



**ERIE COUNTY  
REQUEST FOR PROPOSAL (RFP)  
TO PROVIDE TRUNKED RADIO NETWORK  
MICROWAVE**

**RFP#: 2026-020VF**

**February 6, 2026**

**DEPARTMENT OF HOMELAND SECURITY & EMERGENCY SERVICES  
ERIE COUNTY PUBLIC SAFETY CAMPUS  
45 ELM STREET  
BUFFALO, NEW YORK 14203**

**COUNTY OF ERIE  
REQUEST FOR PROPOSALS**



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## 1. Project Introduction

### 1.1 Project Objective

#### **Project Name: Erie County Public Safety Trunked Network Project – Microwave Backhaul System**

Public safety and public service agencies of the County of Erie, New York are pursuing upgrades to their public safety communications and are seeking a qualified and experienced vendor to design, build, implement, test and commission into service a countywide radio system with a public safety-grade backhaul network. The collective agencies will be represented by Erie County Department of Homeland Security, hereafter referred to as the "County". The resulting system, hereafter referred to as the Erie County Trunked Radio Network ("ECTRN") will be defined per the specifications detailed in this RFP.

The ECTRN will be a Motorola UHF Band Project 25 Phase 2 trunked, simulcast network with geographically redundant network core elements (one core in Erie County that will be constructed under another contract and one core in Niagara County that already exists).

This solicitation addresses a reliable and highly available microwave backhaul network for the new system that interconnects the land mobile radio (LMR) sites and dispatch facilities with the Erie County core network and also interconnects with Niagara County's microwave network. Routing among both these new microwave connections, existing microwave connections, and county fiber connections will be managed by separately purchased MPLS network.

### 1.1 Current Systems Overview

#### 1.1.1 Backhaul

The County currently operates an extensive microwave backhaul network to support its current operations. The existing hops in this network should be used in the design to the extent they meet the stipulated requirements. The system is a mixture of several bands and has a presence at most of the proposed sites. The list of sites and existing microwave equipment will be provided to qualified microwave vendors upon request by email at [communications@erie.gov](mailto:communications@erie.gov).

## 2. General Provisions

### **Statement of Rights: UNDERSTANDINGS**

**Please take notice**, by submission of a proposal in response to this request for proposals, the proposer agrees to and understands:

- that any proposal, attachments, additional information, etc. submitted pursuant to this Request for Proposals constitute merely a suggestion to negotiate with Erie County of Erie and is not a bid under Section 103 of the New York State General Municipal Law;
- submission of a proposal, attachments, and additional information shall not entitle the proposer to enter into an agreement with Erie County of Erie for the required services;
- by submitting a proposal, the proposer agrees and understands that Erie County of Erie is not obligated to respond to the proposal, nor is it legally bound in any manner whatsoever by submission of same;
- that any and all counter-proposals, negotiations or any communications received by a proposing entity, its officers, employees or agents from Erie County, its elected officials, officers, employees or agents, shall not be binding against Erie County of Erie, its elected officials, officers, employees or agents unless and until a formal written agreement for the services sought by this RFP is duly executed by both parties and approved by the Erie



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County Legislature, the Erie County Fiscal Stability Authority, and the Office of the Erie County Attorney.

- In addition to the foregoing, by submitting a proposal, the proposer also understands and agrees that Erie County reserves the right, and may at its sole discretion exercise, the following rights and options with respect to this Request for Proposals:
  - To reject any or all proposals
  - To issue amendments to this RFP
  - To issue additional solicitations for proposals
  - To waive any irregularities in proposals received after notification to proposers affected;
  - To select any proposal as the basis for negotiations of a contract, and to negotiate with one or more of the proposers for amendments or other modifications to their proposals;
  - To conduct investigations with respect to the qualifications of each proposer;
  - To exercise its discretion and apply its judgment with respect to any aspect of this RFP, the evaluation of proposals, and the negotiations and award of any contract;
  - To enter into an agreement for only portions (or not to enter into an agreement for any) of the services contemplated by the proposals with one or more of the proposers;
  - To select the proposal that best satisfies the interests of Erie County and not necessarily on the basis of price or any other single factor;
  - To interview the proposer(s);
  - To request or obtain additional information Erie County deems necessary to determine the ability of the proposer;
  - To modify dates;
- All proposals prepared in response to this RFP are at the sole expense of the proposer, and with the express understanding that there will be no claim, whatsoever, for reimbursement from Erie County for the expenses of preparation. Erie County assumes no responsibility or liability of any kind for costs incurred in the preparation or submission of any proposal;
- While this is an RFP and not a bid, Erie County reserves the right to apply the case law under General Municipal Law § 103 regarding bidder responsibility in determining whether a proposer is a responsible vendor for the purpose of this RFP process; and
- Erie County is not responsible for any internal or external delivery delays which may cause any proposal to arrive beyond the stated deadline. To be considered, proposals MUST arrive at the place specified herein and be time-stamped prior to the deadline.
- All proposals submitted become the RFP Issuer's property and will not be returned to the proposers.
- All consultants should understand that Erie County is committed to an open, fair and transparent selection process. All RFP submissions will be reviewed, objectively scored and ranked. Shortlisted firms will be interviewed prior to recommendation for selection.
- The highest-ranking firm after scoring and interviews will be recommended to the Erie County Legislature for authorization to enter into contract. Scores and ranking of all firms will be provided to the Legislature and the results will at that time become public record.
- Proposing firms should understand that to provide for this open and transparent process, more time will be required. The timeframe from advertisement to contract execution may be up to six months. Consultants should consider this when scheduling staff time and anticipating project commencement.
- Firms are encouraged to include Certified Minority and Women Owned Business Enterprises (MBE/WBE) in their teams in order to meet Erie County's goals of 15% MBE



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and 5% WBE participation. Certified MBE/WBE proposers should include the Erie County certification letter with the proposal.

- If proposer is a Veteran Owned Business, proposer should include letter indicating company is 51% or more Veteran-owned.

### **Contract**

After selection of the successful proposer, a formal written contract will be prepared by County of Erie and will not be binding until signed by both parties and, if necessary, approved by the Erie County Legislature, the Erie County Fiscal Stability Authority and the Office of Erie County Attorney. NO RIGHTS SHALL ACCRUE TO ANY PROPOSER BY THE FACT THAT A PROPOSAL HAS BEEN SELECTED BY ERIE COUNTY FOR SUBMISSION TO THE ERIE COUNTY LEGISLATURE AND/OR THE ERIE COUNTY FISCAL STABILITY AUTHORITY FOR APPROVAL. THE APPROVAL OF SAID LEGISLATURE AND/OR AUTHORITY MAY BE NECESSARY BEFORE A VALID AND BINDING CONTRACT MAY BE EXECUTED BY ERIE COUNTY.

The term of the contract shall be for a three (3) year period commencing approximately July 30th, 2026, and terminating July 29th, 2029. Erie County, in its sole discretion, may extend the agreement beyond its initial term for up to two (2) additional year periods at the same prices and conditions.

### **Indemnification and Insurance**

The proposer accepts and agrees that language in substantially the following form will be included in the contract between the proposer and Erie County:

“In addition to, and not in limitation of the insurance requirements contained herein the Consultant agrees:

- (a) that except for the amount, if any, of damage contributed to, caused by or resulting from the negligence of Erie County, the Consultant shall indemnify and hold harmless Erie County, its officers, employees and agents from and against any and all liability, damage, claims, demands, costs, judgments, fees, attorneys' fees or loss arising directly or indirectly out of the acts or omissions hereunder by the Consultant or third parties under the direction or control of the Consultant; and
- (b) to provide defense for and defend, at its sole expense, any and all claims, demands or causes of action directly or indirectly arising out of this Agreement and to bear all other costs and expenses related thereto. Upon execution of any contract between the proposer and Erie County, the proposer will be required to provide proof of the insurance coverage described in **Schedule “B”**. Insurance coverage in amount and form shall not be deemed acceptable until approved by Erie County Attorney.

### **Intellectual Property Rights**

The proposer accepts and agrees that language in substantially the following form will be included in the contract between the proposer and Erie County:

All deliverables created under this Agreement by the Consultant are to be considered “works made for hire”. If any of the deliverables do not qualify as “works made for hire”, the Consultant hereby assigns to Erie County all right, title and interest (including ownership of copyright) in such deliverables and such assignment allows Erie County to obtain in its name copyrights, registrations and similar protections which may be available. The Consultant agrees to assist Erie County, if required, in perfecting these rights. The Consultant shall provide Erie County with at least one copy of each deliverable.

The Consultant agrees to indemnify and hold harmless Erie County for all damages, liabilities, losses and expenses arising out of any claim that a deliverable infringes upon an intellectual property right of a third party. If such a claim is made, or appears likely to be made, the Consultant agrees to enable Erie



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County's continued use of the deliverable, or to modify or replace it. If Erie County determines that none of these alternatives is reasonably available, the deliverable will be returned.

All records compiled by the Consultant in completing the work described in this Agreement, including but not limited to written reports, source codes, studies, drawings, blueprints, negatives of photographs, computer printouts, graphs, charts, plans, specifications and all other similar recorded data, shall become and remain the property of Erie County. The Consultant may retain copies of such records for its own use.

### **Non-Collusion**

The proposer, by signing the proposal, does hereby warrant and represent that any ensuing agreement has not been solicited, secured or prepared directly or indirectly, in a manner contrary to the laws of the State of New York and Erie County of Erie, and that said laws have not been violated and shall not be violated as they relate to the procurement or the performance of the agreement by any conduct, including the paying or the giving of any fee, commission, compensation, gift, gratuity or consideration of any kind, directly or indirectly, to any County employee, officer or official.

### **Conflict of Interest**

All proposers must disclose with their proposals the name of any officer, director or agent who is also an employee of Erie County of Erie. Further, all proposers must disclose the name of any County employee who owns, directly or indirectly, an interest of ten percent or more in the firm or any of its subsidiaries or affiliates.

There shall be no conflicts in existence during the term of any contract with Erie County. The existence of a conflict shall be grounds for termination of a contract.

### **Compliance with Laws**

By submitting a proposal, the proposer represents and warrants that it is familiar with all federal, state and local laws and regulations and will conform to said laws and regulations. The preparation of proposals, selection of proposers and the award of contracts are subject to provisions of all Federal, State and County laws, rules and regulations.

### **Compliance with Laws**

The New York State Freedom of Information Law as set forth in Public Officers Law, Article 6, Sections 84 et seq., mandates public access to government records. However, proposals submitted in response to this RFP may contain technical, financial background or other data, public disclosure of which could cause substantial injury to the proposer's competitive position or constitute a trade secret. Proposers who have a good faith belief that information submitted in their proposals is protected from disclosure under the New York Freedom of Information Law shall:

a) insert the following notice in the front of its proposal:

#### **"NOTICE"**

**The data on pages \_\_\_\_ of this proposal identified by an asterisk (\*) contains technical or financial information constituting trade secrets or information the disclosure of which would result in substantial injury to the proposer's competitive position.**

**The proposer requests that such information be used only for the evaluation of the proposal, but understands that any disclosure will be limited to the extent that Erie County considers proper under the law. If Erie County enters into an agreement with this proposer, Erie County shall have the right to use or disclose such information as provided in the agreement, unless otherwise obligated by law."**



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And

b) clearly identify the pages of the proposals containing such information by typing in bold face on the top of each page " \* **THE PROPOSER BELIEVES THAT THIS INFORMATION IS PROTECTED FROM DISCLOSURE UNDER THE STATE FREEDOM OF INFORMATION LAW.**"

Erie County assumes no liability for disclosure of information so identified, provided that Erie County has made good faith legal determination that the information is not protected from disclosure under applicable law or where disclosure is required to comply with an order or judgment of a court of competent jurisdiction.

The contents of the proposal which is accepted by Erie County, except portions "Protected from Disclosure", may become part of any agreement resulting from this RFP.

#### **Equal Pay Certification**

During the term of this Contract, the Consultant shall comply with Executive Order13 (2014), and the Consultant shall make such records available, upon request, to Erie County's Division of Equal Employment Opportunity for review. Erie County shall have the right, upon reasonable notice and at reasonable times, to inspect the books and records of the Consultant, its offices and facilities, for the purpose of verifying information supplied in the Erie County Equal Pay Certification (**Schedule "C"**) and for any other purpose reasonably related to confirming the Consultant's compliance with Erie County Executive Order No. 13 (2014). Violation of the provisions of Executive Order 13 (2014), which is attached hereto and made a part hereof, can constitute grounds for the immediate termination of this contract and may constitute grounds for determining that a bidder is not qualified to participate in future county contracts.

#### **EFFECTIVE PERIOD OF PROPOSALS**

All proposals must state the period for which the proposal shall remain in effect (i.e. how much time does Erie County have to accept or reject the proposal under the terms proposed). Such period shall not be less than 180 days from the proposal date.

#### **2.1 Schedule of Events**

The following is a schedule of events concerning the proposal process. Erie County reserves the right to adjust the below schedule as needed in the best interest of Erie County:

<b>Event</b>	<b>Date</b>
Release of RFP	02/05/2026
Pre-proposal meeting (week of)	03/09/2026
Deadline for questions	03/20/2026
Answers to questions posted	03/27/2026
Proposals Due by (3:00pm EST)	05/04/2026
Proposal Opening	05/05/2026

#### **Registration**

All firms wishing to participate in this process must register with Jerry Whittington & Kevin Hughes in the Erie County Department of Homeland Security & Emergency Services- Emergency Preparedness at [communications@erie.gov](mailto:communications@erie.gov). All further information including addendums and contact from Erie County will be sent electronically.



### Questions

Any requests for RFP interpretations or clarifications shall be made by March 20<sup>th</sup>, 2026, via e-mail to [communications@erie.gov](mailto:communications@erie.gov). No requests for oral interpretations via telephone will be accepted. A single response to all questions will be made as outlined in the schedule. NO COMMUNICATIONS OF ANY KIND WILL BE BINDING AGAINST ERIE COUNTY, EXCEPT FOR THE FORMAL WRITTEN RESPONSES TO ANY REQUEST FOR CLARIFICATION.

### 2.2 Evaluation, and Contract Award Process

The award of the contract may be made to the most responsive proposal offering a product of service deemed suitable for use by the County.

The evaluation of proposals and the determination as to the quality shall be the sole and final responsibility of the County and will be based on the information furnished by the Proposer. In the evaluation of otherwise responsible bids/quotes, the proposer's experience, delivery time and responsibility in performing other contracts will be considered. The proposals will be scored using the following criteria:

- To be provided by Erie County. Options include:
  - Firm Relevant Experience for similarly-sized Motorola P25 systems and Financial Condition
  - Proposed Solution Quality – Adherence To Requirements
  - Proposal's use of smaller dishes and minimizing interference risks
  - Proposed Schedule
  - Proposed Cost

Vendors who reach the final selection round may be invited to make an *Oral Presentation* and to provide a demonstration of their network design and equipment. This phase of the evaluation process will be ranked by the Evaluation Committee and incorporated into the overall final vendor ranking.

The County reserves the right (i) to reject any and all proposals or any part of any proposal, (ii) to waive minor defects or technicalities, or (iii) to solicit new proposals on the same project or on a modified project that may include portions of the originally proposed project as the County, in the exercise of their sole and unfettered discretion, may deem necessary. Proposers may be required to submit satisfactory evidence that they have the necessary financial resources to perform and complete the work outlined in this RFP.

Submission of a proposal implies the Respondent's acceptance of the evaluation criteria and process and recognition that subjective judgments may be made by the Evaluation Committee. Any objections to the process described in this Request for Proposal should be raised at the pre-proposal conference.

### 2.3 Oral Presentation

The County anticipates inviting and reserves the right to invite qualifying Respondents for oral presentations.

### 2.4 Submission Requirements

Respondents shall submit the following documents in response to this RFP:



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- Cover Letter: Proposals shall contain the following in a cover letter:
  - Identification of Respondent, including name, address and telephone number.
  - Acknowledgment of receipt of all RFP addenda, if any.
  - Name, title, address, telephone number and email address of Respondent's contact person during the proposal evaluation period.
  - A statement to the effect that the proposal shall remain valid for a period of not less than 180 days from the date of submittal.
  - Signature of a person authorized to bind Respondent to the terms of the proposal; and
  - Identification of proposed subcontractors, including legal company name, and contact person's name, address, phone number. Working relationship between Respondent and subcontractors, if applicable.
- Technical Proposal
  - Written response to Technical Response/Work Plan Description (See Technical Response/Work Plan Description Instructions).
  - Completed ECTRN Compliance Matrix (Excel File).
- Experience, Qualifications and References
  - Respondent Experience per instructions detailed in Respondent Experience Section.
- Cost
  - Completed ECTRN Microwave System Cost Proposal Sheet (Excel File).
  - Include Milestone Payment Percentages.
- Additional Required Submissions and Forms
  - Appendix A: Compliance Matrix.xlsx
  - Appendix B: Microwave System Cost Proposal Sheet.xlsx
  - Appendix C: Schedule A: Proposer Certificate
  - Appendix D: Schedule B: Standard Insurance Provisions
  - Appendix E: Equal Pay Certification
  - Appendix F: MBE\WBE Certification

## 2.5 Compliance Matrix Instructions

Response to the technical and statement of work (SOW) requirements shall be comprehensive and shall be submitted within the Microsoft Excel file named *ECTRN Compliance Matrix*.

When completing the Compliance Matrix, the Respondent shall use a response of "C," "N," or "A" in the designated spreadsheet column for each numbered line item. The respective interpretation of this notation is as follows:

- A response of "C," or "Compliant" means that Respondent's ECTRN offering fully meets the stated requirement and that the Contractor will meet its obligations with no exceptions (for the requirements of this section).
- A response of "N," or "Non-Compliant" means that Respondent's ECTRN does not meet the required performance criteria.
- A response of "A," or "Alternative" means that the Respondent proposes an alternative solution or approach that the Respondent deems sufficient in fulfilling the stated performance



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requirement. The Respondent is required to provide justification that the alternative meets the stated performance criteria.

The Compliance Matrix shall mainly be used to indicate a response of "C," "N," or "A." The *Comments* column should only be used to provide brief responses to qualify an alternative approach or an unmet requirement. In sections that require responses to individual requirements, the Respondent shall use multiple rows to address each requirement that requires an individual response. In such cases, the Respondent shall populate the individual requirement's text in the column entitled "Requirement Text." For example, if a Respondent complies with all requirements in a section other than one particular requirement, the Respondent will create two lines for that section. The first line includes the one requirement that is not in compliance as the "Requirement Text," an "N" for non-compliance, and the Respondent's comments regarding the unmet requirement. The second line will use "All other requirements" in the Requirement Text column and a "C." Other detailed written responses describing the solution and services must be submitted as part of the response to **Technical Response/Work Plan Description** which assigns Respondent specific locations to describe specific portions of the solution and services.

## 2.6 Definition of Terms

**ECTRN:** The term **ECTRN**, unless further specified, in this RFP shall apply to all subsystems, components, software, features and performance criteria prescribe in this RFP.

- Network Controller
- Simulcast Radio Access Layers
- Dispatch Console Subsystem
- Network Management Systems
- Backhaul Subsystem (including the microwave connections created under this RFP)
- Physical Site Infrastructure

**Respondent or Proposal:** Statements that begin with or contain "the Respondent" or "Proposal" define items that must be included in the Proposal as a part of the Respondent's response.

**Contractor:** Statements that begin with or contain "the Contractor" typically define criteria for services that must be completed by the selected Contractor following contract award.

## 3. Respondent Experience

The Respondent and its subcontractors shall have extensive experience with the scope of services outlined in this RFP including, but not limited to, designing, deploying, installing, transitioning to, and maintaining mission critical LMR microwave networks of similar scope and size.

### 3.1 Firm Experience

In its response to this Experience Section, Respondent shall:

Provide a brief corporate profile overview and discuss its history in designing and deploying LMR microwave systems for public safety and other mission critical industries.

Discuss and highlight its recent track record with delivering LMR microwave networks.



Provide an overview of its subcontractors and proposed function(s):

- Provide a description of their qualifications and relevant experience in the design, deployment and implementation and operation of land mobile radio (LMR) microwave networks.
- Discuss the prime Respondent's prior relationship with the subcontractor and previous projects or joint ventures of similar size and scope in which the firms have collaborated.

Submit references and brief narratives for at least three (3) recent successfully delivered LMR microwave projects that are technically and operationally similar in scope and size to the proposed County system. Descriptions for each project shall not exceed two (2) pages. At minimum, references shall include:

- Customer name, address, contact name(s), title, phone number, e-mail address.
- Brief description of the system architecture, subsystems and relevant configurations (trunked/conventional, simulcast/multicast).
- Description of the backhaul solution the vendor supplied.
- Number of system users.
- Brief description of the services rendered including engineering services, implementation, and network cutover process for the successful delivery of project systems.
- Any project specific challenges or obstacles encountered, and corresponding resolution means Respondent employed to address them.
- Total duration for system delivery including the original estimated and actual completion dates and a description for variance in excess of 90 days.
- Total contract amount, including original contract price, final price and a description for variance of price in excess of 5%.
- Explicitly indicate which, if any, of the proposed key personnel supported these referenced projects.

Describe the name, location and capabilities (qualifications, years in business, experience with Respondent's systems) of the local sub-contractors and service facilities, which will provide any or, all of the installation, service and warranty, both initially and on a continuing basis.

### 3.2 Team Experience and Qualifications

Describe your firm's organizational chart, identify who will have overall responsibility for the work, and include the lines of authority between team members up to this senior level.

Respondents shall identify names, positions, roles and responsibilities, and resumes of key project personnel (prime and subcontractor) that will be assigned to the proposed project.

Resumes shall:

- Demonstrate experience and qualifications of each proposed key personnel to be assigned to the project including, but not limited to, educational background, personnel's role in supporting projects of similar scope, and other relevant certifications or career highlights.



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- Indicate the key personnel's tenure with the corporation.
- Indicate whether any proposed key personnel are subcontractors to the primary Respondent.
- Include references for the Project Manager and Lead System Engineer/Integrator.

Include a statement that key personnel will be available to the extent proposed for the duration of the project acknowledging that no person designated as "key" to the project shall be removed or replaced without the prior written concurrence of the County.

### 3.3 Product and Subcontractor Working Experience

Respondents shall identify major subsystems or subcontractors it is proposing with which it does not have prior experience.

### 3.4 Financial Condition

Provide a general description of the firm's financial condition; identify any conditions (e.g., bankruptcy, pending litigation, planned office closures, impending merger) that may impede consultant's ability to complete the project.

## 4. General System and Contractor Requirements

### 4.1 General Project Requirements

The Contractor shall provide a turnkey solution and services to deliver a microwave network solution consisting of all of the services, hardware, equipment, devices, parts, materials, goods, software, firmware, data, physical and network infrastructure, deliverables, and other work necessary for a fully functional and operating system.

The complete microwave solution shall integrate the County's existing microwave systems where such use complies with the requirements of this RFP. The microwave solution shall integrate with the Niagara County Motorola P25 core network and its backhaul network to achieve a geo-redundant network core between Niagara and Erie County systems.

The construction, procurement and installation services included in the microwave network shall be performed with the Contractor's best skill and judgment, in a good and workmanlike manner and shall otherwise be consistent with and in compliance with the specifications.

All equipment furnished by the Contractor shall be new, meet the requirements of this specification and the manufacturers' published specifications, be in operable condition at the time of delivery, reflect high quality workmanship throughout, and be suitable for the intended purposes delineated herein.

The Contractor is solely responsible for planning, designing, developing, constructing, supplying, fabricating, installing, testing, commissioning, deploying, and transitioning the microwave network.

The Contractor shall be solely responsible for ensuring that the microwave network and its components comply with all local, State, and federal Environmental laws, codes, or statutes.

The Microwave Backhaul System (MBS) shall meet the technical performance and reliability parameters prescribed in the RFP.



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The Contractor shall be responsible for spearheading and coordinating the integration of the microwave network with existing and ancillary networks and other County enterprise networks as required, including collaborating with existing maintenance vendors and County staff.

The microwave network shall have a high level of fault tolerance, a high degree of reliability and no single point of failure as further specified in the *Reliability and Availability Section* of this RFP.

All MBS components shall be of current design and manufacture. No MBS components shall be on the manufacturers' equipment cancellation lists. Respondent shall explicitly state the end of manufacture, and end of life dates of all proposed components and systems.

The Contractor shall be solely responsible for all activities and costs required to obtain FCC licenses and approvals for the microwave backhaul links including coordination, preparation, and filing documentation.

The Contractor shall work with the County to ensure all necessary information is provided to tower owners to ensure all owner requirements are met for structural analyses, leasing, construction, and integration.

The Contractor shall be solely responsible for preparing all paperwork and permits required to deliver the MBS including, but not limited to, permits for transportation, storage, and installation of the MBS components in accordance with all federal, state, and local codes.

The Contractor shall be responsible for the delivery and, if necessary, secure storage of all Contractor provided network systems and components.

The Contractor shall, at its own expense, remedy damage caused by the Contractor to the real or personal property of County agencies or their lessor.

## 4.2 General Business Terms

**No Beneficial Use:** Contractor agrees that it will not claim beneficial use of the MBS, or any part thereof, prior to Final System Acceptance.

**Final Payment Retainage:** 10% of the total value of the Agreement retained until Final System Acceptance.

**Acceptance Criteria for Final System Acceptance:** Successful completion of all acceptance tests, and close out of all punch list items.

**Latent Defects:** Contractor is responsible for the correction of any deficiencies identified during the General Warranty Period.

**Changes in Key Project Personnel Subject to Approval:** Replacements of Key Project Personnel shall be subject to approval by the County.

**Project Continuation While Change Orders Pending:** Contractor shall not stop work on any Deliverable that does not have a Change Order pending, even if a Change Order is pending on a different Deliverable.



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Fixed Margin: Any additional work made necessary by a change order from the County shall be billed at the cost necessary to provide the additional work and shall not be subject to an additional fee or profit margin.

### 4.3 Project Management

Contractor shall be solely responsible for all project management functions necessary to ensure the successful completion of all phases of this project.

The Contractor shall provide turnkey project management services during all Phases of the Project, and shall, at a minimum:

- Develop and maintain a project plan and schedule.
- Provide County staff and other pertinent stakeholders with regular status reports and updates.
- Allocate project management staff and other key Contractor and subcontractor resources.
- Conduct project planning sessions with County personnel and other contractor staff.
- Prepare and track action points and associated responsibilities.
- Conduct bi-weekly (or as required) project status/update meetings.
- Prepare and present formal monthly reports which include the status of the project, risks and mitigation approach, an action item register, and salient project financials.
- Prepare as-needed reports and materials for County and executive staff meetings and attend such meetings as directed.
- Develop a risk mitigation plan and facilitate the resolution of problems and issues.
- Provide a mechanism for storing and sharing up-to-date project-related documents and schedules.

The Contractor shall create, maintain and update, until Final System Acceptance, a communications plan, and a risk mitigation and escalation plan.

The Contractor shall designate a Project Manager that is a full-time employee of the Contractor that will serve as the primary point of contact. Once approved, Contractor shall not replace the Project Manager without the written approval of the County.

The Contractor's Project Manager shall be responsible for facilitating the flow of information and coordination among all ECTRN member agencies and project stakeholders.

The Contractor's Project Manager shall have the power to make significant decisions relevant to the project and shall have direct access to the Contractor's top management for the timely resolution of issues that may be beyond the Project Manager's direct authority to resolve.

The Contractor's Project Manager or their designee will convene and attend bi-weekly status meetings and shall submit bi-weekly status reports covering such items as progress of work being performed, milestones attained, resources expended, problems encountered, issues and corrective action taken, until the time of Final System Acceptance.

The Contractor shall provide written agenda items prior to all status meetings.



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The Contractor shall maintain an updated and current written list of open issues and pending decisions.

The Contractor shall allocate sufficient time for the review and approval of Contractor provided project documents by the Stakeholders.

The Contractor shall be responsible for updating the project schedule and providing overall project status, at a minimum, on a monthly basis describing the completed milestones and project delays, if any.

#### **4.4 Kick Off**

The Contractor, led by its Project Manager, shall convene a project planning Kick Off session with County staff and other stakeholders, as identified by the County, within 30 days of contract award. The Kickoff shall include:

- A detailed project plan.
- A work statement that includes the project deliverables and project objectives.
- A description of the finalized project management approach.
- A work breakdown structure (WBS) to the level at which control shall be exercised.
- Performance measurement baselines pertaining to schedule and cost.
- Major milestones target dates, including at a minimum, milestones identified in the Project Milestones and Acceptance section.
- A list of key personnel resources and any other staff requirements.
- A risk management plan, including constraints and assumptions and planned responses to address projected risks.
- Project communications plan, including periodic reporting requirements and milestone achievement determination.
- A Change Order management plan.
- A Design Review Process plan.

#### **4.5 Project Milestones and Acceptance**

Respondent shall submit its proposed schedule for the delivery of the ECTRN microwave network. The County prefers a timely completion of the entire project and the intermediate key milestones identified below.

Respondent shall provide a detailed Gantt chart schedule including deliverables and activities.

The schedule shall identify the following project phases as key project milestones. The milestones below shall additionally correspond with the Contractor's payment timeline. Acceptance criteria for each milestone are described below:

##### **Kick Off:**

Completion of activities listed in the project Kick Off Section.

##### **Detailed Design Review:**

Completion of all activities listed in Design Review Activities.

##### **Site Preparation and Planning:**



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Completion of all activities listed in Installation Planning and Site Preparation.

**Factory Testing and Delivery:**

Completion of all activities listed in Factory Testing and Staging.

**Microwave System Installation:**

Completion of all activities required for system installation.

Completion of all FCC licensing and confirmation of granted licenses.

Installation, turn up, and integration with the Network Management System (NMS).

Completion of all activities listed in Installation and Baseline Testing.

**Acceptance Testing:**

Completion of Functional and Performance Acceptance Testing.

**Final System Acceptance:**

Completion of all acceptance tests.

Completion of user cutover.

Completion of all punch list items.

**Project Close Out:**

Final System Acceptance.

Delivery of all system documentation.

Respondent's project schedule shall account for common national, and State observed holiday periods during which time limited, or no work will be performed. The County reserves the right to designate quiet periods of up to two weeks at a time to ensure service outages do not occur during these periods.

The County will make reasonable efforts to provide the Contractor with adequate resources to support MBS implementation. Contractor shall not expect, however, the County resources to be made available more than eight hours per day or outside of standard business hours unless pre-authorized in writing.

## 4.6 Design Review Activities

### 4.6.1 General Detailed Design Review Phase Requirements

The Contractor shall facilitate a detailed Design Review process culminating in a Detailed Design that meets the specifications herein.

Within 15 days after the Kick-Off, Contractor shall submit for County review and approval an updated Design Review Process Plan that will guide the Detailed Design activities.

The Contractor shall ensure active participation of the County in reviewing, commenting on, and approving the Design Review documents.



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Any required changes to the Detailed Final System Design may trigger another cycle of review for the impacted subsystem or component.

The Design Review process and resulting Final System Detailed Design shall include, at minimum:

- A detailed equipment list (hardware, firmware, software) to be furnished by site.
- All applicable preliminary forms required for permitting and regulatory efforts.
- Logical system block diagrams by site as well as overall network block diagrams.
- Preliminary Cutover and end user migration plan.
- Performance and acceptance criteria for customer-provided backhaul connectivity.
- Noise/Interference Studies as described.
- RF power/characteristics (input and output powers, sensitivity, etc.).
- Site layout drawings.
- Component layout and wiring diagrams by site.
- Rack layout and elevation drawings by site.
- Microwave path design and path profile analysis and frequencies.
- Networking layers configuration.
- Interfaces to other subsystems and enterprise networks.
- Baseline test plan documents and parameters.
- Key Performance Indicators (KPIs) and other thresholds for acceptance.
- Microwave dish diagrams and connections.
- Power and HVAC Loads.
- Acceptance Test Plans.
- Preliminary Training plan (operational and maintenance training).
- Facilities Suitability Assessments as identified in this Section.

The Contractor shall, during the Design Review, produce a Preliminary Cutover Plan that complies with the project objectives (e.g., minimal service outage and coverage reductions) and the specifications as detailed in this solicitation.

Prior to implementation activities, the Contractor shall compile all Design Review documents into a single report for approval and to serve as a reference for future work and changes.

#### 4.6.2 Facilities Suitability Assessment

During the Design Review phase, Contractor shall, through physical visits and documentation review of each proposed facility, conduct a detailed assessment of the suitability of the facilities to support the Contractor's MBS.

The Contractor shall, based on these assessments, identify required site improvements and modifications to the County, noting specifically items that fall outside the scope of this RFP.

#### 4.6.3 Network Link Assessment

During the Design Review phase, the Contractor is responsible for evaluating and certifying the link performance at any identified customer-provided microwave links. The Contractor is also responsible for the assessment of existing microwave components for their possible reuse in the Contractor's MBS.



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#### 4.6.4 Electrical Power Evaluation

During the Design Review phase, Contractor shall evaluate the current AC and backup electrical power systems at the proposed facilities and identify any modifications necessary to support its ECTRN design. The Contractor shall provide detailed power requirements to the County to fully provision electrical systems that support the MBS. Contractor will coordinate with County regarding final designs, configuration, and installation.

#### 4.6.5 Microwave Dish Support Structure Suitability and Design

During the Design Review phase, the Contractor shall be responsible for assessing the suitability of each existing and proposed microwave dish support structure to support the approved microwave dish loading and Cutover Plan.

The Contractor shall provide the County with all of necessary transmission line/waveguide and microwave dish mounting loads and information per site to permit the microwave loading information to be included in the comprehensive radio tower updated structural analyses, which will be performed by the County.

The Contractor shall make efficient use of the available tower space for microwave dish implementation.

Where space on existing towers is not available, Contractor shall implement a design that reuses existing heights and supports both new and planned systems during the transition.

### 4.7 Installation Planning and Site Preparation

The Contractor, in coordination with the County, shall be solely responsible for preparing all paperwork and permits required to deliver the MBS including, but not limited to, permits for transportation, storage, and installation of the MBS components in accordance with all federal, state, and local codes.

The Contractor shall provide all required documentation including, but not limited to, site preparation specifications, shelter drawings, antenna installation plans for approval by the applicable County engineering and permitting personnel.

The Contractor will be required to furnish A&E drawings as necessary depicting the work planned by Contractor.

The Contractor shall prepare a site-by-site work and installation plan detailing all necessary work and the methods that will be used to accomplish the work.

Construction plans, specifications, and documents will be stamped and signed by Professional Engineer(s) (P.E.) of the appropriate engineering specialty and/or architect and licensed in the state of New York, as applicable.

### 4.8 Documentation

#### 4.8.1 General Documentation Requirements

The Contractor shall provide and maintain throughout the duration of the project a centralized web-based file management storage including, but not limited to, the following design and project documentation:



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- All design drawings.
- As-built drawings.
- Equipment specification sheets and manuals.
- Baseline and acceptance testing documents.
- System manuals.
- User manuals.
- Maintenance documentation.
- Detailed Design Review phase tests, studies and report.
- Electrical power systems studies.
- A&E documentation.
- Training material.
- Final functional and coverage ATP.
- System configuration databases.
- Other project related documentation as required in this RFP.

Access to the storage platform will be provided to any County or County-authorized user; all documents and files shall be the property of the County.

Respondent shall provide a description of its documentation repository database.

The Contractor shall transition all electronic files stored on Contractor-provided file management system to the County in electronic media approved by the Stakeholders upon project closeout.

The file management system shall provide access to all County and subcontractor designated personnel.

The County shall be granted the right to reproduce an unlimited number of copies of any documentation for use within and by County stakeholder agencies.

All documentation submitted by the Contractor shall be in draft form for approval by the County.

Appropriate system final documentation, as requested by the County, shall be provided in both electronic format and hardcopy format.

Prior to assembling hard copies as required in this solicitation, Contractor shall provide the County with soft copies for review and approval.

All documentation that is subject to frequent change shall be provided in Microsoft® Office format (e.g., cable pair assignments, punch blocks, logs, etc.) or a mutually agreed to format.

All engineering drawings shall be in native format (e.g., AutoCAD, Microsoft Visio, etc.).

All engineering drawings shall additionally be furnished in Microsoft Visio and Adobe PDF formats.

The Contractor may be required to provide select drawings, such as coverage maps, functional network diagrams, in ANSI - E size format, at no cost. The specific drawings will be determined during the Design Review process.

All engineering drawings shall be provided in 11" x 17" format.



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All engineering drawings shall bear title block and drawing number of the issuing organization.

Manuals shall indicate all safety precautions to be taken by personnel employed in the installation, operation, or maintenance of the components.

System documentation as described in this RFP shall be submitted at appropriate times during the project and as necessary to facilitate County understanding of the project and subsequent design decisions.

All draft documentation shall be submitted at the conclusion of the Radio System Installation milestone.

#### 4.8.2 Maintenance Documentation and Manuals

The Contractor shall supply suitable maintenance manuals for the purpose of allowing the County, Contractor, and other technicians to maintain the MBS.

The maintenance manuals shall contain the following:

A complete narrative description of the MBS including functional block diagrams.

A complete step-by-step procedures and frequency for all routine/preventative maintenance activities.

Complete test and maintenance instructions including trouble-shooting charts.

Functional block diagrams giving signal levels and configuration parameters at each interface.

Component location drawings or pictorials showing component reference designators.

Parts list giving complete description and ordering information for each component. Part numbers will be industry standard or the actual manufacturer part number.

Inter and intra-cabling diagrams reflecting as-built configuration including pin layouts for all plugs, wire color codes, gauge, and functional labeling.

A complete set of software for diagnostic, alignment, and the configuration of components residing at the site.

The maintenance manuals shall be plainly indexed and contain only the information applicable to the components delivered.

The manuals are to be contained in a multi-ring binder, which facilitates insertion of corrections, changes, and additions.

All electronic components will be identified by reference designators for cross-reference to the parts listings.

The Contractor shall provide one physical copy covering all pertinent design and maintenance documentation for each ECTRN facility (or radio site).

Site documentation shall be in hard copies assembled in a three-ring binder, appropriately tabbed and indexed for ease of navigation.

Copies of all factory and installation test results will be provided as part of the manual set.



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Service bulletins and modifications, where appropriate, will be provided for the life of the components, not less than ten (10) years from the date of Final System Acceptance.

### 4.8.3 As-Built Documentation

The Contractor shall provide one complete set for a centralized location and one site-specific set for each ECTRN facility (or radio site) of as-built documents in both hardcopy and electronic format (PDF, Microsoft Visio, and AutoCAD, etc.).

Where Contractor performs upgrades to existing equipment, installs equipment in existing or shared spaces, or integrates into existing County systems, Contractor shall either create new or update existing soft copies documentation such that the final documentation represents complete as-built information. Examples of required design documentation updates include, but are not limited to:

- Rack diagrams.

- Antennas and installation detail.

- Tower diagrams and microwave dish installation elevations and orientations.

- Grounding systems.

- Electrical panel details.

- Shelter floor plans and cable trays.

Similarly, the Contractor shall include existing equipment and components which it reuses as part of the ECTRN within its as-built drawings.

The County will provide available soft copy documentation for updates by Contractor as available.

As-built documentation shall include, at minimum, the following:

- Complete system drawings.

- Major component specifications.

- Networking diagrams.

- Antenna and feed line specifications.

- Antenna diagrams and mounting details.

- An overview of the microwave radio backbone hardware configuration.

- Primary and backup power systems settings and measurements.

- Grounding system updates and connections.

- Detailed rack space layout drawings.

- All interconnection drawings.

- All in-shelter cabling and routing.



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All documentation will be corrected to include any changes made during implementation through Final System Acceptance. Handwritten notes to document changes are not acceptable.

All as-built draft documentation shall be submitted at the conclusion of the Radio Installation milestone.

All as-built final documentation shall be submitted prior to Final System Acceptance.

#### **4.9 Training**

The Contractor shall develop a comprehensive training program for the management, operation, administration and maintenance of the MBS by various tiers of network operators, dispatch personnel, executive management personnel, and the end-user community.

Respondents shall provide a high-level overview of the proposed training plan.

Training shall be delivered in-person at a County facility.

Training shall be structured to accommodate all County and designated personnel.

The Contractor shall complete all training activities prior to, but as close as possible to, the Final System Acceptance and cutover dates.

Training programs and corresponding material shall be flexible and customizable for the County staff to modify based on projected needs of the trainees.

Instructional materials, media presentation devices, presentation media, lesson plans, and other audio-visual aids produced by the Contractor to provide training shall be furnished to the County for continuing education purposes.

The County reserves the right to record or reproduce unlimited copies of the training documentation for use by County agencies.

Training materials shall be provided not less than two weeks prior to the start of any training course.

Training shall simulate the live system and potential failure scenarios to the extent possible but should not interfere with its operation.

Training shall include, but is not limited to:

System Overview.

Operational practice of all system components

Block diagram description.

System failure modes and continuity procedures.

Basic troubleshooting techniques.

Available features.

Networking plans and IP addressing schemes (the IP plan shall be done in coordination with the County and with consideration of the New York State IP suggestions).

Network Management System (NMS) overview.



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NMS reports and report generation.

Detailed discussion of alarm system.

MBS health diagnostic techniques.

Development and maintenance of system databases.

Installation and turn-on procedures.

Operation of all test equipment.

Alignment and optimization testing procedures, including the frequency of routine/preventative maintenance activities.

Detailed troubleshooting procedures.

Unit/module replacement procedures.

Detailed repair procedures.

Detailed maintenance procedures, including the frequency of maintenance activities.

Safety procedures.

Preventative maintenance procedures including the frequency of preventative maintenance activities.

## 5. MBS Technical Requirements

### 5.1 Reliability Requirements

The MBS shall have a high level of fault tolerance, equipment redundancy, a high degree of reliability, and no single point of failure.

The MBS shall continue to operate with all specified features if any single system device fails.

The Contractor shall design and implement redundancies for all major MBS elements.

All MBS hardware and software shall have an availability of 99.999% at the component level (e.g., individual microwave radios, routers, controllers, etc.) as measured on a yearly basis.

Respondent shall describe how the MBS meets the reliability requirements of this RFP addressing the MBS's failure/fallback operation modes and corresponding mitigation strategies. In its response, respondent shall address, at minimum, the following failure modes:

Loss of an entire site.

Loss of multiple sites.

Transmitter failure.

Receiver failure.

Interconnection circuit failure / Link failure.



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The backhaul equipment shall have redundant electronics. See *Backhaul Requirements* section for further details on the Microwave Backhaul System.

All MBS components shall have a modular architecture which includes hot-swappable Field Replaceable Units (FRU). Components must automatically reinitialize both the software and configuration settings without interruption of services after replacing faulty FRUs, and upon restoration of the power after a power failure.

The MBS shall allow for modification or replacement of software and firmware in major components without the interruption of services.

System component software parameters will be backed up and stored locally in non-volatile memory and be available without re-download in the event of reset or interruption of power.

All MBS components provided by the Contractor will be suitable for the environment in which it will be installed. For example, components installed at antenna sites will be resistant to electromagnetic fields and will perform properly in a high RF environment. This requirement includes operating temperature and humidity, altitude, electromagnetic compatibility, primary power voltage, backup power voltage, frequency, and phase.

The MBS shall continue to meet the performance requirements of this RFP during failures of cooling and ventilation control systems.

## 5.2 Network Security

The MBS shall comply with all County IT security protocols for authentication, data integrity, anti-virus plans and encryption.

**System Access Security and Management:** All network elements (servers, workstations, routers, switches, etc.) shall employ username and password authentication.

Where applicable, the ECTRN's network and applications shall connect to the County network only via a De-Militarized Zone (DMZ) which will include firewall and intrusion preventive functions.

Network and application ports access will be filtered for only the ports required by the Contractor provided solutions.

The ECTRN shall include a comprehensive anti-virus package including regular updates as recommended by the equipment and software manufacturers.

## 5.3 Sustainability and Lifecycle

The MBS shall be supportable and expandable for a minimum of ten (10) years after the Final System Acceptance without the need for a major overhaul or significant hardware changes or replacement.

Supportability is defined as the MBS's ability to receive bug fixes, security updates, and standard software refreshes.

Expandability is defined as the MBS's ability to be expanded to accommodate additional sites or channels.



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Spare equipment and a full suite of maintenance and support covering physical components, software, firmware, and security updates shall be available for all MBS components for a period of not less than ten (10) years after the Final System Acceptance.

The MBS shall be software or firmware upgradeable per the stated requirements.

The Contractor shall be capable of providing support and maintenance services for all MBS hardware and software for at least 10 years after system acceptance as detailed in this RFP.

The Contractor shall be responsible for notifying the County of end-of-life and end-of-support from the manufacturer within two-weeks of the manufacturers' issuance of such dates.

#### 5.4 Standards Compliance

All goods and services shall comply with the most current adopted version of all applicable codes, ordinances, and regulations as well as the latest national and industry standards recognized by the same, including, but not limited to:

IEEE, TIA-607, and Telcordia standards on grounding, bonding and lightening protection for sensitive electronic and telecommunications equipment.

Telecommunication Industry Association, ANSI/TIA 222, Structural Standards for Antenna Supporting Structures and Antennas.

Federal Communications Commission (FCC), Title 47, Telecommunications (47 CFR).

Federal Aviation Administration, FAA Advisory Circular AC 70/7476, Obstruction Marking and Lighting, and all Advisory Circular referenced therein including specifications for obstruction lighting equipment (AC 150/5345-ba43F), including all changes.

Office of Engineering and Technology (OET) Bulletin 65, Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields.

National Fire Protection Association (NFPA).

Underwriters Laboratories (UL).

National Electrical Code (NEC).

American Concrete Institute (ACI).

American Institute of Steel Construction Load Resistance Factor Design Manual, 1999, AISC – 3rd Edition.

American Society of Testing Materials, ASTM (applicable sections as listed in this specification).

ANSI/NFPA 780-2004, Standard for the Installation of Lightning Protection Systems.

Motorola R56 - Standards and Guidelines for Communications Sites

American Welding Society (AWS) Structural Welding Code D1.1 – latest revision.

ANSI/IEEE Std. 81.2-1991, IEEE Guide to Measurement of Impedance and Safety Characteristics of Large, Extended or Interconnected Grounding Systems.



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All Local Building Codes, Rulings, Zoning, and Planning ordinances.

In the case where applicable standards or applicable codes, ordinances and regulations conflict, those that pose the most stringent requirements will prevail, as determined by the County.

## 5.5 Microwave Site Equipment Installation

### 5.5.1 General Installation Requirements

All installation services shall be in strict compliance with approved plans and all local, state and federal (including FCC and FAA requirements) building, electrical, construction and fire codes. In the case where governing codes conflict, the most stringent codes will be applied.

The Contractor shall work with the County to ensure all requirements of the affected tower owners are met during installation.

All equipment shall be installed in accordance with the recommendations of the equipment manufacturer.

The Contractor shall provide all tools (including cranes and specialized hoisting equipment), equipment, and software required to perform the installation of Contractor provided equipment at its sole expense.

The Contractor shall be responsible for providing its own transportation to and from remote facilities to perform the equipment installation and testing.

Labelling:

The Contractor shall follow a strict and comprehensive labeling scheme to ensure simple identification of all MBS physical components, including but not limited to, patch panels, cable bundles, grounding cables, networking equipment, passive and active RF elements.

Cable runs shall be labeled, at minimum, at each end, designating the source and destination, and reasonable intervals for long cable runs.

All Contractor plans for site installation shall be subject to review by the County during the Design Review. Final installation shall be according to the approved plan.

The Contractor shall maintain the communications site and equipment shelter free of debris and hazards during the installation period.

All equipment shall be installed in a manner that allows for easy preventive maintenance and servicing based on the most recent revisions of Motorola R-56, Grounding, and Lightning Protection guidelines or equivalent industry site installation and grounding standards.

All sites shall be designed, protected and posted by the Contractor to limit exposure to Electromagnetic Emissions (EME) in accordance with the Federal Communications Commission's (FCC) Bulletin OET-65 (or most recent regulation adopted by the FCC), the Federal Communications Commission's exposure to Radio Frequency Electromagnetic Emissions.

Contractor shall take photographic logs of the RF systems installation including tower and shelter work. Photographs shall be adequately detailed to identify proper installation, grounding, heights, model numbers.



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### 5.5.2 Equipment Installation

The Contractor shall install microwave site equipment in specified shelters, equipment rooms, or outdoor cabinets as available, at all proposed sites.

Respondent shall determine whether any of the existing shelter/equipment facilities planned for reuse will accommodate its proposed MBS equipment and layout and incorporate required or suggested modifications into its Response.

All equipment racks and cabinets must be securely mounted to the floor or concrete pad in the case of outdoor cabinets. If necessary, racks or cabinets must be bolted together or braced from the ceiling to prevent swaying or being dislodged. Racks must be isolated from floors and ceilings using suitable insulators, insulating plates, washers, and sleeves.

Equipment shall be installed per all applicable state and local codes.

The Contractor shall, during the Design Review period, perform site grounding and lightening protection studies of the sites to certify whether Contractor can install its equipment in a manner compliant with the most recent versions of Motorola R56 or equivalent industry standard.

Each frame/chassis ground shall be electrically isolated from the common equipment to eliminate ground loops.

Interior grounding conductors shall be tinned or untinned stranded copper wire and shall be insulated unless otherwise specified.

The Contractor shall be responsible for ensuring that the existing waveguide bridges are capable of supporting the waveguide lines between shelters and towers in the event that existing bridges cannot support the proposed design. If the existing bridges will not support the waveguide, the Contractor is to report these findings to the County.

Where necessary, the Contractor shall build entry ports to accommodate the new waveguide lines.

Entry ports shall be properly insulated, fire-rated, and pressurized.

All equipment shall be clearly labelled with high-quality permanent labels.

Where necessary due to the placement of Contactor-provided racks, the Contractor design shall furnish cable ladders or trays mounted above the racks and cabinets for cable distribution.

The Contractor is responsible for all electrical work on the shelter side of the electrical panel. Where punch blocks and backboards are required but do not exist, the Contractor shall provide new punch blocks, backboards, and terminating equipment.

### 5.5.3 Transmission Line/Waveguide and Microwave Dish Installation

The Contractor shall utilize industry best practices for the physical placement and installation of the microwave dishes. The mounting of the dish shall not alter the antennas' radiation pattern.

All power, signal, and transmission line cables/waveguide shall be routed according to Motorola R-56 Installation, Grounding, and Lightning Protection or County approved alternative guidelines.



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Cables/waveguide shall be appropriately separated based on type to prevent interference. The Contractor will be responsible for mitigating and/or correcting any interference between disparate types of transmission cables.

Transmission lines/waveguide shall be installed to minimize tower face wind loading. The cable support shall be of galvanized steel construction and shall have mounting hardware of stainless steel or galvanized steel construction.

Transmission lines/waveguide shall be securely fastened to a cable tray or ladder attached to the tower using manufacturer-approved devices and methods.

Transmission line/waveguide lengths shall be sized to support the selected sites and heights.

No drilling of the tower legs or cross bracing shall be required to install the cable/waveguide support device.

Transmission lines shall be attached to the transmission line cable/waveguide support using stainless steel hangers and adapters of the appropriate size for the transmission line supplied. Appropriate snap-in kits shall be used to attach the cable/waveguide to the transmission line support.

All transmission cable/waveguide runs shall be mounted in a manner that does not block the tower climbing apparatus.

Transmission lines/waveguide shall be supported on the tower mount or ice-bridge at intervals of not more than six feet, or as recommended for the wind speed design of the tower with  $\frac{1}{2}$ " radial ice or as per manufacturer's instructions, whichever is more stringent.

Multiple transmission lines/waveguide shall be strung and supported adjacent to each other, not bundled together.

The Contractor shall use heavy gauge hanger kits or equivalent for stacking coaxial/waveguide runs on the tower.

Zip ties are prohibited.

All connectors and adaptors installed exterior to shelters shall be sealed and weather proofed.

Manufacturer-approved wrapping and sealer shall be utilized on all outdoor transmission line/waveguide in-line and grounding connections to prevent water intrusion.

Each transmission line/waveguide shall be grounded to the tower or to an approved building ground point using ground kits recommended by the cable manufacturer, and 1/0 bare copper wire where appropriate. Exterior exposed ground wires shall be aluminum coated copper wire.

Grounding conductor lengths shall be kept as short as possible with the minimum number of bends. Conductor bends shall not exceed an 8-inch radius with an included angle of at least 90 degrees. Bends made at connection points shall turn in the direction of earth ground.

The Contractor shall furnish and install tower ground bars per the requirements in this RFP.



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At the top of the vertical run near the antenna, the grounding kit conductor shall be connected to a vertical structural member of the tower using the clamp provided with the grounding kit or to a tower ground bar.

All transmission lines/waveguide shall be grounded within 12 inches of the entrance to the building with a coaxial lightning arrestor surge suppression device.

At the bottom of the vertical run, just above where the transmission line/waveguide turns from the tower toward the communications building or room, the grounding kit conductor shall be connected to the tower ground bar using an appropriate two-hole lug.

The grounding kit conductor shall be connected to the external bus bar (EGB) using an appropriate two-hole lug.

Additional grounding bonds shall be installed to keep the distance between grounding kits to less than 200 ft along the vertical run.

In the event the tower legs are not accessible for the grounding connection, the Contractor shall implement an equivalent solution approved by the County.

Microwave dish ground kit tails shall be connected to the bus bar using stainless steel hardware including a star washer under both the bolt head and nut.

## 6. Backhaul System Requirements

The Contractor shall design, furnish, and deploy a highly reliable Microwave Backhaul System as part of the ECTRN.

The Contractor shall provision and optimize the backhaul network and audio distribution systems for high quality analog audio. Audio received at the simulcast sites shall be equal in quality to the dispatcher audio.

All performance metrics and alarms for the backhaul links shall be integrated into a county-provided NMS provided by Motorola under a separate agreement for remote diagnostics and operation.

Contractor shall coordinate activities with Motorola to fully integrate all required performance and alarm functions required in this RFP.

### 6.1 Microwave System

Where specified, the Contractor shall provide a microwave backhaul system (MBS) that provides connectivity between identified endpoints. The constellation of sites that will make up the ECTRN is subject to change, but the sites to be connected by the Microwave System are provided in Attachment A. Attachment A also includes existing microwave links in the current Erie County network. To the extent possible, the Respondent's proposal shall reuse existing equipment if the equipment allows the final system to meet the requirements of this RFP.

#### 6.1.1 Architecture and Design

A loop backhaul architecture is preferred and shall be utilized when possible. Any microwave backhaul links that do not include loop redundancy shall employ monitored hot-standby redundancy. Each



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microwave ring loop shall be interconnected with one or more rings loops at two geographically redundant sites.

Respondent shall submit its design approach to the microwave links including fade margins, dish sizes, dish elevation, Fresnel zone clearance, system gains and losses, link budgets, line of sight path profiles, and system availability. Paths which do not meet the availability or clearance requirements using existing antenna support structures shall be identified in the proposal. Alternate solutions shall be proposed.

The preference is for all active microwave equipment to be housed within the equipment shelters. However, if the Respondent believes that a split-mount design is required, please explain in your response.

The microwave links shall be limited to frequencies in the L6/U6 GHz, 11 GHz, 18 GHz and 23 GHz. The use of unlicensed spectrum for microwave links is unacceptable. Respondents shall provide details regarding the proposed equipment's ability to resist interference from 6 GHz Wi-Fi operations. If there is a risk of Wi-Fi interference at 6 GHz, the Respondent shall identify how its solution will protect Erie County microwave operations. In the event that interference risk from Wi-Fi at 6 GHz cannot be contained or managed, the Microwave Backhaul System shall minimize the use of 6 GHz. If the Contractor uses the 6 GHz spectrum, the Contractor shall conduct a survey of 6 GHz point to multi-point systems and to take steps to protect the Microwave Backhaul System. The Contractor will establish baseline noise levels. Furthermore, the Microwave Backhaul System will include reporting and monitoring tools that will report on interference from these point-to-multipoint and Wi-Fi interference sources. The use of smaller dishes requiring less tower space and load is preferred. Respondents shall identify high power options that enable their ability to reduce tower impacts.

The microwave backhaul links shall be capable of Adaptive Coding and Modulation (ACM) adapting link throughput to the condition of the RF environment. The microwave radios shall be "hitless" when a change in modulation occurs. A hitless solution is one where there are no Ethernet interface flaps, no packet loss, and no errored seconds during modulation transitions. The microwave radios shall not excessively change modulation rates. A change in modulation shall not cause loss such that the county-provided MPLS network re-routes traffic around the path causing more lost traffic.

The MBS shall provide a minimum throughput of 150 Mbps at an overall reliability of 99.999%.

Individual microwave paths shall provide annual one-way availability of 99.9995% at 150 Mbps and shall include sufficient centerline clearance above trees to allow for 15 years of tree growth from final system acceptance of unobstructed operation.

The backhaul system shall include all necessary interface cards, channel banks, WAN cards, multiplex, radios, antennas, radio and other cabling, and any other equipment to operate the backhaul links.

### 6.1.2 Equipment and System Specifications

Microwave dishes over 3-feet in diameter shall be mounted with two sets of side struts for enhanced wind survivability.

The lowest ACM setting shall maintain a minimum throughput necessary to support high quality audio.

The backhaul links shall support IPv4 and IPv6.



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Microwave links shall be software upgradeable to support additional throughput.

Microwave equipment shall relay SNMP message to the NMS alarm subsystem including information on status of electronics, transmitter failure, receiver failure, power failure, hot-standby switch over and/or alternate route switch.

Alarm outputs for low pressure, high pressure, high humidity, and excessive run time shall be provided and connected to the network monitoring and control system.

Microwave equipment shall have a serviceable lifecycle of at least 15 years.

Microwave antennas shall be of solid construction with pressurized feed horns. Antennas may be single polarized or dual polarized. The microwave dish shall be furnished with long life radomes.

Wave guides shall be equipped with pressurization systems.

Separate pressure metering shall be provided for each pressurized waveguide.

Dehydrators desiccants shall be field replaceable.

Wave guides shall have at minimum three grounds every 200 ft intervals, with an additional ground if above 200 ft.

#### 6.1.3 Additional Contractor Services

In addition to other contractor services described in this RFP, the Contractor will be responsible for preparing all microwave licensing documentation and coordinating all microwave licensing activities. County personnel will sign and approve all license applications.

The Contractor will also be responsible for collaborating with Motorola, the County's Land Mobile Radio vendor for the ECTRN, to integrate all performance management and alarm management requirements from this RFP into Motorola's Network Management System. If, in collaboration with Motorola, the Motorola Network Management System cannot meet some of the performance and alarm management features of this RFP, the Contractor shall provide its own NMS such that all requirements are met. See Section 8 for more information.

## 7. Network Management System (NMS)

### 7.1 General Network Management System Requirements

The ECTRN shall be equipped with a comprehensive and centralized network management and monitoring system with the capability to monitor, diagnose and troubleshoot all aspects of the ECTRN.

The NMS shall have the capability to automatically and manually poll managed devices for status.

The NMS shall be integrated to monitor all Microwave System Contractor provided or integrated ECTRN components.

The ECTRN Microwave System shall be integrated into the County's LMR vendor's (Motorola) UEM system for integrated alarm and performance management. All possible alarm and performance management elements required under this RFP (including the requirements of this section), and those recommended by the Respondent shall be integrated into UEM. For those requirements that are not



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possible to integrate into the UEM, the Contractor shall provide a separate system that fully meets the requirements. In that case, the Contractor shall provide three stand-alone network terminals, dedicated screens, keyboards and mice to be installed at County and City facilities, the location of which is to be jointly determined by the County and the Contractor.

The NMS shall also support local and secure remote access.

The network management functions shall be accessible via a web-based interface from the County's agency networks or via a VPN outside the County's network.

The NMS shall employ a standardized suite of internet and security protocols including Simple Network Management Protocol (SNMP) and FIPS-14X protocols.

All ECTRN equipment and individual components with IP addresses shall be capable of providing the latest applicable SNMP messages to the NMS.

The NMS shall be configurable to provide multiple tiers of password protected access ranging from full access to read-only access to enable various operator personnel to perform their functions independently.

The NMS shall support the FCAPS (fault, configuration, accounting, performance, security) network management framework by the International Organization for Standards (ISO).

All actions taken on the NMS shall be logged for a period of 365 days and retrievable for transfer to a different archive medium.

The NMS shall store activity logs and generate standard and customized reports detailing the status and performance of the ECTRN and other system related parameters.

The NMS shall be configurable to automatically transfer archived data to other media at pre-determined and user definable intervals (e.g., weekly, monthly, quarterly, annual, etc.).

The network management system shall have the capability to generate detailed statistical and reporting capabilities, including network/component failures, detailed airtime summary reports and system utilization reports.

User intervention of the NMS such as data retrieval, device configuration and report generation shall not impact the capability of the NMS to monitor and log activities or reporting events and alarms in real-time.

The NMS software shall provide a centralized, graphical hierarchical network topology map, showing all managed devices using color coding to represent device status.

The graphical user interface shall have the capability to point and click the managed object to view the status of the object and modify the parameters as necessary.

The NMS and all its functions shall be web-based; the County shall have a minimum of two licenses to access all NMS functions.

The NMS shall be configurable to label network components with discernible names for easy identification.



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All IP-based system components including servers, site controllers, routers, gateways, consoles, PCs shall be capable of receiving any necessary upgrades and patches for software applications, operating systems and anti-virus software from a centralized location while being protected from vulnerabilities.

The NMS shall provide a backup of all network configurations and databases (IP Addresses, equipment configuration, etc.) to restore all functionality in the event of any malfunction.

The Respondent shall describe its network management system, including management and reporting capabilities in its response.

## 7.2 Fault Monitoring, Diagnostics and Alarm Management Requirements

The ECTRN shall have an integrated fault and alarm management system capable of logging and reporting system events and alarms with diagnostic information promptly to designated personnel.

The network management system shall be capable of reporting to the UEM all major and critical alarms. The message shall include the nature of the alarm, as well as the time, date, and location of the alarm.

The NMS shall permit operator(s) to filter alarms by type and severity.

Alarms shall be classified into at least three (3) levels of severity (e.g., Level 1, Level 2, Level 3) and programmable to promptly relay specific severity levels to relevant operations, management and maintenance personnel.

The NMS shall have the capability to monitor and report alarms for all existing ECTRN and potential future components with IP addresses, relays or contact closures.

Alarms shall appear as flashing colors and transmit audible tones. Colors and tones shall be programmable based on the severity and type of alarm.

The NMS shall autonomously test the microwave system, repeater stations, site controllers, and other critical hardware and software functions.

The NMS shall permit the network operator(s) to manually run remote diagnostics on managed devices to isolate and troubleshoot faults.

The NMS shall automatically or manually (by network operators) run backhaul link communications integrity tests.

The NMS shall perform diagnostics and generate alarms for all radio, environmental, primary and backup electrical power and other physical shelter equipment across the ECTRN as prescribed in various applicable sections of this RFP. Individual thresholds for ECTRN parameters that trigger alarms will be determined during the design phase and shall, as applicable, include:

Site controllers and associated electronics.

System controllers and NMS applications status.

Voting receiver status.

Servers, switches, routers, gateways.

Dispatch consoles system interface status.



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Base station repeater components (receiver sensitivity, output power, transmitter deviation, etc.).

Microwave radios status.

Backhaul link performance (see Backhaul System for details).

Wave guide dehydrator status.

GPS and other timing equipment status.

Transmission cable status and integrity (insertion loss, VSWR, etc.).

Backhaul equipment including microwave link status, fiber optic network, leased lines

Low/High DC power supply, rectifier alarms.

UPS equipment status (battery voltage levels, rectifier alarms, etc.).

Overall service availability per site and in aggregate for the system with root cause identification for each outage, when it occurs, and its duration.

## 8. Acceptance Testing

### 8.1 General System Acceptance Testing

The ECTRN Microwave System will not be eligible for Final System Acceptance until all acceptance tests have been completed successfully.

The Contractor shall be responsible, at its sole cost, for ensuring the ECTRN Microwave System attains the contractual and design performance criteria, unless it is otherwise proven that external factors beyond the control of the Contractor are impacting compliance with the performance and functional requirements.

The Respondent shall provide a complete description of its testing protocols and procedures (Acceptance Test Plan or ATP) in its response. The proposed ATP will be reviewed and finalized prior to contract execution.

All ECTRN systems, functions, layers, and interfaces obtained through this procurement (and performance across ECTRN interfaces to other non-Contractor subsystems) shall be tested and verified to meet the contractual and design performance criteria.

The County reserves the right to preapprove, witness and participate in the functional and coverage ATPs.

The Contractor shall outline requirements for County-provided interfaces and equipment necessary to support the execution of Contractor's test plans.

The ECTRN shall be tested for performance compliance in a phased manner at specific milestones including, but not limited to, factory testing, equipment installation/baseline testing, and system acceptance testing.



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The ATP shall be designed to identify issues through incremental and phased testing, rather than cumulative testing only at final acceptance testing.

The Contractor shall supply all personnel and equipment necessary to carry out the Acceptance Tests as described in this RFP.

The Contractor shall furnish all final test results and corresponding KPIs as part of the ECTRN documentation.

In the event of a failure of any Acceptance Test, the Contractor shall immediately determine the cause of the failure. The Contractor then shall repair any defective work and replace or repair any defective materials. The Contractor shall document and submit the cause and remediation of the failed test.

After remediation by Contractor, the Contractor shall repeat the Acceptance Test.

## 8.2 Factory Testing and Staging

The Contractor shall include factory staging of the ECTRN Microwave System to demonstrate the functionality of all major features prior to customer delivery and field installation of the ECTRN Microwave System.

For the purposes of factory testing, the ECTRN Microwave System shall be assembled and staged at a Contractor-hosted facility.

Factory testing and staging shall emulate, to the extent possible, the final Microwave System or subsystem configuration.

Factory testing shall be designed to enable County representatives to become familiar with the ECTRN Microwave System features and capabilities. Factory testing will include elements that are difficult to simulate in the live system. For example, the testing shall demonstrate rapid changes in path loss and the ability of the system (with a staged MPLS network) to gracefully accommodate modulation changes.

The Respondent shall include in its response, travel and lodging costs for up to six County representatives to attend and participate in the factory testing.

The County shall be furnished with the results of the successfully completed Factory Test.

## 8.3 Installation and Baseline Testing

Upon installation of each component or subsystem, Contractor shall perform comprehensive tests based upon manufacturer's recommendations and other KPIs finalized during the Design Review.

The Contractor shall finalize certification and measurement procedures during the Design Review process.

The Contractor shall conduct baseline measurement and test of all parameters agreed upon during the Design Review including, but not limited to, individual and subsystem component parameters, equipment installation benchmarks and backhaul networks KPIs.

The Contractor shall submit the baseline measurement and test result documentation.

The Contractor shall develop a complete test list and failure criteria during the Design Review Process for approval and, if necessary, agreed upon modifications by the County.



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The Contractor shall conduct intermodulation testing and receiver desensitization on all installed ECTRN Microwave System components to assure no inter-system and intra-system interference.

At minimum, measured parameters shall include the following:

Microwave radio output power, alignment and sensitivity.

Microwave link throughput, jitter and latency.

Transmission cables/waveguide insertion loss and VSWR.

Motorola R-56 compliance parameters.

Baseline and installation testing shall include customer physical inspection of all installations to validate proper implementation.

The Contractor shall design the physical inspection check list.

The Contractor shall execute the physical inspection test plan with customer attendance.

#### 8.4 Functional Acceptance Testing

After successful completion of Installation Testing, the Contractor shall perform a comprehensive Functional Acceptance test (FAT) to verify proper functionality of all ECTRN features and modes of operation.

The FAT is a real-world repetition of the Staging and shall consist of all features and functions tested during Staging.

The FAT shall demonstrate that each of the failures mechanism supported by the ECTRN Microwave System results in system recovery within the maximum failover timeframe.

FAT shall, in general, cover all functionality and performance specified in this solicitation and, at minimum:

Demonstrate that all equipment meets manufacturer and design specifications.

Verify all Microwave System redundancy schemes are functioning properly

Verify operational continuity during loss of critical network subsystems.

Verify proper functionality of all NMS features and capabilities.

Validate required performance criteria of the Microwave System

Verify all interfaces with the MPLS system are performing properly.

#### 8.5 Testing Punch Lists

The Contractor shall provide a punch list of all items that did not meet the performance requirements or that need to be resolved, along with a timeline and steps that Contractor will take to resolve any failures.



## 9. System Transition and Cutover

The Contractor, together with the County and the radio infrastructure vendor, shall develop and implement an ECTRN and MBS Transition and Cutover Plan in a manner that provides for continued, uninterrupted communications to all County public safety agencies throughout the transition process.

The Contractor shall furnish the County with a Draft Migration and Cutover plan during the Design Review that complies with the project objectives and specifications in this solicitation.

The draft Cutover Plan shall be refined as necessary until 30 days prior to any planned Contractor action expected to have an impact to the communications capabilities of the end users.

Throughout the network transition and implementation period, the Contractor shall ensure or exercise reasonable effort to maintain existing network performance across the following parameters, including but not limited to:

Network Capacity.

Interoperability across various subsystems and agencies.

The Contractor shall supply, furnish and provision any additional equipment required to maintain communications capabilities during the transition plan.

If shelter space is not adequate at any given site, the Contractor shall work with the County to develop a design that reuses currently occupied spaces and relocates equipment in a manner that minimizes outages.

The Contractor shall advise the relevant stakeholders about any planned disruptive events attributed to system implementation no later than 30 days prior to the planned event.

Any action with the potential to effect live system(s) must be coordinated with and approved by the County before the action is taken.

Short scheduled outages may be approved at the discretion of the County.

Respondent shall describe its proposed ECTRN/MBS transition plan in detail in its proposal.

## 10. Decommissioning and Removal of Equipment

All current County-owned equipment replaced by this project or no longer to be used shall be identified by the Contractor. The Contractor shall remove all tower and building mounted equipment such as antennas and cabling and leave the removed equipment at the site. Erie County will handle removal from the site, inventory, transportation, and disposal of the unused/replaced equipment.

## 11. Warranty and On-Going Maintenance Support

### 11.1 Warranty Period and Support Criteria

The Contractor shall warrant, at its sole cost and responsibility, that all MBS components and the installation of such components conform to the requirements and criteria specified in this solicitation and as finalized during the Design Review, or the manufacturer's published specifications, whichever is



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most stringent for a minimum of one (1) year (System Warranty Period) from the date of Final System Acceptance.

The Contractor shall also offer an optional extended warranty on system components.

Warranty Period shall not begin prior to Final System Acceptance and shall begin only upon the start of Beneficial Use by the County of the MBS.

If the manufacturer's warranty period is longer for any individual component or components in the system, the County shall receive the extended warranty beyond the System Warranty Period.

Warranty includes maintenance of the hardware and software to meet the stated coverage, functionality, reliability, and other performance criteria.

All Contractor-furnished equipment shall be software upgraded and be at the equipment manufacturer's latest release at the conclusion of the Warranty period.

During the Warranty Period, in the event the MBS or any component fails to meet any of the stated coverage, functionality, reliability and other performance specifications in this solicitation, the Contractor shall take appropriate steps to correct the deficiency so that the MBS complies with coverage, functionality, reliability and other performance specifications in this solicitation. Such repairs shall be made at the sole cost of the Contractor for parts, material, and labor.

The Contractor shall make available to the County all mandatory and non-mandatory software and firmware revisions, patches, and/or hotfixes as part of warranty.

Implementation services for these updates for all subsystems shall be included in the base Warranty period price.

The Contractor shall be responsible for all warranties including warranties obtained from subcontractors, manufacturers and/or suppliers under the System Warranty Period. Copies of all warranties shall be provided to the County upon delivery of the applicable component.

During the warranty period, the Contractor provided hardware and software components of the system shall be fully operational and available at a rate of 99.999 % measured on a monthly basis.

Base Warranty Period pricing shall contain all costs to provide all hardware, equipment, parts, materials, software, firmware, other components, and services necessary to remediate any deficiencies in the MBS for the System Warranty Period.

During the Warranty Period, Contractor shall provide a monthly status report, at a minimum, itemizing the following: system availability, list of outages/failures that occurred since last report, and list of outstanding problems that have not been resolved since last report.

The Respondent shall submit annual licensing, support and maintenance costs for the MBS for the first five years post the warranty period as provided in the *Microwave System Cost Proposal Sheet*.

## 11.2 General Maintenance and Support Requirements

Respondent shall be capable of providing ongoing support for up to 10 years following the Warranty period for all services prescribed in this Section, and as is necessary to maintain the performance criteria



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of the MBS. Annual and multi-year base costs shall be submitted per the *Microwave System Cost Proposal Sheet*.

The Contractor shall be the single point of contact for all Warranty and Maintenance Period activities.

All test equipment used in the provision or delivery of warranty services provided to the County, shall at all times, be functioning properly and have current equipment calibration certificates.

Technicians shall be properly trained, experienced and certified, if applicable, to utilize the required test equipment. Technicians that are dispatched or assigned to service MBS facilities shall be familiar with its configuration.

The County shall be furnished with four (4) licenses of all software necessary to program, administer, and maintain the MBS components.

The County reserves the right, at Contractor's expense, to perform warranty repairs, including, but not limited to, engaging another contractor to perform such repairs, if the Contractor is unable to satisfactorily complete such repairs within the timeframes specified herein or in the resultant contract. The Contractor shall reimburse the County for all invoices for labor, materials required, and the shipping/handling costs thereof to perform such repairs, within thirty (30) calendar days from presentation of such invoices.

### 11.3 Software and Firmware Support

The Contractor shall provide the full suite of maintenance and software support, including, but not limited to, physical components, software, firmware, and security updates.

Such support shall be available for all MBS components for a period of not fewer than ten (10) years after the Final System Acceptance. Base annual and multi-year costs shall be submitted per the *Microwave System Cost Proposal Sheet*.

The Contractor shall provide all mandatory and non-mandatory software and firmware revisions, updates, patches and/or hotfixes, and MBS maintenance software, and the required services to perform said updates, ensuring updates are compatible with all MBS subsystems.

The Contractor shall provide updates (software, firmware, hardware) for each subsystem, in each of the following situations, and as approved by the County:

- To keep current with technology, security, public safety and industry standards.
- To keep the operating software compatibility packs and security patches up to date.
- To maintain compliance with the performance criteria and other requirements of the resultant Agreement.
- To maintain compatibility across various system components.

The Contractor shall be responsible for providing all mandatory revisions to meet the performance specifications prescribed in this solicitation.

Within a reasonable time in advance of the release of each proposed subsystem update, the Contractor shall provide the County with information regarding the update, including but not limited to proposed



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release date, purpose, functionality, urgency, impact on the other system or subsystem components, and ramifications of accepting or rejecting the proposed update.

Implementation of updates shall receive prior approval of the County.

The Contractor shall test the updates prior to implementation thereof.

The Contractor shall perform all work needed in order to ensure the updates are compatible with the other ECTRN and subsystem components.

The Contractor shall perform scheduled backups of network databases and system configurations prior to and post updates.

## 11.4 System Monitoring and Dispatch Service

### 11.4.1 System Monitoring Requirements

During the warranty period, and beyond, if requested by the County, the Contractor shall provide real-time monitoring of the health and diagnostics of the MBS and ancillary facilities as per the specifications herein.

The Contractor shall provide monitoring of the MBS on a 24 x 7 basis from the Contractor's primary operations facilities and additionally provide the required response to network issues.

During the warranty period, the Contractor shall be responsible for diagnosing service requirements and initiating calls for service to the pertinent party (e.g., Contractor, sub-contractors or other Contractor managed maintenance provider).

### 11.4.2 Technical and On-Call Support Service

The Contractor shall have on-call availability on a 24-hour per day, 7-day per week, 365 day per year basis to address MBS performance issues.

The Contractor shall supply on-call diagnostic and repair service as per the response times and as directed by the County.

The Contractor shall respond to all repair calls and notices and remediate the cause of the system deficiency in accordance with specifications within this section.

The Contractor shall:

Interface and coordinate services with service providers for software and equipment upgrades.

Provide inventory control of all Contractor provided MBS network equipment and spares.

Identify, notify and direct the necessary service contractor regarding network issues.

### 11.4.3 System Performance Reporting

The Contractor shall provide a monthly report or log identifying all calls for service (trouble tickets); report shall, at a minimum, itemize issue type, root cause, remediation steps taken, outages/failures that occurred since last report, and list of outstanding problems that have not been resolved since last report. These reports shall also include a summary of system usage, radio channel and talkgroup loading, busy hour statics, and other data of interest to document and assess MBS performance.



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The list of outages/failures will at a minimum include: issue number, date of outage, time of outage, outage duration, description of failure, time/date stamped list of actions performed, and resolution.

All entries on the list of outages will include information documenting who has made each entry listed on the report (e.g., who opened the issue, who updated the issue, who closed the issue, etc.).

#### 11.4.4 Severity Levels and Response Times

If a Severity One (1) Level problem occurs, the Contractor shall resolve the problem based on the Severity 1 Level timetable.

A Severity 1 Level problem is a major system Deficiency and is defined as one that results in the inability of any portion of the System to operate as normal. This includes, but is not limited to, the following:

Backhaul link failure.

Loss of a site.

A site power outage where the generator fails to power-up.

Loss of NOC Connection and function.

If a Severity Two (2) Level problem occurs, the Contractor shall resolve the problem based on the Severity 2 Level timetable.

Failure of a backed up backhaul link.

A Severity Three (3) Level is defined as any type of non-emergency, non-user affecting problem, including but not limited to:

Questions or inquiries on system upgrades or intermittent problems.

Questions or inquiries on system problems currently being monitored.

Questions or inquiries regarding parts or work to be performed later.

Any failure of a component of the NMS or other supporting systems, where such failure does not rise to the level of Severity Level 1 or 2.

Scheduled maintenance and/or upgrades.

Response times are defined as follows:

**Customer Service and Trouble Ticket Initiation** – This is the response from the Contractor to an initial notification of a system problem by the County or through its own monitoring by its own NOC. This includes responding to customer calls, acknowledgement of the problem, assignment and initiating the dispatch of support personnel to the problem and issuance of appropriate problem tracking information.

**On-Site Dispatch Support** – This is the actual dispatching and arrival of local vendor service personnel to a site or location to resolve the reported problem from the initial notification of the system problem.

Restoration times are defined as the amount of time from notification of a problem to the return of the system to full functionality.



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Customer Service and Trouble Ticket Initiation times shall be as follows:

Severity Level 1 – Twenty-four hours (24) a day, Seven (7) days a week, Three Hundred Sixty-Five (365) days a year, within fifteen (15) minutes.

Severity Level 2 – Twenty-four hours (24) a day, Seven (7) days a week, Three Hundred Sixty-Five (365) days a year, within one (1) hour.

Severity Level 3 – Standard business day, eight (8) AM to five (5) PM (CT), Monday through Friday, within twenty-four (24) hours.

On-Site Dispatch Support response times to have shall be as follows:

Severity Level 1 – Twenty-four hours (24) a day, Seven (7) days a week, Three Hundred Sixty-Five (365) days a year, within four (4) hours of initial notification.

Severity Level 2 – Twenty-four hours (24) a day, Seven (7) days a week, Three Hundred Sixty-Five (365) days a year, within eight (8) hours of initial notification.

Severity Level 3 – Standard business day, eight (8) to five (5) (CT), Monday through Friday, within twenty-four (24) hours of initial notification.

Restoration times shall be as follows:

Severity Level 1 – Twenty-four hours (24) a day, Seven (7) days a week, Three Hundred Sixty-Five (365) days a year, within eight (8) hours of initial notification.

Severity Level 2 – Twenty-four hours (24) a day, Seven (7) days a week, Three Hundred Sixty-Five (365) days a year, within twenty-four (24) hours of initial notification.

Severity Level 3 – Standard business day, eight (8) to five (5) (CT), Monday through Friday, within five (5) business days of initial notification.

The County reserves the right to decide whether a system deficiency is classified as Severity Level 1 or Level 2 and to escalate or downgrade a Severity Level of any deficiency if the deficiency meets the definition of the Severity Level as escalated or downgraded, or if the Contractor fails to respond to or resolve a deficiency as required herein.

## 11.5 System and Field Maintenance Requirements

The Contractor shall provide all services necessary for the maintenance, support, and upkeep of infrastructure facilities as per performance specifications herein, for all Contractor-furnished MBS components.

The Contractor shall provide Field Maintenance services per the response times herein, and per manufacturer recommendations.

The Contractor shall provide to the County and maintain as designated by the County a sufficient local supply of new unused MBS-dedicated spare parts to allow rapid restoration of operation of the system infrastructure.



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In the event that these parts are consumed, they shall be replaced promptly on the County's request.

Replacement stock will also be available via emergency requests with expedited delivery within twenty-four (24) hours of the component failure.

The Contractor is responsible for all costs to include parts, labor and expedited shipping, if required, due to spares not being available.

The Contractor shall be responsible for providing its own transportation to and from remote facilities to perform the servicing, preventative maintenance, troubleshooting and repair work.

The Contractor will maintain adequate staff and spare parts inventory located in proximity to the MBS service area to provide technical support and assure compliance with system availability and response times in this RFP.

After the Contractor has removed the failed component from the system and service is restored, failed parts shall be repaired or replaced and returned to the spare pool within 15 business days.

The Respondent shall detail in its proposal the name, location, and capabilities (qualifications, years in business, experience with Respondent's systems) of the local sub-contractors and service facilities, which will provide any or all of the installation, service and warranty, both initially and on a continuing basis.

## 11.6 Spare Equipment

The Contractor shall furnish the County with critical spare components and parts necessary to maintain and operate the MBS pursuant to the performance criteria (Grade of Service, system availability and reliability) in this solicitation. Spare equipment shall be determined and sized based on MTBF and other relevant factors.

Spare equipment shall be sufficiently distributed across the County and Contractor facilities to reduce site response and problem restoration times.

## 12. Technical Response/Work Plan Description Instructions

In its response to this Section, the Respondent shall demonstrate how its proposed solution and scope of services meet the specifications of this solicitation. Respondents' descriptions shall be thorough and concisely articulated; lengthy descriptions such as product specification sheets and marketing brochures shall be appropriately labeled and included as Attachments to the RFP response.

Prior to responding to this Section, Respondent is responsible for thoroughly reading and understanding the contents of the entire RFP.

Responses shall be provided in the order outlined in this Section. Respondents are not required to provide a point-by-point response to each line item in this section; however, responses shall be ordered and organized by sub-section as identified in this section. ALL requested pieces of information within a given sub-section shall be sufficiently addressed within that section.

### 12.1 MBS Overview

In its response to this section, the Respondent shall



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Provide a functional overview description of its solution for the entire MBS including high level architecture illustrating and describing the major systems, subsystems, and components.

Describe how the proposed solution best suits the County's needs, and the requirements specified in this RFP.

Respondent shall additionally provide a detailed Bill of Material in spreadsheet format for its entire proposed system(s).

### 12.2 Lifecycle and Sustainability

Describe how the MBS will be managed and upgraded (by the Contractor) to meet the 10-year lifecycle requirements.

Discuss the expected and/or published serviceable lifecycle (assuming proper maintenance) of the MBS as a whole and all major network components and subsystems.

Describe the process by which these components are maintained or upgraded (e.g., software only, firmware only, hardware replacement).

State published end-of-life dates, projected vendor maintenance and support dates.

Describe any projected product line changes or cancellations and discuss the technical, operational, and financial impact to the MBS.

### 12.3 Reliability and Security

Describe the security mechanisms, protocols, and standards the network employs to ensure the integrity of network components, information, databases and interfaces to other agency enterprise networks and VPNs.

Provide an overview of the anti-virus, firewall and other security packages included in the proposed MBS.

Describe how the Contractor will ensure overall MBS integrity and security including network configuration backup protocols, security updates, etc.

Describe whether system refresh, software patches and other on-going upgrades cause any system downtime.

Describe the tolerance of respondent's equipment including COTS-network components. This includes how long the equipment is rated to operate in extreme environmental conditions.

### 12.4 Network Management System (NMS) (if provided)

Provide a comprehensive description of the proposed NMS, its physical and logical components, the graphical user interfaces, and how it will meet the requirements of this RFP. (See NMS Requirements Section).

Describe all components to be managed or monitored by the NMS.

Describe the number of NMS licenses included in the response.



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Detail the system fault and alarm management capabilities as per the specifications in and how the NMS will be configured to monitor the various required parameters.

## 12.5 Microwave Backhaul System

Provide a detailed overview and illustration of the proposed backhaul architecture, technologies, selected spectrum, indoor/shelter equipment, antenna systems/waveguides, etc.

Describe how the proposed backhaul design supports the redundancy and high availability requirements specified in this solicitation.

Describe the routing and switching equipment.

Include a logical network diagram illustrating the IP addressing plan, routing algorithms, VLAN, and subnet plans.

Identify the demarcation point into existing (non-Respondent) networks or subsystems.

Describe how the solution will be provisioned to meet the base throughput requirements, and how it can be expanded to support the long-term throughput requirements (State the maximum throughput of the proposed microwave link equipment supported through software only upgrades).

Describe overall network and link latency.

Describe its proposed microwave backhaul link design including the spectrum of operation, the reliability and capacity of each link, antenna, and the base station site microwave radio equipment.

The Respondent shall provide its design approach to the microwave links including fade margins, dish sizes, dish elevation, Fresnel zone clearance, system gains and losses, link budgets, line of sight path profiles, link availability and overall system availability. Paths which do not meet the availability or clearance requirements using existing antenna support structures shall be identified in the proposal. Alternate solutions shall be proposed.

The respondents' proposal shall be compliant with all above requirements and shall demonstrate:

- The design of the system including a network diagram depicting ring/loops interconnected at multiple locations with maximum redundancies and minimal spur paths.
- Predicted system level service availability between the sites and the core overall and for each site.
- For each hop in the network provide path profiles, power level, dish size, dish heights, frequencies, modulation rates, and path reliability.
- Site designs depicting the equipment at each site including indoor (including rack or cabinet mounting design) and outdoor equipment (including an elevation drawing of the tower mounted equipment).
- A detailed description of the respondents' reporting and alarm system and how it will enable the County to:
  - Identify equipment failures and pinpoint the source of the failure
  - Identify path and system performance degradation to enable the County to prevent impending failures



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- Identify external factors that influence or may influence performance degradation (e.g., misalignment of dishes, crane fades, tree growth)

The Respondent shall provide information describing the power, space, and thermal requirements, as well as structural and wind loading of the proposed MBS at all sites in the network.

## 12.6 Factory Testing/Staging and Delivery of the Microwave System

Describe approach for ensuring individual system components and subsystems are fully tested prior to delivery and installation.

Describe the factory acceptance testing and staging process and how all Microwave System requirements will be demonstrated and tested.

## 12.7 Acceptance Test Plan

Describe the acceptance testing process and procedures that will be employed to verify the coverage guarantees and confirm that it is compliant with the acceptance test requirements described in this specification.

Describe test equipment configuration, measures and procedures, and standards employed

Describe the process by which each link will be separately validated.

Describe the process Contractor will employ to simulate or trigger modulation changes.

Identify how many test teams will be deployed.

Estimate the total amount of time required for Acceptance Testing.

## 12.8 Functional and Baseline Acceptance Test Plans

Provide test protocols and procedures the Contractor will employ to validate and verify the overall operation of the Microwave System per the specification.

Describe installation testing and functional acceptance process and the key performance indicators (KPI) that will be used to validate the proper implementation of all aspects of the Microwave System.

Describe how Contractor will track and resolve test failures.

Estimate the total amount of time the County personnel and contract staff will be expected to dedicate to acceptance testing.

## 12.9 System Transition and Cutover Methodology

Provide a description of the methodology that will be used to ensure that the operational impact to existing operations is minimal during the upgrade and transition process.

Identify in detail the impact to existing operations will have, and how the Contractor will ensure mission critical communications is available throughout the transition and cutover.

Describe the proposed sequence of cutover activities and the process of transitioning to the new Microwave System will occur.



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Describe how any current licenses and equipment will be transitioned/transferred to the Respondent's solution.

Describe the level to which the legacy and the proposed systems will operate in parallel during the transition phase.

Describe how Contractor will manage space at existing shelter facilities and antenna support structures, as applicable.

Estimate the timeline of any impact such as reduced system functionality.

Explain why the proposed approach is optimal.

## 12.10 Training Program Overview

Provide a brief overview of the proposed training program including specific proposed courses, allotted number of students, schedule, etc.

Respondent shall state whether off-site training is needed to fulfill any of the training requirements.

## 12.11 Test and Spare Equipment

Describe the major proposed spare equipment including the County facilities where they will be located (e.g., service shop, remote site, etc.).

Describe the recommended test equipment for the County to maintain the Microwave System.

## 12.12 Project Management and Staffing

Describe your project management approach.

Provide a proposed project plan that includes deliverables and project objectives by project phase.

Identify the staffing plan/resource allocation, including, at minimum, key resources such as:

The Project Manager.

Lead Engineer.

Field Installation Lead.

Describe the work which will be performed by subcontractors and how each sub-contractor will be managed.

Describe communications plan including how the team members (Contractor and County) will communicate during the execution of the project and how issues will be escalated.

Describe the risk management plan.

Discuss potential project risks and possible mitigation strategies.

Describe how Contractor will provide project progress updates: format, frequency and setting.

Describe the kick-off plan and activities.

Describe the Contractor's proposed method for managing, storing and sharing project documentation.



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Detail the Change order process.

Describe the Contractor's Quality Control Plan discussing steps that Contractor will employ to monitor system implementation and what performance measures will be used to confirm adherence to the approved Final System Design.

### 12.13 County and Other Client Agency Responsibilities

Identify the County's responsibilities and duties to fulfill the scope of the project.

Estimate County's level of effort by personnel/functional category over the course of the proposed project.

Identify the role it expects the County's staff to play for the successful delivery of the project.

### 12.14 Project Schedule

Submit a project schedule in the form of a Gantt chart with detailed deliverables and activities. Schedule must explicitly identify the end dates of the following project phase/milestones.

Project NTP.

Kick Off.

Detailed Design Review.

Site Preparation and Planning.

Factory Testing and Delivery.

Microwave System Installation.

Acceptance Testing.

Final System Acceptance.

System Cut Over.

Project Close Out.

### 12.15 Detailed Final System Design

Describe the detailed design process.

Describe the objectives and outcomes of the detailed design effort.

Describe the steps that will be used to engage the County and the supporting contractor staff to deliberate, review, approve and finalize the Final System Design.

Describe how project changes (expected and unforeseen) impact the Final System Design and the process by which ensuing iterations are evaluated and formalized.

### 12.16 Microwave System Installation and Implementation

Describe the approach and plan for equipment installation and baseline installation testing plans.



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## 12.17 Warranty and Ongoing Maintenance Services

Provide an overview of the Respondent's maintenance and support plans proposed to the County and how it will meet the requirements.

Describe the proposed annual software or hardware refresh plans to meet the support and lifecycle specifications herein.

Detail the response times of factory support for both repair and engineering.

Describe the Contractor's technical support functions and capabilities and identify, specifically, the capabilities and services included in the County's annual technical support plans.

Briefly describe the types of preventative maintenance plans and frequency of activities the vendor would perform on a time and material basis.

If any portions of the required post acceptance plans are sub-contracted to third party firms, explain how the Contractor, acting as the primary point of contact, will triage, assign, and manage the resolution of system issues.

Describe ongoing factory engineering and service support that the Contractor or manufacturer will provide to the sub-contractor.

Identify services, if any, which are not included in the proposed plan which the Contractor deems necessary to meet the performance and lifecycle requirements of the ECTRN Microwave System.

Describe whether the 10-year maintenance plan and compliance to the technical sustainability specifications herein require replacement of hardware during that period (servers are to be expected and taken into account), or whether the system can be kept sustainable, secure and relatively current via software and firmware upgrades.

## 12.18 Value Add Products and Services

Respondents are invited to provide a brief discussion or portfolio of products and services and estimated costs which they deem are directly complementary to the land mobile radio communications and microwave network prescribed in this solicitation.

# 13. Cost Proposal

## 13.1 Cost Proposal Table

Respondents pricing for the ECTRN Microwave System shall be submitted in the Appendix: *ECTRN Microwave System Cost Proposal Sheet*.

## 13.2 Milestone Payment Percentages

Respondent shall indicate its proposed payment percentages for each of the predefined milestones below (as described in this RFP). Note that the County will retain the noted percentages of the contract value for the last two project milestones.

- Kick-Off and Detailed Design Review.
- Factory Testing, Planning and Delivery.
- Equipment Installation.



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- Final System Acceptance (10%).
- Project Close Out (90-day monitoring) (5%).

## 14. Attachment A – Site List

[Please email [communications@erie.gov](mailto:communications@erie.gov) to receive the site list]

## 15. Exhibits and Appendices

- Appendix A: Compliance Matrix.xlsx
- Appendix B: Microwave System Cost Proposal Sheet.xlsx
- Appendix C: Schedule A: Proposer Certificate
- Appendix D: Schedule B: Standard Insurance Provisions
- Appendix E: Equal Pay Certification
- Appendix F: MBE\WBE Certification