CLAYTON COUNTY ORDINANCE #5-2025
RADIO MICROWAVE PATH ORDINANCE

TITLE

Radio Microwave Path Ordinance

BE IT ENACTED BY THE BOARD OF SUPERVISORS, CLAYTON COUNTY, IOWA.

SECTION 1. PURPOSE

The intent of this ordinance is to protect the public health, safety, and general welfare in regard to the efficient and unobstructed flow of microwave radio communications for the Clayton County Public Safety Radio System and other emergency responders in Clayton County. The pathways between radio towers must be maintained free of obstructions to provide uninterrupted communications. Effective radio communications are essential for quick response in emergency situations and for the operation of the County's public safety agencies.

SECTION 2. DEFINITIONS

1. "Structure" shall mean anything erected, reconstructed, altered, repaired, relocated, or portable, the use of which requires a location on a parcel of land. Structures include, but are not limited to buildings, fill areas, water towers, silos, radio and TV towers, signs and billboards, outdoor movie theater screens, and telephone poles.

2. "Microwave Path" shall mean the three-dimensional Fresnel Zone or zones between transmitting and receiving microwave antennas of the Clayton County Public Safety Radio System.

SECTION 3. BOUNDARIES AND STANDARDS OF DISTRICT

Boundaries and standards of the overlay district are based on the Path Study for the Clayton County Public Safety Radio System. This study is on file at the Clayton County 911 Coordinator Office and Clayton County Health & Zoning Department.

1. Boundaries – The district shall encompass an area thirty feet from the Fresnel zone stretching the entire length of each path. See Appendix A.

2. Standards – The standards of the underlying district shall apply. However, to meet the intent of this district, the following additional standard shall apply:

a. No structure as defined in the Zoning Chapters shall be constructed or erected in the Microwave Radio Path District. The height of proposed structures shall be thirty feet from the Fresnel zone and decided on a case-by-case basis pending determination of potential impact to the microwave radio path. This includes structures attached to existing structures.

SECTION 4. USES IN UNDERLYING ZONES

All principal, conditional, accessory, and nonconforming uses shall be according to the underlying districts, except that uses shall also adhere to the standards detailed in this section.

SECTION 5. NONINTERFERENCE REQUIREMENT

Notwithstanding any provision to the contrary in the Clayton County Code of Ordinances, or any other applicable zoning or building regulation, no application for authority, whether by building permit or by zoning authorization such as land use permit, conditional use permit, or variance, to erect a new structure, or relocate an existing structure may be approved until and unless the requirements of this Chapter have been met.

This ordinance provides for Clayton County to trim, cut down, or control the growth of any trees determined to impact the microwave path and also the right to enter upon any premise in the microwave path at any time for the purpose set forth above. Costs to maintain the microwave path will be borne by Clayton County.

SECTION 6. PERMITTING REQUIREMENT

Any person or entity intending to construct, erect, or modify a Structure after the adoption of this ordinance shall submit an application to the Clayton County 911 Service Board for a finding of no detrimental impact prior to commencement of construction or modification. The application shall include any documentation completed for Antenna Structure Registration from the Federal Communications Commission (FCC) as well as any documentation related to an Obstruction Evaluation or Airport Airspace Analysis from the Federal Aviation Administration (FAA). A copy of the application must also be provided to the Clayton County Zoning Department for their review and approval.

SECTION 7. REVIEW AND ACTION BY AUTHORITIES

Upon receiving an application, the Clayton County 911 Service Board and other authorities identified below shall take the actions set out herein.

1. Preliminary finding of detrimental impact or no detrimental impact. Within fifteen (15) business days of receipt of application, the Clayton County 911 Coordinator shall make a preliminary finding on whether there may be a detrimental impact upon the Clayton County Public Safety Radio System's microwave path or paths, and report that determination to the developer, owner, or agent who filed the application for the permit.

a. If the Clayton County 911 Service Board reports a preliminary finding of no detrimental impact, that report shall be released to the Clayton County Health & Zoning Department to review the application and grant it if it meets the requirements of the applicable codes, such as the provisions in the Ordinances of Clayton County, Iowa.

b. If the Clayton County 911 Service Board reports a preliminary finding of possible detrimental impact, the Clayton County 911 Service Board shall require the applicant to cause an engineering study to be prepared and sealed by a licensed engineer and submitted to the Clayton County 911 Service Board to confirm whether the structure will have a detrimental impact upon the system's microwave path or paths and, if so, the extent of that impact.

2. Finding of detrimental impact or no detrimental impact. Upon receipt of that engineering study, the Clayton County 911 Service Board shall review it and any other relevant evidence available and, as soon as practicable, make a finding of whether a detrimental impact exists, and report that finding to the Clayton County Health & Zoning Department, with a copy to the developer, owner, or agent who filed the application for the permit.

a. If the Clayton County 911 Service Board reports a finding of no detrimental impact, that report shall release the report to the Clayton County Health & Zoning Department to review the application and grant it if it meets the requirements of the applicable codes in the Ordinances of Clayton County, Iowa.

b. If the Clayton County 911 Service Board reports a finding of detrimental impact, the Clayton County Health & Zoning Department and Clayton County Board of Supervisors shall, in consultation with the Clayton County 911 Service Board, work with the applicant to eliminate that detrimental impact. To do so, the applicant may (i) redesign and/or relocate the structure to eliminate its detrimental impact or (ii) negotiate with the County to design, engineer, and install (using a contractor approved by the County) any or all additional equipment or modifications necessary to eliminate that detrimental impact. A negotiated mitigation shall include posting of a performance guarantee ensuring design

and installation of that equipment and conveyance of that equipment along with all necessary easements for access to and maintenance of that equipment to the County.

SECTION 8. ENFORCEMENT

Violation of this ordinance is a County infraction under Iowa Code Section 331.307, punishable by a civil penalty of not more than $750 for each violation. Each day of noncompliance may be deemed as a separate offense. In addition, the County may avail itself of alternative relief, as authorized by Section 331.307(8) and 331.307(9).

SECTION 9. SEVERABILITY CLAUSE

If any section, provision, or part of this Ordinance shall be held invalid, the invalidity of such section, paragraph, clause, or provision shall not affect any of the remaining provisions of this Ordinance.

SECTION 10. ORDINANCE EFFECTIVE UPON PUBLICATION

This Ordinance, being deemed urgent and necessary for the preservation of public safety, shall be in force and effect from and after its passage and publication as provided by law.

/s/ Doug Reimer, Chairperson, Board of Supervisors
Attest: /s/ Jennifer Garms, Clayton County Auditor

Appendix A.

The Fresnel Zone can be calculated with the information below. The Zone is centered around a straight line in three-dimensional space drawn from the center of the transmit antenna to the center of the receive antenna.

- Radius of the n-th Fresnel Zone:

$$r_n = \sqrt{\frac{n \cdot \lambda \cdot d_1 \cdot d_2}{d}}$$

where:

- r_n = radius of the n-th Fresnel zone (meters)
- n = Fresnel zone number (>0)
- λ = wavelength (in meters)
- d_1 = distance (in meters) from the transmitter to the obstacle
- d_2 = distance (in meters) from the obstacle to the receiver
- d = total distance (in meters) between transmitter and receiver.

- Wavelength Calculation:

$$\lambda = \frac{c}{f}$$

Or

$$\lambda = \frac{300}{f\ (MHz)}$$

where:

- c = speed of light (approximately (3 x 10^8) m/s)
- f = frequency (in Hz).

These formulas help in determining the effective Fresnel zones for optimal signal transmission.

When the Fresnel Zone is calculated simply add the necessary County required clearance or Boundary to obtain the final distance.

Example:

Tower site 1 has a microwave dish mounted on the tower at 90ft. This dish is pointing to a receive dish mounted at 100ft on Tower site 2. The distance between the two sites is 8 miles. The frequency of the link is 6300 MHz. The point along the path that needs to be confirmed is 3 miles from Tower site 1. Use a Fresnel of 1.

Determine the wavelength.

$$\lambda = \frac{3x10\text{^}8}{6{,}300{,}000{,}000} = .0476 \text{ m}$$

Calculate the Fresnel radius.

$$r_n = \sqrt{\frac{1 \cdot .0476 \cdot 4828 \cdot 8047}{12875}}$$

r_n = 11.98m (39.30ft) at that location.

39.3ft + 30ft (defined Boundary) = 69.3ft.

(Note: To determine the maximum Fresnel radius use the half-way point between the two sites, which is 4 miles in the example).