BEFORE THE BOARD OF COUNTY COMMISSIONERS
LEWIS COUNTY, WASHINGTON

IN THE MATTER OF:	RESOLUTION NO. 24-054
ISSUE A REQUEST FOR PROPOSALS (RFP) FOR PUBLIC SAFETY RADIO EQUIPMENT AND SERVICES	

WHEREAS, the Lewis County Public Safety radio infrastructure is aging and needs to be updated to improve interoperable communications amongst law enforcement, fire and medical services; and

WHEREAS, Lewis County received federal funding from the American Rescue Plan Act and has designated $4.5 million of these funds to improve the VHF radio infrastructure; and

WHEREAS, updating the current public safety radio system is critical to ensure that responders can receive reliable and accurate information when responding to emergencies in our community.

NOW THEREFORE BE IT RESOLVED that the Director of 911 Communications is directed to prepare a request for proposals (RFP) for Lewis County Public Safety Radio and evaluate responses; and

NOW THEREFORE BE IT FURTHER RESOLVED proposals shall be submitted to 911 Communications Director Jennifer Libby-Jones exclusively via the Lewis County OpenGov procurement platform, by 5 p.m. March 25, 2024; and

NOW THEREFORE BE IT FURTHER RESOLVED the Clerk of Board of County Commissioners is instructed to proceed with all appropriate and necessary notifications to advertise for said purpose.

DONE IN OPEN SESSION this 13th day of February, 2024.

APPROVED AS TO FORM:
Jonathan Meyer, Prosecuting Attorney

David Bailey
By: David Bailey,
Chief Civil Deputy Prosecuting Attorney

BOARD OF COUNTY COMMISSIONERS
LEWIS COUNTY, WASHINGTON

Scott J. Brummer
Scott J. Brummer, Chair

ATTEST:

Lindsey R. Pollock, DVM
Lindsey R. Pollock, DVM, Vice Chair

Rieva Lester, CMC
Rieva Lester, CMC,
Clerk of the Lewis County Board of
County Commissioners

Sean D. Swope
Sean D. Swope, Commissioner

LEWIS COUNTY NOTICE FOR:

Request for Proposals (RFP)

PUBLIC SAFETY RADIO EQUIPMENT AND SERVICES

RELATED TO AMERICAN RESCUE PLAN ACT (ARPA) FUNDS

Lewis County is initiating this request for proposals to develop a complete replacement of the aging radio communications system. This project is intended to design, install, and complete a public safety grade radio communications system.

Lewis County is accepting electronic submissions exclusively through OpenGov. Those wishing to submit a proposal must create a fee account with OpenGov Procurement by signing up at https://procurement.opengov.com/signup.

After completing account registration, proposals can be completed at https://procurement.opengov.com/portal/lewiscountywa/projects/63225.

CLOSING DAY AND TIME: Responses will be accepted no later than 5:00 p.m. March 25th, 2024.

For more information about the project and submittal requirements, contact Jennifer Libby-Jones, 911 Director, at 360-740-3394 or email jennifer.libby-jones@lewiscountywa.gov.

All work performed on this project will be subject to the higher of the prevailing state or federal wage rates (if applicable due to other federal funds that are in the project).

The County of Lewis is an Equal Opportunity and Affirmative Action Employer.

Small, Minority- and Women-owned firms are encouraged to submit bids.

The Request for Proposals does not obligate the County to contract for services specified herein. The Board of Lewis County Commissioners reserves the right to reject any and all proposals.

PUBLISH: The Chronicle Thurs 2/15/24; The Seattle Daily Journal of Commerce Thurs 2/15/24; The Portland Daily Journal of Commerce Wed 2/14/24

Lewis County website @www.lewiscountywa.gov

Lewis County

REQUEST FOR PROPOSAL

FOR

PUBLIC SAFETY RADIO EQUIPMENT AND SERVICES RELATED TO AMERICAN RESCUE PLAN ACT (ARPA) FUNDS

RFP TRACKING NUMBER 2024-RFP-023

Issued by:
Lewis County
351 NW North St
Chehalis, WA 98532

February 13, 2024

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Section 1. RFP Timeline

The Request for Proposal timeline is as follows:

	Date
Request for Proposal Issuance	February 13, 2024
Question Submissions – if allowed Due Date	March 6, 2024 by 5pm Pacific
Question Response Due Date	March 15, 2024 by 5pm Pacific
Request for Proposal Due Date	March 25, 2024 by 5pm Pacific
Review Team's Selection of Top Proposer	April 3, 2024
Contract Negotiations Preparation Period and/or Work Commencement Anticipated Dates (dates subject to contract approval)	April 16, 2024

Section 2. Introduction and Project Description

Background

On March 11, 2021, the American Rescue Plan Act ("ARPA") was signed into law and established the Coronavirus State and Local Fiscal Recovery Fund ("SLFRF") program. This program is intended to provide support to State, territorial, local, and Tribal governments in responding to the economic and public health impacts of COVID-19 and in their efforts to contain impacts on their communities, residents, and businesses.

In 2022, the Lewis County Board of County Commissioners allocated $4,500,000 in Federal ARPA funding to Lewis County Radio Services for the Radio Services Infrastructure Project to improve functionality and interoperability of radio services systems in Lewis County.

Overview

Lewis County Communications is developing a complete replacement of the aging radio communications system. This project is intended to design, install, and complete a public safety grade radio communications system.

All phases of this project will be required to meet minimum standards that have been identified by the county tech team to meet their requirements. These requirements will include the engineering, design, installation, testing, and completion of a public safety grade radio communications system.

Sites have been identified per a current RF study completed in November 2023 through Televate Lewis County, WA Public Safety Radio System Engineering Study Report (Attachment B).

Lewis County is accepting proposals in response to this Request for Proposal (this "RFP," or this "Request for Proposal") in order to find a qualified service provider for Public Safety Radio Equipment and Services related to the American Rescue Plan Act (ARPA) funds.

The objective of this Request for Proposal is to contract with a service provider that will provide the best overall value to Lewis County While price is a significant factor, other criteria will also form the basis of our award decision, as more fully described in the Proposal Evaluation and Contractor Selection section of this Request for Proposal below.

Throughout this project there will be a need to maintain quality control and management of cost and expenses. The selected service provider will be expected to ensure that all applicable federal, state and local laws and regulations are followed The project will require the selected service provider to work closely with Lewis County and other relevant partners staff and the general public throughout the project.

Section 3. RFP Submittal and Closing Date

Vendors shall submit the following in response to the RFP:

Cover Letter

A cover letter addressed to Jennifer Libby-Jones, Director 911 Communications. The cover letter must:

- State the company's ability to comply with all the stipulations of this solicitation.
- Point out the company's particular strengths.
- Provide a reason as to why they should be chosen to provide the service needed.
- Specify any areas that the company cannot or may not be able to comply and explain why.
- Be signed by a person legally able to commit the company.

- Include the submitter's mailing address and telephone number.

Key Proposal Information

Proposal submittals must include:

- System proposal including all specifications as outlined in Section 6 of this RFP.
- History of company showing familiarity with public safety radio systems.
- Engineer and other involved staff qualifications.
- Qualification to complete a turnkey project (or ability to do so with qualified subcontractor services).
- Customer references.
- Training and software support.

Fee Schedule
The proposed fee to accomplish the work shall be submitted in a separate, sealed envelope marked Fee Schedule.

Insurance – The selected vendor shall be required to provide a current copy of the Certificate of Liability Insurance naming Lewis County as an additional insured and shall be considered as primary and shall waive all rights of subrogation. The County insurance shall be noncontributory.

Submission Instructions – Lewis County exclusively utilizes OpenGov for online proposal submissions. Bidders shall create a FREE account with OpenGov Procurement by signing up at https://procurement.opengov.com/signup.

Once you have completed the registration, please visit the Lewis County OpenGov Procurement website at: https://procurement.opengov.com/portal/lewiscountywa and browse to the "Microwave Networking Equipment for Lewis County Public Safety Radio RFP," click on "Submit Response" and follow the instructions to submit the electronic proposal.

All questions and responses shall be submitted through the OpenGov Procurement website. All responses will be public.

Lewis County is not responsible for communication errors. Applicants are advised to call the Lewis County 911 Communications department at 360-740-3394 to confirm that a submittal has been received.

Lewis County Rights

Lewis County reserves the right to reject any or all proposals, make counter proposals and/or engage in negotiations with any or all firms or individuals, waive any requirements or otherwise amend this RFP, or cancel the RFP in order to achieve the County's goals and objectives for this project. Any changes in the status of the RFP will be brought to the attention of all parties that provide contact information for updates. The information contained in this RFP represent the County's best information at the time of the release of the RFP and the County reserves the right to modify any term or condition contained herein.

Responsibility for Proposal Preparation

Except as otherwise specifically agreed to in writing by the County, each consulting individual or team submitting proposals shall provide and pay for all materials, labor, transportation, charges, levies, taxes, fees or expenses incurred, including all costs to prepare a response to this RFP, travel and presentation costs, and all other services and facilities of every nature whatsoever necessary for the preparation of the RFP.

It is neither the County's responsibility nor practice to acknowledge receipt of any proposal as a result of the RFP process. It is the proposer's responsibility to assure that a proposal is delivered and received in a timely manner.

No Conflict of Interest

No member of the Board of COUNTY Commissioners, member of the evaluation committee for this RFP, and any other officer, employee or agent of the Lewis County who exercises any functions or responsibilities in the selection of a proposal, shall have any personal interest, direct or indirect, in the project.

Section 4. Inquiries and Addenda

Questions that are received prior to the RFP deadline identified in Section 1for questions shall be addressed via the County's procurement platform, Open Gov.

Questions and answers will be posted to the Lewis County procurement website at https://procurement.opengov.com/portal/lewiscountywa.

Addenda to this solicitation, if needed, will be posted to the Lewis County procurement website at https://procurement.opengov.com/portal/lewiscountywa. The County, at its sole judgment, may require clarification of information submitted in any Proposal.

Section 5. Mandatory Requirements

The following submission guidelines and requirements apply to this Request for Proposal:

1. Only qualified firms with the capacity to provide ALL services and components included in the scope of work (allowed with subcontractors) should submit proposals in response to this Request for Proposal.
2. Proposers must provide a minimum of 4 projects of relative size and equivalency to the Lewis County project. Project info should include references and contact info.
3. Proposals must include a technical proposal that provides an overview of the proposed approach as well as a list of qualifications for all key personnel performing the work. In addition, the technical proposal should provide a proposed schedule and milestones, as applicable; including the hours estimated for completion of each phase of the project.
4. Proposals must include a description of method of approach, strategy, and/or ability to

understand, facilitate, and complete the tasks listed under Section 6; Project Scope below

5. A price proposal must be provide a per link/site price breakdown. This shall include a per component price and any included service (ie frequency coordination or licensing). Services should be listed by type (ie tower services, networking, programming etc)
6. Proposals must be signed by a representative that is authorized to commit proposer's company.
7. Proposals must include any suggested changes to the proposed terms and conditions for this procurement. Any changes to the proposed terms and conditions will be made at Lewis County's sole discretion.
8. A copy of your current certificate of insurance for professional liability.
9. Statement of Conflicts of Interest (if any) the service provider or key employees may have regarding these services, and a plan for mitigating the conflict(s). Note that the County may in its sole discretion determine whether or not a conflict disqualifies a firm, and/or whether or not a conflict mitigation plan is acceptable.
10. System for Award Management. Service Providers shall have a current registration in the System for Award Management (https://www.sam.gov/SAM/). Service provider and its Principals may not be debarred or suspended nor otherwise on the Excluded Parties List System (EPLS) in the System for Award Management (SAM). Include verification that the service provider as well as its principals are not listed (are not debarred) through the System for Award Management (www.SAM.gov). Enclose a printout of the search results that includes the record date. This clearance information should be included in the service provider's Proposal. The clearance in the Service Provider's proposal must be re-verified prior to award. Federal awarding agencies may relax the timing of the requirement for active SAM registration at time of allocation in order to expeditiously issue funding. At the time of award, the requirements of 2 CFR § 200.206, Federal awarding agency review of risk posed by recipients, continue to apply.
11. Required Contract Provisions. Applicable provisions (enclosed) must be included in all contracts executed as a result of this RFP.
12. Proposals must remain valid for a period of 90 days.
13. Submissions must meet the Pass/Fail Criteria listed under Section 7.2, below.

Open Records/Proprietary Information

Lewis County recognizes that in responding to this RFP, the proposer may desire to provide proprietary information in order to clarify and enhance their response. To the extent permitted by law, Lewis County will keep confidential such information provided that:

1. The information submitted is arguably proprietary, and

2. The proprietary information is submitted in a separate file or section that is clearly identified as containing proprietary information, according to the submittal instructions of this RFP. Only information that is credibly propriety may be included. Inclusion of non-propriety significant information in the sealed portions may render a submittal ineligible.

Responders should note that Lewis County is a county in Washington State, and as such its files are available for public review pursuant all applicable public disclosure laws, the Washington State Open Public Meetings Act, and the Freedom of Information Act.

Section 6. Project Scope

Proposal Submission Requirements

Lewis County ("County") is initiating this request for proposals ("RFP") from qualified professional firms ("Contractor") to provide all engineering and design, licensing, equipment, labor, and materials to implement a public safety grade radio system.

The objective of this Request for Proposal is to contract with a service provider that will provide the best overall value to Lewis County. While price is a significant factor, other criteria will also form the basis of our award decision, as more fully described in the Proposal Evaluation and Contractor Selection section of this Request for Proposal below.

Lewis County is seeking to contract with vendor for a fixed-price contract. Throughout this project there will be a need to maintain quality control and management of cost and expenses. The selected service provider will be expected to ensure that all applicable federal, state and local laws and regulations are followed. The project will require the selected service provider to work closely with Lewis County and other relevant partners staff and the general public throughout the project.

Scope of Services and Specifications

While the scope described presumes the direct performance by the chosen consultant or firm, work may also be performed by a subcontractor to the firm. In such case, the proposal should state so, along with the subcontractor(s)' supporting qualifications to provide such services. In the event the work is performed by a subcontractor to the firm, then the firm shall be responsible for subcontracting with them, as well as for reviewing the work product of such subcontractor(s) for quality and completeness. All services must comply with local law and permit conditions as well as applicable federal, state, and local statutory, regulatory, recording, reporting, and other requirements.

I. The County will accept only turnkey solution proposals addressing all project systems, subsystems, and components.

II. All Contractors providing proposals must acknowledge a requirement and obligation to coordinate planning and implementation activities with other vendors and or county tech teams when required. All work to be performed shall be scheduled with the county tech team and any outages are to be planned in advance.

III. Proposals will not be accepted that include technology from any vendor that is within 5 years of end of life or any technology that has already been cancelled.

IV. Proposals shall not be accepted that include systems or equipment that will no longer be supported for software, spare parts, and repair by the manufacturer within no less than 10 years of system acceptance. Equipment support timeline must be provided by the equipment vendor.

V. Proposals shall include the coordination of licensing through the FCC for all proposed link and any modifications to existing licenses.

VI. Warranty shall be honored if county employees provide maintenance and repairs. No proposal will be accepted if ANY warranty is void in the event that a properly trained employee provides any service or maintenance per provided training requirement listed in scope of work section.

VII. All proposals shall include manufacturer and model information of each component. Vague descriptions of equipment and components will not be accepted and will be cause for disqualification.

Scope of Work

The following criteria must be met and included in the scope of work of any submitted proposal and must comply with any and all project specifications provided herein.

I. Contractor will be expected to provide ALL services in house or through qualified subcontractors and submit a turnkey proposal. These services will include but not limited to: Microwave radio equipment, alignment, FCC licensing and coordination, network and switch programming, antenna installation, tower work, integration with existing network, testing and system qualification.

II. Proposed equipment vendor information and equipment specific model numbers.

III. ALL equipment must be of like and kind. Multiple vendors per type of equipment will not be accepted (i.e. microwave radio equipment shall be of all one vendor or specific manufacturer).

IV. All equipment shall meet or exceed the minimum standards provided by the County technical staff. Technical requirements as listed in Attachment B. See also Attachment C and D for additional microwave path information.

V. Labor to be performed shall be compliant with prevailing wage requirements and contractor shall be in compliance of prevailing wage standards.

VI. Proposals shall be broken down by link and specify equipment proposed at a per link cost (to include equipment, licensing, and labor).

VII. Proposals shall include public safety grade radio equipment. All equipment will be required to meet mission critical criteria for 99.999% reliability.

VIII. Provide the County with testing and documentation of links and network equipment and meet the county's tech team standard before final sign off.

IX. Provide training to county employees for any new equipment as well as necessary software for programming and monitoring. Any cost for training and software is to be included in proposal.

Minimum Equipment Standards

The county tech team has compiled minimum standards for equipment to be included in any proposal. If these basic requirements contained herein are not met the county has the right to reject any proposal not meeting the standards.

Radio Equipment

- See **Attachment A** – Technical Specifications for technical specifications and scope of work.

Section 7. Proposal Evaluation and Contractor Selection

7.1 Evaluation Process

Proposals submitted on time will be reviewed against the Pass/Fail criteria (Section 7.2). RFPs meeting those criteria will be forwarded to an evaluation committee for scoring against the Evaluation Criteria (listed in Section 7.3 below) and ranking. The outcome of the evaluations may, at Lewis County's sole discretion, result in (A) notice to a Proposer(s) of selection for tentative contract negotiation and possible award; or (B) further steps to gather more information for further evaluation. The selection process may be canceled if Lewis County determines it is in the public interest to do so.

7.2 Pass/Fail Criteria

7.2.1 Submission Deadline Date and Time met.

7.2.2 Proposal is complete and addresses all Submission Guidelines and Requirements listed in Section 4.

7.2.3 Correct number of Proposals included (if relevant)

7.2.4 All training for county tech staff shall be included in proposal. Any proposal that does not include training for county tech staff will be eliminated from consideration.

7.3 Evaluation Criteria

Evaluation factors and maximum points will be as follows:

Criteria	Maximum Score
1. Fee Schedule	20
2. Qualifications,	25
3. Experience, Work Samples, References	25
4. Method of Approach	20
5. Timeline and Milestones	10
Total Maximum Score	100

Lewis County reserves the right to award to the proposer that presents the best value to Lewis County as determined solely by Lewis County in its absolute discretion.

Section 8. General Information; Terms and Conditions

1. Lewis County may require any clarification or change it needs to understand the selected contractor's project approach.
2. The successful contractor must have Worker's Compensation Insurance covering work in Lewis County's Location. The successful contractor must also submit documents addressing insurance, non-collusion, tax law, debarment, and conflict of interest as part of the personal services contract.
3. The selected vendor shall be required to provide a current copy of the Certificate of Liability Insurance naming Lewis County as an additional insured and shall be considered as primary and shall waive all rights of subrogation. The County insurance shall be noncontributory.
4. Lewis County reserves the right to reject any or all proposals and is not liable for any costs the contractor incurs while preparing or presenting the proposal.
5. Lewis County reserves the right to cancel this RFP upon a good cause finding.
6. Lewis County may award a contract to the contractor whose proposal, in the opinion of Lewis County, would be most advantageous to Lewis County.
7. The selected contractor will be required to assume responsibility for all services outlined in the RFP, whether the contractor produces them.
8. This RFP does not commit Lewis County to award a contract, nor to pay any costs incurred in the preparation of the response to the RFP. Lewis County reserves the right to accept or reject any or all responses received as a result of this request or to cancel this RFP in part or in its entirety. Lewis County may request additional information from responders.
9. Failure of the Contractor to perform the scope of work identified or to meet the performance standards established by the resulting Contract include, may result in the following:
   a. Lewis County's reduction or withholding of payment under the Contract,
   b. Lewis County's right to require the Contractor to perform, at the Contractor's expense, any additional work necessary to perform the scope of work or to meet the performance standards established by the resulting Contract; and

c. Lewis County's rights, which Lewis County may assert individually or in combination, to declare a default of the resulting Contract, to terminate the resulting Contract, and to seek damages and other relief available under the resulting Contract or applicable law.

Section 9. System for Award Management (SAM)

Vendors must register with the System for Award Management (SAM) and receive a Unique Entity Identifier and must not be debarred from receiving federal funds to qualify for this award. It is recommended vendor register as soon as responding to the RFP as the SAM process may take several weeks to complete and must be in place prior to any contract process.

Section 10. Contract Provisions

The non-Federal entity's contracts should contain applicable provisions described in Appendix II to Part 200—Contract Provisions for non-Federal Entity Contracts Under Federal Awards.

Terms Required for all Lewis County Contracts Funded with American Rescue Plan Act (ARPA) Funds Subject to the Uniform Guidance

In the event of a conflict between these Terms Required for all Lewis County Contracts Funded with ARPA funds Subject to the Uniform Guidance ("Federally Required Contract Terms") and the terms of the main body of the Contract or any exhibit or appendix, these Federally Required Contract Terms shall govern.

1. **2 CFR 200 APPENDIX II (A)**. Contracts for more than the simplified acquisition threshold, which is the inflation adjusted amount determined by the Civilian Agency Acquisition Council and the Defense Acquisition Regulations Council (Councils) as authorized by 41 U.S.C. 1908, must address administrative, contractual, or legal remedies in instances where contractors violate or breach contract terms, and provide for such sanctions and penalties as appropriate.
2. **2 CFR 200 APPENDIX II (B).** All contracts in excess of $10,000 must address termination for cause and for convenience by the non-Federal entity including the manner by which it will be effected and the basis for settlement.
3. **Debarment and Suspension.** Contractor represents and warrants that, as of the execution of this Contract, neither Contractor nor any subcontractor or sub-consultant performing work under this Contract (at any tier) is included on the federally debarred bidder's list listed on the government-wide exclusions in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 CFR 180 that implement Executive Orders 12549 (3 CFR part 1986 Comp., p. 189) and 12689 (3 CFR part 1989 Comp., p. 235), "Debarment and Suspension." If at any point during Contract's term Contractor or any subcontractor or sub-consultant performing work at any tier is included on the federally debarred bidder's list, Contractor shall notify the County immediately. Contractor's completed Vendor Debarment Certification is attached hereto and incorporated herein.

4. **Amendment Permitted.** This list of Federally Required Contract terms may be amended by the County in the event that the applicable federal grant providing funding for this Agreement contains additional required terms.
5. **Public Records.** The Contractor shall assist the County in fulfilling all obligations of the County under the Washington Public Records Act (chapter 42.56 of the Revised Code of Washington). In the event that the Contractor fails to fulfill its obligations pursuant to this section and due in whole or in part to such failure a court of competent jurisdiction imposes a penalty upon the County for violation of the Public Records Act, Contractor shall indemnify the County for that penalty, as well as for all costs and attorney fees incurred by the County in the litigation giving rise to such a penalty. The obligations created by this section shall survive the termination of this contract.
6. **Record Retention.** The Contractor shall maintain all books, records, documents, data and other evidence relating to this contract and performance of the services described herein, including but not limited to, accounting procedures and practices which sufficiently and properly reflect all direct and indirect costs of any nature expended in the performance of this contract. Contractor shall retain such records for a period of seven (7) years following the date of final payment.

   If any litigation, claim or audit is started before the expiration of the seven- (7) year period, the records shall be retained for a period of seven (7) years after all litigation, claims, or audit findings involving the records have been finally resolved.
7. **Procurement of Recovered Materials.** A non-Federal entity that is a state agency or agency of a political subdivision of a state and its contractors must comply with section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act. The requirements of Section 6002 include procuring only items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition, where the purchase price of the item exceeds $10,000 or the value of the quantity acquired during the preceding fiscal year exceeded $10,000; procuring solid waste management services in a manner that maximizes energy and resource recovery; and establishing an affirmative procurement program for procurement of recovered materials identified in the EPA guidelines.
8. **Clean Air Act (42 U.S.C. 7401-7671q.) and the Federal Water Pollution Control Act (33 U.S.C. 1251-1387), as amended**—If this is a contract or sub-grant in excess of $150,000, Contractor must comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).
9. **Byrd Anti-Lobbying Amendment** (31 U.S.C. 1352). Contractor certifies that:

9.1 No federal appropriated funds have been paid or will be paid, by or on behalf of Contractor, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal Loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of and Federal contract, grant, loan, or cooperative agreement.

9.2 If any funds other than federal appropriated funds have been paid or will be paid to any person for making lobbying contacts to an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with

this federal contract, grant, loan, or cooperative agreement, Contractor shall request and provide, completed, the "Disclosure Form to Report Lobbying," in accordance with its instructions as amended by "Government wide Guidance for New Restrictions on Lobbying," 61 Fed. Reg. 1413 (1/19/96).

9.3 Contractor shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

9.4 Contractor's completed Byrd Anti-Lobbying Certification is attached hereto and incorporated herein.

10. **Contract Work Hours and Safety Standards Act (40 U.S.C. 3701-3708).** If this Contract is for an amount in excess of $100,000 and involves the employment of mechanics or laborers, Contractor must comply with 40 U.S.C. 3702 and 3704, as supplemented by Department of Labor regulations (29 CFR Part 5). Under 40 U.S.C. 3702 of the Act, Contractor must compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. 3704 are applicable to construction work and provide that no laborer or mechanic must be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.
11. **Right to Inventions**. If the federal award is a "funding agreement" under 37 CFR 401.2 and this is an agreement between the County or a sub-recipient and a small business firm or nonprofit organization regarding the substitution of parties, assignment of performance or experimental, developmental or research work thereunder, the County or sub-recipient will comply with 37 CFR Part 401, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," and any implementing regulations issued by the awarding agency.
12. **Davis-Bacon Act, as amended (40 U.S.C. 3141-3148)**. If this is a "prime construction contract," in its performance under the Contract, Contractor shall comply with the Davis-Bacon Act (40 Page 13 of 38 U.S.C. 3141-3144, and 3146-3148) as supplemented by Department of Labor regulations (29 CFR Part 5, "Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction"). In accordance with the statute, Contractor is required to pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor. In addition, Contractor is required to pay wages not less than once a week. **Note: this paragraph is not applicable to contracts paid for solely with ARPA SLFRF moneys.**
13. **Prevailing Wage.** Contractor shall pay the prevailing rate of wages to all workers, laborers, or mechanics employed in the performance of any part of the Work in accordance with RCW 39.12 and the rules and regulations of the Department of Labor and Industries. The schedule of prevailing wage rates for the locality or localities of the Work, is determined by the Industrial Statistician of the Department of Labor and Industries. It is the Contractor's responsibility to verify the applicable prevailing wage rate.

Each Application for Payment submitted by Contractor shall state that prevailing wages have been paid in accordance with the pre-filed statement(s) of intent, as approved. Copies of the approved intent statement(s) shall be posted on the job site with the address and telephone number of the Industrial Statistician of the Department of Labor and Industries where a complaint or inquiry concerning prevailing wages may be made.

In compliance with chapter 296-127 WAC, Contractor shall pay to the Department of Labor and Industries the currently established fee(s) for each statement of intent and/or affidavit of wages paid submitted to the Department of Labor and Industries for certification.

14. **Equal Employment Opportunity**. If this is a "federally assisted construction contract," as defined by 41 CFP Part 60- 1.3, except as otherwise provided in 41 CFR Part 60, in its performance under the contract, the 41 CFP Part 60-1.3 shall comply with the equal opportunity clause provided under 41 CFR 60-1.4(b), in accordance with Executive Order 11246, "Equal Employment Opportunity" (30 FR 12319, 12935, 3 CFR Part, 1964-1965 Comp., p. 339), as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and implementing regulations at 41 CFR part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor." The text of 41 CFR 60-1.4(b) is available upon request.
15. **Domestic preferences for procurements.** Pursuant to 2 CFR §200.322, as appropriate, and to the extent consistent with law, contractor should, to the greatest extent practicable under this Contract, provide a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States (including but not limited to iron, aluminum, steel, cement, and other manufactured products). The requirements of this section must be included in all subcontracts and purchase orders for work or products under this Contract.
16. **Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment**. Contractor shall not use funds under this Contract to purchase, or enter into subcontracts to purchase, any equipment, services, or systems that use telecommunications equipment or services as a substantial or essential component of a system that is subject to 2 CFR § 200.216 (generally, video surveillance or telecommunications equipment produced by Huawei Technologies Company, ZTE Corporation, Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company, their subsidiaries or affiliates, or any entity that the Secretary of Defense reasonably believes to be an entity owned or controlled by the government of a foreign country). In the event Contractor identifies covered telecommunications equipment or services that constitute a substantial or essential component of any system, or as critical technology as part of any system that is subject to 2 CFR § 200.216, during Contract performance, Contractor shall alert the County as soon as possible and shall provide information on any measures taken to prevent recurrence.

Section 11. BYRD Anti-Lobbying Certification

(To be submitted with each bid or offer exceeding $100,000)

(a) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(b) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(c) The undersigned shall require that the language paragraph 1 and 2 of this anti-lobbying certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31, U.S.C. § 1352 (as amended by the Lobbying Disclosure Act of 1995).

The Contractor, _____, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. § 3801 et seq., apply to this certification and disclosure, if any.

_____

Signature of Contractor's Authorized Official

_____

Printed Name and Title of Contractor's Authorized Official

_____

Date

Section 11. Certifications Regarding Debarment, Suspension and other Responsibility Matters

The bidder, proposer, contractor, or subcontractor, as appropriate, certifies to the best of its knowledge and belief that neither it nor any of its officers, directors, or managers who will be working under the Contract, or persons or entities holding a greater than 10% equity interest in it (collectively "Principals"):

1. Are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any federal or state department or agency in the United States;
2. Have within a three-year period preceding this proposal, bid, or agreement been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (federal, state or local) transaction or contract under a public transaction; violation of federal or state anti-trust or procurement statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
3. Are presently indicted for or otherwise criminally or civilly charged by a government entity, (federal, state or local) with commission of any of the offenses enumerated in paragraph 2 of this certification; and
4. Have within a three-year period preceding this application/proposal had one or more public transactions (federal, state or local) terminated for cause or default.

I understand that a false statement on this certification may be grounds for rejection of this proposal or bid, or termination of the award or, in some instances, criminal prosecution.

I hereby certify as stated above:

_____

Signature Date

_____

Print Title and Name of authorized representative

I am unable to certify to one or more the above statements. Attached is my explanation.

_____

Signature Date

_____

Print Title and Name of authorized representative

Lewis County

REQUEST FOR PROPOSAL

FOR

PUBLIC SAFETY RADIO EQUIPMENT AND SERVICES RELATED TO AMERICAN RESCUE PLAN ACT (ARPA) FUNDS

SCOPE OF WORK

ATTACHMENT A

SECTION 1

Introduction and Overview

1.1 Basic Project Description

1.1.1 Lewis County (Buyer) is requesting Proposals for a complete VHF analog simulcast radio system with option of future APCO P25 function.

(1) Radio system infrastructure including all radio equipment, controllers, interconnecting network equipment but not the actual transport facilities, microwave antennas, waveguides, and associated equipment

(2) Radio system network alarm management and reporting system

(3) Technical support training

(4) Ongoing equipment updates to keep the system at current manufactured status

(5) Development of a detailed transition plan for conversion from the existing system to the new system

(6) Radio system infrastructure implementation project management, engineering, and full radio system installation services

(7) Ancillary systems such as microwave and fiber transport, DC power, and radio site construction will be furnished by the Owner as will overall system project management

1.1.2 The Buyer anticipates the Successful Proposer will provide a complete RF system solution.

1.1.3 Proposals will be evaluated as indicated in the Instructions to Proposers.

1.1.4 The Successful Proposer will provide a complete radio system solution.

1.2 Document Overview

1.2.1 This Document has the following sections:

(1) Section 1 Introduction and Overview –

This section provides a general overview of the proposed system scope of the project.

(2) Section 2 – Existing System Description –

This section describes the existing system, users, sites, and other systems currently in use.

(3) Section 3 Common Technical Requirements –

This section defines the broadly applicable technical requirements that apply to all aspects of the technical systems and equipment.

(4) Section 4 Radio System Specifications and Requirements –

This section defines the requirements for the P25 capable analog simulcast radio system, interconnecting router networks, and network management systems.

(5) Section 5 Transport System Interface Requirements –

This section defines the interface requirements for any site interconnection systems including microwave, telephone T1 connections, or other interconnection technologies as required.

(6) Section 6 Site Improvement and Upgrade Requirements –

This section defines the requirements for any site improvements required by the Proposers.

(7) Section 7 DC Power Interface Requirements –

This section defines the requirements for 48 VDC power systems interface. The 48 VDC system will be supplied by the Buyer. The Proposer shall interface to this DC power supply.

(8) Section 8 Training Requirements –

This section defines the end user, management, and technical training requirements.

(9) Section 9 Data Network Requirements –

This section defines the requirements for any data networks supplied as part of this Project including system data interfaces. The Buyer will supply the transport data network. The Proposer shall interface to that network.

(10) Section 10 Implementation Requirements –

This section defines the requirements for implementation including but not limited to items such as transition planning, factory staging, field storage, etc.

(11) Section 11 Quality and Workmanship Requirements –

This section defines the requirements for quality and workmanship.

(12) Section 12 Acceptance Testing Requirements –

This section defines the acceptance testing of the entire system as well as coverage testing.

(13) Section 13 Documentation Requirements –

This section defines the documentation required to be produced and delivered for this project.

(14) Section 14 Warranty and Maintenance Requirements –

This section defines the warranty and maintenance requirements for system support.

(15) Section 15 Project Closeout Requirements –

This section describes the project closeout process and requirements.

1.3 Information about Lewis County

1.3.1 Lewis County is located in the Southwest region of Washington state. The county encompasses approximately 2400 square miles with a population of nearly 81,000 citizens. Boasting peaks reaching 7000 feet, the terrain makes for a challenge to provide radio service to emergency personnel.

Having a primarily rural population, the emergency services crews spend the bulk of their time working in low density areas. This coupled with the aggressive terrain of the county makes for reliable radio service coverage.

Lewis County is seeking to upgrade and expand its current radio service footprint to grow with the expanding population and ever-growing call for services.

SECTION 2

Existing System Description

2.1 Existing System Description

2.1.1 Existing system description is provided in the RFP Attachment B, separate document, title Televate Engineering Report.

SECTION 3

Common Technical Requirements

This section describes technical requirements of all equipment supplied as part of the system.

3.1 Equipment to be Furnished Complete

3.1.1 Unless specifically excepted by the terms of these specifications, any parts or accessories ordinarily furnished or required to make a complete operating unit or system must be furnished by the Seller whether directly mentioned or not mentioned in the specifications

3.1.2 The equipment must be complete, installed, and ready for operation at the Buyer's dispatch center location(s), central controller location (s), at any of the remote sites, in identified vehicles, and agency stations as required

3.2 Component Ratings

3.2.1 Every component part of the equipment must be operated within the manufacturer's continuous commercial duty rating under any combination of operating conditions specified.

3.3 Overload Protection

3.3.1 Adequate fuses and/or circuit breakers must be included to protect the equipment from internal and external faults. In the event these fusing devices are employed in circuits exhibiting switching surges, a suitable time delay element must be incorporated in the fuse device to preclude false operation and yet protect the equipment from a sustained overload.

3.4 Existing Equipment Interfaces

3.4.1 The Buyer and Seller must coordinate all interconnections to all Buyer supplied equipment in excess of being supplied under this bid. Actual interconnections to working systems will be completed by seller and coordinate cut-over procedures and timeline with buyer.

3.5 Equipment Placement

3.5.1 All equipment must be arranged and installed so its intended function will not be impaired because of weather, temperature, adjacent equipment, or any other factors. Sufficient installation space and clearance must be provided so service and maintenance can be readily performed. The relative arrangement of operating equipment must be consistent with good human engineering practices resulting in maximum operator efficiency. Plans showing the placement of all equipment must be submitted to the Buyer's Project Manager for approval a minimum of 30 days prior to actual placement since Buyer's installation requirements and standards must be preserved.

3.6 Equipment Mounting

3.6.1 Seller must install equipment in a standard telecommunications open frame rack 19-inch. Cabinets may also be proposed for locations that do not have traditional shelters.

3.6.2 If equipment placement will require cabinets, the cabinets must include a standard EIA 19-inch rack mounting facilities for mounting of equipment. All sections of the cabinet must be constructed to prevent warping, twisting, or sagging of any component or assembly. The cabinet must be supplied with removable front and rear doors and adequate ventilation to provide cooling for the contained equipment.

3.6.3 Access doors must be equipped with locks to prevent access to the equipment by unauthorized personnel. All front and back cabinet doors must be easily removed for equipment maintenance. These doors or panels must have dimensions to permit free, unobstructed access to all equipment mounted in the cabinet. The cabinet must be manufactured of durable, quality materials. All materials prone to rust and/or corrosion must be finished and painted. Swing out or slide out chassis/circuit card assemblies must be provided to facilitate assembly and maintenance. Wiring and cabling must be formed with sufficient slack to allow unrestricted chassis movement. Intra-rack cable management must support the auto-retraction or otherwise automatic stowage of any cables connected to equipment mounted on slide-out rack rails. All hinges, slides, rollers, fasteners, etc. must be of high-quality construction to provide for long life and endure Public Safety use.

3.6.4 All parts requiring periodic servicing or maintenance must be easily accessible and must not require the removal of other parts or exposure to voltages above 60 VDC or VAC in order to gain this access. All cables, wiring, mating connectors, and plugs required for the complete system must be provided by the Seller.

The following color code must be used unless Seller receives prior written approval from the Buyer:

White – telephone cables
Red – Alarm cables
Blue – Ethernet cables
Yellow – Cat 6 patch cords
Green – Radio system Ethernet data cables

3.6.5 Wiring and cabling both within the equipment and in the external interconnections must be neatly formed and dressed. Cable ties or lacing cord must be used to dress all cables in place.

3.7 Non-Lan Cables

3.7.1 All general-purpose interconnecting cables, except power, LAN, and equipment ground, used in the system must consist of standard telephone company type 25-pair cable with tinned-copper conductors, telephone standard color-coded insulation, with vinyl jackets, terminated with an Amphenol 50 terminal male connector on one end and a female connector on the other end. The number of installed cables must meet the system requirements plus specified future growth requirements.

3.7.2 Special purpose cables designed as part of the Seller's system are exempted from the requirement of 3.8.1.

3.7.3 LAN cables are specified in Section 9 Data Networks.

3.8 Connector Blocks

3.8.1 All cabling in the system for non-LAN connections must run below the computer flooring, in overhead cable tray or in Buyer supplied cableway and terminate in Seller supplied Leviton 40066-MR, or equal, 25-pair connector blocks having and standoff bracket and a prewired Amphenol female connector mating with the specified cable connector for general non-patch cable type interconnects. These "66 blocks" must be located on the plywood backboard mounted on the wall of the equipment room. The exact locations of the connector blocks must be identified on drawings and coordinated with the Buyer.

3.8.2 Should any conductor require a different gauge of wire than specified by the "66 block" manufacturer, or require shielding, the conductor must be supplied in addition to and terminate in the same locations with appropriate connectors at each end.

3.8.3 The number of blocks supplied must be the number required to accommodate all the circuits and functions, including the future growth requirements. At least one block must be supplied for each functional group of interconnections as listed. The blocks must be laid out in a logical manner to minimize the length of the interconnecting jumpers. Connections must be by jumpers as required from these blocks to the appropriate termination blocks. Blocks must not contain direct originating and terminating connections on the same block.

3.8.4 No series connecting (daisy chaining) of cabling must be used. All blocks and connectors used on the blocks must be identified with a marked identification strip. All blocks must include a protective cover over punch connections.

3.8.5 The blocks may be mounted directly to the wall-mounted plywood backboard provided they are mounted in an orderly manner with jumper rings or cable distribution posts attached to the backboard. Sufficient rings or posts must be installed and located to accept the vertical jumpers from between the blocks to facilitate jumper runs in either direction, and allow the jumpers to drop directly to their terminating positions. Rings or posts must also be installed located across the top to provide horizontal jumper runs positioned to allow the jumpers to access the vertical runs in either direction.

3.8.6 Patch panels may be used to transition from a single 8P8C (RJ45-type) cable and connector to a cross connect block or multi-conductor cable supporting multiple connections.

SECTION 4

Radio System Specifications and Requirements

4.1 Introduction

4.1.1 This section defines the requirements for the fixed radio system infrastructure. Other elements required to make the system a complete functional radio system are defined in other sections. However, Seller is required to supply all the equipment components and services required to implement a complete system even if not specified in detail in these specifications.

4.2 System Description

4.2.1 The Buyer is seeking to install a new turn-key VHF analog simulcast radio system. This system will be replacing an aging VHF multi-site system. A more detailed description of the current system can be found in a separate document.

4.2.2 The new simulcast analog VHF radio system must:

(1) Operate in the VHF public safety spectrum of 150-170 Mhz for current and future analog narrowband frequencies.

(2) Provided system and components shall be P25 capable for future upgrade.

(3) Meet the requirements of the Lewis County Communications tech team specifications.

(4) Work with existing infrastructure including microwave system, dispatch console s system, logging recorder, alarm systems, and Lewis County enterprise networks. If the new system proposed will not work with any part of existing infrastructure, the proposer must clearly state the reasons the systems are incompatible and provide costs to replace the components identified.

4.3 Frequency Requirements

4.3.1 Seller must analyze the VHF frequencies currently held by Lewis County for use with the system and provide information to the buyer. If new frequency coordination or additional frequencies are to be added, the seller shall propose a detailed list of necessary additional resources required. The buyer will be responsible for all FCC licensing, frequency coordination, and all associated costs, although seller may propose to provide licensing services as an option. Seller

must perform sufficient frequency research to determine if there is a high probability of being able to obtain all Frequency resources required by their proposed system design. Seller is responsible to develop, gain approval from Buyers Project Manager, and implement a plan to transition from existing system to the proposed replacement system.

4.3.2 Seller must assume that there will be at minimum 2 standalone repeater locations to be used as a backup in the event of a catastrophic failure of the system and should account for frequency coordination accordingly.

4.3.3 Seller shall coordinate and engineer the system to create a 7-channel system to include:

(2) Law Channel
(2) Fire Channel
(1) Fire Page only channel
(1) Public Works Channel
(1) Ops Channel

4.4 System Technical Requirements

4.4.1 The radio system must engineered to be a VHF analog simulcast multichannel system.

4.4.2 The Radio system shall be designed to be fully upgradeable to APCO Project 25 (P25) Phase 2 requirements to allow future conversion. All components are to me the requirement for this future option.

4.5 Subscriber Compatibility

4.5.1 The system must be provided to work with all currently used narrowband VHF analog subscriber equipment. This equipment includes mobile radio, portable radios, and fire pagers.

4.5.2 System design shall not have requirements for system keys or specific radio IDs.

4.6 Encryption

4.6.1 System shall allow for standalone encryption software or hardware on the user level. No system encryption requirements are required on a system level at this time.

4.7 Equipment

4.7.1 Equipment supplied under this procurement must be compliant with all FCC rules and specifications at the time of manufacture.

4.7.2 The fixed equipment must operate over a room ambient temperature range of 0 to +40 degrees C with an ambient relative humidity of 5 to 95 percent.

4.7.3 The following equipment must be compatible with 48 VDC:

A. All remote site RF equipment including RF base stations, power amplifiers, receive multicouplers, combiners, and any additional equipment necessary for the remote RF equipment to remain operational.
B. All remote site data and ancillary equipment including data switches, routers, controllers, fault and alarm, and any other equipment required to keep the remote site operational during an AC power failure.
C. All references in this specification refer to nominal 48 VDC refer to the DC power defined in this section and the DC power supply specification section.

4.7.4 All equipment must be installed in EIA standard 19-inch "relay" racks. All racks must be 7ft tall. Seller is to provide additional racks where necessary where current equipment racks do not exist. All racks must comply with the following standard:

A. Anodized aluminum or similar finish to resist corrosion.
B. Drilled and tapped holes on front and back of each rack support rail.
C. Vertical cable management must be 3.65 inches wide minimum and 6 inches deep minimum.
D. Horizontal cable management located on the racks as required to neatly dress and manage intra-rack horizontal cables.

4.8 Interoperability

4.8.1 The system must be capable of interoperable communications with surrounding agencies capable of a VHF narrowband analog signal.

4.9 Reliability

4.9.1 Reliability/Redundancy/Backup

A minimum of two failures occurring with overlapping times must be necessary to cause the loss of any communications system features and functions.

4.9.2 Failure Mode One

A. Due to operational requirements, a failure causing the system at one location to fail, the rf system shall maintain normal operation at all other site locations only degrading coverage surrounding the failed site in question.
B. The complete system or any portion of the system must not be off the air for longer than 10 seconds during system transition. All features of the remaining unaffected system shall remain functional.

4.9.3 Failure Mode Two

A. In the event of a primary system failure where the system loses connection (ie network failure) any linked system components shall continue to operate outside of the affected network failure areas.
B. Network loss resulting from microwave radio failures should automatically switch to alternate routing through IP network switching where available.

C. Primary RF resources shall be located at strategic points within the county footprint to offer standalone radio service from each of the primary sites.
D. Primary sites should be located (1) west area and (1) east area to act as standalone repeater options.

4.9.4 Failure Notification - In the event of a network failure monitoring software shall emit a notification to alert communications staff of the failure. Any loss of a network component over 10 seconds should trigger notification.

4.10 Coverage

4.10.1 Coverage should be calculated based on attachment B of this document (radio system study conducted by Televate).

4.10.2 Coverage testing and adjustment shall be required to meet mobile radio performance standards at minimum. Mobile coverage is expected in 95 percent of the county incorporated areas.

4.10.3 Proposer must provide predicted coverage of the proposed radio system for portable radio coverage.

4.10.4 Proposer must provide coverage areas in failure mode one and two for training and information purposes.

4.10.5 Coverage design, implementation, and testing for the system must adhere to the latest revision of Telecommunications Industry Association (TIA) Telecommunications System Bulletin 88 (TSB-88).

4.10.6 Mobile coverage requirements must be met for user level supplied VHF 40w mobile radios all using unity gain antennas.
4.10.7 Portable radio coverage requirements must be met for user level supplied VHF 5w portable radios all using unity gain antennas.

4.11 Sumulcast System Requirements

4.11.1 Where simulcast operation is proposed, the Proposer must provide full technical details about all aspects of the proposed simulcast equipment including but not limited to:

(1) Methods used to maintain required frequency stability and specifications for frequency stability.

(2) Methods used to maintain proper audio phasing and time of arrival requirements.

4.11.2 Buyer will supply the site interconnection transport facilities consisting of ISO Layer 2 connections using microwave, fiber, telco circuits or other transport facilities. If the proposer requires quality of service, other traffic prioritization, or other traffic shaping (i.e., MPLS services, or ISO Layer 3 routing services, the Proposer must supply the required system(s).

4.11.3 Proposer must detail the bandwidth required to implement the simulcast system. The Seller must supply any networking equipment required to connect the sites to the Buyer supplied transport network. Proposer must detail their limits on transport performance to maintain simulcast phasing in all configurations of transport operation.

4.11.4 Phase Delay Equalization

(1) Phase delay equalization must be provided to minimize simulcast overlap distortion. Equalization equipment must be provided for each transmit channel and will have sufficient delay adjustment to provide "over" and "under" adjustment of at least 25 percent or as required by the overlap distance requirements, whichever is greater. The equipment configuration must support adjustments in the simulcast delay or "launch time" adjustments from the controller location or other defined single location without making a trip to the remote site.

(2) The simulcast timing/phase delay equipment must automatically compensate for changes in the network routing. This compensation must allow for an infinite number of network configurations. Proposer must specify the maximum Buyer network/ transport time delay they can accommodate with their equipment.

4.12 Receiver Voting Systems

4.12.1 Receiver voting systems must be employed as part of any area wide simulcast system. The voting equipment must be capable of continuous duty operation. Proposer must provide detailed information on the voting receiver system including primary and secondary voting for each transmission.

4.12.2 The equipment supplied must be capable of the following operational criteria when an on-channel, properly coded signal appears in the system.

(1) The remote receiver voting system must be designed and interconnected to constantly select the highest quality digital signal being received and automatically rejecting the weak and noisier (e.g., higher bit error rate) signals. The process must be continuously selective and provide for automatic switchover without interruption of speech or data. The best quality digital audio signals during a transmission as changes of condition or location occur must be selected. The voting comparator must monitor the integrity of the incoming receive data circuits and reject any lines not meeting the required bit error rate.

(2) The system must be essentially "fail safe," so any receiver or data transport circuit failure will not cause the rest of the system to malfunction or result in an interruption of communications.

(3) Controls must be provided allowing for individual selection and disabling of each receiver input.

4.13 Receiver Multicoupler System

4.13.1 Sites with multiple receivers must have a receiver multicoupling system. At each site, one receive antenna must be used as much as practical for all receivers at the site. If more than one antenna is required, on any site, for all VHF receive operations, a detailed explanation of the proposed configuration along with complete justification must be included in the proposal. The receiver multicoupling system must not be included in the transmitter combiner system.

4.13.2 The multicoupling system must be expandable to at least 15 channels and employ a high third order intercept above +40 dBm to limit the generation of intermodulation products. Noise figure must not exceed 5.0 dB. Any port not used in the system must be terminated in a 50-ohm load.

4.13.3 The multicoupling system must be powered by a nominal industry standard 48 VDC power connection. The 48 VDC system will be supplied by buyer.

4.14 Antennas and Transmission Lines

4.14.1 All transmission antenna system components must be rated as low PIM (passive intermodulation) by the manufacturer.

4.14.2 The VHF base/repeater antennas furnished as part of the system must be designed to produce uniform signal strength on the ground from the antenna site to the horizon. Heavy null fill is required to assure close in coverage. Polarization must be vertical.

4.14.3 Separate transmit and receive antennas must be provided at all repeater sites. In all cases, antennas must be chosen to provide the best balance for system transmission and reception. Proposer must state the number of antennas required for the proposed system configuration

4.14.4 All proposed antennas must meet the following minimum specifications:

A. Antenna gain: As required
B. Radiation Pattern: As required
C. Down Tilt Angle: As required
D. Rated Power Limit: 500 watt minimum
E. Wind Rating: 120 MPH minimum
F. VSWR: 1.5 to 1 maximum
G. Antenna Termination: N Type connector or equivalent
H. Cable Termination: N Type connector or equivalent
I. Operating Frequency: As Designated

4.14.5 The antenna must be supplied with mounting brackets, mast, and all other suitable mounting hardware for top or side mounting on a mast or tower. All brackets, mast, clamps, and hardware must be of a suitable galvanized steel material to minimize corrosion and rust. Proposer must state in their Proposal the material to be used. The Buyer will supply the specific tower mounting structure and tower mounts as required by the antenna locations indicated in the Proposal. Seller must supply the hardware to mount to the Buyer-supplied tower mounts.

4.14.6 Transmission line losses must be kept at a minimum at each site. Depending on the line length required at each site, the following represents the types of transmission line preferred:

1. Transmission Line – Transmit and receive: Commscope AVA or LDF series, ½" or 7/8" jacket foam dielectric.

2. Impedence: 50 ohms

3. Outer Conductor: Solid copper.

4. Grounding Kit: Kits must be furnished and installed to bond the transmission line at both the top and bottom of towers and at the bottom of non-tower (buildings) sites. Kits must be furnished and installed at all building entry points

5. Cable Attachment: Proper cable attachment device shall be used to securely attach any cabling to tower or cable support structure at all locations. Type of support device will be site dependent. Seller is to provide all cable attachment devices.

6. Lightning Protection: Appropriate PolyPhaser, or approved equivalent, type entrance devices and lightning protectors must be provided at all locations. The lightning arrestors must be configured with Male and Female connectors to allow the removal of a failed lightning arrestor and direct reconnection of the coax cables without the use of a barrel connector

7. Connectors for the equipment end of the transmission line must be field installed.

8. Equipment in-building interconnecting cables may be 1/4" or 1/2" Superflex coaxial cable to interconnect transmitter, combiner, receiver multicoupler, and antenna system transmission lines. However, all equipment in-building interconnecting cables must be either solid jacketed or double-shielded.

4.15 System Monitoring

4.15.1 Proposer must provide a monitoring system allowing the buyer and buyer's technical staff to be alerted to outages remotely as well as remote system monitoring through the network. Monitoring system shall be compatible with the following:

A. Windows 10 or newer.
B. Remote IP accessible though VPN connection supplied by buyer.
C. Alerts through CAD vendor provided through IP network connection supplied by buyer.
D. Multiuser platform capable of being viewed on multiple machines.
E. Remote programming through software over IP network.

SECTION 5

Transport System Requirements

5.1 General

5.1.1 Buyer is responsible for supplying all site interconnections and transport using its microwave system and fiber links. Buyer will provide redundant transport links to each site. For any new radio sites required in the new simulcast radio system, Buyer will supply back haul to the new site by modifying its microwave system or other back haul method after review of the proposed back haul solution with the Seller.

5.1.2 Buyer has requested a fully executed proposal to replace its microwave system to support both native TDM (T1) traffic and native IP packet traffic to its existing radio sites.

5.1.3 The demarcation point between the Buyer's microwave network is the Ethernet ports on the microwave network. In other words, the Seller is responsible for all data cabling and equipment up to the port on the Buyer's equipment

5.1.4 Seller provided networking equipment must provide redundant connectivity.

5.2 Backhaul Requirements

5.2.1 The Proposal must include information related to the following:

(1) Minimum required and recommended backhaul bandwidth for connection between each remote site and the system controller(s).

(2) Minimum required and recommended transport bandwidth for connection between the primary dispatch facility and the system controller(s).

(3) Minimum required and recommended transport bandwidth for connection between the geographically diverse locations of system cores

(4) Details of all physical interfaces and requirements for the proposed new system equipment for future use should additional transport methods become available

(5) Any other transport requirements necessary for making a fully operable system

5.2.2 Seller must provide transport network compatible with a new newly installed microwave system.

5.3 Data Networking Equipment

5.3.1 Buyer will supply network equipment and site to site connections. Each site will contain a IP network switch consisting of 48 ports with POE capability. Any receiver site will have a provided IP network switch of varying port availability.

5.3.2 Buyer supplied IP network equipment will be of a 48 VDC power configuration when available. If this option in not available, seller shall provide a UPS for necessary equipment that will not be 48 VDC or POE powered for backup power.

5.3.2 County technical staff will provide the following for seller prior to install:

1) Network Switching Equipment

2) VPN Information

3) Network Addresses (based on seller identified requirements)

4) Port Assignments (based on sellers identified requirements)

SECTION 6

Site Improvements and Upgrade Requirements

6.1 General

6.1.1 Except as described elsewhere in the Proposal Documents, all necessary site improvements at the remote sites, dispatch center, system controller location, and any other fixed-equipment locations will be performed by Buyer. This scope includes but is not limited to any improvements, modifications, or additions to the grounding systems, AC power systems, heating, equipment shelters, towers, ventilation, and air conditioning (HVAC) systems

6.1.2 Securing of Seller supplied equipment to meet seismic requirements is the responsibility of the Seller.

6.1.3 Space and power limitations may be of concern at some site locations. Depending on the sellers space requirements, buyer should be made aware of the concerns. Buyer will work to address the concerns and make corrective action when necessary.

6.1.4 Seller is encouraged to minimize the space requirements whenever possible. Considerations should be made for future expansion and equipment spacing.

6.1.5 Seller must specify the following for each location of proposed fixed infrastructure equipment so the Buyer can determine the effects on the proposed equipment on the site requirements:

1) Equipment space requirements, including:

A. Number of rack spaces required
B. Rack dimensions, including, width, depth, and height with all equipment.
C. Any interior non-rack space required.

2) Equipment heat and power loads including:

A. Number of AC circuits required and what current and voltage ratings.
B. Number of DC circuits required and what current and voltage ratings.

3) Antenna Requirements, including:

A. Number and types of antennas required, including all transmit, receive GPS and any other necessary antennas.
B. Necessary installation space for each antenna

C. Mechanical/wind loads for each antenna
D. Antenna mounting requirements

4) Any additional requirements or preparations necessary for equipment or antenna installation.

6.1.6 Buyer will develop applications, apply for, attend public hearings, provide responses to questions, for all permits, FAA clearance and review, tribal notifications, and any other environmental, tower, antenna, land use, historical, or related permits and/or approvals required for this project. Buyer will pay the actual permit application fee directly.

6.1.7 Seller must provide a normal length of calendar time for obtaining permits and site construction in their project schedule.

6.2 Seismic

6.2.1 Seller supplied equipment systems and seismic bracing must be capable of withstanding the effects of earthquake motions as defined in seismic design parameters of the adopted edition of the Revised Code of Washington (state) Chapter 70.86.

6.3 Shelter and Equipment Grounding

6.3.1 Seller will be responsible for grounding any new equipment to existing grounding systems.

6.3.2 Seller will be responsible for providing all necessary hardware for grounding.

6.3.3 Seller will be responsible for entry panels, surge protectors, grounding hardware, and any other hardware for attaching to grounding systems in new sites.

6.3.4 Any exterior ground connections not attached to transmissions lines shall be zinc coated wherever open to the weather or ground contact.

6.3.5 Any ground connections will be made to industry standards both interior and exterior.

6.3.6 Buyer will be responsible for upgrades to current site locations for grounding systems.

6.4 Antenna Mounts

6.4.1 Tower attached antenna mounts must be furnished and installed by the Seller. Buyer and Seller must agree on antenna mounting hardware, elevation, azimuth, and other technical parameters prior to installation.

6.4.2 Sellers must supply all antenna mounting hardware required to fasten or install the antenna.

6.5 Transmission Line Supports

6.5.1 Transmission line supports must be furnished and installed by the Seller as needed

6.5.2 Transmission lines must be installed and supported following cable manufacturer instructions, not to exceed more than 48 inches between supports.

6.5.3 The transmission lines must be routed to an in-ground cable trench or an overhead icebridge depending on the site conditions.

SECTION 7

DC Power Interface Requirements

7.1 General

7.1.1 For existing and new sites, Buyer will provide all necessary 48 VDC power, including rectifiers, chargers, batteries, and primary circuit breakers, at all remote sites, dispatch centers, system controller location, and any other fixed-equipment locations as necessary

7.2.2 Industry standard power at the top of the DC power rack as defined by:

(1) Voltage range 43 VDC to 56.4 VDC (48-volt nominal)

(2) Ripple and Noise: 30 millivolts

(3) Low Voltage cut off at 42 VDC and reconnect when power is reapplied to the charger at 49 VDC.

7.2.3 DC power circuits must use a black colored wire for negative ground and red colored wire for positive VDC voltage.

7.2.4 Installation of DC power circuits must comply with the National Electrical Code. NEC Article 336 requires TC or TC-ER rated cables in cable trays. Alternatively, DC conductors in cable trays may be run in Electrical Non-metallic Tube (ENT) commonly called smurf tube.

7.2.5 Unless otherwise approved by Buyer, Seller must furnish and install an appropriately sized circuit breaker panel at the top of each equipment rack, including appropriately sized circuit breakers, to allow each piece of equipment installed in each rack to be individually powered on and off.

7.2.6 Seller must furnish and install appropriately sized wiring between each rack's circuit breaker panel and the site's primary DC plant.

7.2.7 All RF-site equipment must operate on industry standard 48 VDC power. This requirement includes base stations, routers, switches, controllers, etc.

7.2.8 Seller must furnish and install any necessary DC-to-DC converters required to support voltages other than 48 VDC. If any such converters are used, circuit breakers must also be used on the output to control each piece of equipment powers by the converter(s)

7.2.9 To ensure adequate 48 VDC power is made available by the Buyer, Seller must specify the current load for each piece of equipment proposed to be installed at each site, plus the total -48 VDC current load for all proposed equipment at each site.

7.2.10 Proposer must detail the DC power plant design requirements in their Proposal including design calculations and assumptions, operating parameters, and system technical information to fully describe the DC power equipment and system requirements.

7.3 Power Distribution

7.2.1 Any 12 VDC distribution planned for load rack locations must have its own load power distribution panel.

7.2.2 DC Power Distribution in the load racks must be provided as required by the system design. DC distribution must be designed to reduce the amount of equipment losing power when a circuit breaker is turned off. At the very minimum, equipment should be connected so the loss of a single power circuit does not affect the redundancy of the equipment design.

7.2.3 The distribution panels must incorporate circuit breakers providing a connection to each circuit breaker to indicate when it has tripped because of an overload condition and an alarm relay providing a Form C dry contact closure when any of the circuit breakers are tripped.

7.2.4 All wiring to the loads must be done by Seller. All wiring must comply with the NEC wiring methods.

7.2.5 Any equipment (load) rack with a circuit breaker distribution installed as part of this work must have its own power and ground buses of suitable size for the equipment loads and be electrically isolated from the rack itself.

7.3 DC-to-DC Converter Specifications

7.3.1 Any 48V DC to 12V DC converter supplied must supply its rated output voltage ±2% at the load with an input range of 41 to 60 VDC.

7.3.2 The converters must have Form C alarm contacts to indicate a converter failure.

7.3.3 The converters must have the following indicators as a minimum: Input DC, Output DC, Failure.

7.3.4 The converters must be equipped with the following meters: DC output voltage, DC output current. The meters must have an accuracy of 2 percent or greater

7.3.5 The converters must automatically restart when the cause of the shutdown has been removed.

7.3.6 Converters must operate at full output capability over a temperature range of -20°C to 50°C, relative humidity 5 percent to 95 percent.

7.3.7 The converters are all planned for installation at load racks. Seller must furnish and install all equipment and hardware required to mount the specified equipment in 19-inch racks.

7.4 Inverters

7.4.1 Any inverters must provide filtered 120V AC output with an AC ripple component of less than 0.03 volts RMS (30 millivolts). Random electrical noise levels must be 32 dBrnc or less measured at the output terminals for all load currents.

7.4.2 The input voltage range must be 42 to 60 VDC minimum.

7.4.3 All inverters must be capable of supplying 120 VAC at 1 kW load continuously at +25°C temperature.

7.4.4 The inverter AC grounding and neutral connection must be installed in compliance with the NEC. The inverter must be defined as a separately derived system for code requirements.

SECTION 8

Training Requirements

8.1 General

8.1.1 Seller must provide a recommended list of training for the Lewis County radio system. A catalog of available training and a budgeted line item for training is not sufficient to meet this requirement.

8.1.2 Seller must train personnel selected by Buyer in the operation and maintenance of all the equipment supplied under this contract. The training must be for Buyer's training, technical, management, and end user personnel. All training must take place at the Lewis County training/meeting room. This training must occur as close to cutover as possible.

8.1.3 Any system specific programming and or training to maintain and monitor the system will be provided by seller as part of the proposal. Any training not able to be done in the field or on site should be separated and identified by seller.

8.1.4 Seller must propose a system that is configured and able to be maintained by county technical staff and free from void of any warranty of the system or its components. Any system that will void warranty if maintained by trained and qualified staff will not be considered.

8.1.5 Seller must assist with the development of training content for "Train the Trainer" delivery for end-user of radio users and end-user training in the operation of all of the user console equipment supplied. This training must include:

(1) Training aids to be used by the trainers to train Buyer's staff and line personnel. Seller must grant Buyer permission to copy and use any training aids received for training users of the console system.

(2)Vendor activities to support the development of "End User" training on mobile and portable user radios. Training develop is expected to be slightly different between law enforcement users and fire users.

(3) The radio system and console system training must consist of "End User" and "System Manager" training. The "End User" and "System Manager" training classes must be separate and onsite. The "End User" training must also be used to train Buyer's trainers. Training mustinclude all proposed systems.

(4) Manuals or operating guides must be provided for each student in the "System Manager" training sessions.

(5) Seller must provide overall system management training. These classes must be given Monday-Friday 0800-1700 hours at a location in Bremerton, Washington.

(6) Seller must provide training for any optional features provided with the system. These classes must be held in Chehalis, Washington

8.1.6 Seller may be required to provide additional hours of training after contract award.

8.1.7 Seller must coordinate any training schedule with Buyer 45 days prior to starting any training. Concurrently the Seller must provide concise and comprehensive collection of training materials for Buyer's approval.

8.1.8 Seller must supply to Buyer for its approval a sample of all training materials 15 days prior to the start of any training classes

8.1.9 Seller must provide class schedules, syllabi, and costs for basic system technical training. The purpose of this training is to allow Buyer's technical personnel to perform Tier 1 maintenance on all the equipment provided. Maintenance activities include troubleshooting and repair to the major assembly and Field Replaceable Unit (FRU) level. This training must include at a minimum the following:

(1) Detailed explanation of system design.

(2) Detailed explanation of communication network structure.

(3) Detailed instructions on modifying and/or adding new sites, users, base stations, channels, MPLS routers, etc.

(4) Detailed instructions on modifying and/or adding system parameters,

(5) Detailed explanation of Intersystem Interfaces.

(6) Detailed explanations of operational, backup, recovery, and restart procedures.

(7) Diagnostics.

(8) Detailed instructions on repair to the FRU level.

(9) Detailed instructions on software and hardware updates.

(10) Other topics as required to maintain the system.

8.1.10 Proposer must define training for the system software and functions. This training must not be a quick functional overview but must include the following topics:

(1) Operating System basics.

(2) Detailed explanations and instructions on adding or modifying functions.

8.1.11 Proposer must provide cost and class information for factory training of technical personnel on a per-student basis as outlined in the pricing tables. The cost for recommended technician and management factory-based training for two Buyer's personnel, not including travel expenses, must be provided in the base cost of the system. The specific recommended

classes must be listed in the Proposal. In addition, these classes must be bid as an OPTION for additional personnel or additional training desired.

8.1.11 All programming equipment and software shall be included in the proposal.

SECTION 9

Spare Components

9.1 General

9.1.1 Seller will provide in the proposal a replacement stock of system equipment.

9.1.2 (1) spare at minimum shall be included in the proposal for each proprietary system component. This should be considered any manufacturer specific component not readily available on the open market. These components include:

A. Complete radio chassis
B. Simulcast controller
C. Simulcast comparator
D. Voting hardware
E. Additional radio chassis power supply
F. Proprietary timing devices

SECTION 10

Implementation

This section defines the implementation requirements.

10.1 General

10.1.1 These standards and other standards are the requirements for the installation of the system(s) and equipment.

14.1.2 Seller must carefully coordinate all phases of the work with the Buyer's Project Manager.

14.1.3 The following requirements are provided for installation of equipment including, but not limited to, antennas and antenna systems, consoles, base/control/repeater equipment, data networking equipment, and other miscellaneous equipment and devices required or used. Any variation in these guidelines require the approval of Buyer's Project Manager. (1) Seller must furnish all personnel to perform the initial installation, placement and assembling at the Buyer's locations or elsewhere as required, of the individual equipment and the components into an operating system. This requirement includes the performance of any test to determine the satisfactory operating condition of the equipment before it is formally accepted by Buyer. (2) Seller is responsible for the installation of all equipment furnished under this Contract. Seller must provide sufficient competent engineers and technicians to perform the installation, as well as a full-time, factory-trained, technically competent project manager to supervise all phases of the system installation. The project manager must be assigned to this project through

the installation and all testing phases. Seller must also perform connections between Buyer provided equipment and Seller provided equipment (e.g., microwave equipment, routers, Ethernet switches, logging recorder, etc.) as may be required.

10.2 Equipment Installers

10.2.1 The equipment installations required by this specification include the following described items as well as all other attachments, hardware, software, and procedures as may be provided to ensure a completed installation in accordance with the standards of good engineering practices, all building codes and ordinances (including earthquake protection) in effect at the sites specified in this specification and requires the approval of Buyer's Project Manager.

10.2.2 All special tools, testing devices, extenders, and other equipment required to properly maintain the complete network, mobiles, portables, control stations, and any associated components must be supplied with the network in accordance with the maintenance and testing requirements. A list of all such devices, extenders, tools, or equipment must be enclosed with the Proposal.

10.2.3 Wiring of 120 and 240 VAC to the nearest distribution panel will be provided by Buyer as part of the project. A review of existing circuit drops, and available breaker positions must be conducted by Seller. All new circuit breakers in panels must be supplied by Buyer. Wiring from this distribution panel to any new equipment is the responsibility of the Seller. Proposer must identify in their proposal the number and type of AC circuits required.

10.2.4 Buyer will provide space for all console and control equipment. The Seller must install the equipment within this space and connect the units to commercial/ emergency power. Seller must cooperate with the Buyer to connect all Buyer-provided equipment to the Seller-provided equipment. All bonding and grounding connections to the existing bonding and grounding systems must be provided by the Seller.

10.2.5 All site work permits and licenses, as required to improve or develop any of the sites, must be provided by Buyer as part of their work. Seller will be required to obtain electrical and building permits as may be applicable to their work. Each Point of Destination will require separate permits from the agency having jurisdiction.

10.2.6 All site work, tower strengthening, earth work, site grading access improvements, equipment shelter construction, utility work and improvements, structural analysis, architectural work, and associated items will be provided by Buyer. Seller is required to provide all services associated with the implementation of the radio system except those specifically identified in these specifications as provided by Buyer.

10.2.7 Proposed prices must include all installation hardware, brackets, braces, fasteners of all kinds, wiring, conduit, ancillary devices, procedures, and services required to install and/or interface equipment and components to provide a complete operating system fulfilling the requirements of the specification.

10.2.8 Seller is required to adhere to FCC rules and all state and local government codes and ordinances in all matters pertaining to the work.

10.2.9 The proposed installation work must be authorized by Buyer's Project Manager prior to commencement of any particular phase of work at each Point of Destination. Seller must provide descriptions and layout drawings showing the proposed installations at each site at least 30 days prior to beginning any work. Buyer must receive written approval of Buyer's Project Manager prior to beginning work.

10.2.10 Access to all Points of Destination will require prior coordination with Buyer's Project Manager

10.2.11 Fixed equipment and cable installations must be accomplished in accordance with earthquake protection practices. This requirement includes, but is not limited to, providing flexible entry cables, surge loops, special battery racks, and special equipment rack design and mounting practices.

10.2.12 Rack mounting may be accomplished by either of two methods—special floor only mounting or a combination of floor and top mounting. Proposer must recommend a particular method and provide an option for any other method. Buyer will select the preferred method prior to execution of the Agreement. All mounting arrangements must comply with the current edition of the Washington State Building Code and local building requirements.

10.2.13 It is Seller's responsibility to be aware of the facilities for delivering, storing, placing, handling, and disposing of materials. All aspects of the installation must be planned and executed in a professional manner as approved by Buyer's Project Manager. Seller must make provisions to have all trash properly disposed of daily.

(1) Seller must supply all the necessary installation items required to make the equipment a complete operating system including Buyer-supplied equipment. This requirement must include, but is not limited to, clamps, wiring, cable, hardware, ty-wraps, anchors, etc.

(2) Seller must make all the test, adjustments, level settings, etc. to the equipment required to control and operate the consoles, recorders, base stations, and associated equipment in a normal manner.

10.2.14 The Seller must provide any necessary cutouts in the computer floor sections as required. Buyer's Project Manager must approve the location of any cutouts required.

10.3 System Staging

10.3.1 The system minus the antennas and antenna feed lines, but including the transmitter combiners, receiver multicouplers, and tower-top amplifiers must be assembled and tested. This testing may be done at the factory or other location chosen by the manufacturer not on Buyer's premises. This process is referred to as "System Staging" in this Document as defined below.

10.3.2 Due to space constraints at some sites, system staging in racks may not be possible. Seller is required to conduct an in person evaluation of space assessment prior to staging.

10.3.3 Due to both systems being required to be operational for a period of time, considerations should be made to allow for shelter space.

10.4 Installation Plan

10.4.1 Seller must develop and submit a final installation plan to Buyer's Project Manager for approval at least 45 days prior to the start of installation. No equipment is to be installed until the plan has been approved by Buyer's Project Manager. The plan must detail location of equipment, cabling, mounting, hardware, and installation procedures. Diagrams must be used to indicate equipment locations.

10.4.2 The existing system including consoles, remote desktop units, mobiles and portables, etc. must remain operational during the system transition. At no time, can Buyer's users be without communications from one of the systems or the other. Seller must develop an installation plan identifying all the processes for effecting the transition between the old system and the new system including fall back plans and any common operation required.

10.4.3 Proposer must discuss the possibility of using City facilities for the mobile installation and programming work instead of Seller provided facilities. Buyer desires to keep the vehicle fleet as close to the place of use as possible to minimize downtime.

10.5 Equipment Recording

10.5.1 Prior to the installation of equipment, Seller must establish a record system for each unit or equipment to be furnished under this contract. The system must be computerized and must keep current the correlation between equipment serial numbers and model numbers. This system may be in a database or spreadsheet format. The system must allow Buyer's technical staff to keep the information up to date over the life of the system. As a minimum, the record must contain the following but not be limited to:

(1) Type of equipment

(2) Manufacturer

(3) Model number

(4) Serial number

(5) Date of installation

(6) Accessory operational checklist

(7) Maintenance list

(8) Parts replaced

(9) Name of technician who performed the work

14.5.2 Seller, prior to the installation of equipment, must establish a system maintenance log and a failure reporting system to assist in recordkeeping and management of the maintenance program. This system may be the same system as outlined in the previous paragraph but with the additional capacity to add maintenance and repair notes and information.

14.5.3 The record system, the failure reporting system and the system maintenance log must be subject to approval by Buyer's Project Manager. The record system and the system maintenance log must be maintained locally under Buyer's technical staff control.

10.6 Failure to Meet Requirements of Specifications

10.6.1 Should any of the inspections, tests, or operation of the equipment under service conditions show the system or equipment does not meet the requirements of the specifications, Buyer's Project Manager may reject the equipment and direct Seller to immediately furnish new equipment or parts as needed to bring it up to the requirements of the specifications.

10.7 Antennas and Mounts

10.7.1 All communications antennas, regardless of specific installation location, must be erected plumb, level, and square unless specifically noted in the design (e.g., mechanical downtilt antennas). Seller must supply antenna mounts and all attachment hardware required to install Seller-supplied antennas. If fabrication is necessary, antenna mounting hardware must be hot dipped galvanized after fabrication. Antenna mounting hardware must be made of hot dipped galvanized or stainless-steel material. Heavy wall conduit (already galvanized) may be used when mounting antennas to buildings, wooden poles, or other non-tower structures. Exterior utilization of electrogalvanized or plated material for mounting of antennas is not permissible.

10.7.2 If the galvanizing on any antenna support is heavily scratched, saw cut, drilled, or destroyed in any manner, the damaged area must be repaired using cold galvanizing compound.

10.7.3 Antenna mounting hardware must provide a good bond between antenna and antenna mount.

10.8 Antenna Feed Lines

10.8.1 All antennas must have a jumper constructed of Commscope LDF4-50A or equal (not to exceed 50 inches) when using Commscope AVA5-50 or equal or larger as the primary length of feed line. If Commscope LDF4-50A or equal is used as the primary length of feed line, it must be connected directly to the antenna. A "drip loop" must be formed as this jumper or feed line is installed. The manufacturer recommended bending radius specifications must not be exceeded. No connectors must fall within, or be obscured by, any antenna support pipe or conduit run when making antenna feed line installations inside of support pipes or conduit runs.

10.8.2 At tower sites the following items must be employed:

(1) Where feed line support systems have not been provided, cable ladder or angle mount clamps must be installed to support the feedline using waveguide cushions or similar mounting approach.

(2) At locations where galvanized pipe or electrical conduit are used for mounting antennas, the external feed line runs may be secured by the utilization of stainlesssteel wraplock or stainless-steel ties.

10.8.3 When installing antenna feed line runs, the antenna feed line must not be attached to any individual antenna feed line run already installed. Attachment methods must encompass all

antenna feed line runs and antenna feed line support at this point. Attachment intervals must follow requirements contained within this RFP or manufacturer recommendations.

10.8.4 The use of cable trays or messenger cable for antenna feed line support must be considered on an "as needed" basis. All antenna feed line runs must be secured to the messenger or cable tray by the utilization of stainless-steel wraplock or stainless-steel ties.

10.8.5 All antenna feed line runs inside buildings (where cable trays are provided) may besecured by utilization of black nylon cable ties. Where cable trays are not provided, the use of jiffy clips, one hole pipe straps, rigid conduit straps, Unistrut and Unistrut clamps, or black nylon cable ties are permitted to secure antenna feed line runs. Utilization of electrogalvanized or plated material inside of buildings is permitted.

10.8.6 All antenna feed lines must have cable identification tags denoting the corresponding antenna. Each antenna and transmission line must be identified with colored tape bands and brass tags supplied and installed by Seller as follows:

(1) Red – Receive.

(2) Yellow – Transmit.

(3) Brass Tag – Antenna/feedline names chosen during design.

10.8.7 Number of bands denotes antenna number.

10.8.8 Place colored tape bands on antenna, near ends of each cable and jumper and on cables on both sides of building entrance panel and on both sides of cable on the inside of the building.

10.8.9 Color tape must be 3M 7 mil Scotch 35 Vinyl Electrical Color-Coding Tape (red and yellow).

10.9.10 Place 1.5" diameter round blank brass tags (Brady Catalog #23211) near ends of each cable. Each brass tag must be customized to clearly identify each run of cable utilizing ¼" steel stamps for letter and number sets (Brady Catalog #23240 and #23241).

SECTION 11

Quality and Workmanship Requirements

This section defines the quality and workmanship requirements of all phases of this project.

11.1 General

11.1.1 Seller must advise Buyer's Project Manager of any equipment failing during installation and testing or arrives damaged, the cause of the failure or damage, and the actions to remedy the problem. Failed equipment may not be repaired unless the entire module or assembly is replaced with a new unused spare assembly previously been factory tested and aligned.

11.1.2 All equipment must contain the latest current production hardware, firmware, and software at time of the start of system acceptance testing unless otherwise agreed to in writing by Buyer's Project Manager. Such agreement must include a list of all the equipment, firmware, and software not at current production levels, as well as the current version of the equipment,

firmware, and software, plus an explanation as to why it was not upgraded to current release and a description of any difference between the installed version and the current production version.

11.1.3 All field service bulletins, software patches, and similar service and repair notices must be installed prior to the start of system acceptance testing. Buyer's Project Manager must be provided with all such field service notices, documents, patches, release notes, etc. applying to the system being installed prior to the start of acceptance.

11.1.4 In the event of a conflict or different ways of accomplishing the same result, the more stringent code or specification requirement must be used. Seller must request additional clarification from Buyer's Project Manager. Failure to request clarification may result in Seller having to re-install equipment or rework an installation at Seller's own expense

11.1.5 Upon completion of installation, all material must be free from defects, corrosion, scratches, or other such conditions as to present an other-than-new appearance. All the equipment an material must be of recent manufacture and design, new and unused.

11.1.6 All finished work must be straight, level, true and plumb where applicable, and installed exactly per the manufacturer's instructions, recommendations, and drawings. Only qualified mechanics skilled in this kind of work must be used. All workmanship must be first class in all respects. All mounting locations must be approved by Buyer's Project Manager before installation; failure to do this may result in the repair, removal, and reinstallation of the equipment at Seller's expense.

11.1.7 Equipment racks must be securely anchored and electrically isolated from the floor.

11.1.8 Seller must restore any floor panels, ceiling tiles, raceway covers, power panel covers, junction box covers, equipment cabinet panels, and similar covers or protective devices removed during installation. Should Seller find missing covers, panels, etc. the missing items must be brought to the attention of the Buyer's Project Manager as soon as possible for remedy.

11.1.9 Seller must use only technicians trained in the installation of this equipment. Seller must identify and provide resume information including training history of any technician proposed to perform work on the system. Buyer's Project Manager must have the right to reject personnel from proposed project team for in Buyer's Project Manager's opinion lack of training or prior unsatisfactory performance.

11.1.10 All work must be performed, according to local conditions, in a manner best calculated to promote timeliness and accuracy, to secure safety of life, person, and property, to assure safe and continuous operation of Buyer's equipment and mission, and to reduce to a minimum any interference with the public and with other contractors in or about the property.

11.1.11 Seller must be responsible for any damages to Buyer's property which may occur during the installation of the equipment specified in this Contract due to negligence on Seller's part.

11.1.12 Seller must take all appropriate actions to ensure the work areas are kept clean and safe. All waste materials generated by Seller must be removed daily.

11.1.13 All wiring and cabling must be laced, clamped or supported by appropriate means. All wiring must be done in a neat and workmanlike manner. Wiring and cabling must use Buyer-provided cable tray, race way, conduit, or underfloor wiring systems where provided. Ty-wraps must not be used to support or bundle LAN cables rated at CAT 6 or higher. Hook and loop style (e.g., Velcro) straps and cable ties or similar method must be used for all LAN cables rated at CAT 6 or higher. Any method compressing or deforming the LAN cable must not be used.

11.2 AC Wiring

11.2.1 Wiring practice, material and cabling must be in accordance with requirements of the National Electrical Code, OSHA, Underwriters Laboratories, and applicable local codes and standards. All wiring must be laced clamped or supported by appropriate means. All wiring must be done in a neat and workmanlike manner.

11.2.2 If installed by the Seller, AC wiring from the building circuit-breaker or fuse switch panels must be a minimum of 12 AWG.

SECTION 12

Acceptance Testing Requirements

This section defines the acceptance and performance testing requirements for the system and the individual components. The acceptance testing process includes the following:

- Factory Staging Acceptance Testing
- System Acceptance Testing
- Performance Acceptance Testing
- Interface Acceptance Testing
- Coverage Acceptance Testing

12.1 Assembly Staging Testing

12.1.1 The entire system must be assembled and tested at the equipment supplier's location as described in the Implementation section of this specification.

12.1.2 The complete system must pass the Staging Acceptance Test Plan (SATP) prior to final installation. The SATP must include the following as a minimum:

- Certification for each piece of equipment meeting its manufacturer's published specifications

- Test results showing receive sensitivity, transmitter power output, and modulation for each piece of base station equipment showing the test results matched to the serial number of the specific equipment

- Test results showing the testing of each alarm point provided for all alarms

- Test results for the receiver multicoupler and tower-top amplifier

- Test demonstration showing the basic capabilities of the system to make, and process calls at each site in the system.

• Test demonstration of the ability of the system to continue full system functionality during the sudden failure of any single processor or controller in the system where system redundancy is provided.

• Test demonstration of the ability for backup systems to take over operation or provide service.

• Inspection of equipment and installations including cable dressing, cable construction, grounding, equipment condition, etc

• Spot verification of the previous information provided in the test results discussed above for the RF performance, alarm performance, and any other items for which an actual demonstration is not provided on up to five pieces of equipment and or subsystems

12.2 System Acceptance Process

16.2.1 The system acceptance process must:

(1) Seller must submit a final performance test plan or test procedure (Acceptance Test Plan (ATP) for Buyer's Project Manager's approval at least 30 days prior to the time of the tests. The test plan must set forth the test equipment to be used and the procedures to be followed for evaluating the system performance to ensure conformance with these specifications. This test plan must be agreed to by both parties.

(2) Seller must advise Buyer's Project Manager the system is ready for the system acceptance process to start.

(3) Seller must supply to the Buyer the acceptance documentation as outlined in the Performance Test Section below. Buyer's Project Manager will review and approve the documentation or request additional documentation or clarifications if the documentation is not satisfactory.

(4) Buyer and Seller must mutually agree on a schedule for the site visits to inspect the quality of the work, verify the equipment has been installed, perform any spot checks or other tests outlined below performed in the field. Buyer's Project Manager will perform these tests with Seller's assistance to perform measurements. Buyer's Project Manager will then accept each site, generate a punch list of items to be fixed or completed, or reject the site.

(5) Buyer and Seller will then perform the system operational tests as described below and in the ATP.

(6) Seller with Buyer's Project Manager's supervision will then perform the Coverage Acceptance Test Plan (CATP) as described below. Seller must generate a report showing the area tested, the tested locations, the number of locations and the pass fail criteria. This information will be supplied to Buyer's Project Manager. Should the CATP not pass, Seller must verify system operation and re-run the tests. If on the second CATP, the system still does not pass, Buyer's Project Manager will stop the acceptance process and determine the course of action.

(7) After a successful CATP, the general operational testing as described below and in the CATP will commence.

(8) After successful general operational testing the system must run for 30 days without the following:

– Any failure causing the complete loss of one or more channels or a site

– Any central controller failures

– Any voting system failure

– Any console position failure resulting in the loss of one or more console positions

– Any failure of the alarm reporting system resulting in the loss of alarms from more than one site.

(9) If any of the failures described above occur, Seller must replace the failed equipment and the 30-day acceptance period will start again. If 30-day acceptance period is restarted twice, the Seller and Buyer's Project Manager will stop the acceptance process and evaluate the next steps.

12.3 Performance Tests and Buyer's Acceptance

12.3.1 Performance tests must include but are not limited to the following tests. All tests must be performed after the equipment has been fully installed in its final location:

• Certification for each piece of equipment meeting its manufacturer's published specifications

• Test results showing receive sensitivity, transmitter power output, and modulation for each piece of base station equipment showing the test results matched to the serial number of the specific equipment

• Test results showing the testing of each alarm point provided for all alarms

• Test results for the receiver multicoupler and tower-top amplifier • Site effective receiver sensitivity test.

• Test demonstration showing the basic capabilities of the system to make, and process calls at each site in the system

• Test demonstration of all basic console functions to be able to place page calls, patch channels together, interface to conventional resources and any other interconnections defined in these specifications.

• Test demonstration of the ability of the system to continue full system functionality during the sudden failure of any single processor or controller in the system where system redundancy is provided.

• Test demonstration of the ability for backup systems to take over operation or provide service.

• Inspection of equipment and installations including cable dressing, cable construction, grounding, equipment condition, etc

• Spot verification of previous information provided in the test results discussed above for the RF performance, alarm performance, and any other items for which an actual demonstration is not provided on up to five pieces of equipment and or subsystems.

12.4 Interface to Other Equipment

12.4.1 Testing must be conducted by Seller in accordance with the approved plan. All testing must be under the direction and supervision of and witnessed by designated representatives of Buyer's Project Manager. Seller must supply all the test equipment required for each test.

12.4.2 Seller must notify Buyer's Project Manager at least ten days in advance of the time he or she is ready to make the tests on the entire system.

12.4.3 The Buyer's Project Manager will accept the system when it has operated continuously for a 30-day period without a failure after the successful completion of the performance test. This period is in addition to the time of completion.

12.4.4 The acceptance of equipment or parts thereof will in no way relieve Seller of the responsibility for furnishing equipment which meets the requirements of these specifications.

12.5 Coverage Testing

12.5.1 All radio equipment used for coverage testing must be configured with the most current firmware and software available at the time of testing.

12.5.2 Coverage testing must be performed by Seller. At its discretion, Buyer's Project Manager may have a representative present for any or all testing.

12.5.3 All equipment necessary to perform the coverage testing, including radios, power supplies, vehicles, and any other ancillary equipment, must be provided by Seller.

12.5.4 Seller must verify and certify proper calibration of all equipment used during the coverage testing.

12.5.5 All coverage test data and relevant records must be provided to Buyer's Project Manager in both paper and electronic format readable with standard software (Word, Excel, Adobe Acrobat, or other Buyer-approved software).

12.5.6 Prior to performing coverage tests, Seller must submit proposed test grid maps to the Buyer's Project Manager for approval.

12.5.7 Seller must submit a detailed Coverage Acceptance Test Plan (CATP) for approval by Buyer's Project Manager.

12.5.8 Seller is responsible for the coverage guarantee provisions, including remedial actions to be undertaken by and at Seller's expense if the coverage as depicted in the proposal plots is not met. Remedies for coverage failure must address the entire problem area(s) and not be limited to correcting a portion of the failed area. Remedies may not degrade areas of coverage

previously accepted. A retest of coverage must be conducted in any area (previously failed or not) potentially affected by the remedy in order to verify the composite coverage is maintained.

12.5.9 After completion of the coverage test, the Proposer shall provide the raw data collected in a file and an interactive map with the test results for each data point collection

SECTION 13

Documentation Requirements

13.1 General

13.1.1 Seller must deliver the following documentation in electronic format. Documentation must be delivered on removable media (CD, DVD, USB drive) within 60 days following final acceptance of the system.

13.1.2 Whole System

(1) Document: System Detailed Design – The System Detailed Design document includes a clear description of design goals and assumptions, propagation predictions and accompanying data, equipment lists, installation diagrams, interconnect diagrams, transport diagrams, annotated diagrams showing audio, RF, and signaling paths, electrical design including grounding and TVSS devices, list of channels/talkgroups, detailed list of required CTCSS/DTMF/other tone signaling, and other engineering detail sufficient to procure, install, configure, operate and maintain the subsystems comprising the vendor's response to the project scope.

– Format: PDF.

(2) Document: System Access Information

– Seller must supply a complete list of all usernames, account names, passwords, reset instructions, and other information required to satisfy system security requirements. These requirements explicitly require the Seller to supply all information for all levels of access.

–Seller must provide a signed statement attesting no hidden accounts, "backdoors," or other points of unauthorized access exist in the systems. The statement must be dated and signed in ink by a responsible officer of Seller.

– Format: Excel Spreadsheet and PDF.

(3) Document: Programming Documentation

– Where provided by manufacturer, Seller must supply all programming, configuration, and troubleshooting documentation for all components to the Buyer. Seller must further supply to Buyer's Project Manager comprehensive written documentation of all programming and configuration settings implemented on all components of the system.

– Format: PDF and hardcopy.

(4) Document: Licenses and Registrations

– Seller must furnish all hardware, software, and firmware licenses and warranties for all components being provided. Seller must supply proof of registration in Buyer's name for all software, firmware, and hardware where such registration is required for installation, configuration, or other purpose. Seller must further provide a complete list of software, firmware and hardware not registered in Buyer's name, said list to include all information necessary for Buyer's Project Manager to complete registration (i.e., product identification codes, CD keys, serial numbers, etc.).

– Format: PDF and hardcopy.

5) Document: Component Warranty Materials – All certifications and documentation activating, relating to, and governing equipment warranties from component manufacturers, properly completed and authorized by Seller.

– Format: PDF and hardcopy.

13.1.3 Project Management

(1) Document: Work Breakdown Structure (WBS)

– Seller and Buyer's Project Manager must jointly produce a work breakdown structure identifying the elements of work required to fulfill the project's goals and objectives. The WBS must be at a level of detail deemed by Buyer's Project Manager to be sufficient for effective project management. Each entry in the Lewis County Radio System RFP WBS must include, at a minimum, a unique identification number, the task name, the anticipated duration, and all dependencies. WBS in chart form is preferred.

– Format: Native.

(2) Document: Schedule

– Seller must furnish a project schedule for review, modification and acceptance by the Buyer's Project Manager. Schedule must show each set of tasks to be completed, expected duration, start and end time for each subsystem, and responsible person for each task at a level of detail determined by Buyer's Project Manager to be sufficient for project management.

– Format: Native.

(3) Document: Contact List

– Seller and Buyer's Project Manager must generate a common contact list identifying all key participants in the project including, at minimum, project owners; project executives/sponsors; Executive leadership responsible for the project for Seller and Buyer; project managers; engineering leads; technical leads; salespersons; sales manager; technicians; and supervisory personnel for Buyer, Seller, and all subcontractors. Contact information must include, at a

minimum, each person's name, company, project role, email address, office telephone number, mobile/24-hour telephone number, mailing address.

– Format: Native and PDF.

(4) Document: Security/Background Information

– This project requires entry to one or more secure public safety facilities. Seller personnel, including subcontractors, must successfully complete a criminal background security check to be allowed access to these facilities. Seller must supply fully completed Background Check Authorization Forms as supplied by Buyer's Project Manager for each Seller or subcontractor employee who will be on premises. Said forms must be supplied no later than five working days prior to the expected date of facility access.

– Format: Hardcopy.

(5) Document: Risk Register

– Seller must provide an ongoing risk register plan to the Buyer's Project Manager. Buyer's Project Manager must participate in the register's creation and maintenance. Register must contain, at minimum, number, description, probability, impact, risk owner, triggering event or circumstance, and response for each risk identified.

– Format: PDF and hardcopy.

(6) Document: Communication Plan

– Seller and Buyer's Project Manager must jointly produce a communications plan identifying project and agency stakeholders, their level of information required, the frequency of needed communication, the method of communication, and the creator of each communication.

– Format: Native and PDF.

(7) Document: Site Readiness Plan

– Where applicable, vendor must provide reports on the readiness of each Point of Destination and facility to accept the provided systems in accordance with industry standards and codes. Site readiness reports must include the specific instances of standard or code shortfalls, I including drawings, pictures, and text explanations, along with reference to the specific code, standard, or practice being applied. This document is intended to be used as the basis for Buyer improvements at the sites and must be prepared by Seller to best suit this use.

– Format: PDF and native

(8) Document: System Implementation Plan

– Seller must furnish documentation detailing the overall plan for changes in the system. This plan must be focused on subsystem level activity and illustrate the sequencing, interface, and dependencies of each subsystem.

– Format: PDF and native.

(9) Document: Transition Plan for Each Subsystem

– Seller and Buyer's Project Manager must jointly create a transition plan for each subsystem. The transition plan identifies the specific steps and changes required to move Buyer from the existing system to the new/upgraded system, including all interim or temporary states through which the process must move before achieving end state. For example, if system users must temporarily move to a backup location while the primary location is being implemented, this condition must be noted in the transition plan.

– Format: PDF and hardcopy

(10) Document: System Planning Documentation

– System Planning documentation includes the following, all of which are to be presented by Seller to Buyer's Project Manager for review, input, and approval prior to equipment ordering:

- Channel/talkgroup/frequency plan
- Transport design.
- Network management design identifying type and number of devices, alarms, monitors and presentation program and other elements required by the system

– Format: PDF and hardcopy

(11) Document: Staging Acceptance Plan

– Seller must provide a comprehensive test plan for all system components and their i interactions in a staged configuration to Buyer's Project Manager for review and approval. Seller must provide written (hardcopy) certification of the plan's successful completion signed by Seller and Buyer's Project Manager.

– Format: Native and hardcopy.

(12) Document: System Acceptance Plan

– Following installation and configuration, Seller and Buyer's Project Manager must inspect and test the system prior to implementation. Seller must supply the initial System Acceptance Plan (SAP) to Buyer's Project Manager for review and approval prior to implementation. Seller and Buyer must complete the testing as identified in the SAP and both must sign the document as satisfactorily completed prior to implementation beginning.

– Format: Native and hardcopy

(13) Document: Certificate of System Acceptance

– Seller must furnish a Certificate of System Acceptance to Buyer's Project Manager for review and signature. The Certificate must be signed by the Buyer's Project Manager upon successful completion of the project including any post installation system run time requirements.

– Format: Hardcopy.

13.1.4 Radio System

(1) Document: System Overview – A written description of the system including components used, transport methods employed, installation locations, configuration parameters, features and functionality of the installed system. – Format: PDF and native.

(2) Document: Component Operation, Installation and Maintenance Manuals – Manufacturer supplied operation, installation and maintenance manuals for all radios, antennas, TVSS devices, combiners, multiplexers, power distribution units, inverters, timing sources, simulcast equipment, and other components of the radio system.

– Format: PDF.

(3) Document: As Built

– The set of drawings, equipment specification sheets, engineer's instructions and other documentation detailing how the systems addressed by the project scope were implemented. The make, model, serial number and installed location of each major component must be noted and supplied in Native format (MS Excel preferred). Where applicable, a complete inventory of circuit board/card used in each equipment chassis, along with their location in the chassis, must be provided in Native format (MS Excel preferred). As built documents must include photographs of components' completed installation. This information will be used by Buyer's Project Manager to maintain and operate the system and will form the basis for ongoing documentation throughout the lifetime of the system.

– Format: PDF and native.

13.1.5 Federal Communications Commission (FCC) Licenses

(1) All applications made on behalf of the Buyer.

– Format: PDF.

(2) All documentation received from the FCC or sent to the FCC on behalf of Buyer in regard to the licenses.

– Format: PDF.

(3) All licenses received from the applications made on behalf of Buyer.

– Format: PDF.

13.1.6 Antenna Systems

(1) Document: As Built

– Antenna system as built drawings must include manufacturer make, model, and serial number for each installed antenna along with the site location, antenna support structure (tower), location on the structure (leg/face, height and azimuth), connection media, and downtilt. Additional components such as tower top amplifiers, waveguide splitters, circulators and others must be noted with make, model, serial number, mounting location, and connection

type. Photographs of the connection media's entry point into the equipment facility must be supplied and the proper connection media clearly identified. Photographs and identifying notations of antennas as mounted, grounding, inline TVSS, and cable paths must also be included.

– Format: Native.

13.1.7 Transport

(1) Document: Transport Design

– All network designs and engineering documentation including MPLS, WAN, and LAN systems. Documentation must include:

- System diagrams for all data networks and interconnections

  (i) Radio Network with interconnections to other networks

  (ii) Network Management Systems

  (iii) MPLS Network

- IP Addressing (Multicast and Unicast) - IP Address, Subnet Mask, and Default Gateway

- Port assignments for every data network device including unused ports indicating interface type (i.e., copper, SFP, etc.)

- VLAN diagrams (simply adding VLAN number to IP addressing tables will not suffice to meet this requirement) ◊ IP Multicast networks and protocols

- MPLS Network Diagrams:

  (i) LSPs
  (ii) Individual diagrams for each MPLS service instance (i.e., each epipe, VPLS, VPRN, IES, etc

– Format: Native.

(2) Document: As Built

– Where the Vendor furnishes transport elements, the Vendor must supply diagrams and explanatory text identifying each component and connection comprising the system transport (i.e., Ethernet, microwave, telco) as actually built. The characteristics of each connection (i.e., speed/bandwidth, protocol) must be identified for each link in the transport. Each component

of the system transport must be identified by make, model, device type, and serial number along with its installation location.

– Format: PDF and Native.

(3) Document: Maintenance and Operation

– Seller must supply all manufacturer provided documentation regarding the maintenance and operation of each component of the transport systems being furnished by Seller.

13.1.8 Network Management

(1) Document: System Design

– All final design and engineering documentation pertaining to the network management system must be supplied by Seller to Buyer's Project Manager for review and approval prior to implementation. The System Design must include diagrams, explanatory text, and other material detailing all network health, monitoring, configuration, routing, alert, alarm, and notification systems, devices and mechanisms used in the system. These systems include site alarms, environmental monitoring and report, equipment alarms, data network, database, server, backhaul, and other subsystems.

(2) Document: As Built

– Seller must supply drawings, specifications, diagrams, photographs, test data, and explanatory text identifying all network management elements described herein as they were built and configured. As builts must include addressing schemes used, equipment makes, model, serial number and firmware/software revision as applicable.

(3) Document: Maintenance and Operation

– Manufacturer supplied operations and maintenance manuals must be supplied for each portion of the network management system and the related subsystems (i.e., alerting, environmental, site alarms, etc.).

SECTION 14

Warranty and Maintenance Requirements

This section describes the warranty and maintenance requirements for the Lewis County Radio System.

14.1 Warranty and Maintenance

14.1.1 Seller must repair or replace without charge to Buyer, any equipment or part thereof, which fails in operation during normal use within 12 months after system acceptance. Repairs or replacement do not apply to failures caused by acts of God or extraordinary circumstances beyond the control of Seller.

14.1.2 Seller must perform all maintenance, servicing, removal and replacement of defective parts, and adjustments and measurements to maintain the equipment supplied under this contract to the manufacturer's specifications and requirements of the FCC for a period of 1 year from the date of Buyer's acceptance of the system. These actions must be at no additional cost to Buyer for those services requested for malfunctions reported during a normal working day. A normal working day is Monday through Friday, 0800 to 1700 hours, holidays excepted.

14.1.3 Seller must provide Buyer with written documentation after each service call describing the service performed, the cause of the outage or repair, and post repair testing, programming, or other actions taken to verify proper operation. If Buyer's spares were used in the repair, the item number or model number and serial number of the spare used, and the defective unit replaced must also be documented. Seller must return the defective unit to Buyer's specified location.

14.1.4 Seller must have a trained and competent technician to maintain the supplied equipment in a timely manner on 24-hour call at all times. Buyer must be given the phone numbers and addresses of the people to contact in an emergency. The designated technician on call must be located within a 60-minute normal driving range of Buyer's dispatch center.

14.1.5 When a malfunction is reported and service is requested, Seller's technician must be in contact with county technical staff within 30 minutes after Seller was notified by Buyer of request for service.

14.1.6 Seller must provide the names of the persons acting as the primary contact point for service, complaints, and general inquiries. Their names, addresses, and telephone numbers must be given to Buyer. Seller must supply the escalation process and personnel in written form in the event the normal trouble alerting and service request process not work.

14.1.7 Buyer may at its discretion elect to have its technical staff on site during the warranty repair and maintenance actions. The onsite staffing will be to witness and possibly assist in the equipment repair or upgrade process as desired.

14.1.8 Seller must provide the after-warranty services for board and module level return and repair service for the following:

- Five-day turnaround from receipt of the defective unit to return shipment.

- Twenty-four-hour turnaround from receipt of the defective unit to return shipment.

- Advance Replacement if a replacement unit is sent for Buyer's use prior to removal of service of the defective unit and Buyer returns the replacement unit to the repair depot after receiving Buyer's repaired unit back.

14.1.9 All warranty and repair work must be done to restore the original operation of the system is restored to the more stringent of these specifications or the manufacturer's original specifications. All replacement parts must be of new manufacturer, appearance, and performance. Any replacement parts or modules with a shelf life must have the original shelf life starting from the time of receipt by Buyer as when the unit was manufactured.

14.1.10 Maintenance and Test Equipment

(1) Each Proposer must include with the Proposal a list of recommended spare parts deemed necessary by the manufacturer to minimize down time and test and maintenance equipment required to maintain the equipment to the card level. Each Proposer must also submit a required list of test equipment and fixtures to maintain the system to the component level if possible or as close to the component level as possible.

14.1.11 Proposer must provide quotes as an option for the following:

- Complete system maintenance on a normal 0800-1700, five days a week basis for quoted on an annual basis for a 5-year term. Provide after-hours' call out hourly rates as well.

- Complete system maintenance on a 24/7 basis but not including mobile and portable units quoted for on an annual basis for a 5-year term.

- Services and equipment to keep the hardware and software up to date for a period of 10 years. The exact services included must be detailed along with any additional required services not included in the cost. This requirement includes work required of Buyer as well.

18.2 Future Equipment and Parts Availability

18.2.1 The manufacturer must certify in writing all parts, components, software, firmware, and major subassemblies used in this equipment will be available for at least 10 years after award of contract. This requirement ensures additional equipment required in the future can be assembled and supplied and replacement parts, software, and firmware will be available to maintain the supplied equipment.

SECTION 15

Project Closeout Requirements

This section describes project closeout requirements applicable to the Project. Each of the following elements must be accepted by Buyer's Project Manager as complete before the project will be considered closed and final payments issued.

15.1 Objectives Met

15.1.1 Buyer's Project Manager will conduct a product completion review to verify all project work was completed. All project objectives, goals and deliverables must be met at the quality and quantity identified in the project plan, specifications, and contract. This determination must be made solely at the discretion of Buyer's Project Manager in accordance with the contract, specifications, and plan relevant to this Project.

15.1.2 Accomplishment of goals and objectives must be signified by Buyer's Project Manager's signature on a Final Acceptance document.

15.2 Contract Terms

15.2.1 Every contract requirement and term, including requirements contained change orders, contract amendments, and other formally incorporated documents must be fulfilled to the Buyer's Project Manager's satisfaction prior to the acceptance of the proposed system as complete.

15.3 Documentation

15.3.1 Each document described in Section 17 Documentation Requirements must be completed and accepted by Buyer

15.4 Governmental Certifications

15.4.1 Where required, Seller must provide proof of compliance with federal, state and local requirements prior to project closure. These requirements may include, but are not limited to:

(1) Compliance with prevailing wage, insurance, tax and other requirements.

(2) Escrows for source code or other intellectual property as required by the Contract.

(3) Proof of payment to suppliers, subcontractors, and others as required by law and/or contract.

(4) Grant requirements, as applicable

15.5 Transfer of Responsibility and Support

15.5.1 1 The Project's resulting systems must be transferred from project teams to operations, maintenance, and warranty teams as appropriate. Seller must supply documentation of the transfer and conduct a training/orientation session regarding the Buyer contacts and process with ongoing support providers identified by the Seller.

15.6 Financial Review and Final Invoice

15.6.1 Final invoice may be submitted following completion of a financial review and reconciliation of the Project conducted by Buyer's Project Manager with Seller.

15.7 Project Closure Certification

15.7.1 Upon satisfactory completion of these requirements, Buyer's Project Manager and Seller must certify the Project as complete by signing a Project Closure document.

>>> END OF TECHNICAL SPECIFICATIONS SECTION<<<

END OF TECHNICAL SPECIFICATIONS DOCUMENT

TELEVATE

Lewis County, WA Public Safety Radio System Engineering Study Report

Televate, LLC
1934 Old Gallows Road
Suite 350
Vienna, VA 22182

November 2023
P: 703-639-4200
www.televate.com

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Executive Summary

Introduction

Lewis County, WA ("the County") engaged Televate to identify gaps in current public safety radio system coverage and provide recommendations to improve radio site coverage, compatibility, and interoperability. Specifically, the County requested that Televate:

1. Develop a plan for and make recommendations for replacement of existing radio infrastructure equipment as a county-wide simulcast system
2. Develop a plan for and make recommendations for replacement of existing microwave infrastructure
3. Develop a plan for and make recommendations for replacement of existing DC power plants
4. Perform an analysis of existing sites and provide recommendations of additional/alternate sites for improved coverage, and
5. Provide coverage maps of existing and proposed sites.

To accomplish these objectives for the County, Televate sought to define a comprehensive public safety radio system upgrade, which will prepare the County for an effective procurement and smooth execution of the upgrade implementation process. Televate proceeded to work in partnership with Lewis County project leadership and stakeholders to document their unique requirements and to help prepare for the next phase of the system procurement cycle that will establish a mutually agreeable contract with a qualified radio system vendor resulting in a sustainable, interoperable, standards-based and cost-effective radio system that addresses the public safety community's needs throughout the County. This report documents and details the findings and recommendations for the County.

Key Findings

During the needs analysis and through discussions with County stakeholders, Televate identified multiple systems supporting public safety and public works communications within the County. These systems include:

- Fire System East
- Fire System West
- RFA City System
- RFA District 12 System
- Fire Paging
- City PD System
- LCSO System East
- LCSO System West
- Public Works
- Microwave/Backhaul System

Televate also identified the following key items affecting County system users:

System Item/Feature	Findings
Coverage	• Fire coverage is limited in many areas • The use of a simplex channel for fire hampers the ability of field users to communicate directly with each other and they must relay messages through dispatch in many situations • Coverage within the cities and along Route 12 is a priority

	• FD14 has coverage issues in the southern portion of the district – repeater was moved from Watch Mountain due to site access problems • FD1 has coverage issues along Route 508 • Lewis County Sheriff's Office (LCSO) experiences coverage issues along Route 12 east of Packwood, in the Mineral area, in the northwest portion of the County, in addition to other areas • Western fire districts including FD11, FD13, FD16 have many coverage issues – can usually hear dispatch but can't reliably talk back • Fire Paging generally has adequate coverage • PD coverage in the cities of Chehalis and Centralia is generally good – has improved since the main site was moved – some in-building issues exist in buildings such as the hospital, Walmart and Home Depot • Coverage for the separate Riverside Fire Authority (FD12 and Centralia) system is generally good, except for in-building coverage in large commercial facilities • Public Works operates with a single repeater in the east and a single repeater in the west
Interference	• The County frequently receives substantial interference on the primary fire frequency (Fire 1) from transmitters in Mason and Pacific Counties – this should be addressed as soon as possible • Some fire districts in the eastern portion of the County use a different channel to avoid the interference
Site Connectivity	• Microwave connectivity is limited • Connectivity to many sites is done through aged Telco T1 channels over partner's microwave, or via analog circuit connections
Capacity	• Capacity for the most part is adequate, however, additional repeated Tactical channels should be considered for both fire and law enforcement, if available, to offload the dispatch channels • Newly acquired simplex Tactical channels (5) will provide additional opportunity to offload traffic from the main dispatch channels – these tactical channels, along with other potential frequency changes, need to be programming into all radios
System Reliability	• System reliability has generally been acceptable, although it was noted that one microwave link becomes unreliable when temperatures are over 95 degrees • Regular site checks are performed by the Radio Services personnel which helps to maintain consistent operation

Dispatch Operations	• Dispatch spends time repeating communications between units in the field since they can't hear each other – a repeated frequency pair will significantly reduce this need • Dispatch contends with users in the east and west portion of the County since they can't hear each other • The dispatch workload suggests 24 dispatch operators are needed, yet the center currently has only nine • Users in the field would like more consistent dispatch related to training/procedures, voice volume and clarity
Interoperability	• County fire and law enforcement can talk to each other • No interoperability with the State Patrol, although it is seldom needed • Fire districts require interoperability with the state Division of Natural Resources (DNR) • FD11 also needs to talk with Pacific County to the west
Site Infrastructure	• The conditions of the sites vary – an assessment was performed • The Democrat site is currently located at a residence and needs to be upgraded • Additional recommendations will be provided as part of the enhanced system concept
Features	• The Lewis County Sheriff's Office (LCSO) and the local police departments need encryption capability and would also like radio location capability, emergency button use, and individual call capability
Operational	• New Radio Services personnel have been very helpful and have made substantial improvements • The radio committee meetings should be continued • The fire chief's meetings should be continued

Table 1: Study Key Findings

Following a complete analysis of the existing systems and considerations of the key findings and needs, Televate provided specific actionable recommendations for each of the systems listed above to provide significant improvements in public safety communications for the County's first responders. Please see the Recommendations for Improved Public Safety Communications section of this report.

Televate additionally provided capital cost estimates for the recommended site facilities upgrades, as well as estimated ongoing operating and maintenance costs. Please see Cost Estimate of Proposed Recommendations. A complete estimated project budget was also provided under separate cover.

Finally, to facilitate an efficient project to implement the recommended enhancements, a set of next steps for the County to pursue were provided, including:

- Achieving consensus on the recommended direction and performing coordination with its partners

- Developing a comprehensive frequency plan as soon as possible, which entails:
    - Performing coordination on potential new frequencies and identifying frequency pairs
    - Evaluating available frequencies from a combining/multicoupler perspective for the following groups:
        - East simulcast cell group:
            - Fire East repeater pair
            - LCSO East repeater pair, and
            - Public Works East repeater pair.
        - West simulcast cell group:
            - Fire West repeater pair
            - LCSO West repeater pair, and
            - Public Works West repeater pair.
    - Identifying a new Fire West frequency and begin using ASAP
- Identifying and allocating sufficient funding for the project
- Developing a long-term Public Safety Communications strategy
- Establishing a procurement strategy and developing a procurement specification, and
- Considering dispatch improvements.

Existing System Background

County Systems

In order to develop firsthand familiarity with the County's system and to subsequently outline viable paths for system enhancement options, an exhaustive data collection, review and analysis effort was conducted. System data was collected through a review of available electronic records from the County's operational personnel, publicly available information from FCC records and other sources, as well as through targeted onsite physical surveys. Additionally, a series of discussions were held with the radio services and dispatch personnel to better understand the system's history, strengths and gaps, desired outcomes, and overall vision.

Data collected to support the assessment included:

- Overall radio and microwave network architecture and system design
- VHF radio and microwave equipment types, models, quantities, and years in operations
- RF site coordinates
- Operational frequencies
- Dispatch center equipment and interfaces, and
- Site equipment inventory.

Current Systems Overview

The County currently operates VHF analog conventional systems for both their law enforcement and fire operations. These systems support the following County and partner agencies:

- Law Enforcement:
  - Lewis County Sheriff
  - Centralia PD
  - Chehalis PD
  - Napavine PD
  - Winlock PD
  - Toledo PD
  - Morton PD
- Fire Agencies:
  - LCFD #1-Onalaska
  - LCFD #2-Toledo
  - LCFD #3-Mossyrock
  - LCFD #4-Morton
  - LCFD #5-Napavine
  - LCFD #6-Chehalis
  - LCFD #8-Salkum
  - LCFD #9-Mineral
  - LCFD #10-Packwood
  - LCFD #11-PeEll
  - LCFD #13-Curtis
  - LCFD #14-Randle
  - LCFD #15-Winlock
  - LCFD #16-Doty
  - LCFD #18-Glenoma
  - Cowlitz-Lewis #20
  - Riverside Fire Auth.
  - Chehalis FD
- Other Agencies:
  - American Medical Response
  - Coroner's Office
  - Public Works/DEM
  - US Forest Service

Televate analyzed the different systems in order to establish a complete picture of communications throughout the County. These systems include:

- Fire System East
- Fire System West
- RFA City System
- RFA District 12 System
- Fire Paging
- City PD System
- LCSO System East
- LCSO System West
- Public Works
- Backhaul System

A description of each of these systems is provided below and estimated coverage performance based on a propagation simulation is provided in Appendix B: Current System Predicted Coverage.

Fire System East:

The fire system in the eastern portion of the County operates with Tx/Rx sites at Storm King (154.19 MHz for the Mineral area – FD9), Dog (154.19 & 156.105), Randle Fire (155.805), and Packwood (155.805). The Storm King and Dog sites use the Fire 1 channel of 154.19, while the Randle Fire and Packwood sites utilize the Fire 3/4 repeated channel (155.805/156.105) which support fire districts 10 and 14. The Hopkins site is used as a relay site for Storm King (via 159.315). A diagram of this configuration is shown in Figure 1.

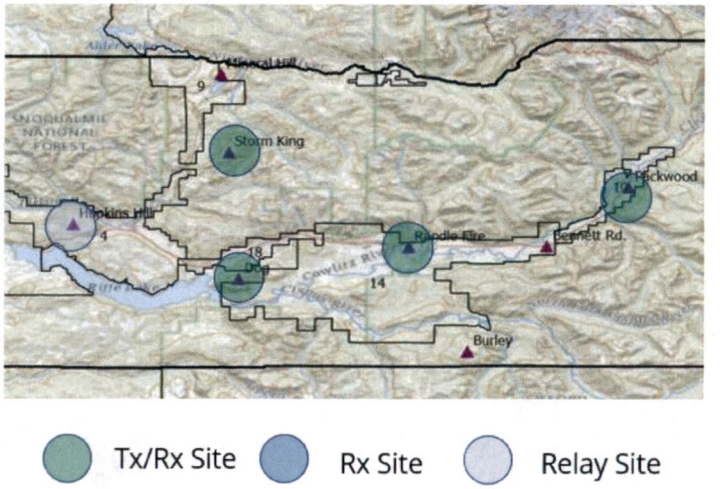


Figure 1: Lewis County Fire System East Sites

Fire System West:

The fire system in the western portion of the County operates with Tx/Rx sites at Crego and Democrat, with receive only sites at Cooks, Onalaska, Toledo, and at the Fire District 11 Station (receives one frequency then transmits on 154.19). All of these sites utilize the Fire 1 channel of 154.19, except for the alternate receive frequency used at the Fire District 11 Station. A diagram of this configuration is shown in Figure 2.

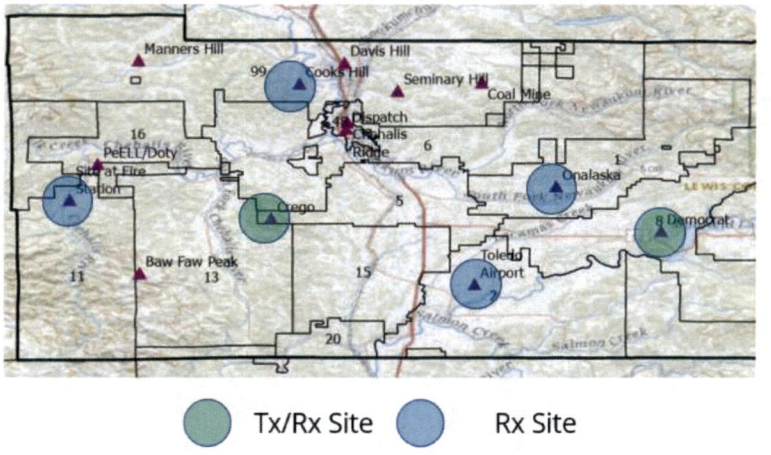


Figure 2: Lewis County Fire System West Sites

RFA City System:

The RFA system that supports the fire departments for Chehalis and Centralia uses Tx/Rx sites at the Courthouse and Seminary Hill, with receive only sites at Cooks and Crego. This system is configured as simulcast transmit and voted receive and uses the repeater pair of 154.145/158.760 MHz, which is also referred to as the Fire 6 channel. A diagram of this configuration is shown in Figure 3.

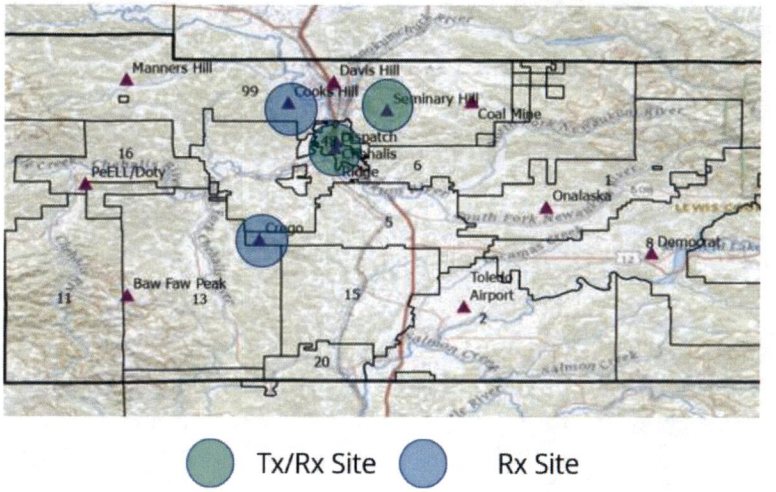


Figure 3: RFA City Fire System

RFA District 12 System:

The Riverside Fire Authority (RFA) District 12 system supports the fire district in the northwest portion of Lewis County and utilizes Tx/Rx sites at Crego, Cooks, Coal Mine, Manners and receive only sites at the Courthouse and Seminary Hill. This system is configured as simulcast transmit and voted receive and uses the repeater pair of 154.9725/159.0975 MHz, which is also referred to as the Fire 2 channel. A diagram of this configuration is shown in Figure 4.

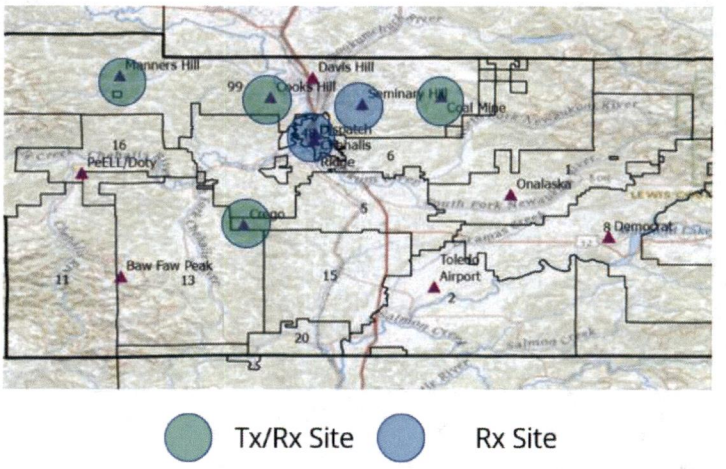


Figure 4: RFA District 12 System

Fire Paging System:

The paging system that supports all fire agencies within the County utilizes two sites in the east (Dog and Packwood) using the mobile receive side of the voice channel in that area (155.8050 MHz) instead of a dedicated paging channel. The paging system in the western portion of the County uses a total of four sites at Cooks, Crego, Manners, and Toledo using a dedicated paging frequency 155.7150 MHz. A diagram of this configuration is shown in Figure 5.

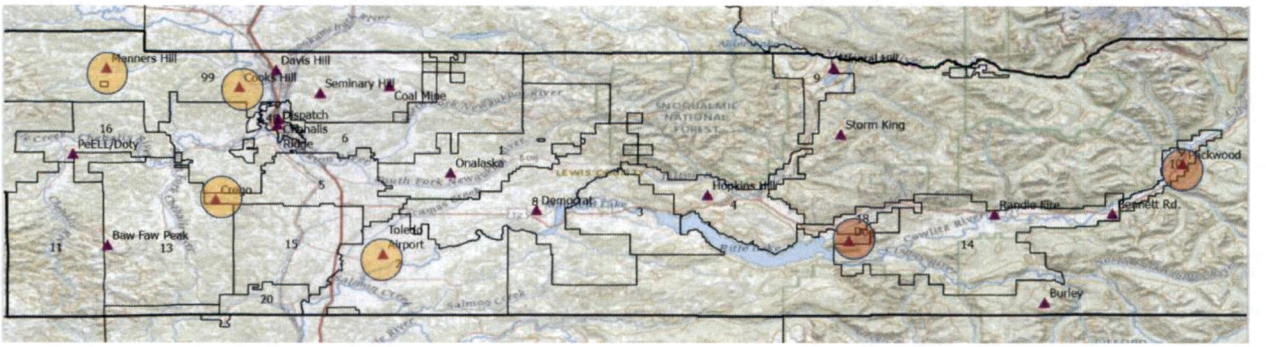


Figure 5: Fire Paging System

City Police Departments (PDs) System:

The system that supports the police departments for Chehalis and Centralia uses one Tx/Rx site at Chehalis Ridge and a receive only site at Seminary Hill. An additional receive site at Davis Hill has been disabled as it was not found to provide any additional benefit. This system uses the repeater pair of 156.1800/159.0000 MHz. A diagram of this configuration is shown in Figure 6.

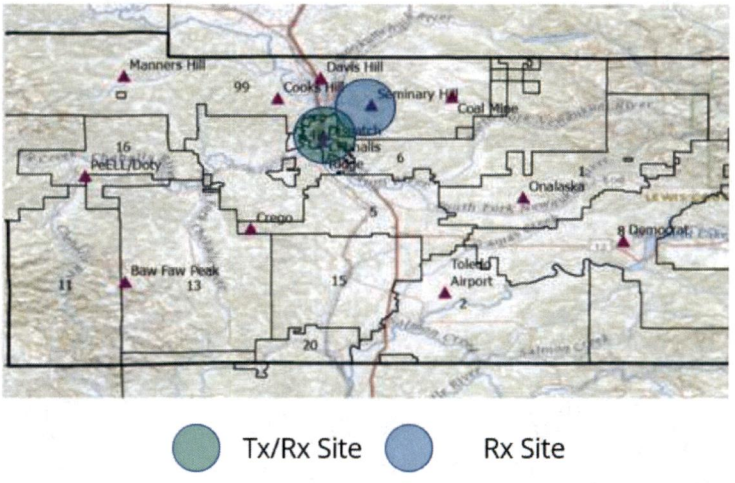


Figure 6: City PD System

LCSO System East:

The system that supports LCSO in the eastern portion of the County uses the Burley and Storm King remote sites as Tx/Rx, which are linked via a transmitter at Crego. This system also uses receive only

sites at Bennett, Dog, Hopkins, and Packwood. The frequency pair used for this system is 155.6250/156.0300 MHz. A diagram of this configuration is shown in Figure 7.

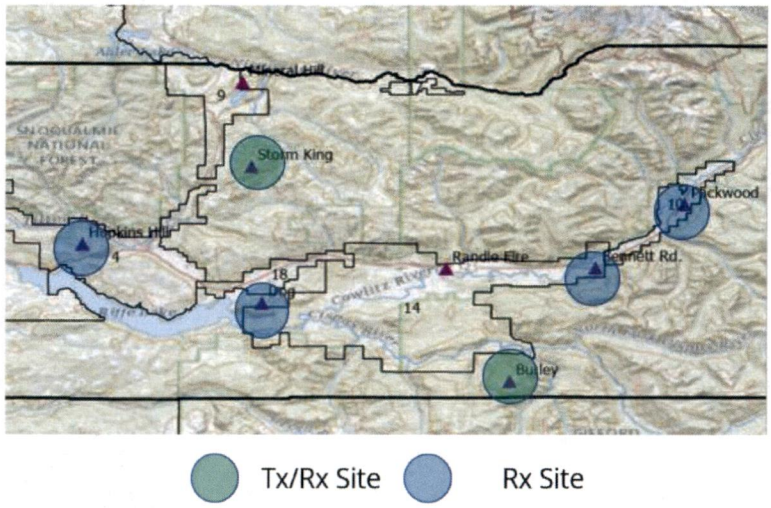


Figure 7: LCSO System East

LCSO System West:

The system that supports LCSO in the western portion of the County uses a single Tx/Rx site at BawFaw and receive only sites at Crego, Davis Hill, Hopkins, and Toledo. The frequency pair used for this system is also 155.6250/156.0300 MHz. A diagram of this configuration is shown in Figure 8.

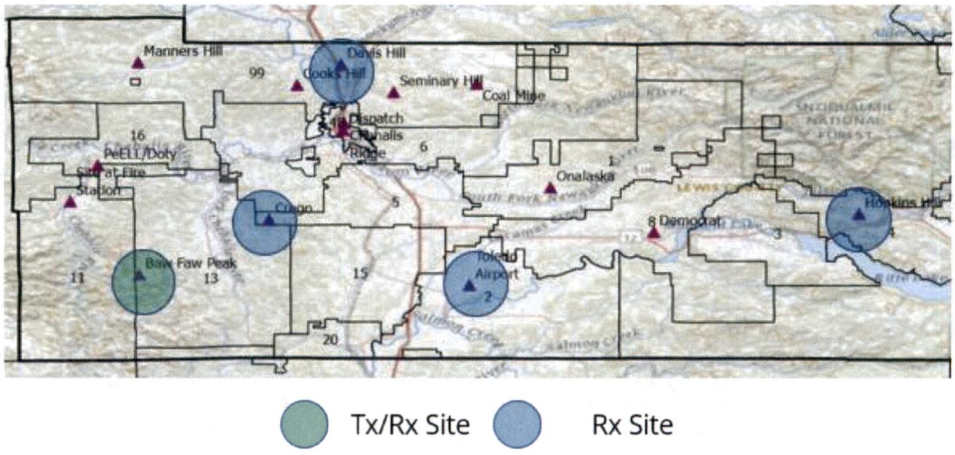


Figure 8: LCSO System West

Public Works:

The public works system operates from a single repeater site at Hopkins for the east side of the County, and single repeater site at Crego for the west side of the County. A diagram of this configuration is shown in Figure 9. Both repeaters use the frequency pair 155.1000/155.7450 MHz for their operations.

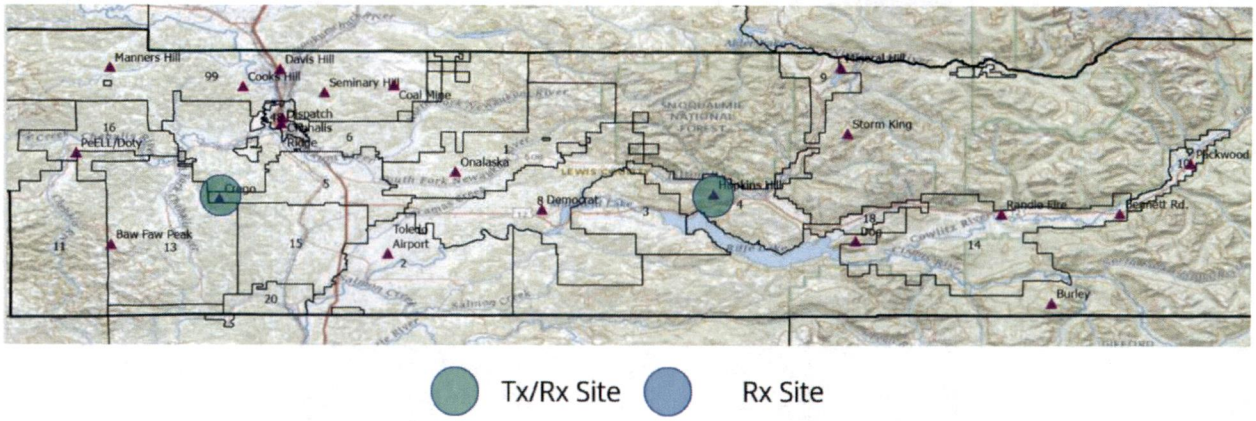


Figure 9: County Public Works System

County Microwave Backhaul Network:

The County currently uses microwave links to provide radio site backhaul connectivity to some of the communications sites in use throughout the County. Some microwave links are owned by the County and other connections provide a T1 connection configured over a County partner's microwave. These existing connections are shown in Figure 10.

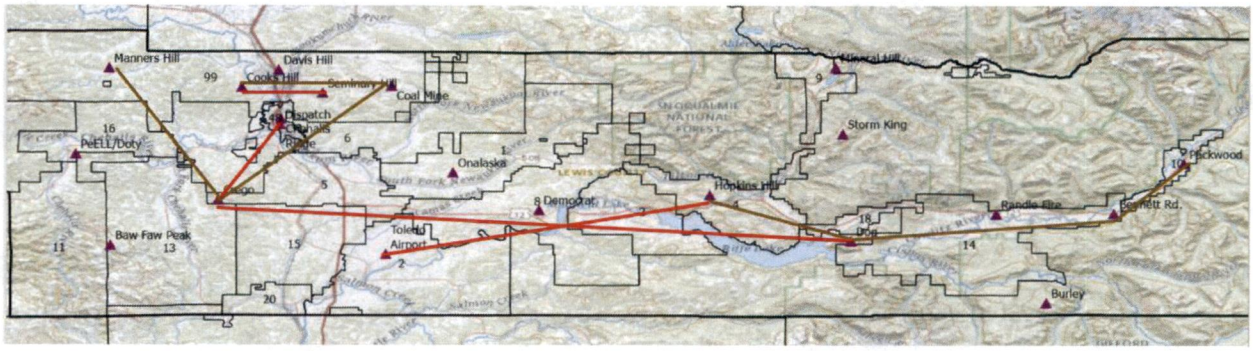


Figure 10: Lewis County Microwave Backhaul Network

Physical Infrastructure

The County maintains approximately twenty communications sites to support the operations described above. These sites contain substantial physical infrastructure which includes radio towers or other support structure, equipment shelters with environmental support systems, DC power plants and backup generators. These facilities are essential for maintaining a robust radio network. Basic descriptions of the sites currently in use today in Lewis County appear below in Table 2.

Site Name	Structure	Equipment Location	Backup Power
BawFaw Peak	Self-support tower	Custom block building	Batteries and generator

Bennett Rd.	Self-support tower	Concrete prefab building	Batteries and generator
Burley	Tower	Custom building	None – Solar power only
Chehalis Ridge	Monopole tower	Custom block building	Generator
Coal Mine	Self-support tower	Custom building	Batteries and generator
Cooks Hill	Self-support tower	Room inside fire station	Batteries and generator
Crego	Self-support tower	Portion of custom block building	Batteries and generator
Davis Hill	Pole attached to building	Custom brick building	None
Democrat	Pole attached to house	Garage	None
Dog	Self-support tower	Custom building	Batteries and generator
Historic Courthouse	Building rooftop	Building equipment room	UPS and generator
Hopkins Hill	Self-support tower	Custom building	UPS and generator
Manners Hill	Self-support tower	Custom block building	Batteries and generator
Onalaska	Pole attached to building	Room inside fire station	Batteries
Packwood	Ladder structure of water tower	Custom building	Batteries
Seminary Hill	Wooden pole	Outdoor cabinets	Batteries and generator
Storm King	Tower	Custom building	None – Solar power only
Toledo Airport	Self-support tower	Custom building	Batteries
Randle Fire	Tower attached to building	Room inside fire station	Batteries

Table 2: Current Lewis County Infrastructure Sites

FCC Licenses

Another key ingredient for maintaining a public safety radio system is the access to licensed frequency spectrum. Voice communications is achieved via the use of frequencies licensed by the Federal Communications Commission (FCC). The primary frequencies in use by Lewis County, as well as some additional licensed frequencies, are listed in Table 3.

Frequency (MHz)	Current Usage
154.1900	Primary fire dispatch and voice channel - simplex
154.1450/158.7600	Used by RFA for fire voice for Chehalis and Centralis fire
154.9725/159.0975	Used by RFA for fire voice for fire district 12
155.8050/156.1050	Repeated pair for fire paging and voice for fire districts 10 and 14

155.7150	Fire paging for County and RFA fire districts
155.6250/156.0300	Law enforcement voice channel for Lewis County Sheriff's Office
156.1800/159.0000	Law enforcement voice channel for Chehalis and Centralia PD
155.4150/159.0300	Jail voice channel
155.1000/155.7450	Voice communications for County public works
154.3400	Hospital Emergency Administrative Radio (HEAR) - Primarily used by ambulance services for administrative communications with hospitals
155.7675	SW WA public department (fairgrounds voice communications)
155.9550	Used by fire district 14
154.4300	Licensed by Lewis County and RFA
154.9800	Licensed by Lewis County
154.9950	Licensed by Lewis County
155.0100	Licensed by Centralia, Chehalis, and Lewis County
158.9250	Licensed by Lewis County

Table 3: Lewis County Licensed Frequencies

FCC license changes are likely to be required when the County chooses to implement system enhancements.

Subscriber Devices and Vehicular Repeaters

The public safety agencies within Lewis County operate a variety of mobile and portable radios as part of their communications systems. Based on on-site interviews and responses to a user survey, it is estimated that the County agencies operate approximately 300 mobile radios and 500 portable radios. These radios come from various manufacturers, including Bendix King, Icom, Kenwood, and Motorola. The majority of these radios support analog voice only, although a small percentage would be capable of supporting digital voice. Some agencies also utilize in-band vehicular repeaters as a means to extend the usable range of portable radios in areas of limited coverage.

Dispatch Centers and Equipment

Radio dispatch consoles are critical tools used by telecommunicators or dispatch staff to communicate with, support, and coordinate the first responder field response and operations. Dispatch equipment is situated at call-taking/dispatch operator positions and is typically connected via wired or wireless links to central switching controllers or to base station radio sites. Lewis County dispatches from the historic courthouse location and maintains eight dispatch positions utilizing Motorola MCC7500 consoles. The County also uses a Motorola (formerly Spillman) Computer Aided Dispatch (CAD) system.

Current Systems Signal Measurements

LMR network signal level measurements were taken to confirm existing system performance, as well as to provide input into the radio propagation tool to improve the accuracy of the RF coverage simulations. During Televate's on-site visit in August 2023, a signal measurement device was used to gather existing system signal measurements. A Berkeley Varitronics Systems Coyote™ (shown in Figure 11) unit was used to measure the signal level and correlate it to GPS location.

Figure 11: Measurement Device

The unit was programmed to receive and measure frequency 155.1000 MHz for testing purposes. The testing was performed in a County vehicle while driving throughout the County with the unit held inside in the passenger seat. Since the Lewis County systems are conventional, the channels are normally only active when a call is in process. However, to record data throughout the drive route, the channel was placed into a periodic transmit mode, which would cycle the transmitter on and off for 30 seconds each. The data was then filtered to eliminate the data when the transmitter was off.

Over a two-day period, measurements were recorded from a total of four sites: BawFaw, Crego, Hopkins and Packwood. Data from each of these measurements are shown in the figures below. In each case, the following legend applies to illustrate the measure radio signal strength:

> -78 dBm	
-78 to -88	
-88 to -98	
-98 to -107	

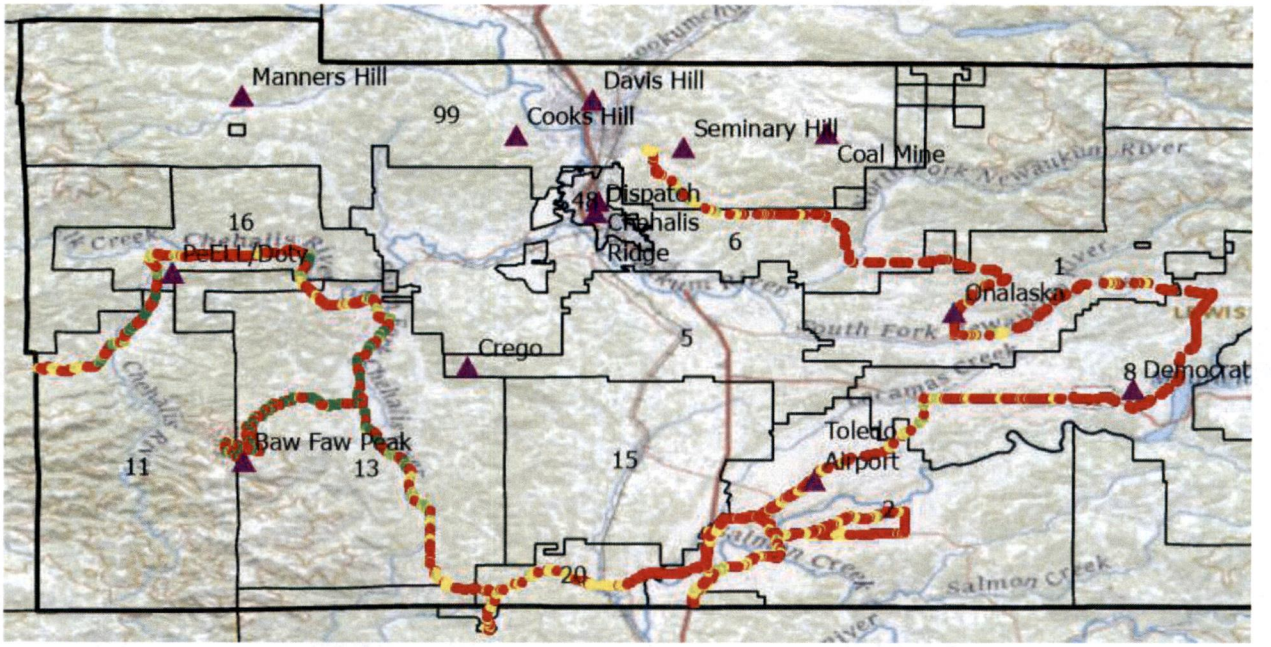


Figure 12: Recorded Signal Level Data from BawFaw

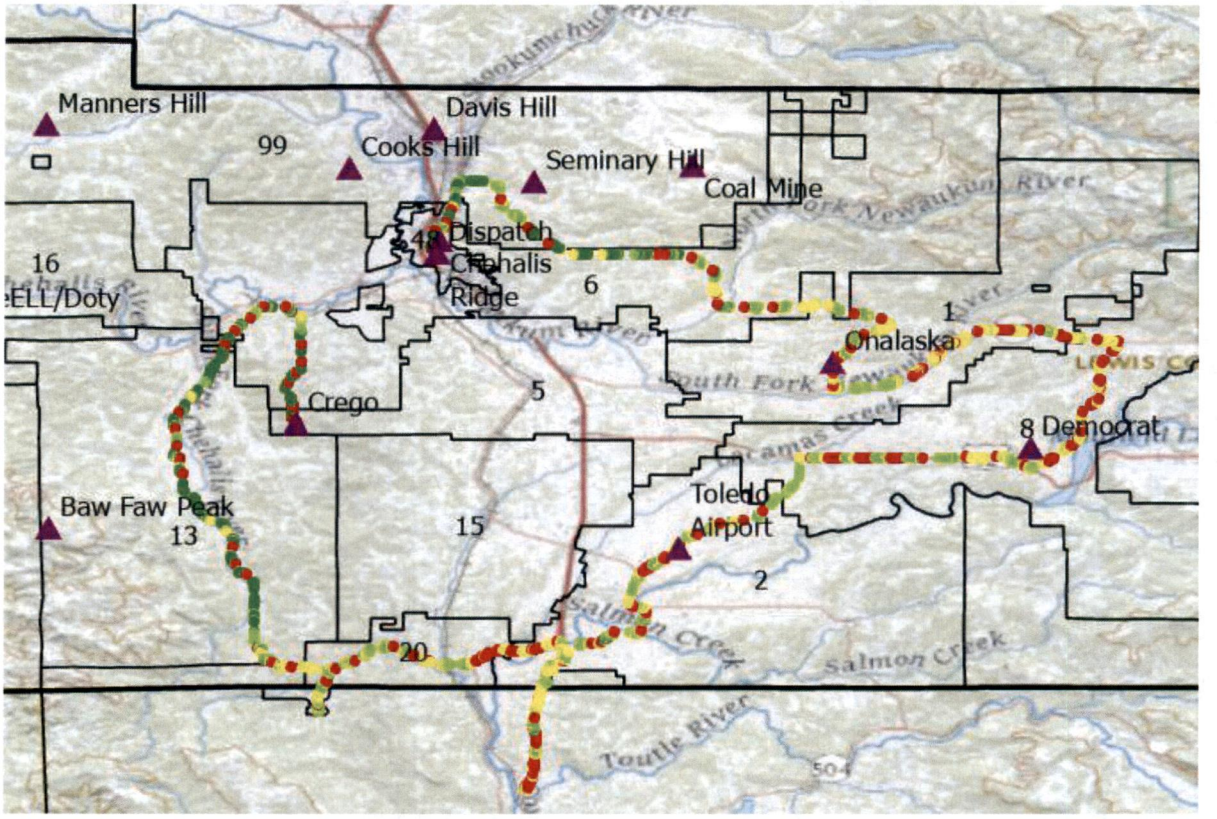


Figure 13: Recorded Signal Level Data from Crego

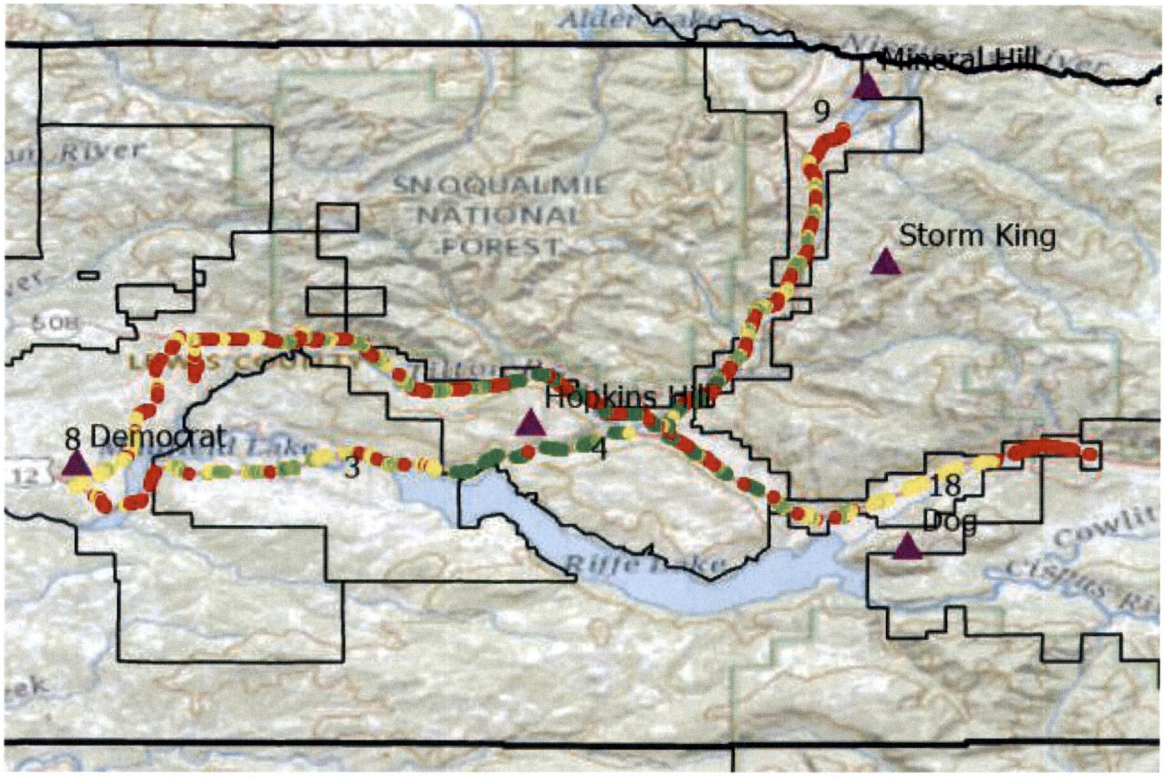


Figure 14: Recorded Signal Level Data from Hopkins

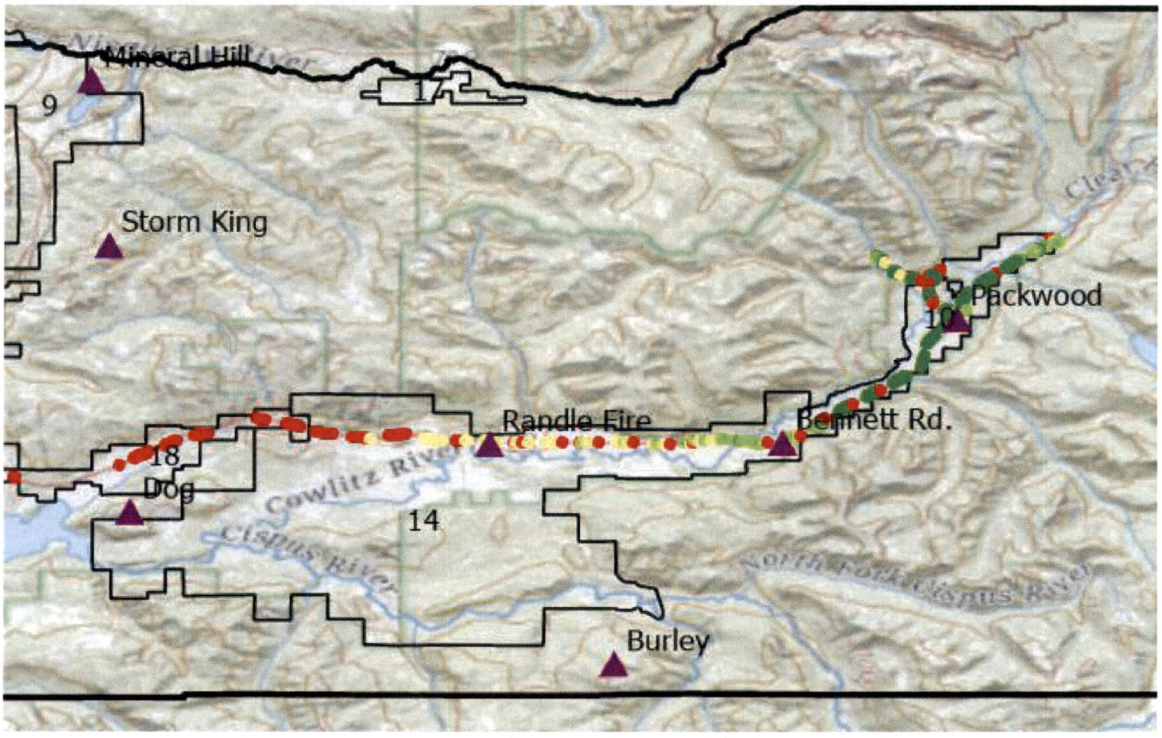


Figure 15: Recorded Signal Level Data from Packwood

SYSTEM FEEDBACK FROM USERS

Identifying the objectives and needs of the public safety communications system stakeholders is key to establishing requirements for radio system enhancement solutions. Technology selections and investments are best driven by the user community to ensure that the next generation radio network satisfies their unique communications needs, and likewise considers fundamental financial and governance objectives. During the on-site visit to Lewis County, the Televate team conducted interviews and informal discussions with technical, end user, management and systems operations staff regarding the system's operation and performance. Discussions focused on a range of topics including current systems capabilities and gaps, interoperability requirements, and the condition of existing and new infrastructure assets. A radio user survey form was also made available for those stakeholders that did not have the opportunity to attend in person interviews.

Detailed notes from the on-site interviews are included in *Recommended Next Steps*

Televate recommends Lewis County proceed in the following manner to implement the recommendations provided in this report.

Consider Recommendations and Direction and Coordination

The County should review the recommendations provided in this report, provide feedback and update plans as necessary. Additionally, the County should engage additional stakeholders from the County's first responder community to solicit input on the recommended direction and achieve consensus on the approach. Once consensus on the preferred approach is achieved, Televate recommends that the County begin the coordination activities with its communications partners, including RFA, WSDOT, and others as necessary to implement the recommended improvements.

Develop a Comprehensive Frequency Plan As Soon As Possible

Co-channel interference on the main fire frequency is one of the most critical issues currently faced by County first responders. It is essential that the County address this issue as soon as possible. To do so, Televate recommends the following short-term actions:

Perform coordination on potential new frequencies

A number of potential alternative and additional frequencies suggestions are provided in this report. Televate recommends the County work with a licensed frequency coordinator to perform coordination services on selected frequencies to determine what frequencies can be licensed by the County and to move forward with the licensing process. The usable frequencies should then be combined as candidate frequency pairs to create repeated channels.

Evaluate available frequencies from a combining/multicoupler perspective

Once the collection of new frequencies is identified and candidate repeater pairs are created, it is suggested that the County identify groups of frequency pairs that can be easily combined at a common site. The groups that the County should consider include:

- East simulcast cell group:
  - Fire East repeater pair
  - LCSO East repeater pair, and
  - Public Works East repeater pair.
- West simulcast cell group:
  - Fire West repeater pair

- LCSO West repeater pair, and
- Public Works West repeater pair.

Identify new Fire West frequency and begin using ASAP

The process described above will identify a candidate repeated frequency pair for the Fire West system. Televate believes that the County should begin using this frequency as soon as possible, even if the other recommended enhancements are not addressed until a later time. Elimination of the interference currently experienced on the 154.1900 frequency may be worth the additional effort of reprogramming radios with this new frequency, even if radios will need to be programmed again at a later date.

Allocate Funding for the Project

It is Televate's understanding that the County intends to utilize identified ARPA funding in addition to a source of grant funding in support of this project. It is recommended that the County confirm these allocations in the amounts available to support this project. In order to implement all enhancements, the currently identified ARPA and grant funding may not be sufficient to support the entire project. Therefore, since additional funding, above and beyond the currently identified allocations may be required for this project, it is recommended that the County develop a plan to address the potential for additional costs. Potential options for addressing this may include:

- Identifying additional funding to cover potential additional costs
- Scaling back or phasing in the improvements over several years, or
- Working with partner agencies to identify additional funding.

Additionally, since the timing for the funding may vary by source, it is recommended that the earliest available funds be allocated toward the portions of the project that are likely to have the longest lead time for implementation, including the facilities updates and the extensive microwave connectivity.

Develop a Long-Term Public Safety Communications Strategy

In addition to these near-term improvements, Televate recommends the County also consider additional improvements to further enhance the public safety communications within the County. Considerations may include:

- Upgrading law enforcement user radios for P25 capability to support encryption and location services
- Adding additional site infrastructure to further improve coverage in key areas
- Upgrading additional site infrastructure to support digital communications for improved coverage with existing sites, and
- Considering a regional consortium with neighboring counties to share resources and improve regional communications.

Establish a Procurement Strategy and Develop a Procurement Specification

Once the final project direction has been established and the funding strategy is in place, Televate recommends that the County develop a procurement strategy for the project, and as required, a procurement specification to define the project and solicit proposals. Televate would be happy to assist the County further with establishing this strategy and documentation.

Consider Dispatch Improvements

In addition to the radio enhancements recommended in this report, Televate recommends that the County perform an internal dispatch assessment to consider potential improvements to dispatch operations and to address comments received from stakeholders. Some areas that could be investigated include:

- A staffing analysis to determine the optimal number of dispatch operators required for the current call volume and a means to achieve this level
- A review of and potential update to the current dispatch processes regarding call handling and interaction with the first responders – this should include communications with the first responder agencies to solicit their input as well as inform them on the dispatch processes and challenges that exist
- Consideration of a patching policy to facilitate communications between the east and west systems/channels when necessary
- A review of and potential update to the current dispatch training processes to better enable consistent call handling and response, and
- An evaluation of an Automated Voice Dispatching (AVD) system to ensure consistent volume and voice quality.

Appendix A: On-Site Interview Notes. A summary of the key findings from the in-site interviews and survey results has been provided in Table 1 in the executive summary portion of this report.

The primary issues that surfaced during interviews and also in the survey results was the need for better coverage and problems due to disruptive radio channel interference. Coverage issues plagued most of the agencies, except for those that work primarily in the Cities of Chehalis and Centralia. However, even for these agencies, larger buildings such as the big "box" stores (Walmart, Home Depot, etc.) still cause problems.

Interference is a major concern with most of the County fire agencies. All agencies that still utilize Fire 1 (154.1900) commented on the interference from outside the County, mostly from Mason County. Televate was able to confirm the assertion that Mason County is operating a site on 154.1900 at high power. Our research of FCC records did reveal a City of Shelton call sign KNFF591 in Mason County which is licensed at an Effective Radiated Power (ERP) of 350W. Televate performed a contour analysis of that license to determine its potential impact. Figure 16 below shows the location of the City of Shelton site and the predicted service (Blue) and interference (Red) contours based on the license information. It can be seen that the predicted interference contour intersects a very large portion of Lewis County and confirms the reason behind the significant interference problems experienced on Fire 1.

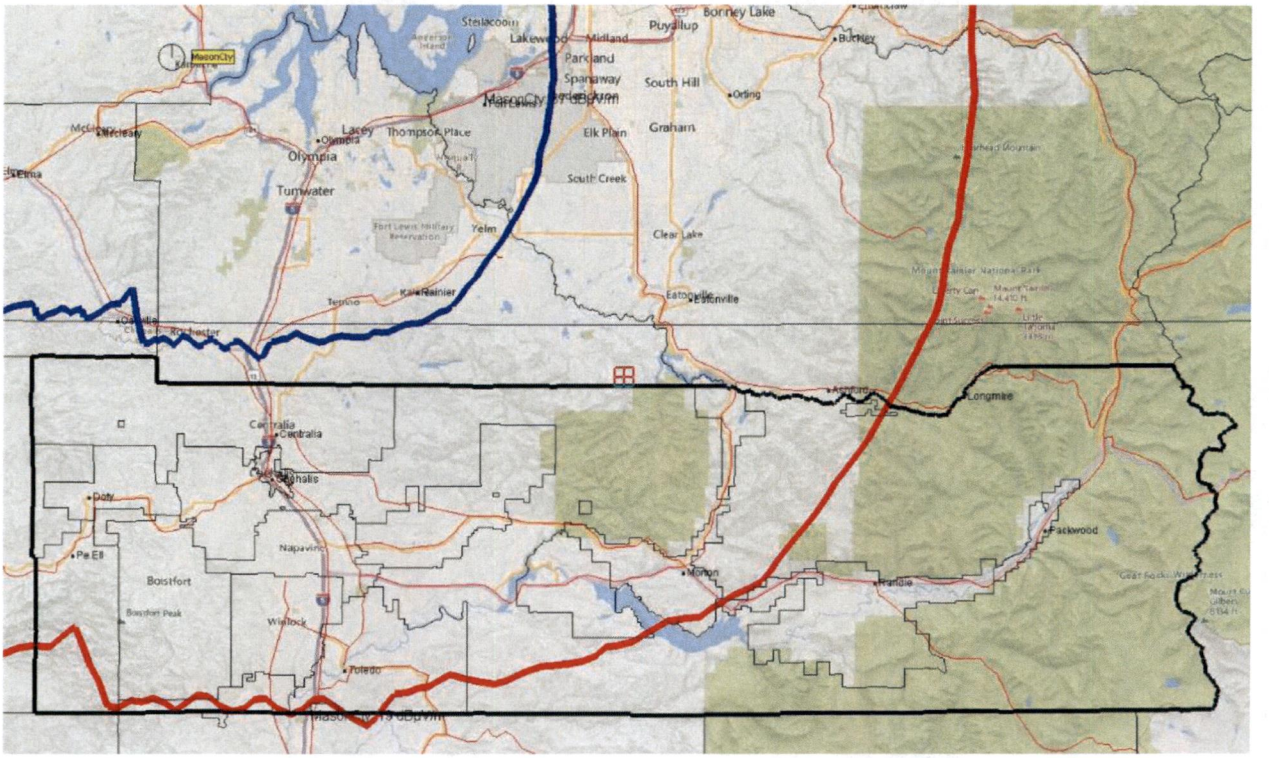


Figure 16: City of Shelton License KNFF591 Service (—) and Interference (—) Contours

In addition to documenting significant findings from the system research and stakeholder meetings, Televate developed a list of key requirements that should be addressed by the system enhancements. These key system requirements are summarized in Table 4.

Category	Key System Requirements
Overall Functionality and Coverage	• An alternative to the main fire frequency (154.1900) must be identified and implemented to resolve the interference issues • Fire system coverage must be improved in key areas in both the eastern and western portions of the County ○ Additional vehicular repeaters can provide a short-term improvement • Law Enforcement system coverage must be improved in key areas in both the eastern and western portions of the County
Site Connectivity	• It is critical to implement a modern microwave system to support digital signaling and robust connectivity between sites
Dispatch Operations	• Implementing a repeater pair for the primary fire channel to facilitate direct communications between field users and eliminate the need for dispatch to repeat traffic would be a significant improvement

Radio Programming, TAC channels and Interoperability	• Additional TAC channels should be incorporated into a common radio template • Additional repeated channels should be incorporated if available • Key interoperability channels (such as DNR) should be incorporated into the radio templates • Fire radio templates should be programmed to a common standard
Features	• A key enhancement would include the capability for future support of digital communications to support encryption and location tracking of radios for law enforcement
Operations and Maintenance	• Ensure a sustainable, fault-tolerant network, including redundant power at the sites and redundant backhaul • Implement a full suite of remote monitoring, alarm/fault management capabilities • Implement consistent system service and maintenance procedures • Fire radio batteries are very old and should be replaced
General	• Implement the most cost-effective, yet beneficial system upgrade • Plan for a system that is financially sustainable

Table 4: Key Requirements

RECOMMENDATIONS FOR IMPROVED PUBLIC SAFETY COMMUNICATIONS

Based on the needs assessment, survey results, and detailed discussions with stakeholders, Televate developed a number of recommendations for the County to consider which will provide improved communications. For the recommended improvements, Televate approached the process by considering the east and west portions of the County. This approach was taken due to several considerations, primarily:

- The geography of the County lends itself to an east/west approach as it is extends more than 90 miles east to west, while being approximately 25 miles north to south
- The Lewis County Sheriff's Office using an east and west approach
- A single County simulcast cell would be impractical to deploy due to the extended site separation that would occur between east and west sites. A large site separation significantly increases the chance of internal system interference known as Time Delay Interference (TDI), which occurs when areas within the coverage boundary receive signals from multiple sites, but at noticeably different times. An example of potential interference areas from a simulcast cell utilizing sites in both the east and west portions of the County is shown in Figure 17, where the red areas indicate areas of likely TDI interference. These issues can largely be avoided by utilizing separate simulcast cells in the east and west.

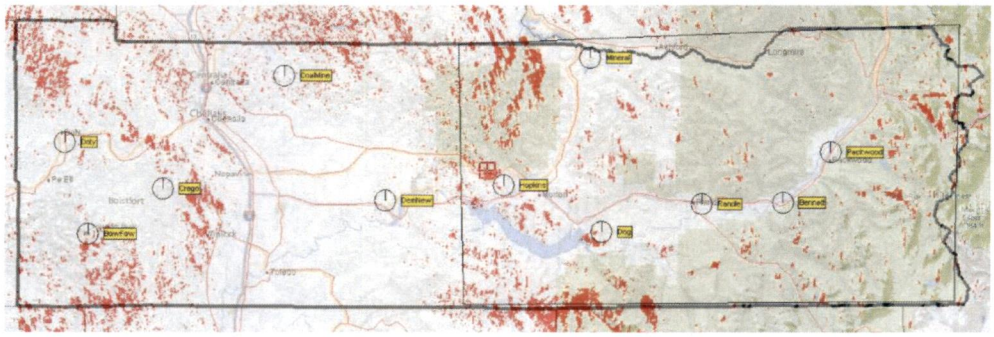


Figure 17: Potential TDI Interference from sites in both East and West

With the East/West approach, the recommendation is for the fire districts to be broken down in this manner:

- East: Fire Districts 4, 9, 10, 14, 17, 18
- West: Fire Districts 1, 2, 3, 5, 6, 8, 11, 13, 15, 16, 20.

Geographically, this grouping is shown in Figure 18, where the East districts are shown in red, and the West districts are shown in green. In addition to these groupings, it is assumed that the RFA communications system remains separate.

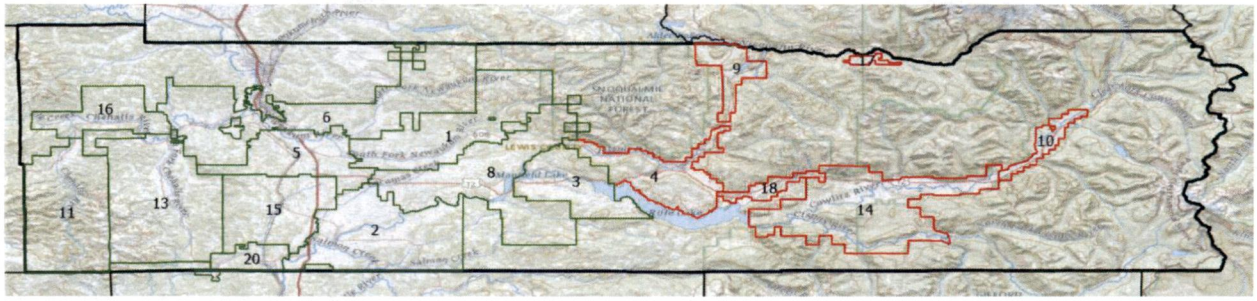


Figure 18: Fire District Recommended East/West Grouping

Neighboring districts that work together regularly, such Fire Districts 3 and 4 that fall in different regions may raise some concern with the east/west approach. However, these concerns can be addressed through appropriate operational procedures such as ensuring that these districts have the East and West primary channels and they enable scanning of both channels, and also that they use the same TAC channel.

In general, Televate recommends Lewis County maintain operations in the VHF frequency band and continue to operate analog conventional radio systems. This approach will permit the County to maintain interoperability with neighbors and partners, as well as utilize much of their existing equipment while implementing targeted enhancements designed to improve coverage and enhance operations. Additionally, Televate recommends that the infrastructure improvements proposed (including microwave, RF repeaters and receivers) be capable of supporting migration to digital P25 operation at a later date to enable further operational improvements such as encryption for law enforcement and location services. Specific recommended improvements for each of the existing systems are provided below.

System Enhancement Recommendations

Fire System East:

The goals for the enhanced Fire System in the east is to improve coverage and reliability without using the solar-powered sites as the primary assets. To achieve these goals, the following changes/additions are recommended:

- Implement transmit/receive sites at Hopkins, Mineral Hill, Dog, Randle Fire, Bennett, and Packwood in a simulcast cell
- Convert Storm King to a receive only site and add Burley as receive only as well
- Utilize the current repeated frequency pair used in the east (155.8050/156.1050), or a suitable replacement based on additional frequency analysis, and
- Ensure all new infrastructure is digital (P25) capable.

A graphical view of the recommended new configuration is shown in Figure 19.

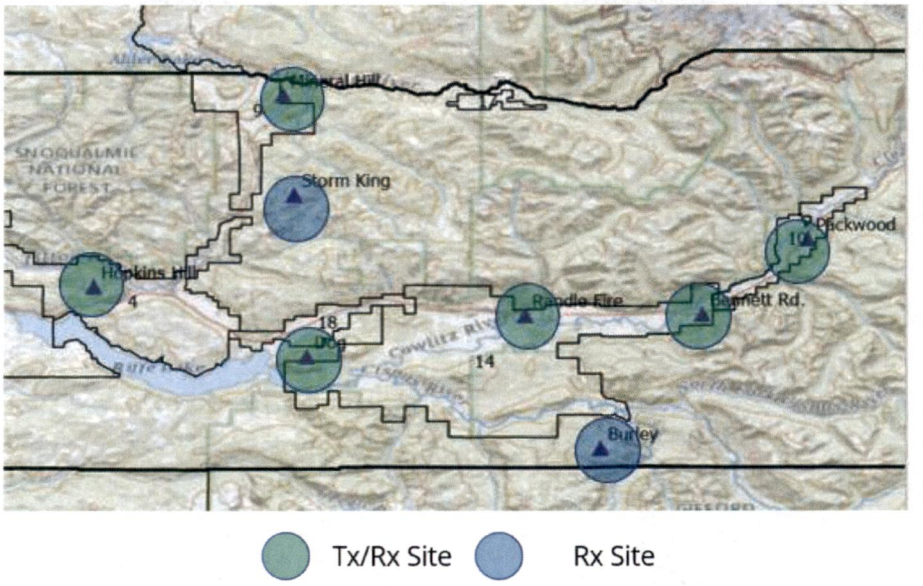


Figure 19: Lewis County Fire System East Recommended Configuration

Fire System West:

To improve communications performance for the fire system in the west, the following changes/additions are recommended:

- Implement transmit/receive sites at BawFaw, Crego, Doty, Coal Mine, and Democrat (new tower) in a simulcast cell
- Maintain receive sites at Cooks, Onalaska (new tower), and Toledo
- Eliminate the relay/receive site at the Fire District 11 station (The Doty site covers this area
- Utilize a new repeated frequency pair based on the frequency analysis provided in this report, and
- Ensure all new infrastructure is digital (P25) capable.

A graphical view of the recommended new configuration is shown in Figure 20.

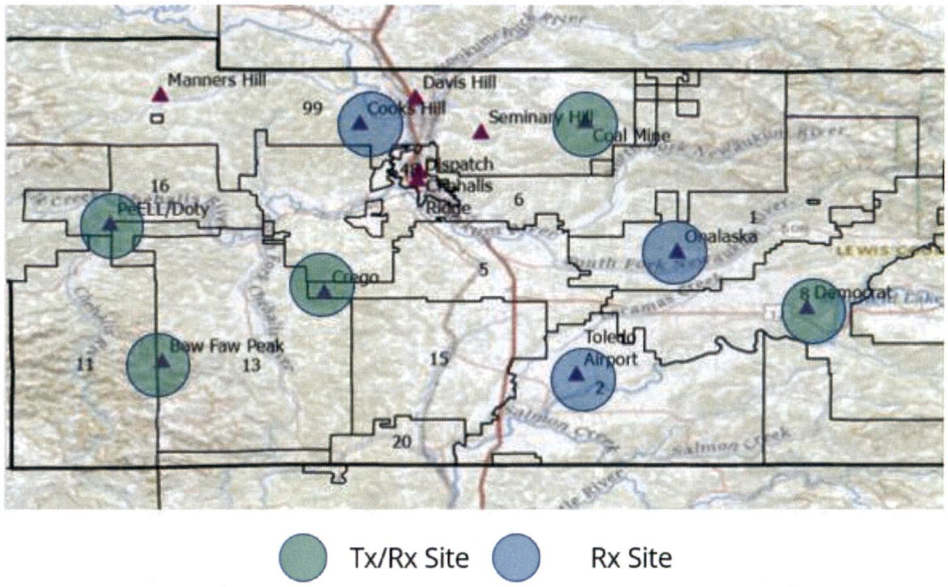


Figure 20: Lewis County Fire System West Recommended Configuration

RFA City System:

The RFA system that supports the fire departments for Chehalis and Centralia appears to be working well and no configuration changes are recommended at this time. However, if needed, additional vehicular repeaters can be purchased to address current coverage problems within buildings.

A diagram of the existing configuration was provided earlier in Figure 3.

RFA District 12 System:

Similarly, the RFA District 12 System appears to be working well and no configuration changes are recommended at this time. However, if needed, additional vehicular repeaters can be purchased to address current coverage problems within buildings.

A diagram of the existing configuration was provided earlier in Figure 4.

Fire Paging System:

The paging system that supports all fire agencies within the County appears to be working well at this time. However, given that the fire agencies in the east currently utilize the base transmit/mobile receive

voice frequency 155.8050 MHz for paging and additional sites are recommended for the east voice system, utilizing this same method and frequency will improve the paging performance in the east.

In the west, the paging system currently uses different sites than the recommended updated voice system, as it supports paging for RFA as well as other County fire districts. Therefore, in order to not disrupt the current paging system in the west, it is recommended that this system remain unchanged at this time. However, it is noted that an additional site (Coal Mine) is currently being added to the paging system in the west, which will improve paging performance in that area.

City Police Departments (PDs) System:

The City PDs System that supports the police departments for Chehalis and Centralia appears to be working well and no configuration changes are recommended at this time. However, it is recommended that all infrastructure (repeaters, receivers, comparators, microwave equipment) be upgraded to current manufacturer equipment and enabled to support digital (P25) operation. Additionally, if needed, additional vehicular repeaters can be purchased to address current coverage problems within buildings.

A diagram of the existing configuration was provided earlier in Figure 6.

LCSO System East:

The recommendation for the LCSO System in the east mirrors that for the Fire System as this recommendation provides the best coverage using existing sites and it is preferrable to maintain equivalent coverage for first responder agencies. The following changes/additions are recommended:

- Implement transmit/receive sites at Hopkins, Mineral Hill, Dog, Randle Fire, Bennett, and Packwood in a simulcast cell
- Convert Burley and Storm King to receive only sites
- Utilize a new repeated frequency pair based on the frequency analysis provided in this report, and
- Ensure all infrastructure is digital (P25) capable.

A graphical view of the recommended new configuration is shown in Figure 21.

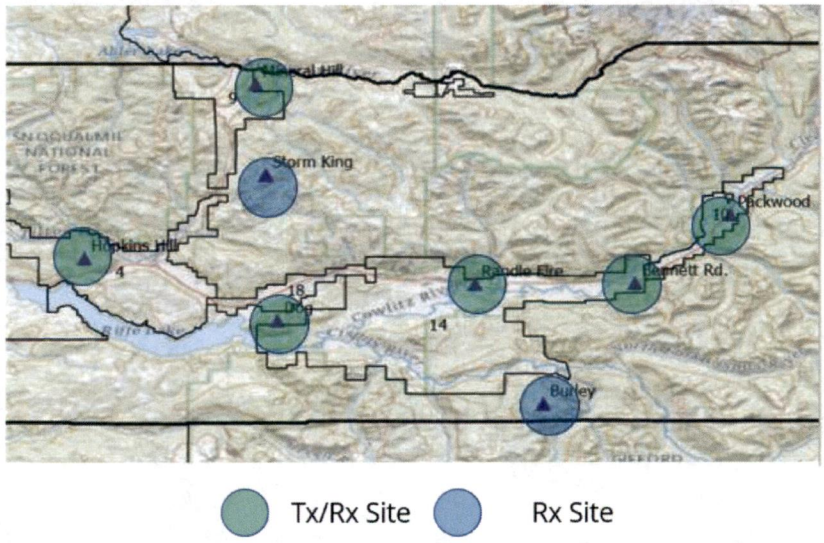


Figure 21: LCSO System East Recommended Configuration

LCSO System West:

Similar to the east systems, it is recommended that for the most part, the LCSO System West mirror the configuration of the Fire System in the west. However, in addition to the previously proposed west simulcast cell, an additional repeater for LCSO is recommended at Manners Hill. For clarification, this site is not recommended for the Fire agencies in the west since this area is currently covered and supported by the RFA system. The following changes/additions for the LCSO System West are recommended:

- Implement transmit/receive sites at BawFaw, Crego, Doty, Coal Mine, Democrat (new tower), and Manners Hill in a simulcast cell
- Maintain receive sites at Toledo and implement new receive sites at Cooks and Onalaska (new tower)
- Eliminate the receive site at Davis Hill (Cooks Hill covers this area)
- Utilize the current LCSO repeated frequency pair (155.6250/156.0300), or a suitable replacement based on additional frequency analysis, and
- Ensure all infrastructure is digital (P25) capable.

A graphical view of the recommended new configuration is shown in Figure 22.

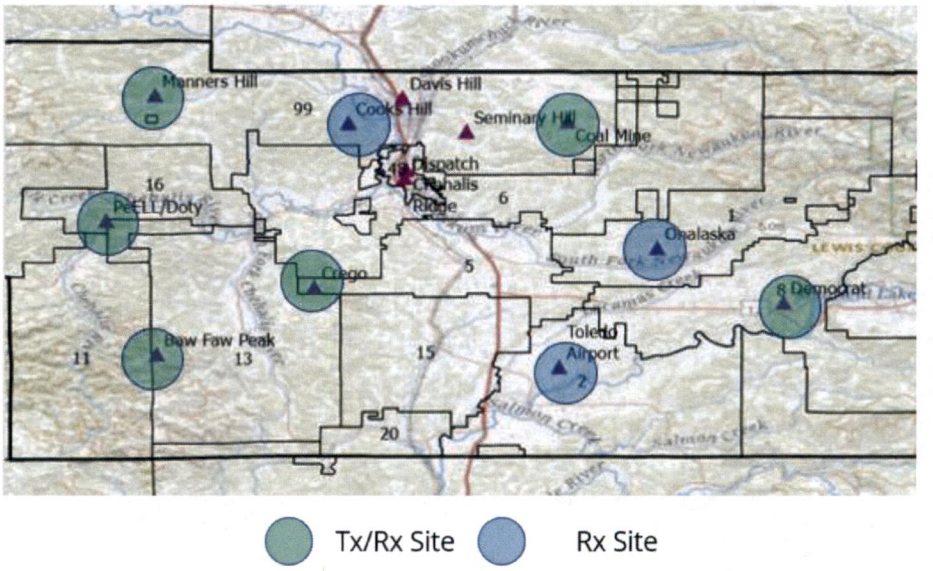


Figure 22: LCSO System West Recommended Configuration

Public Works:

In order to maintain equivalent coverage for the fire, law enforcement and public works personnel, it is recommended that the public works system also be expanded in the east and west utilizing the same east and west simulcast cells as proposed above in Figure 21 and Figure 22. This will equate to adding an additional channel to each of these simulcast cells to support public works.

Predicted coverage for each of the revised system configuration recommendations are provided in Appendix C: Proposed System Predicted Coverage.

Site Usage Summary

A summary of the proposed site usage based on the recommended system configurations described above is provided in Table 5.

Site	Fire System East	Fire System West	RFA City System	RFA District 12 System	Fire Paging	City PD System	LCSO System East	LCSO System West	Public Works
BawFaw		T/R						T/R	T/R
Bennett	T/R						T/R		T/R
Burley	R						R		R
Chehalis Ridge						T/R			
Coal Mine		T/R		T/R	In process			T/R	T/R
Cooks		R	R	T/R	T			R	R
Crego		T/R	R	T/R	T			T/R	T/R
Davis									
Democrat		T/R						T/R	T/R
Dispatch			T/R	R					
Dog	T/R				T		T/R		T/R
Doty		T/R						T/R	T/R
Hopkins	T/R						T/R		T/R
Manners				T/R	T			T/R	T/R
Mineral	T/R						T/R		T/R
Onalaska		R						R	R
Packwood	T/R				T		T/R		T/R
Peterman									
Randle Fire		T/R					T/R		T/R
Seminary Hill			T/R	R		R			
Storm King	R						R		R
Toledo		R			T			R	R

Table 5: Recommended Site Utilization

County Microwave and Backhaul Network:

A major portion of the Countywide system upgrade is expected to be the microwave network. The current system utilizes some existing County-owned links, in addition to T1 connections over partner links. A simulcast-based system will require robust inter-site connections and precise timing.

Additionally, the new microwave system must be capable of supporting both native Time Division Multiplex (TDM) and native Ethernet/IP traffic to support modern digital communications. For existing links that utilize partner microwave, Televate recommends the County work with their partners to ensure that the existing links can support the new system requirements, and/or provide upgrades to the equipment as necessary.

The recommended backhaul network configuration for the east utilizes the following configuration:

- Maintaining/upgrade existing links:
  - Crego to Dog
  - Dog to Bennett
  - Bennett to Packwood
- Incorporating new links:
  - Democrat to Hopkins
  - Hopkins to Peterman (site to be used for microwave relay)
  - Peterman to Dog
  - Peterman to Mineral, and
  - Dog to Randle Fire.

A diagram of the configuration is shown in Figure 23. It is important to note that the recommended microwave network is not proposed in a loop configuration. While a loop is generally preferred, the rugged terrain of this region makes a loop configuration extremely difficult and costly. However, the recommended configuration does include two separate paths to connect to the Dog site, which provides redundancy for links to the other east sites. Also, the microwave spur links are recommended to be implemented in a "hot-standby" configuration to maximize reliability.

It is also important to note that all proposed microwave links have been verified via an electronic terrain path profile. These path profiles are included in Appendix D: Proposed Microwave Link Path Profiles (From Terrain Database). All planned links must ultimately be verified by a physical path survey prior to implementation.

Connections to Storm King and Burley are recommended to remain as RF connections (via control stations), as these sites are solar powered only and cannot support a microwave connection. However, due to the recommended use of these sites as receive only, this type of connection should be adequate.

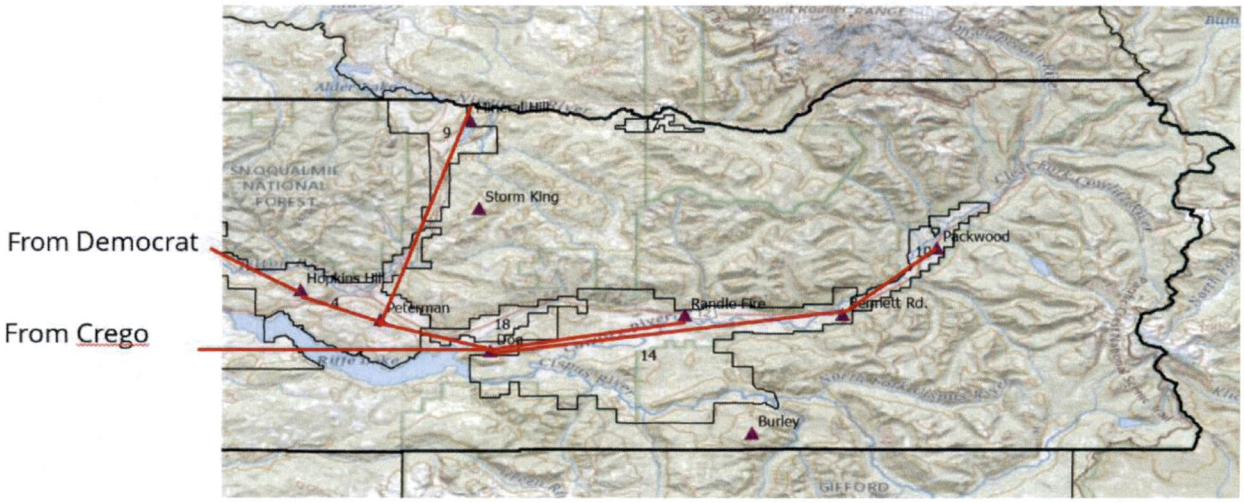


Figure 23: Lewis County Recommended East Backhaul Network

The recommended backhaul network configuration for the west utilizes the following configuration:

- Maintaining/upgrade existing links:
  - Crego to Courthouse
  - Crego to Coal Mine
  - Crego to Manners
  - Cooks to Coal Mine
  - Seminary Hill to Cooks
- Incorporating new links:
  - Manners to Doty
  - Manners to BawFaw
  - BawFaw to Toledo
  - Toledo to Democrat
  - Crego to Democrat
  - Democrat to Onalaska
- Additional recommended links (via fiber as microwave is not possible)
  - Courthouse to Cooks.

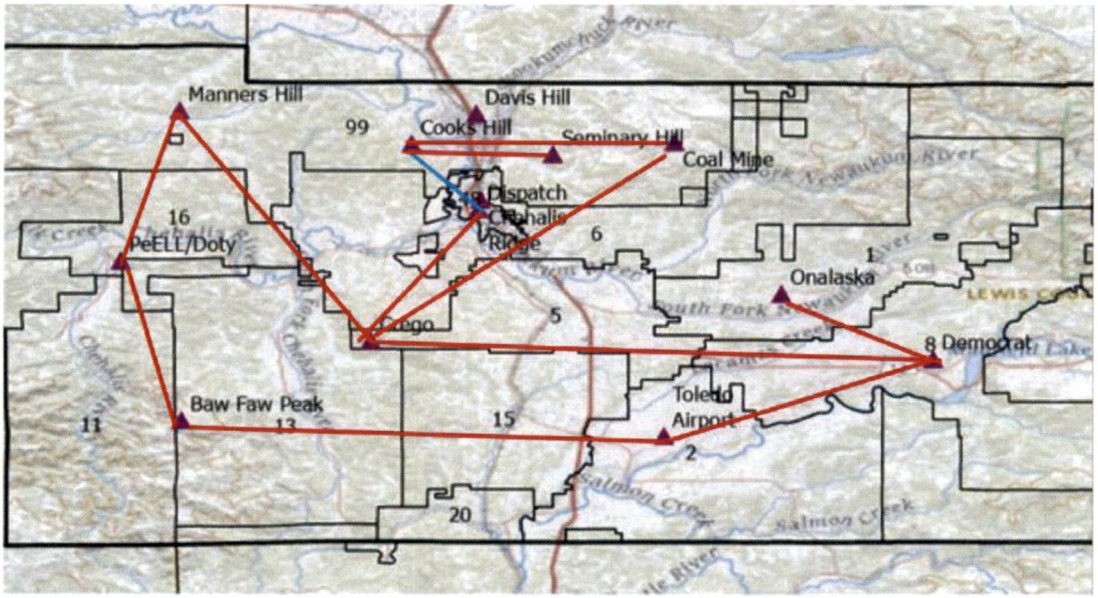
A diagram of the configuration is shown in Figure 24. The recommended configuration incorporates two loops for redundancy, namely:

- Loop 1: Manners, Crego, Democrat, Toledo, BawFaw, Doty
- Loop 2: Crego, Coal Mine, Cooks, Courthouse

In addition to those loops, the following spur links are part of the recommended configuration:

- Cooks to Seminary Hill, and
- Democrat to Onalaska.

Since the spur links are not part of either loop, the microwave spur links are recommended to be implemented in a "hot-standby" configuration to maximize reliability.



Current or future Microwave Links ——

Other Necessary Links ——

Figure 24: Lewis County Recommended West Backhaul Network

Televate notes that the proposed link between Manners Hill and Doty is indicated as questionable using the electronic path profile analysis, and previous experience by the County indicates it may not be reliable. If this path is not feasible, Doty can be alternatively accessed through a spur link from BawFaw, and a variation of Loop 1 can be implemented by closing the loop via a link from BawFaw to Crego. A diagram of this alternate configuration is shown in Figure 25.

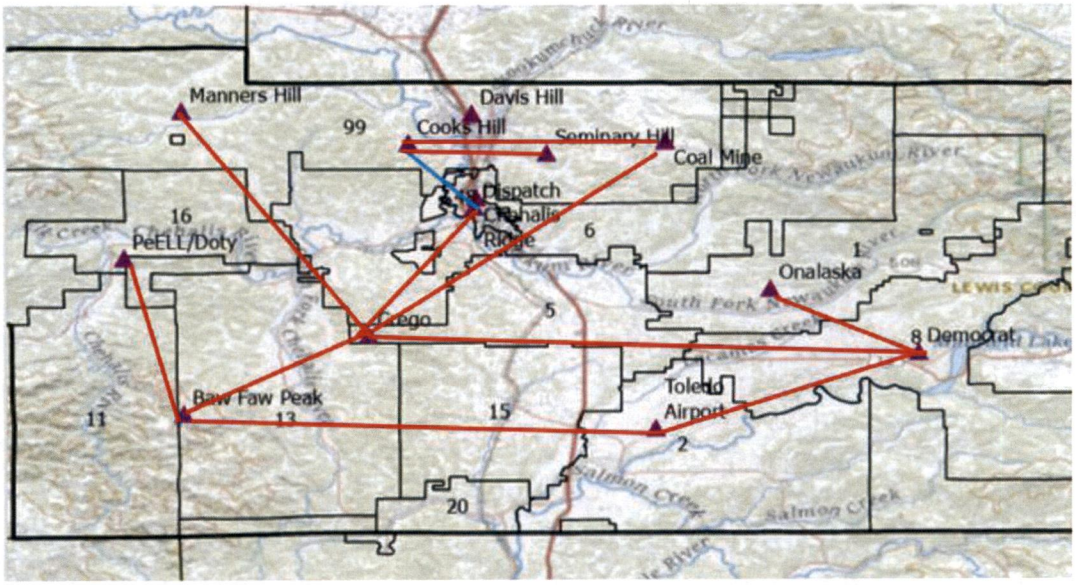


Figure 25: Lewis County Recommended West Backhaul Network (Alternate)

Site Facility Requirements

In order to support the system recommendations developed in this report, some new site development and facility upgrades will be required. The recommendations presented in this report will require the site development shown in Table 6.

Site Name	Area	Recommended Development	Purpose/Improvement
Democrat	Fire District 8 area	Either a new tower and site are to be developed to support the County's needs, or space must be leased on one of the existing towers (3 potentials)	Improved coverage in the central/western positions of the County, including Fire District 8. While a current site exists in this area, it is only a temporary site with an antenna attached to a house.
Doty	Pe Ell	Either a new tower and site are to be developed	Improved fire system coverage in the western portion of the County and to

		(potentially use abandoned tower) to support the County's needs, or space must be leased on the existing tower	replace the Fire District 11 station receive/repeater site
Mineral	Mineral	Lease/share space on the existing WSDOT tower and in the existing equipment shelter	Improved coverage in the Mineral area and the replacement of Storm King as a primary site
Onalaska	Onalaska (Fire District 1)	Construct a new tower of at least 100'	A taller tower will provide better coverage in this area and the capability for a microwave connection to Democrat
Peterman	Central County south or Morton	Lease/share space on the existing tower and in the existing equipment shelter	To facilitate microwave connectivity to Mineral
Randle Fire	East part of County, Fire District 14	Tower enhancement	A tower extension or new tower may be required to support a microwave connection

Table 6: Potential Additional Site Development

In addition to the new site development, additional site facility upgrades will be required to support the enhanced systems. These upgrades are anticipated to include the new towers or site colocations described above, as well as potential tower strengthening/remediation to support additional loads, new equipment shelters, new equipment power systems (DC Plant), and new generators. The anticipated needs for each site, based on on-site surveys and feedback from County personnel, are included in Table 7.

Site	New Tower	Tower Remediation	New Shelter	New DC Plant	New Generator	Microwave End Points
BawFaw		1	1	1		2
Bennett				1		2
Burley				Battery Upgrade		
Chehalis Ridge				1		1
Coal Mine		1		1		2
Cooks				1		2

Crego		1		1		5
Davis						
Democrat	1		1	1	1	4
Dispatch						2
Dog		1		1		4
Doty		1	1	1	1	2
Hopkins		1		1		2
Manners		1		1		2
Mineral		1				1
Onalaska	1			1	1	1
Packwood				1		1
Peterman		1		1		3
Randle Fire		1		1		1
Seminary Hill						1
Storm King				Battery Upgrade		
Toledo				1		2

Table 7: Recommended Site Facility Enhancements

Frequency Analysis

New and/or different frequencies will also be necessary to effectively implement the recommendations presented in this report. A number of potential new frequencies that may be useful for the County were identified either by the County or others from previous work. These frequencies are listed in Table 8.

Frequency (MHz)	Current Usage
151.1075	No current site license in Lewis County – planned for one of five new simplex TAC channels
153.9275	No current license in Lewis County - Only current WA license in Spokane
153.9950	No current license in Lewis County - Only current WA licenses in Spokane and Chelan County – planned for one of five new simplex TAC channels

154.2875	No current site license in Lewis County – planned for one of five new simplex TAC channels
154.8600	No current license in Lewis County - Licenses in Benton and King Counties
154.9875	No current license in Lewis County
155.0625	No current license in Lewis County
155.3925	No current site license in Lewis County – planned for one of five new simplex TAC channels
155.4000	No current license in Lewis County
155.4900	No current site license in Lewis County – planned for one of five new simplex TAC channels
155.9325	No current license in Lewis County
155.9925	No current license in Lewis County
156.0000	No current license in Lewis County - Licenses in Columbia, Pend Oreille, Island, King, Kittitas, Okanogan, Yakima County
156.2250	No current license in Lewis County - Licenses in Skagit, Mason
159.3150	No current license in Lewis County - Licensed by WA Dept. of Natural Resources in several places – Mason County is closest

Table 8: Potential New Frequencies

These candidate frequencies were evaluated further to determine their applicability for use with the County's recommended new system configurations. The recommended configuration will require the following new or reused frequency pairs, at minimum:

- Fire East repeater pair (Currently 155.8050/156.1050)
- Fire West repeater pair
- LCSO East repeater pair
- LCSO West repeater pair (Currently 155.6250/156.0300)
- Public Works East repeater pair (Currently 155.1000/155.7450)
- Public Works West repeater pair
- Paging West (Currently 155.7150)
- RF receive link from Storm King and BawFaw for Fire, and
- RF receive link from Storm King and BawFaw for LCSO.

The frequencies currently used for the RFA systems and City PDs system are not anticipated to change.

The three channels in the east and the three in the west (and potentially other frequencies based on site) will each be combined using an RF combiner/multicoupler for support by a single transmit and single receive antennas. Therefore, it is preferable that the chosen frequencies for these channels have sufficient separation to allow efficient combining, without significant combiner loss.

In order to determine applicability for the recommended configurations, an FCC license search was performed for the candidate frequencies where a co-channel search was performed within 70 miles of the site locations to be licensed. In general, if there are no co-channel licensees within 70 miles of the proposed sites, the frequency can be licensed at that site. If co-channel licensees are present within 70 miles, the frequency may still be able to be licensed, but an engineering study and contour analysis will be required to ensure acceptable performance without the risk of interference. Table 9 shows the results of the co-channel studies for the candidate frequencies that were evaluated.

Candidate Frequency (MHz)	East System Co-Channels within 70 Miles (Hopkins, Mineral, Packwood)	West System Co-Channels within 70 Miles (BawFaw, Coal Mine, Democrat)
151.1075	None	None
153.9275	None	None
153.9950	WPMG928	WPMG928
154.2875	None	None
154.8600	KOH888, WPIT540, WPQF424, WQTD257	KOH888, WNZN460, WQTD257
154.9875	None	WRBY483 (70.5 mi.)
155.0625	WPYT650	WPYT650
155.3925	WQUR851	WQUR851
155.4000	11 Active Licenses	Did not search
155.4900	KTS776, WPBV445, WQCE971, WXY382	KTS776, WPBV445, WQCE971, WXY382
155.9325	WQWX932	None
155.9925	None	None
156.0000	KCJ932, KDP304, KXV380, WPYL588, WQWP397	KCJ932, KDP304, KXV380, WPYL588
156.2250	KNCY702, WNDZ708, WNIG952, WPAF993, WPAF745	KNCY702, WNDZ708, WNIG952, WPAF993
159.3150	WNUS280	WNUS280

Table 9: Co-Channels of Candidate Frequencies

Due to the mountainous terrain environment in and around Lewis County, it is Televate's opinion that many of the above frequencies can be used by Lewis County without causing or experiencing significant interference, even though some show co-channel licensees within 70 miles. Also, the best frequency selection may require repurposing some of the frequencies currently utilized or planned in the County. The decision as to what specific frequencies are best to use will require further analysis and frequency coordination activities, which is recommended as a next step and should be performed prior to proceeding with the system enhancement in this report.

Cost Estimate of Proposed Recommendations

Televate developed a detailed cost model to estimate the capital and recurring costs anticipated to develop and maintain the recommended system configurations. All cost estimates are based on the specific components and upgrades required at each site within the system, as well as Televate's previous experience with equipment and site construction costs.

Capital Costs

A significant portion of the project costs will include the site facilities upgrades, as well as development of the redundant microwave connectivity between the sites, which may include:

- Site development, civil services and tower construction for new radio sites
- Upgrade costs for existing sites including any required tower remediation to accommodate additional antenna loads
- Equipment shelters as necessary
- Redundant power sources, including UPS/batteries and generator, and
- Primary and redundant site backhaul/interconnection.

These estimated costs for these activities are provided below on a site-by-site basis.

Radio Site Facility	Facility Upgrade and Connectivity Cost Estimate
BawFaw	$242,000
Bennett	$132,000
Burley	$9,600
Chehalis Ridge	$72,000
Coal Mine	$182,000
Cooks Hill	$132,000
Crego	$362,000
Democrat	$677,000
Dog	$302,000
Doty	$257,000
Hopkins	$182,000
Manners	$182,000
Mineral	$110,000
Onalaska	$437,000
Packwood	$72,000
Peterman	$242,000
Randle Fire	$122,000

Seminary Hill	$60,000
Storm King	$9,600
Toledo	$132,000

Table 10: Facilities Cost Estimate by Site

In addition to the site development costs, the County will incur additional project costs for the radio site equipment and installation costs for the enhancements described in this report. The cost estimate for this portion of the project includes:

- Manufacturer's costs for all infrastructure and core equipment for all system enhancements
- Design and engineering services and FCC licensing
- Construction and installation services
- Project management services, and
- Vendor oversight and quality assurance services.

The capital cost estimate to complete the full project implementation of the specific system enhancements included in this report was provided to County emergency personnel under separate cover.

Operating Costs

The annual operating cost estimate for the recommendations described in this report (not including County labor) are based on typical recurring costs associated with maintaining public safety radio systems, and are expected to include equipment maintenance costs, site maintenance costs, network monitoring, etc. An estimate for these costs is provided in Table 11.

System Component	Annual Cost Estimate
Annual Lease/Site Maintenance	$185,000
Annual Software and Licensing (Core and RF)	$180,000
Annual Software and Licensing (Microwave)	$45,000
Proactive Spares/Preventive Maintenance	$44,000
Network Monitoring	$20,000
Project Total	**$474,000**

Table 11: Cost Estimate of Annual Maintenance

Recommended Next Steps

Televate recommends Lewis County proceed in the following manner to implement the recommendations provided in this report.

Consider Recommendations and Direction and Coordination

The County should review the recommendations provided in this report, provide feedback and update plans as necessary. Additionally, the County should engage additional stakeholders from the County's first responder community to solicit input on the recommended direction and achieve consensus on the approach. Once consensus on the preferred approach is achieved, Televate recommends that the County begin the coordination activities with its communications partners, including RFA, WSDOT, and others as necessary to implement the recommended improvements.

Develop a Comprehensive Frequency Plan As Soon As Possible

Co-channel interference on the main fire frequency is one of the most critical issues currently faced by County first responders. It is essential that the County address this issue as soon as possible. To do so, Televate recommends the following short-term actions:

Perform coordination on potential new frequencies

A number of potential alternative and additional frequencies suggestions are provided in this report. Televate recommends the County work with a licensed frequency coordinator to perform coordination services on selected frequencies to determine what frequencies can be licensed by the County and to move forward with the licensing process. The usable frequencies should then be combined as candidate frequency pairs to create repeated channels.

Evaluate available frequencies from a combining/multicoupler perspective

Once the collection of new frequencies is identified and candidate repeater pairs are created, it is suggested that the County identify groups of frequency pairs that can be easily combined at a common site. The groups that the County should consider include:

- East simulcast cell group:
  - Fire East repeater pair
  - LCSO East repeater pair, and
  - Public Works East repeater pair.
- West simulcast cell group:
  - Fire West repeater pair
  - LCSO West repeater pair, and
  - Public Works West repeater pair.

Identify new Fire West frequency and begin using ASAP

The process described above will identify a candidate repeated frequency pair for the Fire West system. Televate believes that the County should begin using this frequency as soon as possible, even if the other recommended enhancements are not addressed until a later time. Elimination of the interference currently experienced on the 154.1900 frequency may be worth the additional effort of reprogramming radios with this new frequency, even if radios will need to be programmed again at a later date.

Allocate Funding for the Project

It is Televate's understanding that the County intends to utilize identified ARPA funding in addition to a source of grant funding in support of this project. It is recommended that the County confirm these allocations in the amounts available to support this project. In order to implement all enhancements, the currently identified ARPA and grant funding may not be sufficient to support the entire project. Therefore, since additional funding, above and beyond the currently identified allocations may be required for this project, it is recommended that the County develop a plan to address the potential for additional costs. Potential options for addressing this may include:

- Identifying additional funding to cover potential additional costs
- Scaling back or phasing in the improvements over several years, or
- Working with partner agencies to identify additional funding.

Additionally, since the timing for the funding may vary by source, it is recommended that the earliest available funds be allocated toward the portions of the project that are likely to have the longest lead time for implementation, including the facilities updates and the extensive microwave connectivity.

Develop a Long-Term Public Safety Communications Strategy

In addition to these near-term improvements, Televate recommends the County also consider additional improvements to further enhance the public safety communications within the County. Considerations may include:

- Upgrading law enforcement user radios for P25 capability to support encryption and location services
- Adding additional site infrastructure to further improve coverage in key areas
- Upgrading additional site infrastructure to support digital communications for improved coverage with existing sites, and
- Considering a regional consortium with neighboring counties to share resources and improve regional communications.

Establish a Procurement Strategy and Develop a Procurement Specification

Once the final project direction has been established and the funding strategy is in place, Televate recommends that the County develop a procurement strategy for the project, and as required, a procurement specification to define the project and solicit proposals. Televate would be happy to assist the County further with establishing this strategy and documentation.

Consider Dispatch Improvements

In addition to the radio enhancements recommended in this report, Televate recommends that the County perform an internal dispatch assessment to consider potential improvements to dispatch operations and to address comments received from stakeholders. Some areas that could be investigated include:

- A staffing analysis to determine the optimal number of dispatch operators required for the current call volume and a means to achieve this level
- A review of and potential update to the current dispatch processes regarding call handling and interaction with the first responders – this should include communications with the first

responder agencies to solicit their input as well as inform them on the dispatch processes and challenges that exist

- Consideration of a patching policy to facilitate communications between the east and west systems/channels when necessary
- A review of and potential update to the current dispatch training processes to better enable consistent call handling and response, and
- An evaluation of an Automated Voice Dispatching (AVD) system to ensure consistent volume and voice quality.

APPENDIX A: ON-SITE INTERVIEW NOTES

The interview schedule followed during the on-site visits is shown in Figure 26.

LEWIS COUNTY RADIO
TELEVATE RADIO INTERVIEW SCHEDULE

MONDAY 8/21

900	
1000	LEWIS 8
1100	LEWIS 14
1200	LUNCH
1300	LEWIS SO
1400	LEWIS 11/13/16
1500	CHEHALIS PD
1600	

BOCC CONF ROOM (BASEMENT)

TUESDAY 8/22

800	
900	
1000	LEWIS 2/15
1100	LEWIS 1
1200	LUNCH
1300	
1400	CENTRALIA PD
1500	RFA/CHEH FIRE
1600	

911 CONF ROOM (3RD FLOOR)

Figure 26: Stakeholder Interview Schedule

Jennifer Libby-Jones and Justin Stennick

- Fire Departments
  - Lewis County, Chehalis, Centralis and Riverside (RFA)
- Mike Kytta is the fire chief of RFA (Riverside Fire Authority). Have their own trunked radio system – Fire Two dispatch
  - 155.715 paging channel to alert
  - 4-site simulcast
  - Could their network become part of the countywide network?
  - We now have 5 simplex channels – all not yet programmed into county radios
    - 3 dedicated to fire
    - 1 designated for law
    - 1 designated for all other agencies
  - Fire believes that all in-building fire radio comms need to be recorded
    - OSHA requirement to be on tac channel interior during a fire
  - 154.190 is the fire dispatch channel – however, this channel is co-channel with two nearby counties

        - Mason County has a tall site using this frequency and it is highly interference prone
- The FDs use Zone A which is common for all FDs
- XTS/XTL 5000 radios purchased for FDs in 2007 via a grant
    - Old fire radio batteries – many need to be replaced – possible use of grant funding? Purchase new radio batteries?
- Countywide radio network improvements need to be implemented
    - What new radio technologies to consider?
    - Need a near, mid-, and long-term plan for radio network/equipment
    - $7.3M in funding available now – assessing the introduction of a 0.2% sales tax to increase the available radio network budget
        - $2.8M spent by the end of 2024
        - $4.5M spent by 2026, designated for spending by the end by 2023
    - Backhaul network is at risk, a new plan is required
        - Designate for Phase 1 allocation?
    - New GTR radios required
    - The Burley site is 18 miles off of the road and is running on solar power
    - Hwy 12 coverage is essential
- Primary needs – Justin and Jen
    - Radio technology upgrades
        - Sufficient funding in Phase 1 to design a conventional simulcast radio network – leverage the RFA network and expand where possible?
    - Microwave network upgrades – network connectivity is essential
    - Radio spectrum upgrade – eliminate fire dispatch channel interference - no backup channel for the law
        - Phase 1 replacement of the fire dispatch channel
        - Identify law backup channel
    - We can always buy new radios later
    - We're familiar with Simulcast but do we have sufficient budget and frequencies?
    - Jenn
        - Plan focused on near term, mid-term, or long-term radio plan

Fire Districts 3 and 8

- Attendees
    - Chiefs McDaniel (FD 8)
    - Chief Doug Fosburg (FD 03)
- When visiting the sites, you will learn about their condition
- When leaving Morton and hitting the lakes, you are in FD3 and FD8
- The Democrat site sits in my districts commissioner's garage
    - Update the Democrat radio site in Phase 1?
- What are your thoughts on transitioning to a digital communications channel?
    - State patrol has migrated to digital, and we cannot talk with them
    - My education on digital is limited (FD3)
- Narrowbanding created radio comm issues
- On a major incident scene – we typically monitor 3-frequencies
    - RedNet

        - RedNet appears to be a tac channel at 153.830 MHz
    - Countywide dispatch
    - Working frequency channels are those owned by the district
    - Fire channels are being recorded
        - Fire 1
        - Fire 2
        - VTAC 11 – used to communicate with helicopters
        - RedNet also being recorded – in certain areas
    - The Democrat site needs a complete redo
    - Mason County interference is common on FD Channel 1
        - Similar call signs in play as well
    - Relaying through dispatch is common occurrence
    - Getting away from 154.190 is critical
        - County radio dept
    - Very happy with the new radios
- Key needs
    - Need to be able to communicate on scene from our portable radios back to dispatch
        - Limited vehicular repeaters, Pyramid's that do not facilitate auto shut off to manage interference
            - Phase 1 purchase of vehicular repeaters?
        - Old radios are being used
            - Phase 1 purchase of new radios?
        - Operating budget is very limited
- Interoperability with DNR is required
    - Further investigation required to determine how to fix – could be simple radio programing
    - DNR operates multiple VHF sites and frequencies throughout the state – need to identify the required sites and freqs.
- Dispatchers would benefit if there were additional dispatch channels
- Using "I Spy Fire" (iSpyFire, Inc.) and "BRYX" (Station Alerting System & Software for First Responders | Bryx) as smartphone app fire comms
- Need to talkaround on occasions due to inability for dispatch channel to be free
- Not using MDC's due to cellular coverage issues
- Adventure medics are providing back ambulance service and using the FD3 radios
- FD3
    - 30 portables
        - CDM50 mobile radio
        - XTL-1500 portables
        - HT 1250 portables
        - Two Icom radios
        - One Pyramid repeater
- County needs to support comms
    - Two repeated channels
    - Eliminate the 154.190 freq.

    - East, west and central channels
    - Channels need to be recorded
- Perhaps 25% down on their respective volunteers

Fire District 14

- Chief Jeff Jacques
- Eastern side of the county
- Respond into the federal forest area, clear into the adjacent county
- Coverage issue in the southern sections of the county
- Cispus (town and river) areas in the forest not well covered
- Using the Pyramid VRS which is working well
- Difficulty in talking back to a new repeater site
    - Phase 1 remote receive radio site requirement
- Added several new repeater sites
- Radio
    - APX7500 radios
    - Bendix King
    - XTL2500
- Friends in Pierce County who have donated radios
- Interop primarily with FD 10 and FD 18, WA-DNR (RedNet) and the Fire Service (freqs. programmed in radios)
- Hope that we never go digital – WASP use digital – listening in on WASP and their comms are poor
- Assistance from the County radio shops
    - Plenty of support from the county radio shops
    - County committee was meeting every two months, now not meeting as frequently – need to get this group back together and add in radio comms agenda
        - Requirement to reignite these meetings
- The 5-new radio tac channels are not well coordinated and not programmed into law enforcement radios – can be beneficial if programmed and support an SOP
    - Develop common fire radio fleetmap and program all radios
- Use of cell phone to communicate with law enforcement
    - T-Mobile and US Cellular service is limited – US Cellular has some backup power
- County Public Works has a radio site as well that needs to be updated
    - Could not identify this radio license?
- Top requirements
    - Complete buildout of countywide dispatch channel, just not possible
    - Getting off of 154.190 beneficial but not necessary since they have licensed a new dispatch channel
        - Have licensed 156.105 – main dispatch in FD14 area
            - FCC Callsign WPIU343 (LEWIS COUNTY FIRE PROTECTION DISTRICT NO 14) (radioreference.com)
            - Multiple sites and VHF freqs. licensed – need to determine ability to integrate into countywide radio network

        - At Packwood and the FD 14 fire station
        - FD14 need to be higher
    - Wondering why the county has not moved off of 154.190
  - More towers to expand coverage of the 156.105
    - Is this frequency licensable for an East site dispatch channel?
  - Radio users are qualified at using their radios

County Sheriff Meeting

- Wes Rethwill, Rick Van Wyck, Captain Ben White, Chief Engleburtson
- Radio issue has been in play for years, and is finally being addressed
- 42 sworn officers
- Using federal funds to update the radio network
- Long term concerns also need to be defined
- 100% lack of support of infrastructure - no capital investments being made in the infrastructure
- No stakeholder money available to invest in infrastructure – now that we have federal money, we can invest to update
- Trying to set the law rate for LE and Fire, currently at 70/30%. Recommendations to change to 75/25
- Suggest we meet with County Sheriff's operations guild and sergeants – Televate to schedule meeting with these gentlemen
  - Deputy Dan Reardon – Operations Guild
  - Sgt. Jeff Godbey (Spoke via phone on 10/5/23)
- Coverage
  - Anywhere near power lines is a comms issue
  - East End
    - Packwood
    - Along the pass for portable and mobile
    - Mineral area (P/M)
    - NW portion of the county
  - State agency also uses the county radio network in some geographic areas
  - 1-deputy on duty per 12 hours shift – Mossyrock bridge to pass on the East End
  - West end, Mossyrock Bridge to County end
  - No available repeated tac channels except of the LEARN channel
    - New tac channels have been licensed – has the sheriff programmed them into radios?
  - There is also a DES channel – Channel 8 that is recorded
  - VTAC11 is also usable for incidents
- Familiar with digital radio – can we afford it?
- Radio encryption is required – no coverage impact over a P25 digital network

Fire Departments 11 and 13 representing 16

- Gwen Turner and Miles Burmeister
- The biggest issue is that the radio network is old, expensive to upgrade
- Lots of "blind spots" – no portable coverage where needed

- Inability to communicate back – uplink limitations
- Justin is top notch
- Interference from 154.190 – needs to be replaced – issue with Mason County
- District 11 has a private radio tower and frequency
- Greg Peterson programed the radio repeater for FD11
- Paging
    - Most of the time the paging is good
    - Occasionally there is a "ghost" page, could be an operator error?
    - Minitor 5 and 6 Moto pagers
    - No pager issues that we have experienced
- Hwy 5 in the canyon is a coverage issue
- FD 11 also needs to talk with Pacific County to the west
- Rider Wood is in Cowlitz County but part of FD 20
- Interop with the sheriff and DNR and public works
- Have to use the cell phone when radio coverage in unavailable – US Cellular – recently changed towers and the coverage declined
- Ambulance Consortium Group – have an agreement with AMR for emergency medical
    - Does AMR use the county's radio network? What impacts if county institutes changes (freqs, sites, simulcast)
- Challenges with outbound radio comms from the fire station
- Coverage issue in the Weyerhaeuser forest area in the SE portion of FD 11 = Weyerhaeuser may have radio sites – Miles Burmester offers to talk with Weyerhaeuser to find out more about their towers in this area
- Radios
    - XTS1500
    - HT
    - Kenwood
    - No budget for new radios
    - HT is a better radio
- Top requirements
    - Highly reliable radio coverage – 100%
    - New Fire dispatch channel
    - Get the word out when necessary – no coverage in the white area
    - Systems need to work better
    - Similar county access within and with neighbors
    - Common radio templates and frequencies for all radios
- Radio committee has not met in over one year
- Need uniformity in how we talk with one another and with dispatch

Chehalis PD: Randy Kaut

- New radio tower now providing better coverage
- Recently installed new tower
- In-building coverage may still be an issue at Walmart, Home Depot, all of the big box stores

- Secondary channel on a tower that we are leasing and since they are not needed, should be abandoned
- Mobile and portable radios working fine
- Total of 12 vehicles and 18 sworn
- City may be expanding into Napavine
- Shared freq with Centralia – can be an issue with chatter over the main dispatch channel
    - New repeated tac channels for PD?
- Have secondary repeated channel, however not sufficient dispatchers to cover
- Wish list
    - Go to digital which adds capabilities
    - Encryption
    - Location
    - Individual officer radio comms
- We generally do not talk with the sheriff
- We generally do not talk with city fire, have capabilities but do not use it
- Political side of the issue is that the city is paying for only one site and not the countywide radio network – why should they pay for the coverage for all
- Radios
    - XTS-1500
- Radio committee should be reinstated and the chief or deputy chief will participate
- Primary goals
    - Cost of fulfilling the wish list
    - System is functional
- Dispatchers are understaffed and doing the best they can with what they have

FDs 2, 5, 13, and 15

- Chief Underdahl FD15 (Winlock), Chief Dorothy of FD2 (Toledo), Greg of FD5 (Napavine)
- Greg: 25 years in Lewis County – new radio, narrowbanding funding and experience,
- HT1250 is my favorite radio
- Frequently our radio transmission cannot be heard
- Issues with 154.190 – first change to be made
- Building coverage issues
- 20 minutes status check when we are on scene
- Use RedNet when necessary
- VTAC11 is also used for air to ground comms
- Have TAC channels now that have not been implemented – plan in development - will use in place of VTAC11
- Countywide use of fire manual – Greg to provide to Dom
- Wish list
    - New dispatch channel – Mason County interference needs to go
    - Repeated channel configuration
    - Second repeated tactical channel countywide
    - Program in new talkaround TAC channel

- What is Cowlitz system doing?
  - They can talk over their portable radio throughout the network
- Toledo site not providing expected coverage improvements
  - Toledo site includes Fire 1 and RedNet receive
- Expand portable radio coverage

Fire District 1

- Chief Brad Flexhaug – 32 years working in the county
- Portable radio is XPR-3500
- General impressions of the radio network
  - Having been here 30+ years, his expectations have been set
  - Dispatchers need better training
    - Some are too quiet
    - Dispatcher protocols not being followed
    - Not using the correct radio sites – talks about toning out of the Democrat site
    - Use I SPY FIRE
    - East end of district not served by the Crego site
    - What challenges do the dispatchers have? Would like to know so that the district fire fighters adjust their comms accordingly
    - Route 508 is the main road through the district
      - Cannot directly communicate with state patrol
  - Rarely need to speak with neighboring counties
  - Go to RedNet when on scene
  - Poor coverage in the fire stations
    - Poor paging in fire stations – main in Onalaska
  - The school might also be a poor coverage building – not responding there often
- Wish list
  - Transition away from 154.190 – reality is that we could migrate to a freq. that is still probably interference prone
  - New base station in the eastern portion of the district
    - This is our challenge, may be able to convert the Onalaska site
    - New site on Hurricane Ridge where the windmills are located
  - Review a few calls with dispatch to assess quality and areas for improvement
  - Have 13 apparatus and would prefer to have a VRS on at least two vehicles

Lewis County PSAP Manager - Liz

- 25 years of dispatching and now as Ops Supervisor
- Can hear Mason County, which is 100 miles away
- Fire 1 is a major problem – interference related
- RFA is the busiest fire station
  - Not sufficient staff to cover RFA
- Good if the East End could hear the West End, or have the ability to listen and communicate
- FIRE 2 includes RFA, AMR and Station 48 (Chehalis fire)
- 8-positions, minimum of 3-positions working, but we also do 2-positions

- Recommendations that 24 telecommunicators are required, we have 9 positions filled, and a budget for 20 – difficult to hire staff
    - Working 4 10-hour shifts, often 4 12s, we pay OT for all hours worked when only 2-telecommunicators are on site
    - Phase 1: Expand efforts/create incentives/pay raise, whatever to hire and retain additional dispatch staff – can the grant be leveraged to hire new staff if there is insufficient budget?
- We do relay radio messages, but not frequently – did not know that we relay this often
    - Reconsiders and agrees that dispatch relays info for fire depts
- Fire fighters always call in the know what's going on with events – we have no time to talk with them when we are on an incident
    - Suggest that fire depts have CAD access to view events and to stop from calling into dispatch
- I love ISPY, however, the chiefs call in and wants to know why I Spy informed them of an event that was not the event? Well, the original entry that I SPY relayed was modified.
- More pagers, do not rely on I SPY
- Rules for recording
    - We use Equature for recording and it works well
    - Hold recordings for 6-months
    - VTAC11 is recorded
- We can hear RedNet, not being recorded, but better check
- If responders say Mayday, we are listening and responsive,
- Reviewing options to use Metal Myrtle voice automated dispatching assistance – I SPY offers one, however Motorola will over charge to integrate it into their Spillman CAD product
- Wish list
    - Auto dispatch
        - Phase 1 implementation?
    - Like the idea of an East and West dispatch dispatching zones and will likely have to maintain RFA
        - Phase 1: Can we do an East and West dispatch channel and combine RFA into the West dispatch zone?
    - Repeated dispatch
    - Mason County interference eliminated
        - Taking care of Mason will result in more free time for the dispatchers, it will reduce the number of calls from fire chiefs

Centralia PD

- Chief Tracey Denham
- 32 years of LE, 5 as PD chief
- Share a dispatch channel with Chehalis
    - Backup car-to-car backup freq.
- New site working much better
- Davis Hill and Cooks Hill RX sites need to be upgraded
    - Phase 1 activity? What is required to upgrade these RX sites?

- Thinking that the city is charging us $250,000 annually, which we think is too hard
    - Calls for service, keystrokes data entry into RMS
    - Other PDs were cheating to pay less (MDT searches)
    - Requested that any increase equal across the board
    - 45% calls for service, # of officers, population
    - The Deltaworx model was not good
    - Recommendations to split 75/25% (PD to FD)
    - All PDs are paying
    - Policy for the PSAP
    - Huge distrust for the Lewis County
- The hospital is poorly covered
    - Delivery
    - ER
    - ICU
- Walmart may be still not covered since the new site was installed
- PD is not covered well, but it could be related to a new cell site located
- Typically, we do not talk with FD, we would communicate with them through dispatch
- Thurston just upgraded their radio network and donated their radios to the PD
- 29 officers with 35 vehicles (all have radios) 40 portables
- Features
    - Location of the officers (on push to talk)
    - Encryption
        - We use DEA radios
- The LERN statewide LE network radio network is not performing (WA Mutual Aid (Washington) Scanner Frequencies and Radio Frequency Reference (radioreference.com))
    - Need to investigate if the LERN network is still functional – 155.370 MHz – appears to be talkaround? WA_CEMP_ESF2_Appendix 1_10.25.2019
    - State patrol is supposed to monitor LERN

Chehalis Fire Dept and RFA

- Kevin Anderson Deputy Fire Chief, Mike Kytta (RFA), Captain Casey McCarthy, Adam Albright (Chehalis)
- 20 years doing our own thing
- More sites were required to deliver needed coverage
- 4 RX/TX and 6 RX sites in RFA, separate system for the cities with 2 TX/RX and 2 RX
- Topography is extremely challenging to serve
- Auxiliary back up network: 2 radio sites
- One repeated pair on each site
- Coverage
    - In building coverage poor in most Chehalis buildings into box stores not reliable
    - Use Pyramid in most vehicles (have lights on the dashboard that lights up when the VRS in in operations – use voice paging and I SPY
- Replaced all mobiles and portables in the last year
    - New radios and batteries have improved marginal coverage areas

  - APX-6000XE portable radios
  - APX-1500 mobile radios
- Funding the radio network is a priority for fire district funding
- Provide letters of operations to neighboring jurisdictions to use the RFA network
- Chehalis Ridge site should be considered for the RFA system
- Accounts for 55% of the call volume
- Boat load of licenses that we are protecting – might be able to share a frequency
  - Phase 1: What freqs. might be available for countywide use?
- Keep the communications open with all chiefs – they should be engaged
- Chiefs need to have skin in the game
- Dispatch fees do not cover the radio network – the people need to know the facts
- Chief Lonny Gobel of FD 10 – need to visit with him to get him involved
- **Dispatch needs to speak more directly**
  - One male dispatcher is very clear
  - Thurston is now using Medal Myrtle – should talk with them
- Kluge of MW out there, some licensed and unlicensed
  - All 4.9 GHz for RFA sites
  - MLC are used
  - Wind and ice storms occur to the MW dish
- What about dispatch back up operations?
- What about the back-up fire radio paging at BawFaw
  - Ross McDowell

Appendix B: Current System Predicted Coverage

A detailed propagation simulation was developed to further analyze coverage and to predict performance from various site constellations for an enhanced system. The simulations utilize the EDX SignalPro™ application, which is a standard propagation tool employed by Public Safety to model the system elements and to predict coverage by incorporating industry standard propagation algorithms in addition to terrain and land use databases. Once the initial simulation was developed, the recorded data from the signal testing was factored into the SignalPro™ application to calibrate the model and improve its accuracy.

The propagation simulation was further developed to predict where the system would provide a voice quality (Delivered Audio Quality (DAQ)) of at least 3.4 per typical public safety standards. The minimum Channel Performance Criteria (CPC) required for a DAQ level of 3.4 for an analog narrowband (12.5 kHz) voice system was derived using the information from Table A-1 of TSB-88[1]. The TSB-88 report serves as the public safety LMR network design industry standard.

The propagation model predicts coverage for a mobile radio, as well as a portable radio worn on the hip on street (outdoors) and within buildings up to a specific dB signal loss value for both outbound (dispatch to field) and inbound (field to dispatch). The results for the simulation at this level of voice quality for the following conditions, for each of the analyzed county systems are provided in the figures on the following pages.

> Medium Building

> Light Building

> Portable

> Mobile

[1] TIA Telecommunications System Bulletin TSB-88.1-C: Wireless Communications Systems Performance in Noise and Interference Limited Situations - Part1: Recommended Methods for Technology Independent Performance Modeling: February 2008.

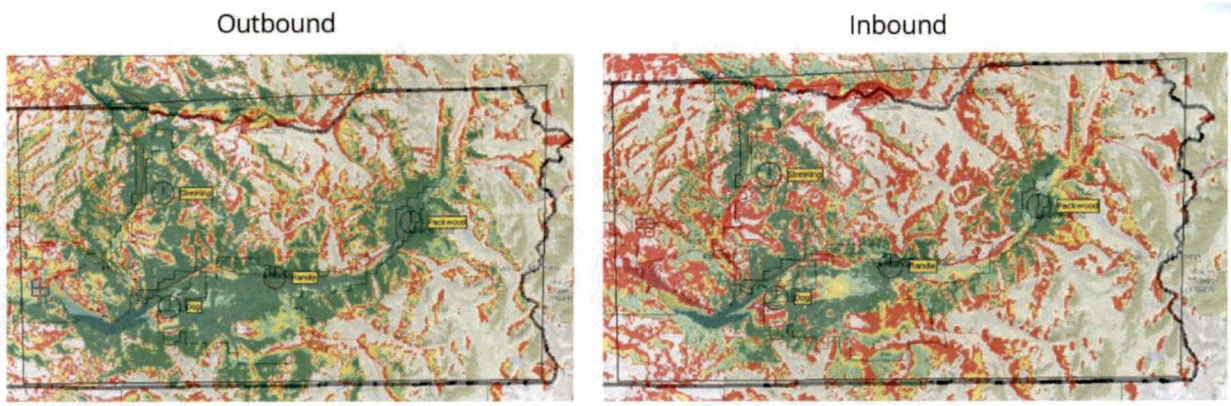


Figure 27: Fire System East Current Coverage (Simulated)

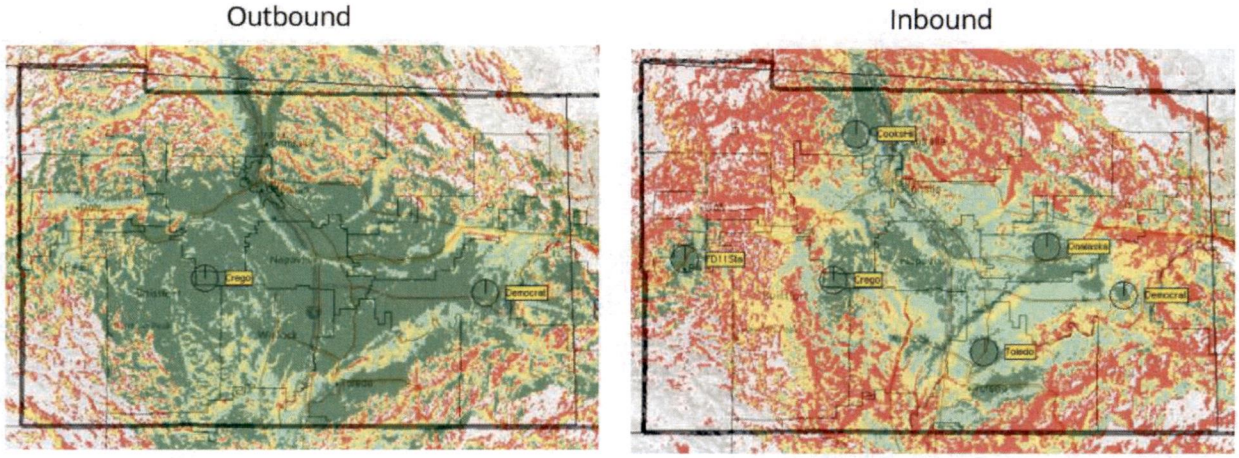


Figure 28: Fire System West Current Coverage (Simulated)

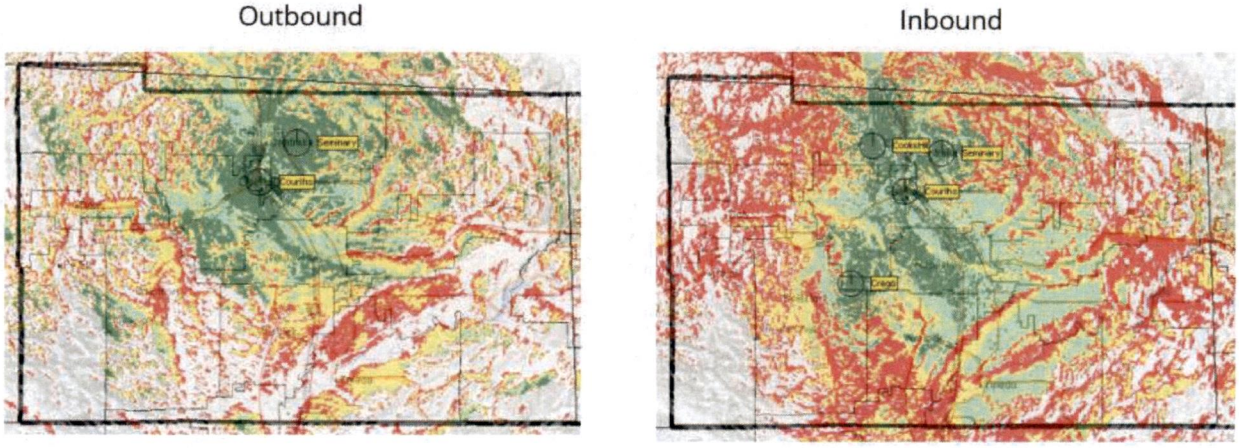


Figure 29: RFA City System Current Coverage (Simulated)

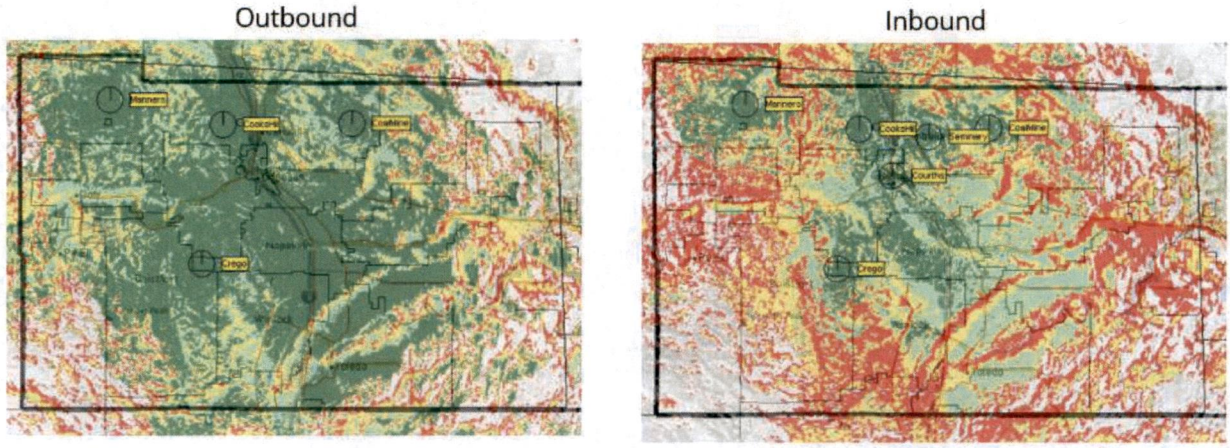


Figure 30: RFA District 12 System Current Coverage (Simulated)

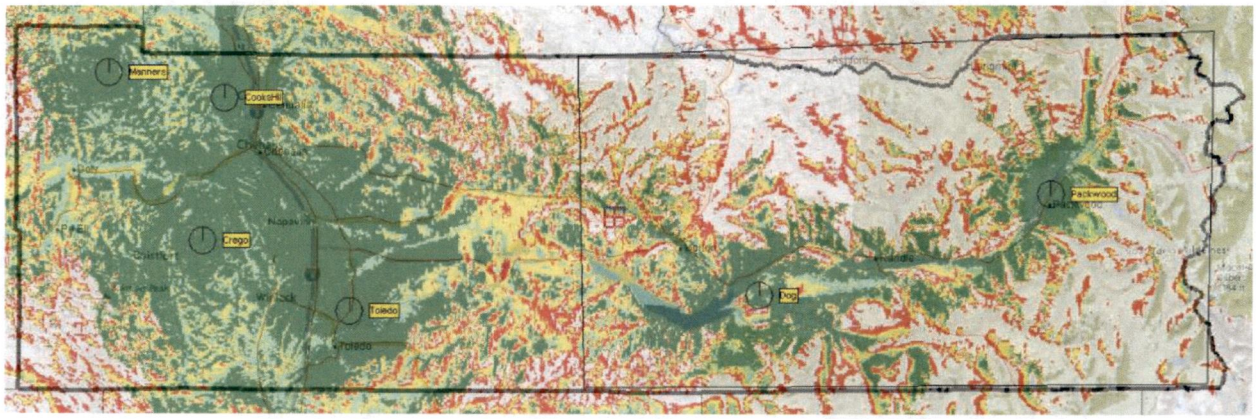


Figure 31: Paging System Current Composite Coverage (Simulated)

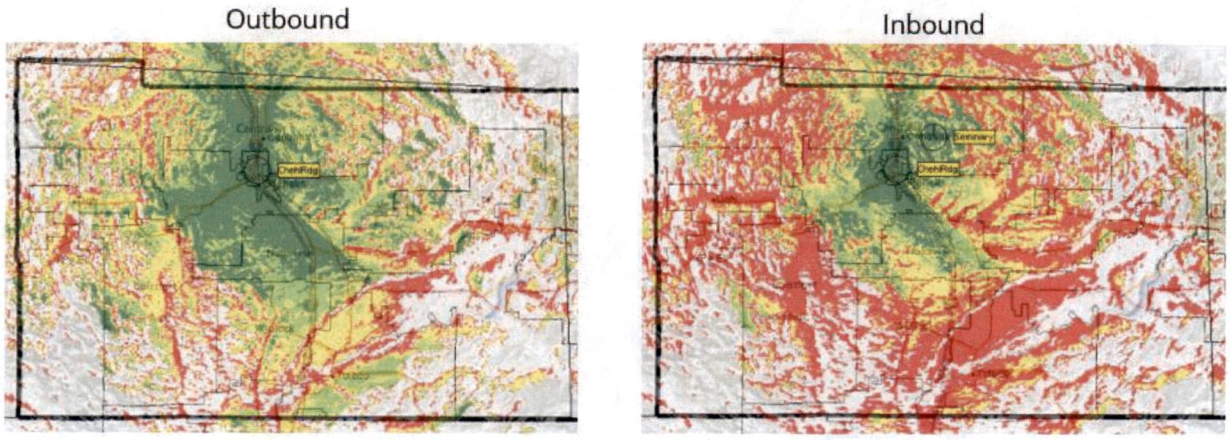


Figure 32: City PD System Current Coverage (Simulated)

Outbound

Inbound

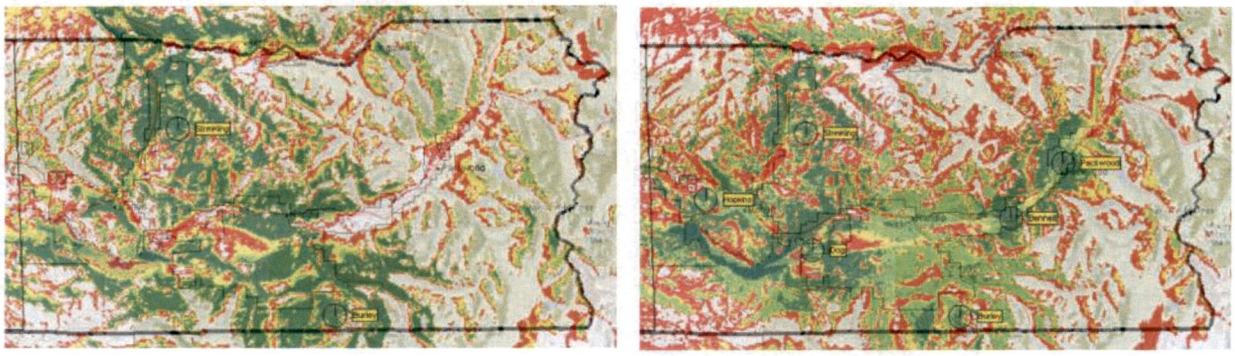


Figure 33: LCSO East System Current Coverage (Simulated)

Outbound

Inbound

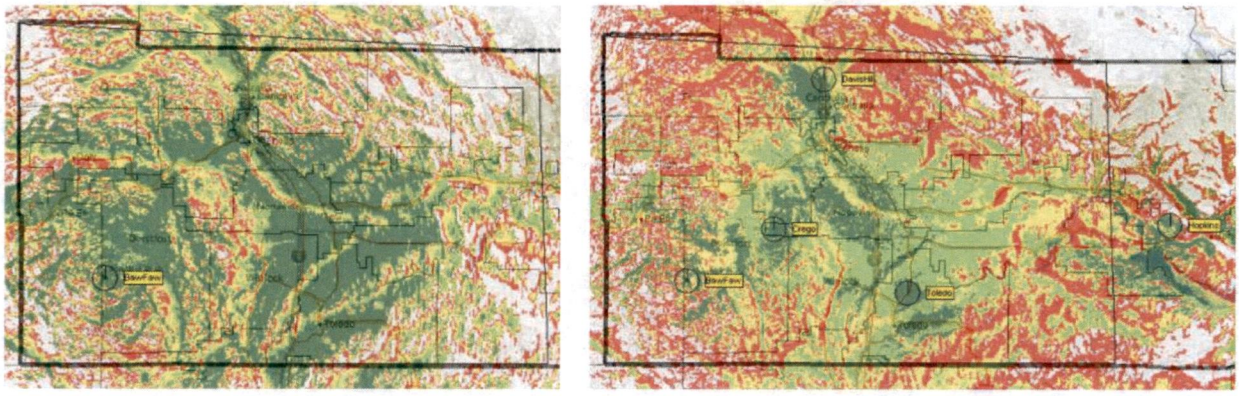


Figure 34: LCSO West System Current Coverage (Simulated)

APPENDIX C: PROPOSED SYSTEM PREDICTED COVERAGE

A detailed propagation simulation was developed to further analyze coverage and to predict performance from various site constellations for an enhanced system. The simulations utilize the EDX SignalPro™ application, which is a standard propagation tool employed by Public Safety to model the system elements and to predict coverage by incorporating industry standard propagation algorithms in addition to terrain and land use databases. Once the initial simulation was developed, the recorded data from the signal testing was factored into the SignalPro™ application to calibrate the model and improve its accuracy.

The propagation simulation was further developed to predict where the system would provide a voice quality (Delivered Audio Quality (DAQ)) of at least 3.4 per typical public safety standards. The minimum Channel Performance Criteria (CPC) required for a DAQ level of 3.4 for an analog narrowband (12.5 kHz) voice system was derived using the information from Table A-1 of TSB-88[2]. The TSB-88 report serves as the public safety LMR network design industry standard.

The propagation model predicts coverage for a mobile radio, as well as a portable radio worn on the hip on street (outdoors) and within buildings up to a specific dB signal loss value for both outbound (dispatch to field) and inbound (field to dispatch). The results for the simulation at this level of voice quality for the following conditions, for each of the analyzed county systems are provided in the figures on the following pages.

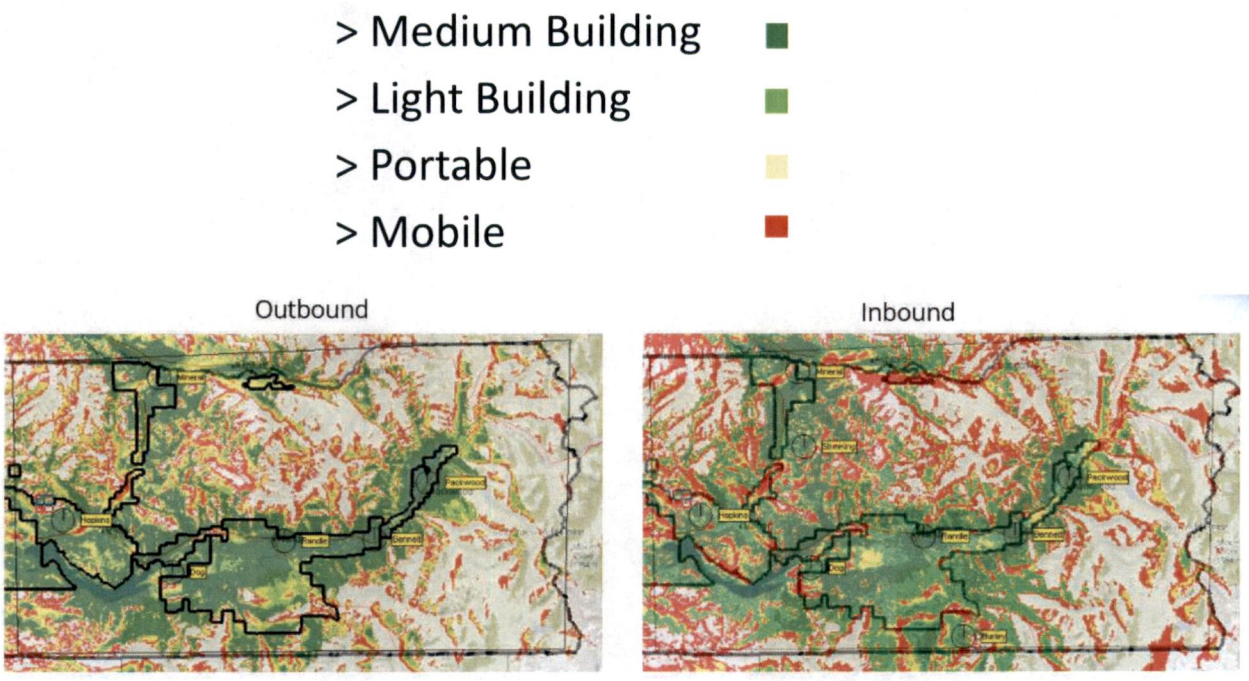


Figure 35: Proposed Fire System East Coverage (Simulated)

[2] TIA Telecommunications System Bulletin TSB-88.1-C: Wireless Communications Systems Performance in Noise and Interference Limited Situations - Part1: Recommended Methods for Technology Independent Performance Modeling: February 2008.

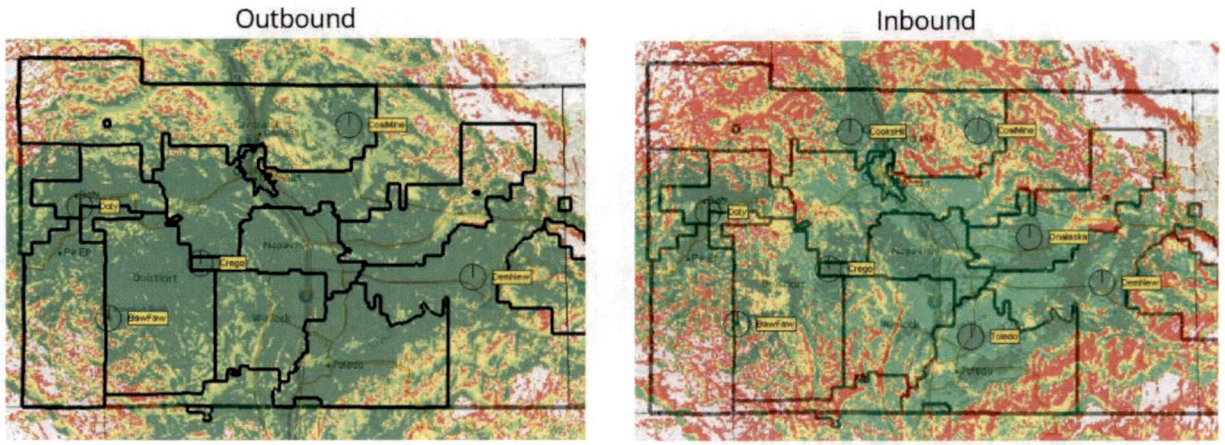


Figure 36: Proposed Fire System West Coverage (Simulated)

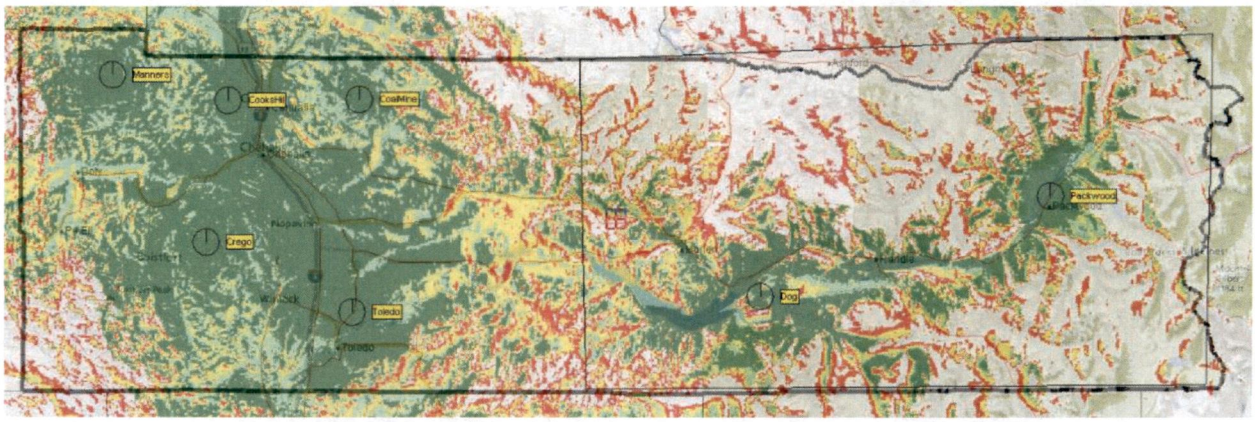


Figure 37: Paging System Composite Coverage – Current + Coal Mine (Simulated)

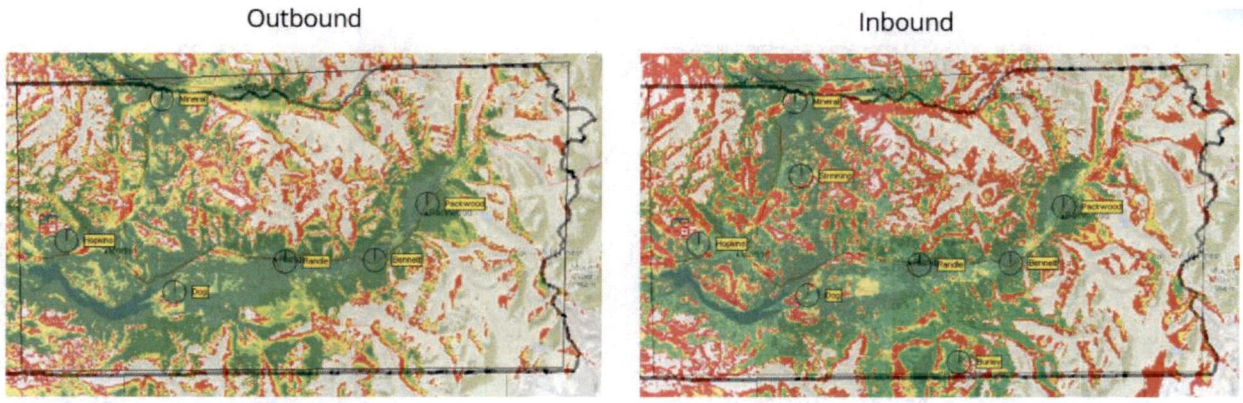
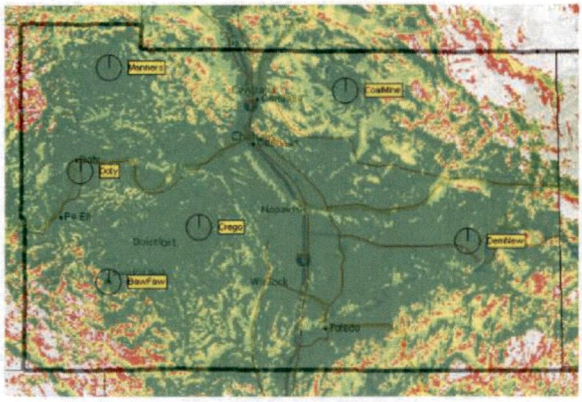


Figure 38: Proposed LCSO East System Coverage (Simulated)

Outbound



Inbound

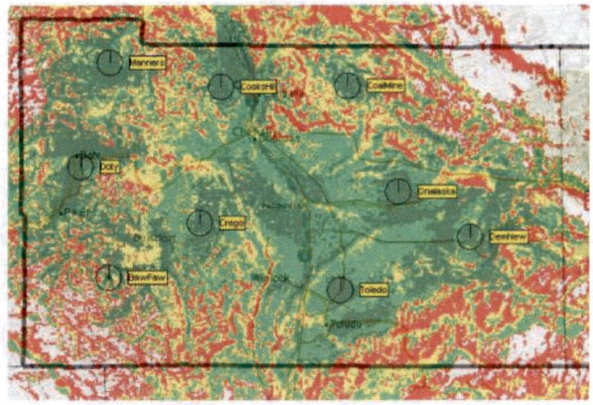


Figure 39: Proposed LCSO West System Coverage (Simulated)

APPENDIX D: PROPOSED MICROWAVE LINK PATH PROFILES (FROM TERRAIN DATABASE)

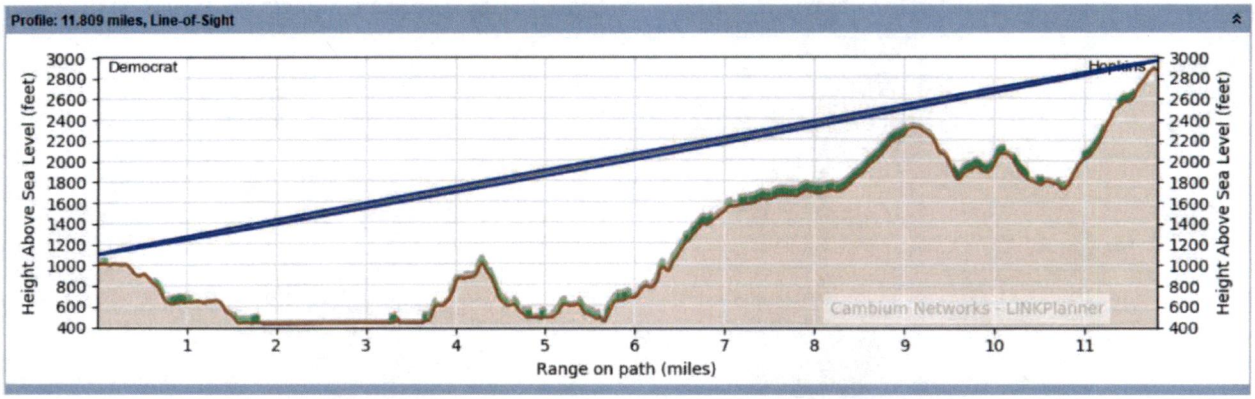


Figure 40: Democrat (90 ft.) to Hopkins (90 ft.) Path Profile

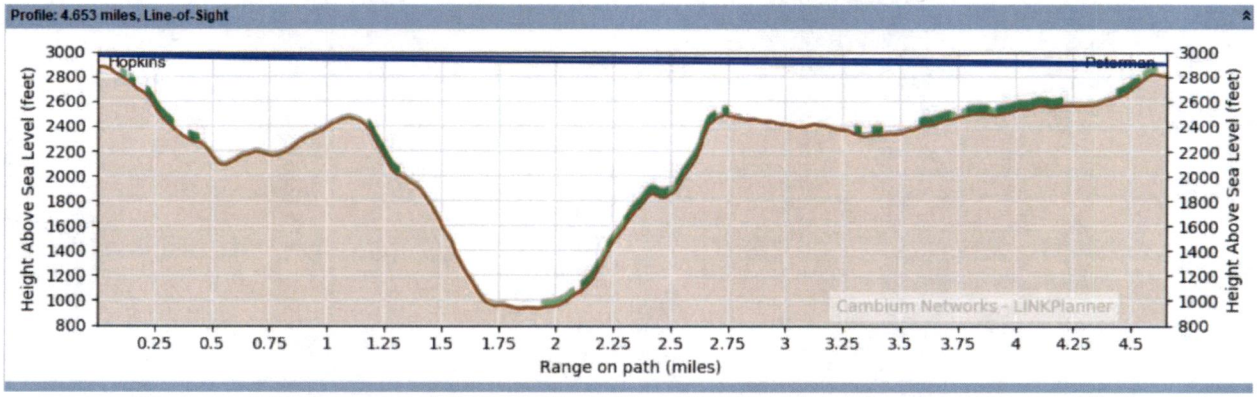


Figure 41: Hopkins (90 ft.) to Peterman (100 ft.) Path Profile

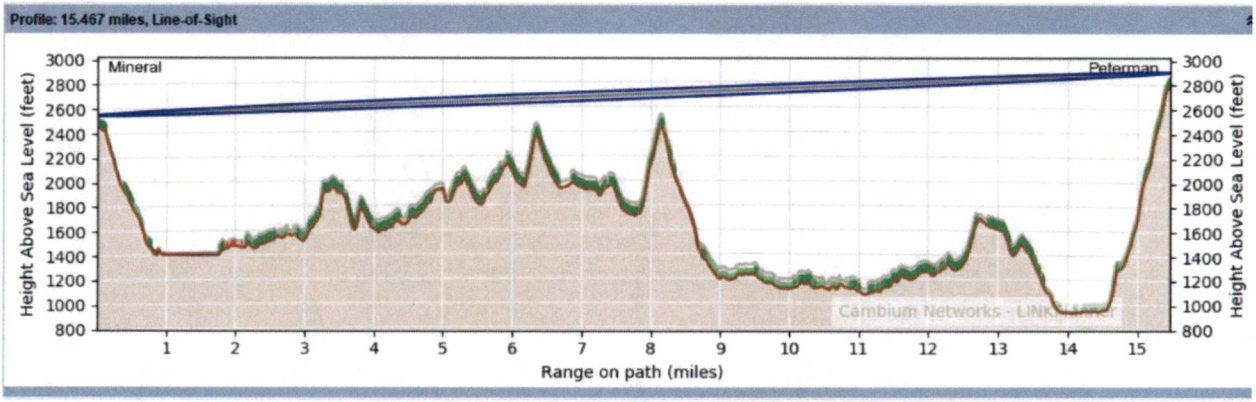


Figure 42: Mineral (90 ft.) to Peterman (100 ft.) Path Profile

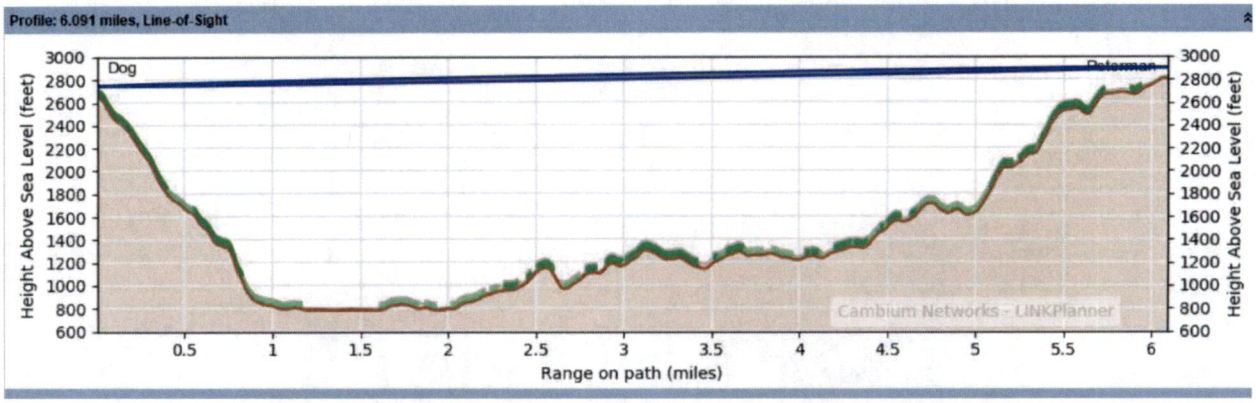


Figure 43: Dog (90 ft.) to Peterman (100 ft.) Path Profile

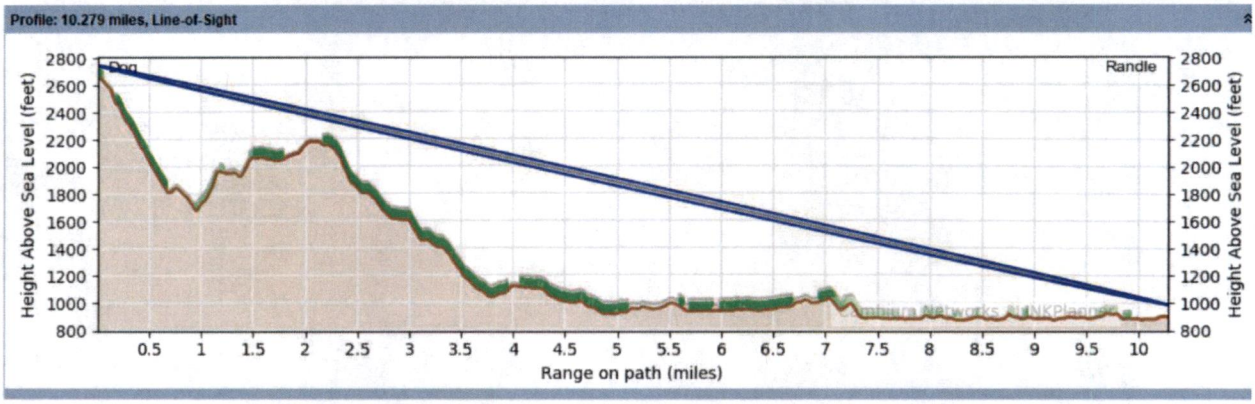


Figure 44: Dog (90 ft.) to Randle (90 ft.) Path Profile

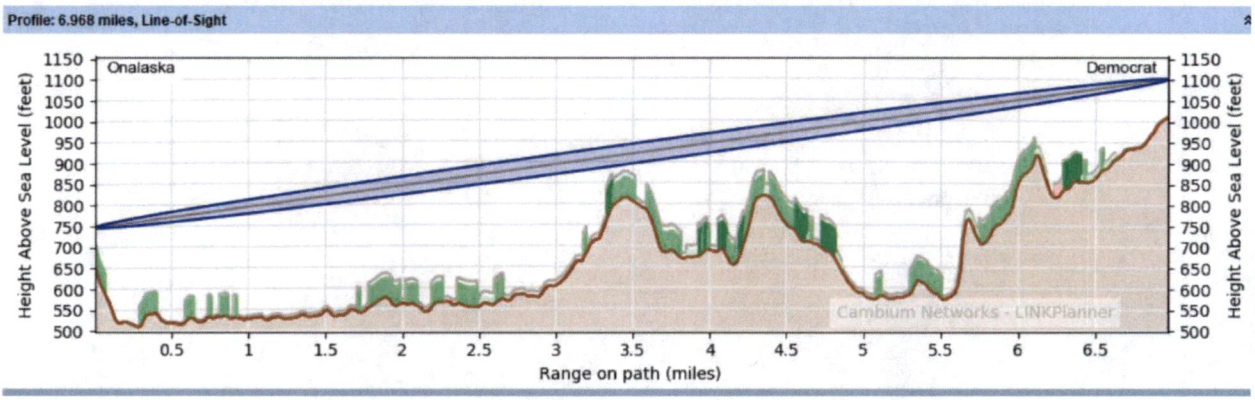


Figure 45: Onalaska (90 ft.) to Democrat (90 ft.) Path Profile

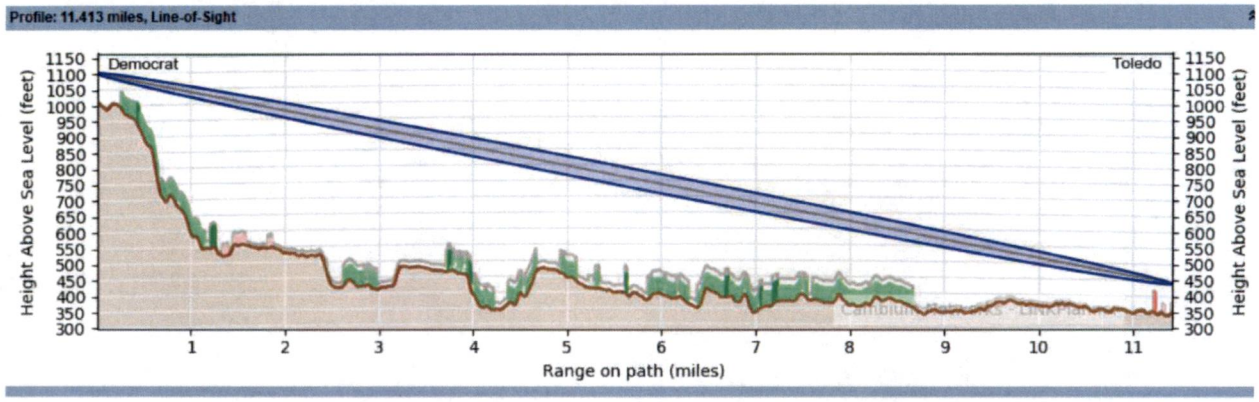


Figure 46: Democrat (90 ft.) to Toledo (90 ft.) Path Profile

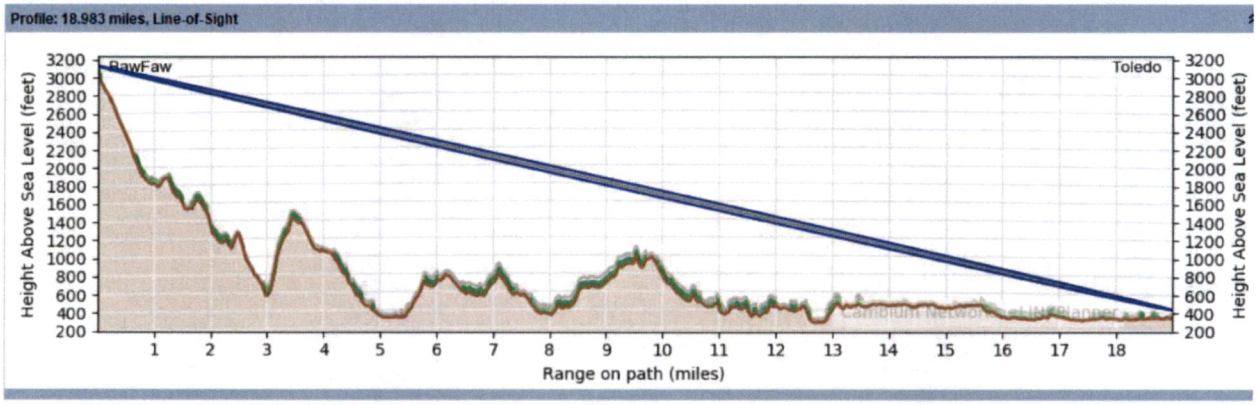


Figure 47: BawFaw (90 ft.) to Toledo (90 ft.) Path Profile

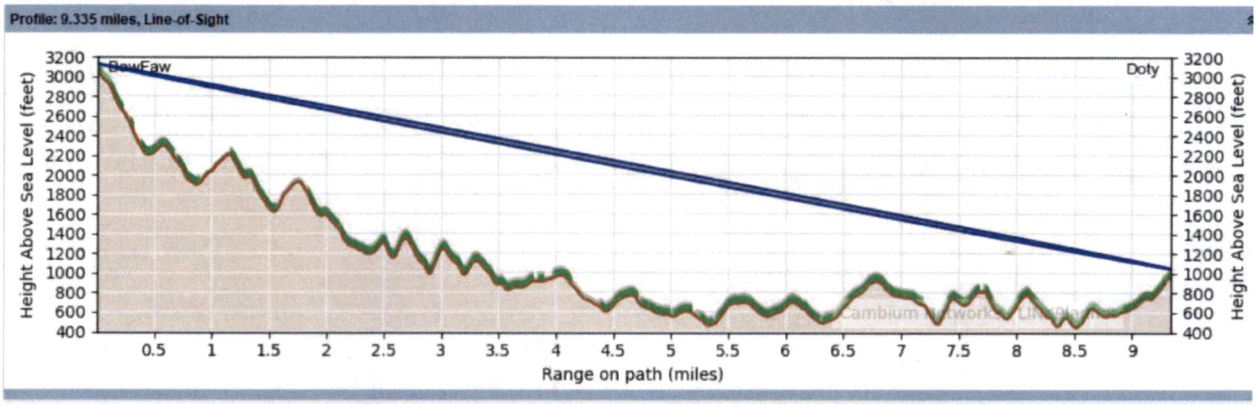


Figure 48: BawFaw (90 ft.) to Doty (100 ft.) Path Profile

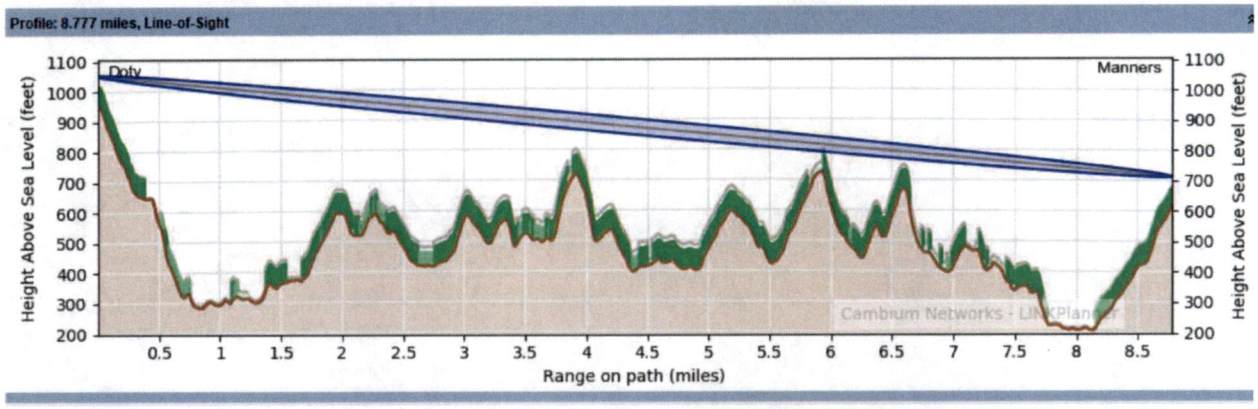


Figure 49: Doty (100 ft.) to Manners (100 ft.) Path Profile

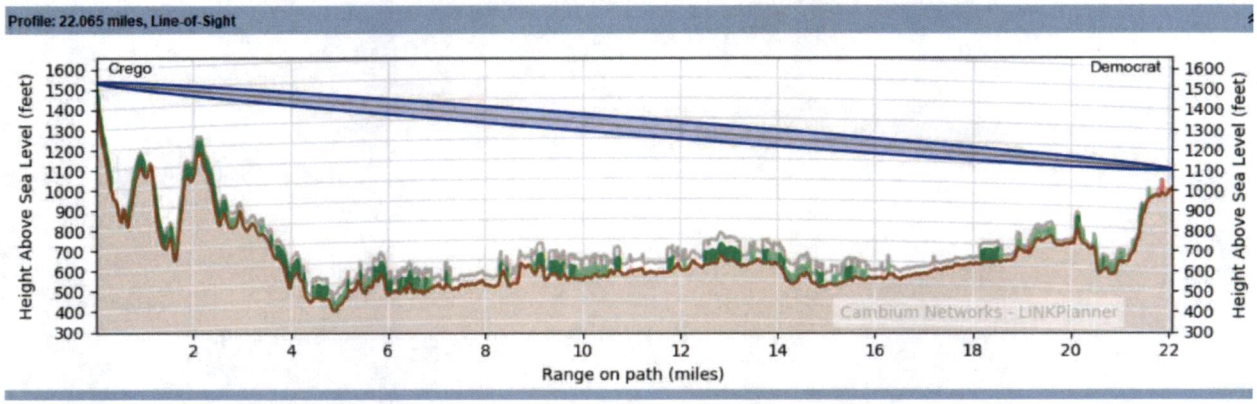
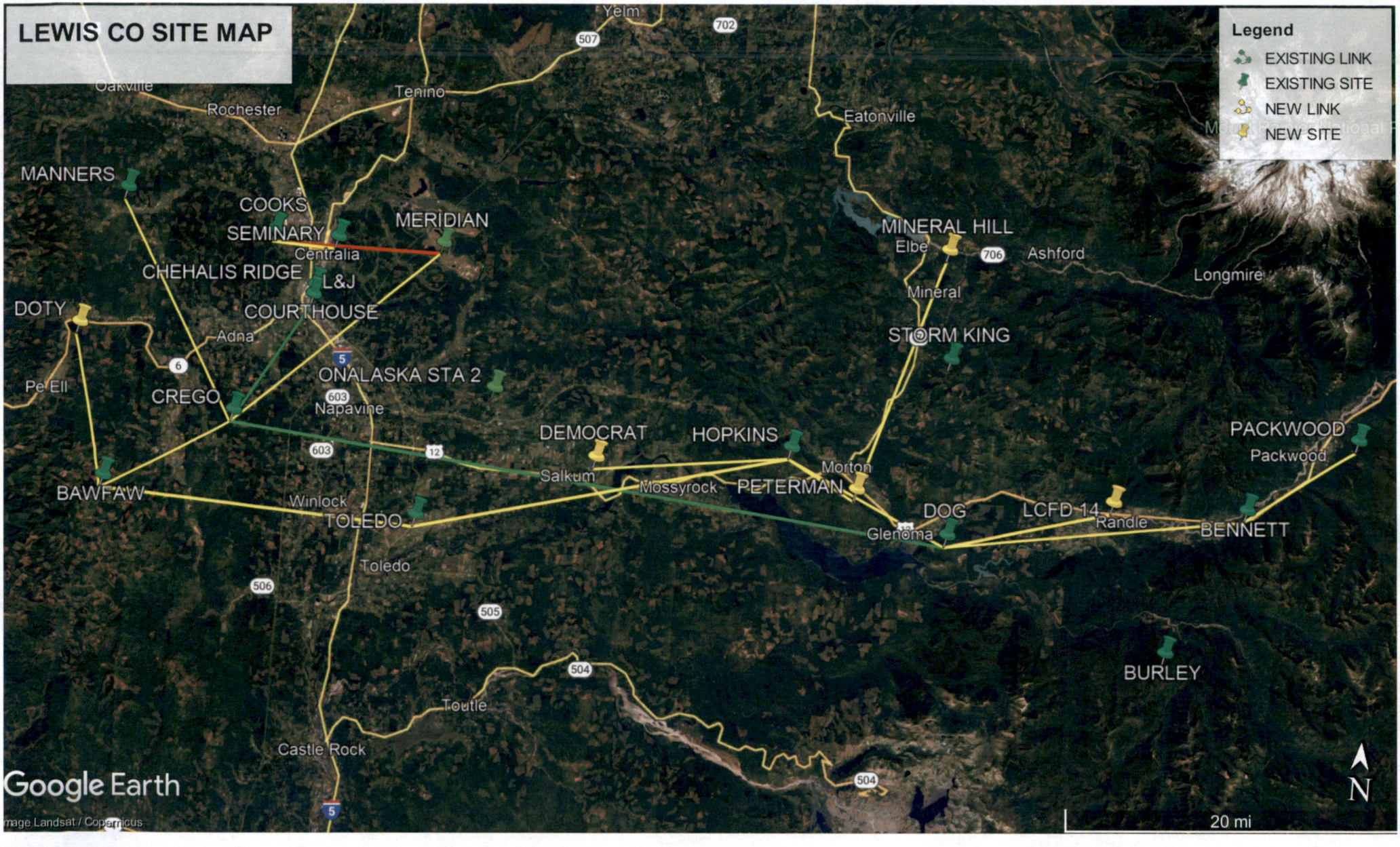


Figure 50: Crego (90 ft.) to Democrat (90 ft.) Path Profile


LEWIS CO SITE MAP
Legend
EXISTING LINK
EXISTING SITE
NEW LINK
NEW SITE
Yelm
702
507
Oakville
Rochester
Tenino
Eatonville
MANNERS
COOKS
SEMINARY
Centralia
MERIDIAN
MINERAL HILL
Elbe
706
Ashford
Longmire
CHEHALIS RIDGE
L&J
Mineral
DOTY
COURTHOUSE
Adna
STORM KING
5
6
ONALASKA STA 2
Pe Ell
CREGO
603
Napavine
DEMOCRAT
HOPKINS
PACKWOOD
Packwood
603
12
Salkum
Morton
Mossyrock
PETERMAN
BAWFAW
Winlock
TOLEDO
DOG
LCFD 14
Randle
Glenoma
BENNETT
Toledo
506
505
BURLEY
504
Toutle
Castle Rock
504
5
Google Earth
Image Landsat / Copernicus
N
20 mi

BOCC AGENDA ITEM SUMMARY

Resolution: 24-054

BOCC Meeting Date: Feb. 13, 2024

Suggested Wording for Agenda Item:

Agenda Type: Legal Notice

Issue a Request for Proposals (RFP) for Public Safety Radio Equipment and Services

Contact: Jennifer Libby-Jones

Phone: 360-740-3394

Department: COMM - 911

Description:

Issue a Request for Proposals for Public Safety Radio Equipment and Services

Approvals:

User	Status
PA's Office	Approved

Publication Requirements:

Publications:

The Chronicle Thurs 2/15/24; The Seattle Daily Journal of Commerce Thurs 2/15/24; The Portland Daily Journal of Commerce Wed 2/14/24

Additional Copies:

Cover Letter To: