Bull Run TREATMENT PROJECTS

Technical Memorandum

Subject: Microwave Path Survey Interpretation

Project #s: PWB: W02229

Date: March 17, 2022

To: Lyda Hakes, Design Project Manager
Portland Water Bureau

Prepared by: Paul Gamboa, Information System Analyst, Principal
Bureau of Technology Services

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Limitations: Add additional limitations, if desired.

Aviat Networks Microwave Path Survey Report and resulting tower recommendations for the Portland Water Bureau Filtration Plant

Following the Survey Procedures in the Path Survey Report, Aviat Network Engineers met with City of Portland BTS Radio Engineers to evaluate the proposed tower location and determine the minimum height that would provide reliable microwave communications. Note, this is not the minimum height of the tower but the minimum height for the microwave system to operate reliably. Other factors also influence the height of the tower such as FAA requirements, vertical spacing needs between antennas and other services which may operate on the tower. Sufficient height and space are required to physically install and maintain antennas, while provisioning for mounting hardware and transmission lines.

The Path Survey involves evaluating terrain, the surrounding trees, buildings, towers, other potential obstructions, as well as reflective surfaces which would impact the reliable operation of a microwave transmission path. The proposed tower location was evaluated based on the Vigants clearance criteria, an industry standard for determining path clearance. Another factor involved is evaluating the frequency of other microwave systems in or passing through the area of the proposed tower. Aviat Networks evaluated the path and the required clearance, which is limited primarily by the height of the trees in the near field of the proposed path. The tree growth rate used by Aviat is 13 to 24 inches per year which is consistent with the Douglas Fir tree stands near the proposed tower location on the site. Aviat calculated 10 years of tree growth in their analysis.

Aviat's conclusion was that the minimum recommended height for the proposed Microwave Dish be located at 145 feet above ground level. However, the microwave path would have obstructions after 10 years of operation if installed at 145 feet per Aviat recommendations. To extend the life of the path we recommend raising the minimum installation height proposed from 145 feet to a height of 165 feet. This will provide a 20-year life for the microwave path.

The physical requirements to install and maintain the tower without the use of cranes requires the tower to be taller than the proposed microwave dish and equipment by a height of 15 feet, for a total tower height of 180 feet.

Summary

BTS recommends the Water Bureau install the microwave system at 165 feet to allow for 20 years of tree growth and constructs a 180' tower to allow for installation and maintenance of the microwave system.