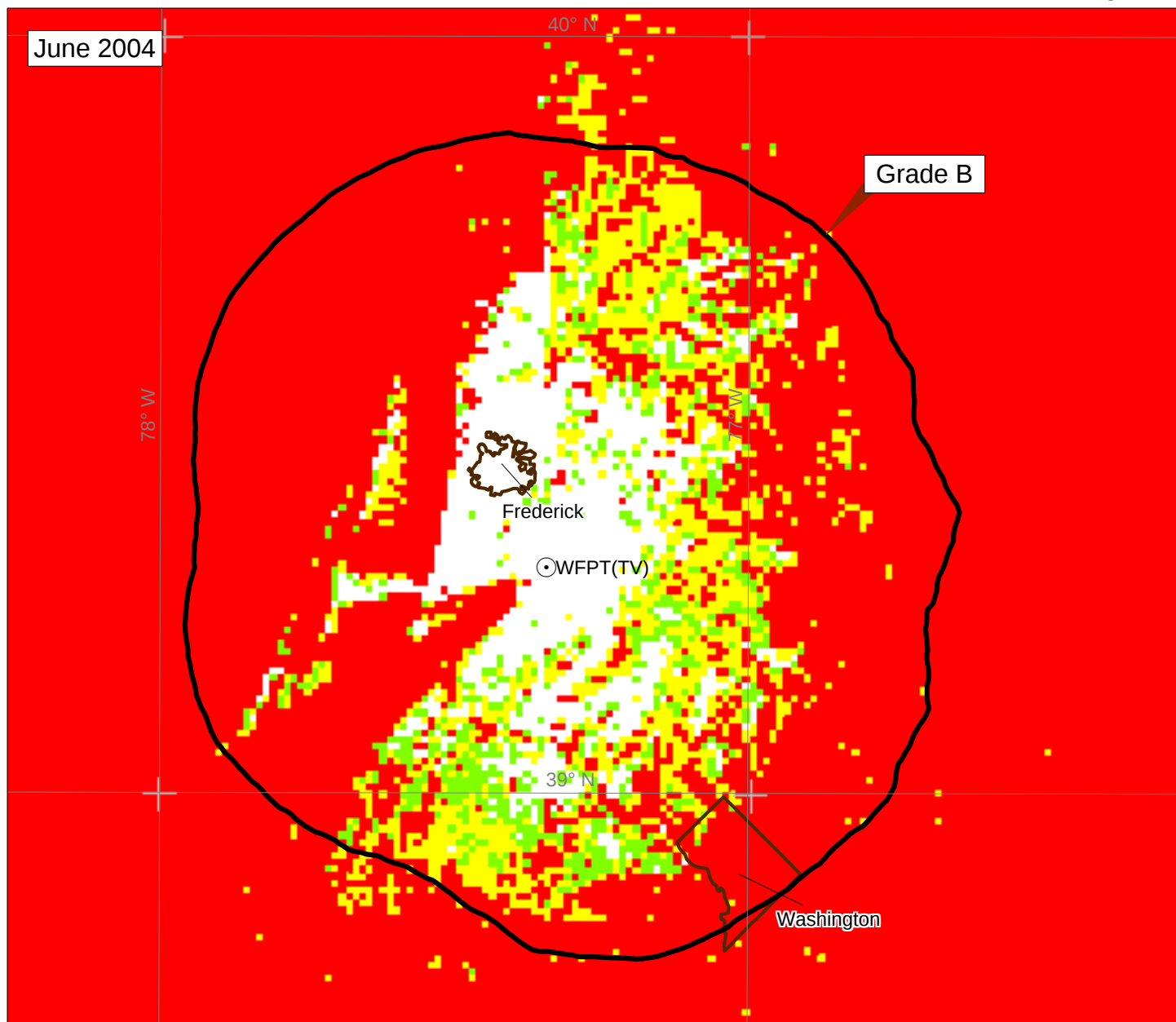


CALCULATED FIELD STRENGTH

Prepared for

DISTRICT OF COLUMBIA
OFFICE OF THE CHIEF TECHNOLOGY OFFICER
STATION WFPT(TV) FREDERICK, MARYLAND
CH 62z 3160 KW (MAX-DA, BT) 138 METERS

Denny & Associates, P.C. Consulting Engineers



Key to Longley-Rice Study

Predicted F(50,50) field strength:

- City Grade or better
- Between Grade A and City Grade
- Between Grade B and Grade A
- Less than Grade B



Note: Longley-Rice field strength prediction includes additional loss due to land use (clutter).

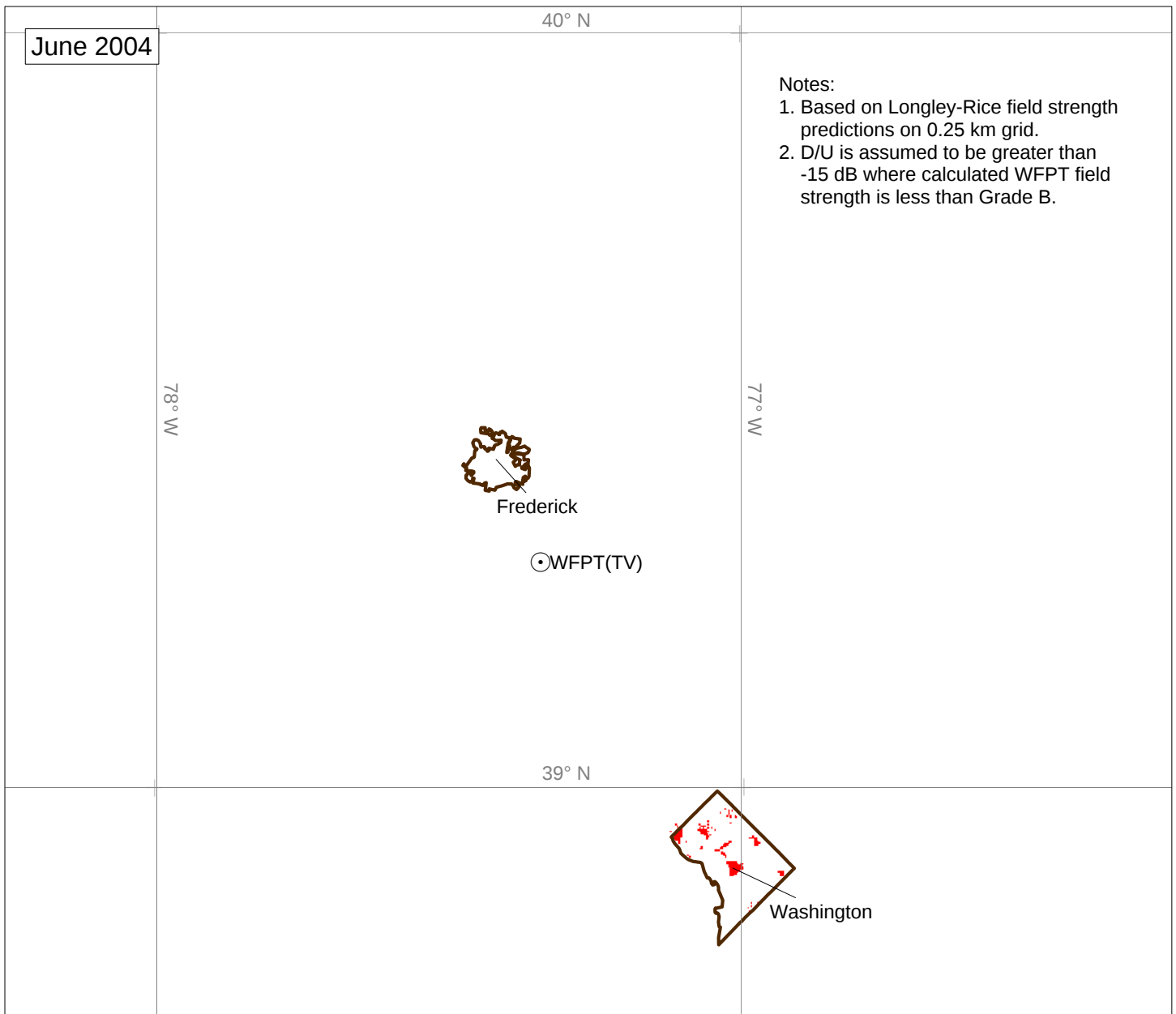
CALCULATED FIELD STRENGTH

Prepared for

DISTRICT OF COLUMBIA
OFFICE OF THE CHIEF TECHNOLOGY OFFICER
STATION WFPT(TV) FREDERICK, MARYLAND
CH 62z 3160 KW (MAX-DA, BT) 138 METERS

Denny & Associates, P.C. Consulting Engineers

Figure 3



DESIRED-TO-UNDESIRED FIELD STRENGTH STUDY

Prepared for
 DISTRICT OF COLUMBIA
 OFFICE OF THE CHIEF TECHNOLOGY OFFICER

Denny & Associates, P.C. Consulting Engineers