

RFP No. 2016-020

P25 Trunked Radio System Replacement

LEGAL NOTICE

By order of the Commissioners' Court of Collin County, Texas, sealed proposals will be received by the Purchasing Agent, 2300 Bloomdale, Suite 3160, McKinney, TX 75071, until **2:00 P.M., Thursday, February 25, 2016**, for Request for Proposal **P25 Trunked Radio System Replacement**. A **Pre-Proposal** conference will be held **Tuesday, November 17, 2015 at 10:00 A.M.** at Collin County Sheriff's Office 4300 Community Ave, McKinney, TX 75071. Proposers shall use lump sum pricing. All Proposers must submit, prior to the proposal opening time, a Cashier's Check or acceptable Bid Bond payable without recourse to Collin County in the amount of not less than five percent (5%) of the total proposal. Proposers must furnish a performance and payment bond within thirty (30) consecutive calendar days following award of contract. Funds for payment have been provided through the Collin County budget approved by the Commissioner's Court for this fiscal year only. Proposers may obtain detailed specifications and other documents at Office of the Purchasing Agent: Collin County Administration Building, 2300 Bloomdale, Suite 3160, McKinney, TX 75071, 972-548-4165, or by going to: <https://collincountytx.ionwave.net>. Sealed proposals will be opened on **Thursday, February 25, 2016 at 2:00 P.M.** by the Purchasing Agent, 2300 Bloomdale, Suite 3160, McKinney, TX 75071. The Commissioners' Court reserves the right to reject any and all proposals.

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ATTENTION:	CLASSIFIEDS
BILL TO:	ACCOUNT NO 06100315-000
	COMMISSIONER'S COURT

NOTICE TO PUBLISHERS: Please publish in your issue on **Thursday, November 5, 2015** and **Thursday, November 12, 2015**. A copy of this notice and the publisher's affidavit must accompany the invoice when presented for payment.

NEWSPAPER:	<u>Plano Star Courier</u>
DATE:	<u>November 3, 2015</u>
FAX:	<u>972-529-1684</u>

Collin County, Texas

Bid Information

Bid Owner Sara Hoglund, CPPB Asst.
 Purchasing Agent
Email shoglund@co.collin.tx.us
Phone (972) 548 4104
Fax (972) 548 4694

Bid Number 2016-020
Title P25 Trunked Radio System
 Replacement
Bid Type RFP
Issue Date 11/03/2015
Close Date 2/25/2016 2:00:00 PM Central

Contact Information

Address 2300 Bloomdale Rd.
 Ste. 3160
 McKinney, TX 75071
Contact Sara Hoglund, CPPB Asst.
 Purchasing Agent
Department Purchasing
Building Admin. Building
Floor/Room Ste.3160
Telephone (972) 548 4104
Fax (972) 548 4694
Email shoglund@co.collin.tx.us

Ship to Information

Address See Purchase Order

 McKinney, TX 75071
Contact
Department
Building
Floor/Room
Telephone
Fax
Email

Supplier Information

Company Name _____
Contact Name _____
Address _____

Telephone _____
Fax _____
Email _____

Signature _____

Supplier Notes

Date ____ / ____ / ____

Bid Notes

Collin County has released this Request for Proposals (RFP) for the purpose of purchasing, implementing, acceptance testing, and transitioning to a new turnkey shared countywide 800 MHz P25 Phase 2 TDMA Simulcast Trunked Radio System

Bid Activities

Date	Name	Description
11/13/2015 5:00:00 PM	To Submit Pre-Proposal Conference Questions	The cut-off date for submitted questions will be 2 business days before the conference as noted in the Schedule of Events provided in this document.
11/17/2015 10:00:00 AM	Pre-Proposal Conference	<p>A pre-proposal conference will be conducted by Collin County, 10:00 a.m., November 17, 2015, located at the Sheriff's Office 4300 Community Ave, McKinney, TX 75071. It is the offeror's responsibility to review the site and documents to gain a full understanding of the requirements of the RFP. All contractors desiring to submit a proposal are encouraged to have a representative at the pre-proposal conference.</p> <p>The County recommends that vendors read all sections of the RFP prior to attending the conference and submit their questions in writing (Microsoft Word) to Sara Hoglund, Assistant Purchasing Agent via e-mail at shoglund@co.collin.tx.us so that the discussion during the conference can be as productive as possible. Submitted questions should include the name of the firm submitting the questions. A written summary of all questions and the County's responses to the questions will be provided to all attendees in the days following the meeting.</p> <p>The cut-off date for submitted questions will be 2 business days before the conference as noted in the Schedule of Events provided in this document. Any interpretation of or change in the RFP will be made by addendum.</p>
12/31/2015 5:00:00 PM	To Submit RFP Questions	Please e-mail questions to Sara Hoglund at shoglund@co.collin.tx.us. The end date for questions is 5:00 p.m. December 31, 2015.

Bid Messages

Bid Attachments

The following attachments are associated with this opportunity and will need to be retrieved separately

Bid Attributes

Please review the following and respond where necessary

#	Name	Note	Response
1	Exceptions	Do you take exceptions to the bid specifications. If so, by separate attachment, please state your exceptions. Valid Responses: [Please Select], Yes, No	_____ (Required)
2	Insurance	I understand that the insurance requirements in section 3.0 of this Quote/IFB/RFP are required and a certificate of insurance shall be submitted to the Purchasing department if I am awarded all or a portion of the resulting contract. Please initial.	_____ (Required)
3	Subcontractors	State the business name of all subcontractors and the type of work they will be performing under this contract. If you are fully qualified to self-perform the entire contract, please respond with "Not Applicable-Self Perform".	_____ (Required)
4	Preferential Treatment	The County of Collin, as a governmental agency of the State of Texas, may not award a contract to a nonresident bidder unless the nonresident's bid is lower than the lowest bid submitted by a responsible Texas resident bidder by the same amount that a Texas resident bidder would be required to underbid a nonresident bidder to obtain a comparable contract in the state in which the nonresident's principal place of business is located (Government Code, Title 10, V.T.C.A., Chapter 2252, Subchapter A). 1. Is your principal place of business in the State of Texas? 2. If your principal place of business is not in Texas, in which State is your principal place of business? 3. If your principal place of business is not in Texas, does your state favor resident bidders (bidders in your state) by some dollar increment or percentage? 4. If your state favors resident bidders, state by what dollar amount or percentage.	_____ (Required)

- 5 Debarment Certification _____ (Required)
- I certify that neither my company nor an owner or principal of my company has been debarred, suspended or otherwise made ineligible for participation in Federal Assistance programs under Executive Order 12549, "Debarment and Suspension," as described in the Federal Register and Rules and Regulations.
- Please initial.
- 6 Immigration and Reform Act _____ (Required)
- I declare and affirm that my company is in compliance with the Immigration and Reform Act of 1986 and all employees are legally eligible to work in the United States of America.
- I further understand and acknowledge that any non-compliance with the Immigration and Reform Act of 1986 at any time during the term of this contract will render the contract voidable by Collin County.
- Please initial.
- 7 Disclosure of Certain Relationships _____ (Required)
- Chapter 176 of the Texas Local Government Code requires that any vendor considering doing business with a local government entity disclose the vendor's affiliation or business relationship that might cause a conflict of interest with a local government entity. Subchapter 6 of the code requires a vendor to file a conflict of interest questionnaire (CIQ) if a conflict exists. By law this questionnaire must be filed with the records administrator of Collin County no later than the 7th business day after the date the vendor becomes aware of an event that requires the statement to be filed. A vendor commits an offense if the vendor knowingly violates the code. An offense under this section is a misdemeanor.
- By submitting a response to this request, the vendor represents that it is in compliance with the requirements of Chapter 176 of the Texas Local Government Code.
- Please send completed forms to the Collin County County Clerk's Office located at 2300 Bloomdale Rd., Suite 2104, McKinney, TX 75071.
- Please initial.
- 8 Bidder Survey _____ (Required)
- In order to better serve our bidders, the Collin County Purchasing Department is conducting the following survey. We appreciate your time and effort expended to submit your bid. Should you have any questions or require more information please call (972) 548-4165.
- How did you receive notice of this request?
Valid Responses: [Please Select], Plano Star Courier, Plan Room, Collin County eBid Notification, Collin County Website

9 Proposer Acknowledgement

Proposer acknowledges, understands the specifications, _____ (Required) any and all addenda, and agrees to the proposal terms and conditions and can provide the minimum requirements stated herein. Offeror acknowledges they have read the document in its entirety, visited the site, performed investigations and verifications as deemed necessary, is familiar with local conditions under which work is to be performed and will be responsible for any and all errors in Proposal submittal resulting from Proposer's failure to do so. Proposer acknowledges the prices submitted in this Proposal have been carefully reviewed and are submitted as correct and final. If Proposal is accepted, vendor further certifies and agrees to furnish any and all products/services upon which prices are extended at the price submitted, and upon conditions in the specifications of the Request for Proposal.

Please initial.

Line Items

#	Qty	UOM	Description	Response
1	1	fee	Provide detailed turnkey system pricing for all services (included but not limited to engineering, design, detailed design review, manufacturing, staging, installation, system optimization, testing, training, and system acceptance), equipment, software, system warranty and maintenance support as required in the RFP, cost discounts, purchase incentives, and equipment trade-ins, etc.	\$_____

Manufacturer:

Supplier Notes: _____

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GENERAL TERMS AND CONDITIONS

1.0 GENERAL INSTRUCTIONS

1.1 Definitions

1.1.1 Offeror: refers to submitter.

1.1.2 Vendor: refers to a Successful Offeror.

1.1.3 Submittal/Offer: refers to those documents required to be submitted to Collin County, by an Offeror.

1.1.4 RFP: refers to Request for Proposal.

1.2 If Offeror does not wish to submit an offer at this time, please submit a No Bid.

1.3 Awards shall be made not more than one hundred eighty (180) days after the time set for opening of submittals.

1.5 Collin County is always conscious and extremely appreciative of your time and effort in preparing your submittal.

1.5 Collin County uses Ion Wave Technologies, Inc. for the notification and dissemination of solicitations. The receipt of solicitations through any other company may result in your receipt of incomplete specifications and/or addendums which could ultimately render your offer non-compliant. Collin County accepts no responsibility for the receipt and/or notification of solicitations through any other company.

1.6 A submittal may not be withdrawn or canceled by the offeror prior to the ninety-first (91st) day following public opening of submittals and only prior to award.

1.7 It is understood that Collin County, Texas reserves the right to accept or reject any and/or all submittals for any or all products and/or services covered in a Request For Proposal (RFP), and to waive informalities or defects in submittals or to accept such submittals as it shall deem to be in the best interest of Collin County.

1.8 All RFP's submitted in hard copy paper form shall be submitted in a sealed envelope, plainly marked on the outside with the RFP number and name. A hard copy paper form submittal shall be manually signed in ink by a person having the authority to bind the firm in a contract. Submittals shall be mailed or hand delivered to the Collin County Purchasing Department, 2300 Bloomdale Rd., Ste. 3160, McKinney, TX 75071.

1.9 No oral, telegraphic or telephonic submittals will be accepted. RFP's may be submitted in electronic format via Ion Wave.

1.10 All RFP's submitted electronically via Ion Wave shall remain locked until official date and time of opening as stated in the Special Terms and Conditions of the RFP.

1.1.10 Time/date stamp clock in Collin County Purchasing Department shall be the official time of receipt for all RFP's submitted in hard copy paper form. RFP's received in County Purchasing Department after submission deadline shall be considered void and unacceptable. Absolutely no late submittals will be considered. Collin County accepts no responsibility for technical difficulties related to electronic submittals.

1.1.11 For hard copy paper form submittals, any alterations made prior to opening date and time must be initialed by the signer of the RFP guaranteeing authenticity. Submittals cannot be altered or amended after submission deadline.

1.1.12 Collin County is by statute exempt from the State Sales Tax and Federal Excise Tax; therefore, the prices submitted shall not include taxes.

1.1.13 Any interpretations, corrections and/or changes to a RFP and related Specifications or extensions to the opening/receipt date will be made by addenda to the respective document by the Collin County Purchasing Department. Questions and/or clarification requests must be submitted no later than seven (7) days prior to the opening/receipt date. Those received at a later date may not be addressed prior to the public opening. Sole authority to authorize addenda shall be vested in Collin County Purchasing Agent as entrusted by the Collin County Commissioners' Court. Addenda may be transmitted electronically via Ion Wave, by facsimile, E-mail transmission or mailed via the US Postal Service.

1.1.14 Addenda will be transmitted to all that are known to have received a copy of the RFP and related Specifications. However, it shall be the sole responsibility of the Offeror to verify issuance/non-issuance of addenda and to check all avenues of document availability (i.e. Collin County eBid at <https://collincountytx.ionwave.net>, telephoning Purchasing Department directly, etc.) prior to opening/receipt date and time to insure Offeror's receipt of any addenda issued. Offeror shall acknowledge receipt of all addenda.

1.15 All materials and services shall be subject to Collin County approval.

1.16 Collin County reserves the right to make award in whole or in part as it deems to be in the best interest of the County.

1.17 Offeror shall comply with Commissioners' Court Order No. 96-680-10-28, Establishment of Guidelines & Restrictions Regarding the Acceptance of Gifts by County Officials & County Employees.

1.18 Any reference to model/make and/or manufacturer used in specifications is for descriptive purposes only. Products/materials of like quality will be considered.

1.19 Offerors taking exception to the specifications shall do so at their own risk. By offering substitutions, Offeror shall state these exceptions in the section provided in the RFP or by attachment. Exception/substitution, if accepted, must meet or exceed specifications stated therein. Collin County reserves the right to accept or reject any and/or all of the exception(s)/substitution(s) deemed to be in the best interest of the County.

1.20 Minimum Standards for Responsible Prospective Offerors: A prospective Offeror must meet the following minimum requirements:

- 1.20.1 have adequate financial resources, or the ability to obtain such resources as required;
- 1.20.2 be able to comply with the required or proposed delivery/completion schedule;
- 1.20.3 have a satisfactory record of performance;
- 1.20.4 have a satisfactory record of integrity and ethics;
- 1.20.5 be otherwise qualified and eligible to receive an award.

Collin County may request documentation and other information sufficient to determine Offeror's ability to meet these minimum standards listed above.

1.21 Offeror shall bear any/all costs associated with its preparation of a RFP submittal.

1.22 Public Information Act: Collin County is governed by the Texas Public Information Act, Chapter 552 of the Texas Government Code. All information submitted by prospective bidders during the bidding process is subject to release under the Act.

1.23 The Offeror shall comply with Commissioners' Court Order No. 2004-167-03-11, County Logo Policy.

1.24 Interlocal Agreement: Successful Provider agrees to extend prices and terms to all entities that has entered into or will enter into joint purchasing interlocal cooperation agreements with Collin County.

1.25 Bid Openings: All offers submitted will be read at the county's regularly scheduled bid opening for the designated project. However, the reading of an offer at bid opening should be not construed as a comment on the responsiveness of such offer or as any indication that the county accepts such offer as responsive.

The county will make a determination as to the responsiveness of offers submitted based upon compliance with all applicable laws, Collin County Purchasing Guidelines, and project documents, including but not limited to the project specifications and contract documents. The County will notify the successful bidder upon award of the contract and, according to state law; all offers received will be available for inspection at that time.

2.0 TERMS OF CONTRACT

2.1 A proposal, when properly accepted by Collin County, shall constitute a contract equally binding between the Vendor and Collin County. No different or additional terms will become part of this contract with the exception of an Amendment and/or a Change Order.

2.2 No oral statement of any person shall modify or otherwise change, or affect the terms, conditions or specifications stated in the resulting contract. All Amendments and/or Change Orders to the contract will be made in writing by Collin County Purchasing Agent.

2.3 No public official shall have interest in the contract, in accordance with Vernon's Texas Codes Annotated, Local Government Code Title 5, Subtitle C, Chapter 171.

2.4 Design, strength, quality of materials and workmanship must conform to the highest standards of manufacturing and engineering practice.

2.5 Proposals must comply with all federal, state, county and local laws concerning the type(s) of product(s)/service(s)/equipment/project(s) contracted for, and the fulfillment of all ADA (Americans with Disabilities Act) requirements.

2.6 All products must be new and unused, unless otherwise specified, in first-class condition and of current manufacture. Obsolete products, including products or any parts not compatible with existing hardware/software configurations will not be accepted.

2.7 Vendor shall provide any and all notices as may be required under the Drug-Free Work Place Act of 1988, 28 CFR Part 67, Subpart F, to its employees and all sub-contractors to insure that Collin County maintains a drug-free work place.

2.8 Vendor shall defend, indemnify and save harmless Collin County and all its officers, agents and employees and all entities, their officers, agents and employees who are participating in this contract from all suits, claims, actions, damages (including personal injury and or property damages), or demands of any character, name and description, (including attorneys' fees, expenses and other defense costs of any nature) brought for or on account of any injuries or damages received or sustained by any person, persons, or property on account of vendor's breach of the contract arising from an award, and/or any negligent act, error, omission or fault of the offeror, or of any agent, employee, subcontractor or supplier of offeror in the execution of, or performance under, any contract which may result from an award. Vendor shall pay in full any judgment with costs, including attorney fees and expenses which are rendered against Collin County and/or participating entities arising out of such breach, act, error, omission and/or fault.

2.9 If a contract, resulting from a Collin County RFP is for the execution of a public work, the following shall apply:

2.9.1 In accordance with V.T.C.A. 2253.021, a governmental agency that makes a public work contract with a prime contractor shall require the contractor, before beginning work, to execute to the governmental entity a Payment Bond if the contract is in excess of \$25,000.00. Such bond shall be in the amount of the contract payable to the governmental entity and must be executed by a corporate surety in accordance with Section 1, Chapter 87, Acts of the 56th Legislature, Regular Session, 1959 (Article 7.19-1 Vernon's Texas Insurance Code).

2.9.2 In accordance with V.T.C.A. 2253.021, a governmental agency that makes a public work contract with a prime contractor shall require the contractor, before beginning work, to execute to the governmental entity a Performance Bond if the contract is in excess of \$100,000.00. Such bond shall be in the amount of the contract payable to the governmental entity and must be executed by a corporate surety in accordance with Section 1, Chapter 87, Acts of the 56th Legislature, Regular Session, 1959 (Article 7.19-1 Vernon's Texas Insurance Code).

2.10 Purchase Order(s) shall be generated by Collin County to the Vendor. Collin County will not be responsible for any orders placed/delivered without a valid purchase order number.

2.11 The contract shall remain in effect until any of the following occurs: delivery of product(s) and/or completion and acceptance by Collin County of product(s) and/or service(s), contract expires or is terminated by either party with thirty (30) days written notice prior to cancellation and notice must state therein the reasons for such cancellation. Collin County reserves the right to terminate the contract immediately in the event the offeror fails to meet delivery or completion schedules, or otherwise perform in accordance with the specifications. Breach of contract or default authorizes the County to purchase elsewhere and charge the full increase in cost and handling to the defaulting offeror.

2.12 Collin County Purchasing Department shall serve as Contract Administrator or shall supervise agents designated by Collin County.

2.13 All delivery and freight charges (FOB Inside delivery at Collin County designated locations) are to be included as part of the proposal price. All components required to render the item complete, installed and operational shall be included in the total proposal price. Collin County will pay no additional freight/delivery/installation/setup fees.

2.14 Vendor shall notify the Purchasing Department immediately if delivery/completion schedule cannot be met. If delay is foreseen, the Vendor shall give written notice to the Purchasing Agent. The County has the right to extend delivery/completion time if reason appears valid.

2.15 The title and risk of loss of the product(s) shall not pass to Collin County until Collin County actually receives and takes possession of the product(s) at the point or points of delivery. Collin County shall generate a purchase order(s) to the Vendor and the purchase order number must appear on all itemized invoices.

2.16 Invoices shall be mailed directly to the Collin County Auditor's Office, 2300 Bloomdale Road, Suite 3100, McKinney, Texas 75071. All invoices shall show:

2.16.1 Collin County Purchase Order Number;

2.16.2 Vendor's Name, Address and Tax Identification Number;

2.16.3 Detailed breakdown of all charges for the product(s) and/or service(s) including applicable time frames.

2.17 Payment will be made in accordance with V.T.C.A., Government Code, Title 10, Subtitle F, Chapter 2251.021, Time for Payment by Governmental Entity.

2.18 All warranties shall be stated as required in the Uniform Commercial Code.

2.19 The Vendor and Collin County agree that both parties have all rights, duties, and remedies available as stated in the Uniform Commercial Code.

2.20 The Vendor agrees to protect Collin County from any claims involving infringements of patents and/or copyrights.

2.21 The contract will be governed by the laws of the State of Texas. Should any portion of the contract be in conflict with the laws of the State of Texas, the State laws shall invalidate only that portion. The remaining portion of the contract shall remain in effect. The contract is performable in Collin County, Texas.

2.22 Jurisdiction, Venue, or Forum: The parties submit all their disputes arising out of or in connection with any Agreement resulting from the RFP to the exclusive jurisdiction of the Courts of Collin County, Texas.

2.23 The Vendor shall not sell, assign, transfer or convey the contract, in whole or in part, without the prior written approval from Collin County.

2.24 The apparent silence of any part of the specification as to any detail or to the apparent omission from it of a detailed description concerning any point, shall be regarded as meaning that only the best commercial practices are to prevail. All interpretations of the specification shall be made on the basis of this statement.

2.25 Vendor shall not fraudulently advertise, publish or otherwise make reference to the existence of a contract between Collin County and Vendor for purposes of solicitation. As exception, Vendor may refer to Collin County as an evaluating reference for purposes of establishing a contract with other entities.

2.26 The Vendor understands, acknowledges and agrees that if the Vendor subcontracts with a third party for services and/or material, the primary Vendor accepts responsibility for full and prompt payment to the third party. Any dispute between the primary Vendor and the third party, including any payment dispute, will be promptly remedied by the primary vendor. Failure to promptly render a remedy or to make prompt payment to the third party (subcontractor) may result in the withholding of funds from the primary Vendor by Collin County for any payments owed to the third party.

2.27 Vendor shall provide Collin County with diagnostic access tools at no additional cost to Collin County, for all Electrical and Mechanical systems, components, etc., procured through this contract.

2.28 Criminal History Background Check: If required, ALL individuals may be subject to a criminal history background check performed by Collin County Homeland Security prior to access being granted to Collin County. Upon request, Vendor shall provide list of individuals to Collin County Purchasing Department within five (5) working days.

2.29 Non-Disclosure Agreement: Where applicable, vendor shall be required to sign a non-disclosure agreement acknowledging that all information to be furnished is in all respects confidential in nature, other than information which is in the public domain through other means and that any disclosure or use of same by vendor, except as provided in the contract/agreement, may cause serious harm or damage to Collin County. Therefore, Vendor agrees that Vendor will not use the information furnished for any purpose other than that stated in contract/agreement, and agrees that Vendor will not either directly or indirectly by agent, employee, or representative disclose this information, either in whole or in part, to any third party, except on a need to know basis for the purpose of evaluating any possible transaction. This agreement shall be binding upon Collin County and Vendor, and upon the directors, officers, employees and agents of each.

2.30 Vendors must be in compliance with the Immigration and Reform Act of 1986 and all employees specific to this solicitation must be legally eligible to work in the United States of America.

2.31 Certification of Eligibility: This provision applies if the anticipated Contract exceeds \$100,000.00 and as it relates to the expenditure of federal grant funds. By submitting a bid or proposal in response to this solicitation, the Vendor certifies that at the time of submission, he/she is not on the Federal Government's list of suspended, ineligible, or debarred contractors. In the event of placement on the list between the time of proposal submission and time of award, Offeror will notify the Collin County Purchasing Agent. Failure to do so may result in terminating this contract for default.

2.32 Notice to Vendors delivering goods or performing services within the Collin County Detention Facility: The Collin County Detention Facility houses persons who have been charged with and/or convicted of serious criminal offenses. When entering the Detention Facility, you could: (1) hear obscene or graphic language; (2) view partially clothed male inmates; (3) be subjected to verbal abuse or taunting; (4) risk physical altercations or physical contact, which could be minimal or possibly serious; (5) be exposed to communicable or infectious diseases; (6) be temporarily detained or prevented from immediately leaving the Detention Facility in the case of an emergency or "lockdown"; and (7) subjected to a search of your person or property. While the Collin County Sheriff's Office takes every reasonable precaution to protect the safety of visitors to the Detention Facility, because of the inherently dangerous nature of a Detention Facility and the type of the persons incarcerated therein, please be advised of the possibility of such situations exist and you should carefully consider such risks when entering the Detention Facility. By entering the Collin County Detention Facility, you acknowledge that you are aware of such potential risks and willingly and knowingly choose to enter the Collin County Detention Facility.

2.33 Delays and Extensions of Time when applicable:

2.33.1 If the Vendor is delayed at any time in the commence or progress of the Work by an act or neglect of the Owner or Architect/Engineer, or of an employee of either, or of a separate contractor employed by the Owner, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Vendor's control, or by delay authorized by the Owner pending mediation and arbitration, or by other causes which the Owner or Architect/Engineer determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Owner/Architect may determine.

2.33.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time and could not have been reasonably anticipated, and that the weather conditions had an adverse effect on the scheduled construction.

NOTE: All other terms and conditions (i.e. Insurance Requirements, Bond Requirements, etc.) shall be stated in the individual RFP Solicitation documents as Special Terms, Conditions and Specifications.

3.0 INSURANCE REQUIREMENTS

3.1 Before commencing work, the vendor shall be required, at its own expense, to furnish the Collin County Purchasing Agent with certified copies of all insurance certificate(s) indicating the coverage to remain in force throughout the term of this contract.

3.1.1 **Commercial General Liability** insurance including but not limited to the coverage indicated below. Coverage shall not exclude or limit Products/Completed Operations, Contractual Liability, or Cross Liability. Coverage must be written on occurrence form.

- Each Occurrence: \$1,000,000
- Personal Injury & Adv. Injury: \$1,000,000
- Products/Completed Operation Aggregate: \$2,000,000
- General Aggregate: \$2,000,000

3.1.2 **Workers Compensation** insurance as required by the laws of Texas, and Employers' Liability.

Employers' Liability

- Liability, Each Accident: \$1,000,000
- Disease-Each Employee: \$1,000,000
- Disease – Policy Limit: \$1,000,000

3.1.3 **Commercial Automobile Liability** insurance which includes any automobile (owned, non-owned, and hired vehicles) used in connection with the contract.

- Combined Single Limit – Each Accident: \$1,000,000

3.1.4 **Professional/Errors & Omissions Liability** insurance with a two (2) year extended reporting period. If you choose to have project coverage endorsed onto your base policy, this would be acceptable.

- Each Occurrence/Aggregate: \$5,000,000

3.1.5 **Umbrella/Excess Liability** insurance.

- Each Occurrence/Aggregate: \$4,000,000

3.1.6 **Installation/Erections Floater** insurance with a limit equal to the largest tower installation/erection. This limit shall apply to each tower separately.

3.2 With reference to the foregoing insurance requirement, the vendor shall endorse applicable insurance policies as follows:

3.2.1 A waiver of subrogation in favor of Collin County, its officials, employees, volunteers and officers shall be provided for General Liability, Commercial Automobile Liability, and Workers' Compensation.

3.2.2 The vendor's insurance coverage shall name Collin County as additional insured under the General Liability policy.

3.2.3 All insurance policies shall be endorsed to require the insurer to immediately notify Collin County of any decrease in the insurance coverage limits.

3.2.4 All insurance policies shall be endorsed to the effect that Collin County will receive at least sixty (60) days notice prior to cancellation, non-renewal or termination of the policy.

3.2.5 All copies of Certificates of Insurance shall reference the project/contract number.

3.3 All insurance shall be purchased from an insurance company that meets the following requirements:

3.3.1 A financial rating of A-VII or higher as assigned by the BEST Rating Company or equivalent.

3.4 Certificates of Insurance shall be prepared and executed by the insurance company or its authorized agent, and shall contain provisions representing and warranting the following:

3.4.1 Sets forth all endorsements and insurance coverages according to requirements and instructions contained herein.

3.4.2 Sets forth the notice of cancellation or termination to Collin County.

4.0 EVALUATION FACTORS

The award of the contract shall be made to the responsible vendor, whose proposal is determined to be the best evaluated offer resulting from negotiation, taking into consideration the relative importance of price and other factors set forth in the Request For Proposals in accordance with Vernon's Texas Code Annotated, Government Code 262.030.

The Evaluation Committee will review all proposals received by the Opening date and time as part of a documented evaluation process. For each decision point in the process, the County will evaluate contractors according to specific criteria and will elevate a certain number of contractors to compete against each other.

The County reserves the right to determine the suitability of proposals on the basis of all of the criteria below.

The County will use a competitive process based upon "selection levels." The County recognizes that if a vendor fails to meet expectations during any part of the process, it reserves the right to proceed with the remaining providers or to elevate a provider that was not elevated before. The selection levels are described in the following sections.

Level 1 - Procurement Requirements Assessment

Criteria assessed during Level 1:

Conformance with RFP guidelines and submittal requirements.

The first part of the elevation process is to validate the completeness of the proposal and ensure that all the RFP guidelines and submittal requirements are met (the proper signatures, bonds, insurance requirements and other similar required information). Those vendors who do not meet all the requirements for the RFP may, at the discretion of the County, be contacted to submit the missing information within two (2) Business days. Incomplete or noncompliant RFPs may be disqualified.

Level 2 – Detailed Proposal Assessment

The Evaluation Committee will conduct a detailed assessment of all proposals elevated to this Level. Criteria evaluated in Level 2:

Description	Percentage
Guaranteed Radio Coverage	30%
System Reliability and Functionality, Past Experience	20%
Proposed Project Team, Project ,Proposed Warranty and Maintenance Team	10%
Project Plan, Schedule	10%
Turnkey Pricing For All Services (included but not limited to engineering, design, manufacturing, installation, system optimization, testing, training, and system acceptance) Equipment, Software, System Warranty and Maintenance Support as Required in the RFP	30%

The Proposal Evaluation Committee will conduct an initial review of the proposals and may develop a short list of respondent(s) and the short listed respondent(s) may be invited and scheduled to participate in a structured oral presentation and interview. Such presentation(s) will be provided at no cost to the County. Upon completion of the oral presentation(s) the information obtained during the presentation(s) will be factored into the evaluation process. The oral presentation(s) may be recorded and/or videotaped by the County.

Level 3 – Best and Final Offer

Vendors elevated to Level 3 will be asked to respond in writing to issues, as well as any other cost and implementation planning considerations in the proposal, and may be invited to present their responses on-site. Criteria evaluated during this phase include:

Description	Percentage
Updated Cost	50%
Response to Questions/Clarifications	50%

Level 4 – Contract Negotiations

Based on the information collected in this phase, a single contractor will be identified as the finalist for contract negotiations. If a contract cannot be reached after a period of time deemed reasonable by the County, it reserves the right to contact any of the other contractors that have submitted bids and enter into negotiations with them.

5.0 SPECIAL TERMS AND CONDITIONS

5.1 Introduction

Collin County has released this Request for Proposals (RFP) for the purpose of purchasing, implementing, acceptance testing, and transitioning to a new turnkey shared countywide 800 MHz P25 Phase 2 TDMA Simulcast Trunked Radio System.

Collin County, located in northeastern Texas, is part of the Dallas-Fort Worth-Arlington, TX Metropolitan Statistical Area. A small portion of the City of Dallas is located in Collin County. The County has an area of approximately 886 square miles of which 841 square miles are land and 45 square miles is water most notably from Lake Lavon in the southeast corner. As of the 2010 United States Census, the county's population was 782,341. The County is home to a broad range of businesses including numerous high-technology and healthcare companies.



The existing Collin County trunked radio system currently supports many agencies throughout the County including both public safety and local government users. There are 25 different public safety agencies and departments operating on the system including:

- Collin County Sheriff's Office
- Collin County Constables
- Collin County Jail
- Collin County Juvenile Detention
- Collin County Fire Marshal
- Collin County Animal Services
- Collin County Homeland Security
- Anna Police Department
- Anna Fire Department
- Branch Fire Department
- Celina Police Department

- Celina Fire Department
- Fairview Police Department
- Farmersville Police Department
- Farmersville Fire Department
- Josephine Police Department
- Josephine Fire Department
- Lavon Police Department
- Lowery Crossing Fire Department
- Melissa Police Department
- Melissa Fire Department
- Nevada Fire Department
- Parker Police Department
- Parker Fire Department
- Princeton Police Department
- Princeton Fire Department
- Westminster Fire Department
- Weston Fire Department

In addition, the system also provides radio communications for Collin County's local government operations that include the County's Public Works Department, Facilities Maintenance Department, and Animal Services.

The County's current radio system is a four-site six-Channel analog Motorola SmartNet Trunked Simulcast network. The County owns all four sites. The system was initially installed as a two-site simulcast system in 1993 with the prime site located at the County's Service Center on Wilmeth Rd. and a single southeastern remote simulcast site situated the City of Copeville. Since its initial implementation, the system has been expanded to four sites and has undergone various modifications and upgrades to meet the County's changing needs. A detailed description of the existing system and facilities has been provided in Section 1 – Current System Environment.

The new radio system developed through this project will represent a new start, a new system, and a new era in wireless communications for the public safety and local government agencies within Collin County. The County will serve as the contracting entity for the new shared radio system. The following pages of this RFP provide structured guidance for the development and submission of your competitive turnkey system proposal.

5.2 Authorization: By order of the Commissioners' Court of Collin County, Texas sealed proposals will be received for P25 Trunked Radio System Replacement.

5.3 Intent of Request for Proposal: Collin County's intent of this Request For Proposal (RFP) and resulting contract is to provide offerors with sufficient information to prepare a proposal for P25 Trunked Radio System Replacement.

5.4 Term: Provide for a term contract commencing on the date of the award and continuing until project is complete with five (5) years of annual maintenance.

5.5 Pre-Proposal Conference: A pre-proposal conference will be conducted by Collin County, 10:00 a.m., November 17, 2015, located at the Sheriff's Office 4300 Community Ave, McKinney, TX 75071. It is the offeror's responsibility to review the site and documents to gain a full understanding of the requirements of the RFP. All contractors desiring to submit a proposal are encouraged to have a representative at the pre-proposal conference.

The County recommends that vendors read all sections of the RFP prior to attending the conference and submit their questions in writing (Microsoft Word) to Sara Hoglund, Assistant Purchasing Agent via e-mail at shoglund@co.collin.tx.us so that the discussion during the conference can be as productive as possible. Submitted questions should include the name of the firm submitting the questions. A written summary of all questions and the County's responses to the questions will be provided to all attendees in the days following the meeting.

The cut-off date for submitted questions will be 2 business days before the conference as noted in the Schedule of Events provided in this document. Any interpretation of or change in the RFP will be made by addendum.

5.6 Funding: Funds for payment have been provided through the County budgetary process. State of Texas statutes prohibit the County from any obligation of public funds beyond the fiscal year for which a budget has been approved. Therefore, anticipated orders or other obligations that arise past the end of the current Collin County fiscal year shall be subject to budget approval.

5.7 Bonding Requirements:

5.7.1 Proposal Guarantee (Bid Bond): Proposals submitted in response to this RFP shall include the submission of a proposal guarantee. Offers submitted without the required proposal guarantee in the form of a bond or a cashier's check will not be accepted. A proposal guarantee in the amount of 5% of the proposed system cost is required at the time of proposal submission.

5.7.2 Performance and Payment Bonds: In accordance with V.T.C.A. 2253.021, a governmental agency that makes a public work contract with a prime contractor shall require the contractor, before beginning work, to execute to the governmental entity a Payment Bond if the contract is in excess of \$25,000.00 and a Performance Bond if the contract is in excess of \$100,000. Such bond shall be in the amount of the contract payable to the governmental entity and must be executed by a corporate surety in accordance with Section 1, Chapter 87, Acts of the 56th Legislature, Regular Session, 1959 (Article 7.19-1 Vernon's Texas Insurance Code).

The County shall require, within 30 days after signing of a contract and prior to beginning the actual work (whichever comes first) that the vendor provide the County with a performance

bond and a payment bond in the amount of the contract. A surety company authorized to do business in this state shall execute these bonds. Bonds shall be delivered to the Collin County Purchasing Department, 2300 Bloomdale, Suite 3160, McKinney, TX 75071.

The performance bond and payment bond must be automatically renewed annually on the anniversary of the effective date of the bonds for the term of the Agreement and any extensions, unless the Surety gives the vendor and the County 30 days written notice before the renewal date that the Surety will not renew a bond or bonds, in which case the vendor shall provide the County with a replacement bond (in the same form as the affected Bond(s)) before the renewal date.

5.8 Completion/Response Time: Vendor shall place product(s) and/or complete services at the County's designated location within the number of calendar days according to the schedule proposed by offeror in Section 6.0 Proposal Format.

5.9 Schedule of Events

The following anticipated schedule of events outlines the RFP process and is tentative. The County reserves the right to modify this schedule as deemed necessary.

Full RFP Release and advertising date	November 3, 2015
Pre-Proposal Conference	November 17, 2015
Site Visits: Preferred repeater sites	Immediately after pre-proposal conference
Site Visits: Mandatory buildings	TBD
Cut-off Date for Final Questions	December 31, 2015
Proposals Due	2:00 p.m. February 25, 2016
Oral Presentation(s) / Product Demonstration(s)	March/April 2016
Contract Award	August 2016

5.10 General Requirements:

Read this entire document carefully, follow all instructions. You are responsible for fulfilling all requirements and specifications. Be sure you understand them. Review the Table of Contents. Be sure your proposal package is complete.

In special circumstances, vendors may be required to allow duly authorized representatives of Collin County, the Collin County Proposal Evaluation Committee, or the State of the Texas and the federal government access to contracts, books, documents and records necessary to verify the nature and extent of the cost of services provided by the vendor.

Addenda

When requirements or specifications are revised, the Collin County Purchasing Department will issue an RFP addendum addressing the nature of the change. In each case, Vendors must acknowledge addendums on the Signature Page. Failure to do so may result in disqualification of your proposal.

Alteration of Proposals

Any interlineations, alteration, or erasure made before the submission deadline must be initialed by the signer of the proposal, guaranteeing authenticity.

Award

This project is being conducted under Texas' High-Technology Procurement statutes and the County reserves the right to award this contract on the basis of the offering most advantageous to the County and its project participants in accordance with the laws of the State of Texas. The County reserves the right to waive any formality or irregularity, to make awards one vendor or to more than one vendor, and to reject any or all proposals.

Brand Names

If there are any uses of any brand names or trade names in this RFP they are only for illustrative purposes solely as a reference as to the product tier, type, features, and quality of the item mentioned. Such references should not be construed to imply that any brand is preferred or would be given preference in the evaluation of responses to this RFP. This will be competitive system procurement.

Change of Ownership

If ownership of your firm should change during the term of this contract, Collin County must be notified as soon as possible in writing within (10) days and a new declaration of relationships shall be submitted immediately to the Collin County. Failure by the vendor to provide written notification of change of ownership may result in cancellation of the contract.

Changes or Modifications

No oral statement of any person shall modify or otherwise change, or affect the terms, conditions or specifications stated in the resulting contract. All changes to the contract must be approved by the County and will be made in writing by the Collin County.

The County has retained a "Consultant" to provide consulting support for this project. The Consultant will have the authority to order minor changes in the Work not involving an adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order and shall be binding on the County and vendor.

Site visits will be provided to allow all vendors to explore the existing conditions at the sites for proposal preparation purposes. If concealed or unknown physical conditions are encountered at the sites later on that could not have been reasonably be identified during the site visits and those conditions differ materially from those indicated in the Contract Document or from those conditions

ordinarily found to exist, the County and selected vendor will work together to resolve the issues in a fair and equitable manner. If appropriate, and agreed to by both parties, the Contract Sum and Contract Time may be equitably adjusted as mutually agreed to by the County and vendor; provided that the vendor provides notice to the County and Consultant promptly and before such conditions are disturbed.

Upon execution of a contract with the vendor, a project budget and implementation schedule will be established. Change orders for concealed or unknown physical conditions, or scope additions of any kind requested by the vendor or the County, will place undue stress on the project budget; therefore the County will limit all vendor and subcontractor markups on such change orders to no more than 10%. In the event that additional vendor project management, engineering, or other vendor services are also required to support the changes, the costs for those vendor services shall also be reviewed by the County and the Consultant prior to approval. Similarly, such actual vendor costs will be limited to a markup of no more than 10%.

The Consultant will, within fourteen work days after receipt of the vendor's Application for Payment, either issue to the County a recommendation for Payment, with a copy to the vendor, for such amount as the Consultant determines is properly due, or will notify the vendor and County in writing of the Consultant's reasons for withholding a recommendation for payment in whole or in part.

The issuance can be delayed if:

1. Defective work is identified;
2. Defective work not remedied;
3. Third party claims are filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the vendor;
4. Failure of the vendor to make payments properly to Subcontractors or for labor, materials or equipment;
5. Reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
6. Damage to the Owner or a separate contractor;
7. Reasonable evidence that the Work will not be completed within the Contract Time and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
8. Repeated failure to carry out the Work in accordance with the Contract Documents.

Clean-up

Following contract award, the vendor shall at all times keep the work premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the vendor shall remove all remaining waste materials, rubbish, the vendor or

subcontractor's tools, construction equipment, machinery and surplus material from and about the Project. The vender shall take proper care in its work to avoid damaging existing facilities.

Complete System to be Described

Vendors submitting a proposal for the P25 Phase 2 Trunked Radio System must describe all components, services, and tasks required to implement a working, fully functional system, and clearly state whether said components and services are to be furnished by the vendor or not. Any and all components—whether hardware or software—required to make the system compliant with the County's RFP, usable and fully operational that are not described in the proposal documents as being necessary, shall be provided at the vendor's expense. The price listed in the vendor's proposal shall be the turnkey delivered price, including all freight charges. Submission of a proposal shall be conclusive evidence that the proposer has investigated and is satisfied as to the conditions to be encountered in performing the work.

Confidentiality of Information

All information disclosed by Collin County, the County's Consultant or the County's project participants to the successful vendor for the purpose of the work to be performed or information that comes to the attention of the successful vendor or its subcontractors during the course of performing such work is to be kept strictly confidential. Any material provided by the vendor to the County or its project participants that is to be considered as confidential in nature must be clearly marked **IN BLUE** on every page as such by the vendor and will, to the best of the County's ability, be treated as confidential by the County. Collin County is subject to the Texas Government Code 552 in regards to release of public information.

Consultant Duties

The County has retained a consultant (the Consultant) to provide system procurement assistance and will also retain a Consultant for the implementation of the system. The Consultant will assist the County in administration of the Contract and will be an Owner's representative during construction, until the date the Consultant issues a recommendation for the County to provide a Final Acceptance Certificate for Payment. The Consultant will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

The Consultant will visit the site at intervals appropriate to the stage of the construction to determine in general, if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Consultant will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Consultant will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, since these will be solely the vendor's rights and responsibilities under the Contract Documents.

Based on the Consultant's evaluations of the Work and of the vendor's Applications for Payment, the Consultant will review and recommend the amounts due the vendor and will issue recommendations for Payment in such amounts to the County.

The Consultant has authority to reject Work that does not conform to the Contract Documents and to require inspection or testing of the Work.

The Consultant will review and approve or take other appropriate action upon the vendor's submittals such as Site Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept.

The Consultant will assist the County in interpreting and deciding matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner. The Consultant will assist the County in making decisions on claims, disputes and other matters in question between the Owner and vendor but will not be liable for results of any interpretations or decisions.

Contract Obligation

Collin County Commissioners Court will award the contract. Following the Court's approval the County shall send an award letter approving the contract and thereby the proposal becomes binding on Collin County and the vendor. Department heads are not authorized to execute a contract, or any amendment or modification there from on behalf of Collin County.

Contract Renewals

Renewals may be made only by written agreement between Collin County and the vendor. Any price escalations are limited to those stated by the vendor in the original proposal.

Delivery

All goods shall be delivered in appropriate packaging to assure safe, undamaged delivery F.O.B. Destination unless otherwise authorized herein. C.O.D. shipments or deliveries are not permitted. The successful vendor will coordinate the delivery of all project materials with the County's Project Manager.

Design, Standards and Practices

Design, strength, quality of materials and workmanship must conform to the highest standards of engineering practices and/or professional services.

Drug Free Work Place

The County reserves the right to review drug-testing records of any personnel involved in this proposed project. The County may require, at vendor's expense, drug testing for vendor's personnel if no drug testing records exists or if such test results are older than six (6) months.

E-mail Addresses Consent

The vendor affirmatively consents to the disclosure of its e-mail addresses that are provided to Collin County. This consent is intended to comply with the requirements of the Texas Public Information Act and shall survive termination of this agreement. This consent shall apply to the e-mail addresses provided by the vendor, its employees, officers, and agents acting on the vendor's behalf and shall

apply to any e-mail address provided in any form for any reason whether related to this bid/proposal or otherwise.

Errors and Omissions

Due care and diligence have been used in preparation of this request for proposals and it is believed to be substantially correct. However, the responsibility for determining the full extent of the exposure and the verification of all the information presented herein shall rest solely on the vendor. Collin County and its representatives shall not be responsible for errors or omissions in these specifications, nor for failure on the part of the vendor to determine the full extent of the exposure.

Force Majeure

To the extent either party of this agreement shall be wholly or partially prevented from the performance of the term specified, or of any obligation or duty placed on such party by reason of or through work strikes, stoppage of labor, riot, fire, flood, acts of war, insurrection, court judgment, act of God, or other specific cause reasonably beyond the parties control and not attributable to its malfeasance, neglect or nonfeasance. In such event, the time for performance of such obligation or duty shall be suspended until such disability to perform is removed.

Governing Forms

In the event of any conflict between the terms and provisions of these requirements and the specifications, the specifications shall govern. In the event of any conflict of interpretation of any part of this overall document, Collin County's interpretation shall govern.

Inspections and Testing

Collin County reserves the right to inspect any item(s) or service location for compliance with specifications and requirements and needs of the County. If a vendor cannot furnish a sample of a proposed item, where applicable, for review, or fails to satisfactorily show an ability to perform, the County can reject the offer as inadequate.

Goods and services purchased are subject to inspection and approval by the County. The County reserves the right to reject or refuse acceptance of goods which are not in accordance with County's instructions, specifications, drawings and data, or seller's warranties (expressed or implied). Goods not accepted will be returned to the vendor at the vendor's risk and expense. Installations not in conformance with requirements will be re-installed at no additional cost and approved by the County prior to system acceptance. Payment for any goods shall not be deemed an acceptance thereof.

Interlocal Agreement

The successful vendor shall agree to extend prices to all entities that have entered into or will enter into joint purchasing interlocal cooperation agreements with the County. The County is a participating member of one or more interlocal cooperative purchasing agreements. As such, the County has executed or will be executing interlocal agreements, as permitted under Chapter 791 of the Texas Government Code, with certain other political subdivisions, authorizing participation in a cooperative purchasing program. The successful vendor shall provide products/services based upon the proposed pricing, to any other participant including but not limited to the external entities that

utilize the County's existing trunked radio system or participate in the use of the County's new P25 system.

Invoices and Payments

Vendors shall, at the appropriate times, submit an original invoice for each negotiated project milestone that requires a payment. Invoices must include the contract number, the name of the project, and be itemized. Itemization must include at a minimum a detailed description of the milestone associated with the invoice, and a written certification that all aspects of that particular milestone have been successfully completed, delivered, and approved by the County's Project Manager or approved agent in accordance with contract requirements. Any invoice, which cannot be verified by the contract price and/or is otherwise incorrect, will be returned to the vendor for correction.

Labor and Materials

Unless otherwise provided in the Contract Documents, the vendor shall provide and pay for labor, materials, equipment, tools, vehicles, office space, storage space for equipment and materials waiting on installation or field deployment, as well as construction equipment and machinery, water, heat and other facilities, environmental studies for new tower sites (if needed), structural analyses for existing tower facilities as needed, geotechnical (soil) surveys and analyses for new site construction, and services necessary for proper execution of the Work.

County's Right to Stop the Work

If the vendor fails to correct Work which is not in accordance with the requirements of the Contract Documents, the County may order to the vendor to stop the Work, or any portion thereof, until the cause for such order is eliminated.

County's Right to Carry Out the Work

If the vendor defaults or neglects to carry out the Work in accordance with the Contract Documents, and fails within a thirty-day period after receipt of notice from the County to provide an acceptable plan to correct such default, the County may correct such deficiencies and may deduct the reasonable cost thereof, from the payment due the vendor.

Payments

Progress Payments

Based upon Applications for Payment submitted to the County by the vendor, the County will make milestone progress payments as provided below:

1. Based on the County's observations and evaluations of the Project and vendor's Applications for Payment, the County will determine the amounts due to the vendor. Those amounts are listed below:

Table 1: Collin County Proposed Payment Terms

Project Milestone	Payment
I. Detailed Design Review Completed	10%
II. Shipment of FNE from Staging	15%
III. Infrastructure Acceptance Testing Completed and Approved	20%
IV. Coverage Acceptance Testing Completed and Approved	20%
V. 30-Day Operational Testing Successfully Completed	10%
VI. Installation and Distribution of Radio Field Units Completed	5%
VII. Final Project Acceptance, Warranty Begins	20%

Final Completion and Final Payment

Final payment, constituting the entire unpaid balance of the Contract Sum, will be made by the County when:

1. The Contract has been fully performed by the vendor as determined by the County; and
2. An affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Project have been paid or otherwise satisfied;
3. A certificate evidencing that the required insurance will remain in force after final payment and will not be canceled or allowed to expire until at least thirty (30) days prior written notice has been given to the County;
4. A written statement that the vendor knows of no substantial reason that the insurance will not be renewable to cover the period required by the County;
5. Consent of surety to final payment;
6. Other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of this Contract, to the extent and in such form as may be designated by the County; and written warranties and other documents required by the Contract have been delivered and accepted.

Upon receipt of the vendor's written notice that the Work is ready for final inspection and acceptance and upon final receipt of a final Application for Payment, the County staff and the Consultant will make such inspections and, when the County and Consultant finds the Work acceptable under the Contract Documents and the Contract has been fully performed, the Consultant will recommend a final Certificate for Payment stating that to the best of the Consultant's knowledge, and on the basis of the Consultant's on-site visits and inspections, the work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the vendor and noted in the final Certificate is due and payable.

Permits and Approvals

All work done under this contract shall comply with all local and state codes having jurisdiction and with the requirements of the utility companies whose services may be used. Where code requirements are less than those shown in the contract documents, the contract documents shall be followed. The selected vendor shall obtain all permits, inspections and approvals as required by all authorities having jurisdiction. All fees and costs for these items shall be paid for by the vendor.

Point of Contact

The Collin County Purchasing Department shall be the sole point of contact for any and all issues pertaining to this procurement and its process. The Department may designate an alternate point of contact for specific purposes. **Contacting anyone other than the Purchasing Department or their designated representative may result in disqualification.** Do not rely on oral instructions or clarifications. Requests from interested vendors for additional information or interpretation of the information included in the specifications should be directed in writing to the Collin County Purchasing Department.

Protections of Persons and Property

The vendor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. The vendor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to:

1. Employees on the Work site and other persons who may be affected thereby;
2. The Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the vendor or the vendor's subcontractors or sub-subcontractors; and
3. Other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

Schedule

The successful vendor will be responsible for preparing, maintaining and updating the official detailed project schedule from start to finish. The vendor, after being awarded the Contract, shall submit for the Owner's and Consultant's information a vendor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents and shall be updated at appropriate intervals as required by the conditions of the Work.

Severability

If any section, subsection, paragraph, sentence, clause, phrase or word of these requirements or the specifications shall be held invalid, such holding shall not affect the remaining portions of these requirements and the specifications and it is hereby declared that such remaining portions would have been included in these requirements and the specifications as though the invalid portion has been omitted.

Silence of Specification

The apparent silence of these specifications as to any detail or to the apparent omission from it of a detailed description concerning any point, shall be regarded as meaning that only the best commercial practices are to prevail. All interpretations of these specifications shall be made on the basis of this statement.

Site Visits

Vendors are highly encouraged to participate in the site visits prior to preparation of their proposals. There will be two sets of site visits. The first set includes the following:

- Collin County Sheriff's Dispatch Center;
- Collin repeater site locations (4), and
- Potential County properties for new repeater sites

The tentative date and time for the first set of site visits will be immediately after the pre-proposal conference.

The second set of site visits involves the list of mandatory buildings requiring indoor portable radio coverage as outlined in Section 3 – Radio Coverage Requirements. If requested, the County and its external project Partners will provide an escort for the mandatory buildings.

Firms participating in the site visits shall contact the Collin County Purchasing and provide the number of personnel expected to attend. The contact is provided below.

Sara Hoglund, Assistant Purchasing Agent
Collin County Purchasing
2300 Bloomdale, Suite 3160
McKinney, TX 75071
(972) 548-4104

System Staging

Following equipment manufacturing, the P25 radio infrastructure shall be staged at a suitable facility at which all of the radio infrastructure equipment required to make a fully operational communications system shall be assembled into the proposed system configuration and shall be tested as a system, with test scripts approved by the County and its project Partners. This testing is referred to as Factory Acceptance Testing (FAT), and will include the following:

- Trunked repeater site equipment including representative antenna system equipment with factory level RF cabling. Dummy loads are acceptable for the repeater sites;
- Main Control Point, Simulcast Control Points, Servers;
- LAN/WAN/Audio Distribution Equipment;

- Alarm and control units;
- System alarm panels and alarm reporting systems, and
- Dispatch console systems;
- Representative radio field units;
- System management systems;
- Microwave/MPLS system – The vendor shall recommend whether or not the microwave system is to be staged with the trunked radio system equipment or be staged separately at the microwave vendor’s facility, and provide the basis for this decision for approval by the County.

Supervision and Construction Procedures

The vendor shall supervise the Work and shall be solely responsible for and have control over subcontractors, construction means, methods, techniques, sequences and procedures, and for coordinating all portions of the Work unless the Contract Documents give other specific instructions concerning these matters.

Substantial Completion

Substantial Completion is the stage in the progress of the Work when the Work or the designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the P25 Radio System for its intended day-to-day use. System acceptance testing or resolution of system problems identified during acceptance testing shall not constitute substantial completion. Substantial completion shall not be achieved prior to final system acceptance by the County unless specifically agreed to and authorized by the County.

Terminology

Wherever the words ‘furnish’, ‘provide’, ‘furnish and install’, ‘provide and install’ and similar phrases occur, it is the intent that the materials and equipment described be furnished, installed, connected, optimized, and successfully acceptance tested under these Specifications, complete for operation unless specifically noted to the contrary.

Title & Risk of Loss

Title to and risk of loss for the deliverables shall pass to the County only when County actually receives and accepts delivery of the equipment.

Warranty

All warranty requirements are stated in Section 11 of this RFP.

6.0 Proposal Format:

Collin County prefers that vendors who submit a proposal in response to this RFP upload documents to Collin County e-bid ([.https://collincountytx.ionwave.net](https://collincountytx.ionwave.net)). It is requested that vendors consolidate

their proposal into one (1) searchable PDF document. If vendors choose to submit a hard copy the following shall be provided:

- One (1) original signed in BLUE ink and a searchable electronic soft copy in one (1) PDF document of the entire proposal with bookmarks on DVD media or flash drive. If submitting a hard copy proposals shall include a table of contents and shall be printed on double sided 8.5 x 11 inch paper with a reasonable allowable exception for pages that need to be printed on 11 x 17 inch media to facilitate readability. Such pages might include the proposed project schedule and required radio coverage maps (propagation analyses).

Proposals submitted in response to this RFP shall be organized and configured in the following format.

Section 1 – Executive Summary

The proposal shall include an Executive Summary of ten (10) pages or less, which provides in brief, concise terms, a summation of the proposal.

Complete the attached “E-Bid” document. The document may also be completed electronically on Collin County e-bd.

Section 2 – Overview of the Firm and its Experience in Delivering Systems of this Nature

The response to Section 2 shall at a minimum include the following information:

- The full name and address of your organization and identify the parent company if you are a subsidiary.
- An overview of the firm, its background, history, and experience in providing public safety and local government land-mobile radio communication systems, particularly P25 700 and 800 MHz trunked simulcast radio system of this size and complexity or larger. Provide the number of years your firm has been in business and the number of years it has been providing land-mobile radio systems of this type for cities and counties.
- A statement indicating whether you operate as a partnership, corporation, or individual. Include the State in which incorporated or licensed to operate. Identify if you are a manufacturer of the proposed system or you are a reseller, integrator or agent of the manufacturer.
- Specify the branch office or other subordinate element that will perform, or assist in performing, work herein. State whether or not that branch is located in the Dallas Metropolitan area.
- Provide the name, phone number, and fax number for your proposal contact. Provide the required project references and system summaries with a customer name and contact information so that the Proposal Evaluation Committee can contact your project references.

- Identify whether or not the firm or a subordinate of the firm submitting the proposal is conducting or contemplating the sale of the company or subordinate unit of the company that would provide the County's new P25 radio system.
- Provide a minimum of five Reference Projects for public safety / local government P25 linear simulcast trunked radio systems of similar or larger size and scope which have been developed and installed by your company within the last five years. Provide a thorough description of each referenced system including at a minimum the following information:
 - Name of the system owner;
 - System location;
 - Client Contact;
 - Client Title;
 - Telephone Number;
 - Email Address;
 - Name of system manufacturer of the following components:
 - o Radio infrastructure
 - o Dispatch console system
 - o User radio equipment
 - o Microwave equipment
 - A brief description of the system architecture and configuration (P25 Phase 1 / Phase 2, simulcast, multicast, redundancy);
 - Number of repeater sites;
 - Frequency band;
 - Number of RF radio channels per site;
 - Number of user radios in use;
 - Type of agencies using the system;
 - Type of System Connectivity (dedicated MPLS microwave, fiber, leased 3rd party circuits, etc.);
 - Number of Dispatch centers in use, number of dispatch positions per center;

- System status (awarded, manufactured, undergoing installation, installation completed, fully operational, system accepted, system cutover, etc.), and
- System acceptance date: _____

Section 3 – Proposed System Design and Configuration

Provide a detailed description of your proposed system configuration and architecture including at a minimum the:

- Overall system configuration , design, and capabilities;
 - Guaranteed radio coverage performance as outlined in this RFP. Include radio coverage analyses as required elsewhere in this RFP;
 - Radio system RF channel capacity (proposed initially and expansion capabilities for future growth)
 - Microwave system design and connectivity;
 - Provided system redundancy to maintain normal trunked simulcast operation during adverse conditions, including a detailed failure mode analysis as required in Section 2 of this RFP. Be sure to discuss any single points of failure that result in loss of normal coverage, capacity, or operational functionality.
 - System features and functional capabilities;
 - System modularity allowing for graceful expansion without the need for a “forklift upgrade”. Proposers shall identify and discuss subsystem bottlenecks, thresholds or hardware / software limits that inhibit easy growth and expansion or result in major out-of-pocket expenditures to expand the system;
 - Proposed number of system IDs included in the baseline proposal;
 - Proposed user radio equipment and accessories;
 - Dispatch console systems for the County and the County’s external partners;
 - System management capabilities;
 - Radio interoperability both internally and with external entities in the area, and
 - Site equipment and services (site development, towers, shelters, fencing, HVAC, commercial and auxiliary power systems, grounding and surge protection, site security, and connectivity).

See RFP Sections 2 through 7 for additional information and requirements.

Section 4 – Proposed Project Team

Provide an overview of the proposed project team, including the names, titles, responsibilities and location of the key personnel you will assign to this project and describe the contribution each will make on your company's behalf, paying particular attention to the project engineers and project manager. In addition, provide the following information for each member of your team: education, certifications, related experience, the number of years with your firm, location, and a current resume. Include the percent of each individual's time devoted specifically to this project. List any other projects or commitments that each proposed person is committed to or expected to be involved with during the period of time this project is underway. Identify who within your company will have overall responsibility for quality assurance and ultimately the successful completion of this project. Include a project team chart with assigned roles and reporting responsibilities.

Identify and discuss all subcontractors, their experience in providing the services you have assigned them to. Discuss their responsibilities and the roles they will play on your behalf in supporting this project. Identify who will be providing the system installation, optimization, system warranty, and system maintenance.

Project Manager References

The proposed project manager must have been heavily involved in a minimum of three prior P25 public safety trunked radio system projects of similar or greater size and scope that were provided by your company. Briefly identify those systems and your Project Manager's contributions. Provide a minimum of three customer references for your proposed project manager and identify which systems were involved. Provide at a minimum the following information:

- Project Manager's Name:
- Location:
- Number of Years with your Company:
- Percent of Project Manager's time dedicated to this project:
- PMP / PMI certified? Yes No

1. Customer Reference Name and Title: _____

Address: _____

Street/PO Box City State Zip

Telephone No.: _____ Fax No: _____

Email: _____

2. Customer Reference Name and Title: _____

Address: _____

Street/PO Box City State Zip

Telephone No.: _____ Fax No: _____

Email: _____

3. Customer Reference Name and Title: _____

Address: _____

Street/PO Box City State Zip

Telephone No.: _____ Fax No: _____

Email: _____

Section 5 - Project Work Plan and Schedule

Project Work Plan

Provide a detailed project workplan i.e. a task-based scope of work for the project from project initiation through final system acceptance. This is intended to be a turnkey system purchase. Include a division of responsibilities that identifies work to be undertaken and completed by your firm (including subcontractors) and the work and responsibilities that you believe belong to the County and its external partners. See RFP Section 8 for additional information.

Project Schedule

Provide a detailed task-based project schedule in Microsoft Project format to accompany your project work plan. Include relevant project timeframes, dependencies and milestones, some of which are associated with milestone payments by the County as previously outlined in this document under the heading called **Payments**

Section 6 – System Acceptance Testing

Provide a detailed description of your proposed system acceptance testing program at both system staging and in the field following system installation and optimization. Ensure that the following is included:

- Detailed narrative of Coverage Acceptance Test Plan (CATP)
- Outline of Staging Functional Acceptance Test Plan (test scripts not required for proposal)
- Outline of Field Functional Acceptance Test Plan (test scripts not required for proposal)
- Outline of Microwave Radio Acceptance Test Plan
- Outline of MPLS Acceptance Test Plan

- Outline of Site Civil, Installation, and Grounding Acceptance Test Plan

If there are any exclusions or deviations from the requirements in this RFP they must be clearly noted and described in this section. Additional information regarding Acceptance Testing is provided in RFP Section 10.

Section 7 - System Training

Provide a detailed description of your proposed training program following system installation and optimization. If there are any exclusions or deviations from the training requirements in this RFP they must be clearly noted and described in this section. Training requirements have been provided in Section 12.

Section 8- System Installation, Warranty and Maintenance

System Installation

Provide a detailed description of your proposed system installation team including your in-house personnel and any involved subcontractors. Identify specifically who will provide the system installation and whether or not the proposed firm and proposed personnel have been previously factory trained in the installation and optimization of the proposed P25 Phase 2 TDMA simulcast trunked radio system as well as the proposed MPLS microwave system. If there are any exclusions or deviations from the requirements in this RFP they must be clearly noted and described in this section. RFP Section 9 includes more detailed information.

Warranty

Provide a detailed description of your proposed system warranty program. If there are any exclusions or deviations from the requirements in this RFP they must be clearly noted and described in this section. Identify who will provide the warranty support and the number of personnel the provider has who are trained in warranty and repair of the proposed system/ equipment. Identify the warranty provider's location and response times to both major and minor system problems as defined elsewhere in this RFP. Additional information is provided in RFP Section 11.

System Maintenance

Provide a detailed description of your proposed system maintenance program. If there are any exclusions or deviations from the requirements in this RFP they must be clearly noted and described in this section. Identify who will provide the system maintenance support and the number of personnel the provider has who are trained in the maintenance and repair of the proposed system/ equipment. Identify the maintenance provider's location and response times to both major and minor system problems as defined in this RFP. Additional information is provided in RFP Section 11.

Section 9 - System Pricing

Provide detailed turnkey system pricing for all services (included but not limited to engineering, design, detailed design review, manufacturing, staging, installation, system optimization, testing, training, and system acceptance), equipment, software, system warranty and maintenance support as required in the RFP, cost discounts, purchase incentives, and equipment trade-ins, etc. To help reduce

system costs, it is the intent of the County and its project Partners to offer a substantial portfolio of equipment from the current system including infrastructure, dispatch consoles and mobile and portable radios to be used as a “trade-in” offer to help reduce the cost of the new P25 system. Additional information is provided in RFP Section 13.

Section 10 - Point-by-Point Response

Proposers shall insert a complete Point-by-Point response that addresses each numbered point or paragraph listed in this section. The response shall address at a minimum, the following:

1. **Read and Understood:** Where appropriate, when there is a point or paragraph that does not specifically require that the Proposer indicate any level of compliancy and this point or paragraph is provided for informational purposes, the Proposer shall indicate that it has read and understood that point or paragraph.
2. **Fully compliant with this point or paragraph:** This shall indicate that the proposer fully understands the specification and is fully compliant with this requirement.
3. **Partially compliant with this point or paragraph:** This shall indicate that the Proposer does not fully meet the requirement or intent of the specification. The Proposer shall provide a complete description of why they do not meet the full requirement of the specification and then state their clarification or substitution for that particular point or paragraph.
4. **Not Compliant (Exception):** This shall indicate that the Proposer’s solution does not comply with this specification listed in this point or paragraph.

Section 11 – Additional Documents

Proposers shall complete the following documents and attached to proposal:

1. W-9
2. Conflict of Interest Questionnaire

Form W-9 (Rev. December 2014) Department of the Treasury Internal Revenue Service	<h2 style="margin:0;">Request for Taxpayer Identification Number and Certification</h2>	Give Form to the requester. Do not send to the IRS.
Print or type See Specific Instructions on page 2.	1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.	
	2 Business name/disregarded entity name, if different from above	
	3 Check appropriate box for federal tax classification; check only one of the following seven boxes: <input type="checkbox"/> Individual/sole proprietor or single-member LLC <input type="checkbox"/> C Corporation <input type="checkbox"/> S Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Trust/estate <input type="checkbox"/> Limited liability company. Enter the tax classification (C-C corporation, S-S corporation, P-partnership) ▶ _____ <i>Note.</i> For a single-member LLC that is disregarded, do not check LLC; check the appropriate box in the line above for the tax classification of the single-member owner. <input type="checkbox"/> Other (see instructions) ▶ _____	
	4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3): Exempt payee code (if any) _____ Exemption from FATCA reporting code (if any) _____ (Applies to accounts maintained outside the U.S.)	
	5 Address (number, street, and apt. or suite no.)	Requestor's name and address (optional)
	6 City, state, and ZIP code	
	7 List account number(s) here (optional)	

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I Instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the instructions for line 1 and the chart on page 4 for guidelines on whose number to enter.

Social security number								
<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%; border: 1px solid black; height: 20px;"></td> </tr> <tr> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> </tr> </table>					-	-	-	-
-	-	-	-					
OR								
Employer identification number								
<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%; border: 1px solid black; height: 20px;"></td> </tr> <tr> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> </tr> </table>					-	-	-	-
-	-	-	-					

Part II Certification

Under penalties of perjury, I certify that:

- The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
- I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
- I am a U.S. citizen or other U.S. person (defined below); and
- The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification Instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 3.

Sign Here	Signature of U.S. person ▶ _____	Date ▶ _____
------------------	----------------------------------	--------------

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. Information about developments affecting Form W-9 (such as legislation enacted after we release it) is at www.irs.gov/w9.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following:

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)

- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See *What is backup withholding?* on page 2.

By signing the filled-out form, you:

- Certify that the TIN you are giving is correct (or you are waiting for a number to be issued).
- Certify that you are not subject to backup withholding, or
- Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income, and
- Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct. See *What is FATCA reporting?* on page 2 for further information.

CONFLICT OF INTEREST QUESTIONNAIRE		FORM CIQ		
For vendor doing business with local governmental entity				
<p>This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.</p> <p>This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a).</p> <p>By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. See Section 176.006(a-1), Local Government Code.</p> <p>A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">OFFICE USE ONLY</th> </tr> </thead> <tbody> <tr> <td style="height: 100px; vertical-align: top;">Date Received</td> </tr> </tbody> </table>		OFFICE USE ONLY	Date Received
OFFICE USE ONLY				
Date Received				
<p>1 Name of vendor who has a business relationship with local governmental entity.</p> <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/>				
<p>2 <input type="checkbox"/> Check this box if you are filing an update to a previously filed questionnaire.</p> <p style="font-size: small;">(The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)</p>				
<p>3 Name of local government officer about whom the information in this section is being disclosed.</p> <p style="text-align: center;">_____</p> <p style="text-align: center;">Name of Officer</p> <p>This section (item 3 including subparts A, B, C, & D) must be completed for each officer with whom the vendor has an employment or other business relationship as defined by Section 176.001(1-a), Local Government Code. Attach additional pages to this Form CIQ as necessary.</p> <p>A. Is the local government officer named in this section receiving or likely to receive taxable income, other than investment income, from the vendor?</p> <p style="text-align: center;"><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>B. Is the vendor receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer named in this section AND the taxable income is not received from the local governmental entity?</p> <p style="text-align: center;"><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>C. Is the filer of this questionnaire employed by a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership interest of one percent or more?</p> <p style="text-align: center;"><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>D. Describe each employment or business and family relationship with the local government officer named in this section.</p>				
<p>4</p> <p style="text-align: center;">_____</p> <p style="text-align: center;">Signature of vendor doing business with the governmental entity</p> <p style="text-align: right; margin-right: 100px;">_____</p> <p style="text-align: right; margin-right: 100px;">Date</p>				

Adopted 8/7/2015

SECTION 1 – CURRENT SYSTEM ENVIRONMENT

1.1 GENERAL INFORMATION

Collin County covers some 848 square miles with a population of 748,050 and population density of 882 persons per square mile. Cities with greater than 3,000 populations are listed as follows:

- Plano
- McKinney
- Frisco
- Allen
- Wylie
- Murphy
- Prosper
- Fairview
- Anna
- Princeton
- Lucas
- Celina
- Melissa
- Parker
- Farmersville

Collin County operates an analog 4-site trunked simulcast radio system with sites in McKinney, Copeville, Verona, and Celina. Its “Simulcast Control Point” site is located at its County owned radio tower site on Wilmeth Road in Mckinney.

This section, in conjunction with Section 4 of this report, sets the stage for the development of specifications for the new system. Using information collected through the different sorts of data collection such as the questionnaires, needs and requirements are compiled to help develop the conceptual system design. Once the conceptual system design is developed, it is possible to generate budgetary cost estimates for planning purposes.

1.2 RADIO SYSTEM USER OVERVIEW

1.2.1 Radio System Users

The Collin County radio system is used to support many agencies throughout the County including public safety and local government users. There are 25 different public safety agencies and departments operating on the system that include:

- Collin County Sheriff
- Collin County Constables
- Collin County Jail
- Collin County Juvenile Detention
- Collin County Fire Marshal
- Collin County Homeland Security
- Anna Police Department
- Anna Fire Department
- Branch Fire Department
- Celina Police Department
- Celina Fire Department
- Fairview Police Department

- Farmersville Police Department
- Farmersville Fire Department
- Farmersville ISD
- Josephine Police Department
- Josephine Fire Department
- Lavon Police Department
- Lowery Crossing Fire Department
- Melissa Police Department
- Melissa Fire Department
- Melissa ISD
- Nevada Fire Department
- Princeton Police Department
- Princeton Fire Department
- Westminster Fire Department
- Weston Fire Department

The system is also used to support radio communications for different local County government operations that include the County's Public Works Department, Facilities Maintenance Department, and Animal Services. There are many State and Federal users on the system as well. In many circumstances, these agencies utilize radios that are owned by the County assigned to these external users.

There are a total of 1870 radio units operating on the Collin County trunked radio system.

1.3 COLLIN COUNTY TRUNKED RADIO SYSTEM

1.3.1 Trunked Radio System Overview

Collin County owns and operates a 6-channel, 4-site analog Motorola Smartnet Trunked Simulcast Radio System. The system's Control Point is located at the County Service Center, 700 Wilmeth Road in McKinney.

Each of the remote simulcast sites are interfaced to the Wilmeth Road site via a Harris microwave radio system operating in the 6 GHz frequency range. The County Dispatch Center is also directly interfaced via a microwave link as well. A description of each of the four existing simulcast repeater sites is described below.

1.3.2 Current System Trunked Radio Sites

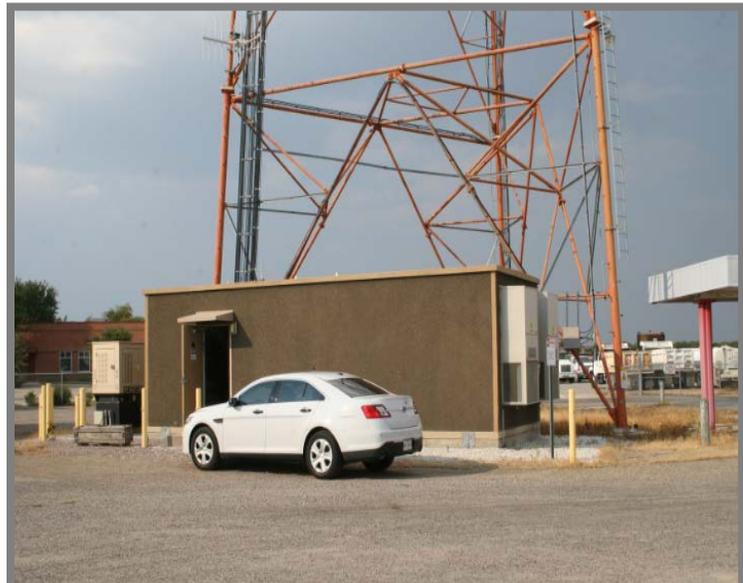
Information in this section provides details regarding each of the radio tower sites used on the system. It provides location information and details about the site amenities such as the shelter, back-up power, etc. Each site is addressed individually.

WILMETH ROAD RADIO TOWER SITE DATA

Wilmeth Road Tower Site	
Tower Site Owner:	Collin County
Latitude:	33-13-51.0 N
Longitude:	96-37-07.0 W
Structure Height:	420'
Ground Elevation:	605'
ASR Number	1056235
Site Address on ASR:	700 A West Wilmeth Road, McKinney TX, 75071
Tower Type:	Free Standing Structure constructed in 1986
Equipment Shelter Type:	Pre-Fabricated that is approximately 9 years old
Back-up Power	Generac Generator, Liebert NFinity UPS
HVAC Type	Bard Dual Lead / Lag 4-Ton HVAC



Wilmeth Road Radio Tower



Wilmeth Road Equipment Shelter

This site houses the “Simulcast Control Point” equipment, as well as the voting comparators. It also houses a co-located remote simulcast site. NCTCOG has implemented a 4-site 700 MHz P25 “overlay interoperability” radio system. This site also serves as one of the remote simulcast sites. Other radio equipment at this site includes the NPSPAC mutual aid repeaters and the VHF Texas V-Call and V-TAC base stations. Each of these systems are interfaced to the Collin County Dispatch Center through a co-located Central Electronics Bank (CEB) that is used to interface the dispatch consoles to these separate interoperability systems and the actual trunked radio system.

COPEVILLE RADIO TOWER SITE DATA

Copeville Tower Site	
Tower Site Owner:	Collin County
Latitude:	33-04-46.4 N
Longitude:	96-24-58.9 W
Structure Height:	180'
Ground Elevation:	555'
ASR Number	N/A
Site Address on ASR:	15512 FM 1776, Farmersville TX, 75442
Tower Type:	Free Standing Structure constructed in 1986
Equipment Shelter Type:	Pre-Fabricated New Castle shelter that is approximately 9 years old
Back-up Power	Generac 50 KW Generator, 20KVa Liebert Nfinity UPS
HVAC Type	Bard Dual Lead / Lag 4-Ton HVAC



Copeville Radio Tower



Copeville Radio Equipment Shelter

This site was one of the two original sites implemented in 1994. The equipment shelter and generator were replaced in 2005 when the system was upgraded to the current 4-site system.

CELINA RADIO TOWER SITE DATA

Celina Tower Site	
Tower Site Owner:	Collin County
Latitude:	33-20-57.0 N
Longitude:	96-45-08.0 W
Structure Height:	338'
Ground Elevation:	810'
ASR Number:	1059609
Site Address:	9165 County Road 101, Celina TX, 75009

Celina Tower Site	
Tower Type:	Guyed Tower Constructed in 1968
Equipment Shelter Type:	Cinder Block Construction
Back-up Power:	Generac 50 KW Generator, 20KVa Liebert Nfinity UPS
HVAC Type:	Friedrich Dual Lead / Lag 4-Ton HVAC



Celina Guyed Radio Tower



Celina Radio Equipment Shelter

This site was one of the new sites implemented in 2006 intended to improve countywide radio system coverage. This site was purchased by the County. It previously to belong to the Alliance for Higher Education. The tower and the equipment shelter were constructed in the late 1960's. The equipment shelter was refurbished to support the new remote simulcast site when the system expansion was implemented in 2006.

VERONA RADIO TOWER SITE DATA

Verona Tower Site	
Tower Site Owner:	Collin County
Latitude:	33-16-41.2 N
Longitude:	96-26-51.7 W
Structure Height:	400'
Ground Elevation:	602' AMSL
ASR Number:	1249002
Site Address:	8499 County Road 502 TX, 75424
Tower Type:	Guyed Tower Constructed in 2005
Equipment Shelter Type:	Pre-fabricated New Castle installed in 2005
Back-up Power:	Generac 50 KW Generator, 20KVa Liebert Nfinity UPS
HVAC Type:	Bard Dual Lead / Lag 4-Ton HVAC



Verona Guyed Radio Tower



Verona Radio Site Equipment Shelter

This site also was one of the new sites implemented in 2006 intended to improve countywide radio system coverage in the northeastern portion of the County.

1.3.3 Radio System Frequencies

The Collin County trunked radio system operates in the 800 MHz frequency band. Collin County was involved in the Sprint / Nextel rebanding process that included changing all of the frequencies that originally operated in the NPSPAC frequency band (821 to 824 MHz and 866 to 869 MHz). The County is also licensed and has the capability of utilizing all five of the NPSPAC 8CALL and 8TAC mutual aid channels. Each of the licensed frequencies is shown in the following tables. System channels operate under different parameters for the different sites and in some cases under different call signs, so each site is addressed individually.

Collin County Wilmeth Tower Site 800 MHz Frequencies				
Channel Name	Transmit Frequency (MHz)	Receive Frequency (MHz)	Licensed ERP (Watts)	Call Sign
Trunked Channel 1	853.1250	808.1250	581W	WPFD844
Trunked Channel 2	852.7250	807.2250	581W	WPFD844
Trunked Channel 3	852.2250	807.2250	581W	WPFD844
Trunked Channel 4	851.7250	806.7250	581W	WPFD844
Trunked Channel 5	851.2250	806.2250	581W	WPFD844
Trunked Channel 6	859.5875	814.5875	581W	WQGI893
NPSPAC 8CALL	851.0125	806.0125	453W	WPFD844
NPSPAC 8TAC1	851.5125	806.5125	453W	WPFD844
NPSPAC 8TAC2	852.0125	807.0125	453W	WPFD844
NPSPAC 8TAC3	852.5125	807.5125	453W	WPFD844
NPSPAC 8TAC4	853.0125	808.0125	453W	WPFD844

Collin County Copeville Tower Site 800 MHz Frequencies				
Channel Name	Transmit Frequency (MHz)	Receive Frequency (MHz)	Licensed ERP	Call Sign
Trunked Channel 1	853.1250	808.1250	555W	WPFD844
Trunked Channel 2	852.7250	807.2250	555W	WPFD844
Trunked Channel 3	852.2250	807.2250	555W	WPFD844
Trunked Channel 4	851.7250	806.7250	555W	WPFD844
Trunked Channel 5	851.2250	806.2250	555W	WPFD844
Trunked Channel 6	859.5875	814.5875	555W	WQGI893

Collin County Celina Tower Site 800 MHz Frequencies				
Channel Name	Transmit Frequency (MHz)	Receive Frequency (MHz)	Licensed ERP	Call Sign
Trunked Channel 1	853.1250	808.1250	508W	WPFD844
Trunked Channel 2	852.7250	807.2250	508W	WPFD844
Trunked Channel 3	852.2250	807.2250	508W	WPFD844
Trunked Channel 4	851.7250	806.7250	508W	WPFD844
Trunked Channel 5	851.2250	806.2250	508W	WPFD844
Trunked Channel 6	859.5875	814.5875	508W	WQGI893

Collin County Verona Tower Site 800 MHz Frequencies				
Channel Name	Transmit Frequency (MHz)	Receive Frequency (MHz)	Licensed ERP	Call Sign
Trunked Channel 1	853.1250	808.1250	235W	WPFD844
Trunked Channel 2	852.7250	807.2250	235W	WPFD844
Trunked Channel 3	852.2250	807.2250	235W	WPFD844
Trunked Channel 4	851.7250	806.7250	235W	WPFD844
Trunked Channel 5	851.2250	806.2250	235W	WPFD844
Trunked Channel 6	859.5875	814.5875	235W	WQGI893

1.3.4 Radio System Talkgroups

COUNTY LAW ENFORCEMENT

The County provides dispatch services for most of the smaller police departments in the county. All PD's and FD's in the larger cities operate on their own dedicated talkgroup. The Law Enforcement talkgroups operating on the County's simulcast system are listed below:

- CCSO Dispatch
- CCSO Inquiry
- CCSO Field Ops
- CCSO PD-1, Municipal PDs
- CCSO PD-2, Municipal PDs
- CCSO Tactical
- CCSO Narc/Vice
- Constable Pct 1
- Constable Pct 2
- Constable Pct 3

- CCSO ERT (Jail)
- CCSO Invest-Ch. 10
- CCSO Negotiator
- CC Common 1
- CC Services
- Constable Pct 4
- CC Common 2
- CCSO Special Event
- 9-1-1

COUNTY FIRE OPERATIONS

The County also provides dispatch services for most of the Volunteer Fire Departments throughout the County over the CCSO radio system. Dispatch alerts the different VFD's utilizing two-tone sequential paging over talkgroups on the system. There are separate tone codes for each VFD with alert signals initiated by the console system operator. All agencies use the CC FD Fire Ops 1 and Fire Ops 2 talkgroups as their primary dispatch talkgroup. The primary Fire and EMS talkgroups utilized on the system are listed below:

- CC FD Ops1
- CC FD Ops2
- CC FD Investigation

COUNTY SERVICES

- Facilities Maintenance 1
- PW Operations
- PW Administration
- PW Traffic
- PW Bridges
- PW Maintenance

GENERAL TALKGROUPS

Each PD and FD has their own talk group for their city. They use it if they wish to speak to another officer in private or have a special event in their town. These talkgroups are listed below.

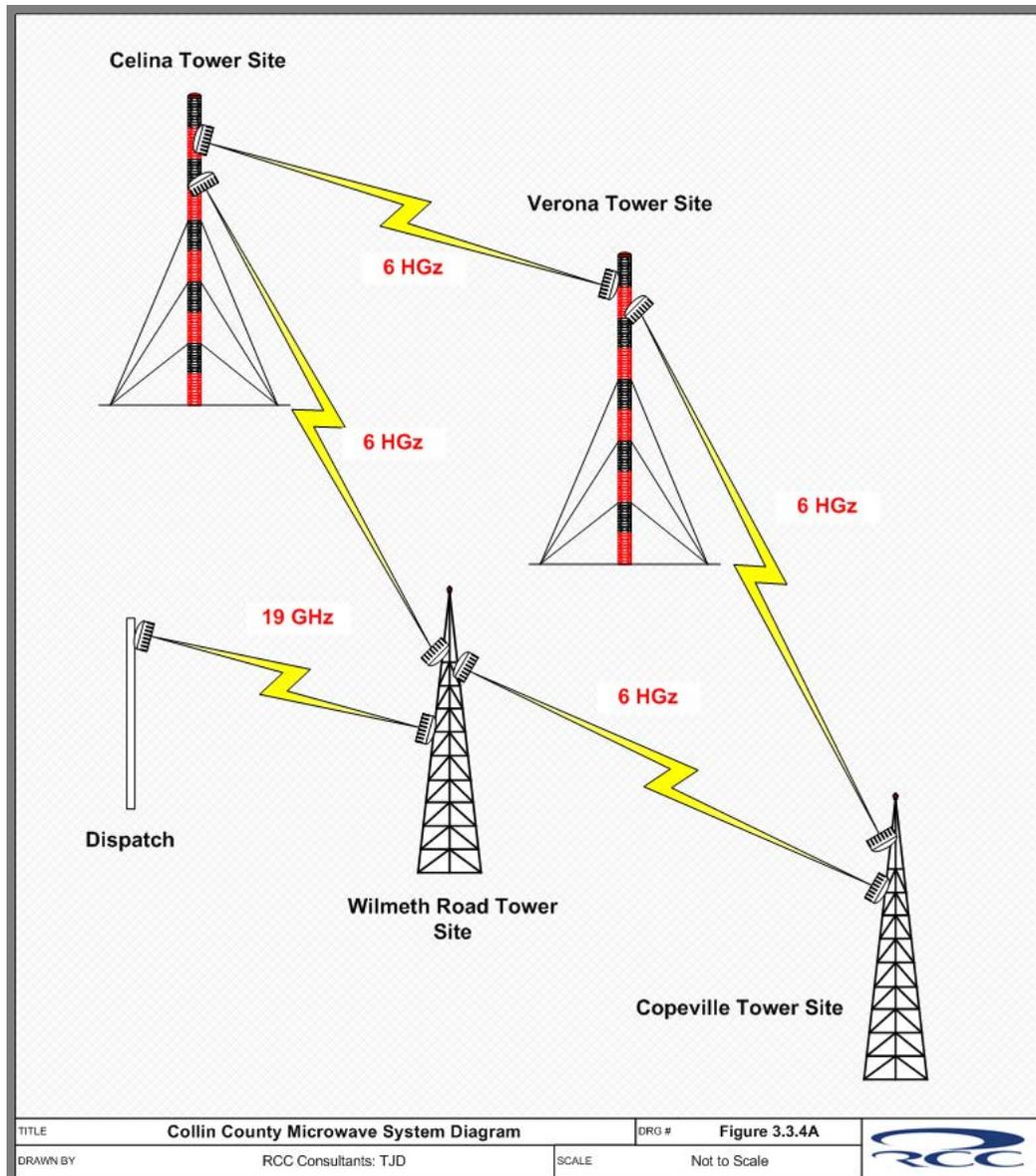
- Allen FD
- Allen PD
- Anna FD
- Anna PD
- Blue Ridge FD
- Branch FD
- Celina FD
- Celina PD
- Fairview FD
- Fairview PD
- Farmersville FD
- Farmersville PD
- Frisco FD
- Frisco PD

- Josephine FD
- Josephine PD
- Lavon PD
- Lowery Crossing FD
- Lucas FD
- McKinney FD
- McKinney PD
- Melissa FD
- Melissa PD
- Murphy FD
- Murphy PD
- Nevada FD
- Plano FD
- Plano PD
- Princeton FD
- Princeton PD
- Prosper FD 2
- Prosper PD 2
- Royse City FD
- Royse City PD
- Westminster FD
- Weston FD
- Wylie FD
- Wylie PD

1.3.5 Microwave Radio System

A microwave radio system is used to interconnect the dispatch center to the system and to interconnect each of the tower sites. A mixture of 6GHz and 19GHz microwave systems are used to link each of the different locations. Links between each of the tower sites consist of a 6 GHz loop protected microwave system. The link between dispatch and the Wilmeth Road Tower is a 17 / 19 GHz link.

The following drawing illustrates a basic block diagram of the entire microwave network. Notice the microwave “loop” between each of the tower sites. The “spur” hop to dispatch actually terminates at the Facilities Maintenance Central Plant monopole, where it then continues as a fiber run to the dispatch equipment room.



Microwave Radio System Diagram

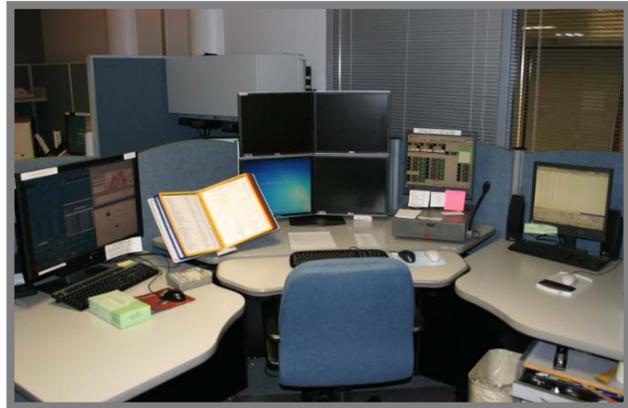
1.3.6 Dispatch Console System

Collin County operates a Motorola Gold Elite CRT based dispatch console system. The County’s console system includes “two” different Central Electronic Banks (CEB’s). One of these is located in the equipment room adjacent to the dispatch center, and the second CEB is located at the Wilmeth Road Tower Site.

The CEB in the dispatch center accommodates the console interface to the system and an interface to back-up control stations operating on the system if the link is lost to Wilmeth Road. The second CEB is located at the tower site and its purpose is to interface directly to the trunked radio system allowing direct access to the trunked radio system from all dispatch consoles on the system. All of this functionality is accomplished through the use of a Motorola Embassy Network.

The console system consists of 5 operator positions assigned as follows:

- Console Position 1 – Collin County Supervisor
- Console Position 2 – Collin County Fire Ops
- Console Position 3 – Collin County SO Dispatch
- Console Position 4 – Collin County Inquiry (NCIC)
- Console Position 5 – Collin County Jail



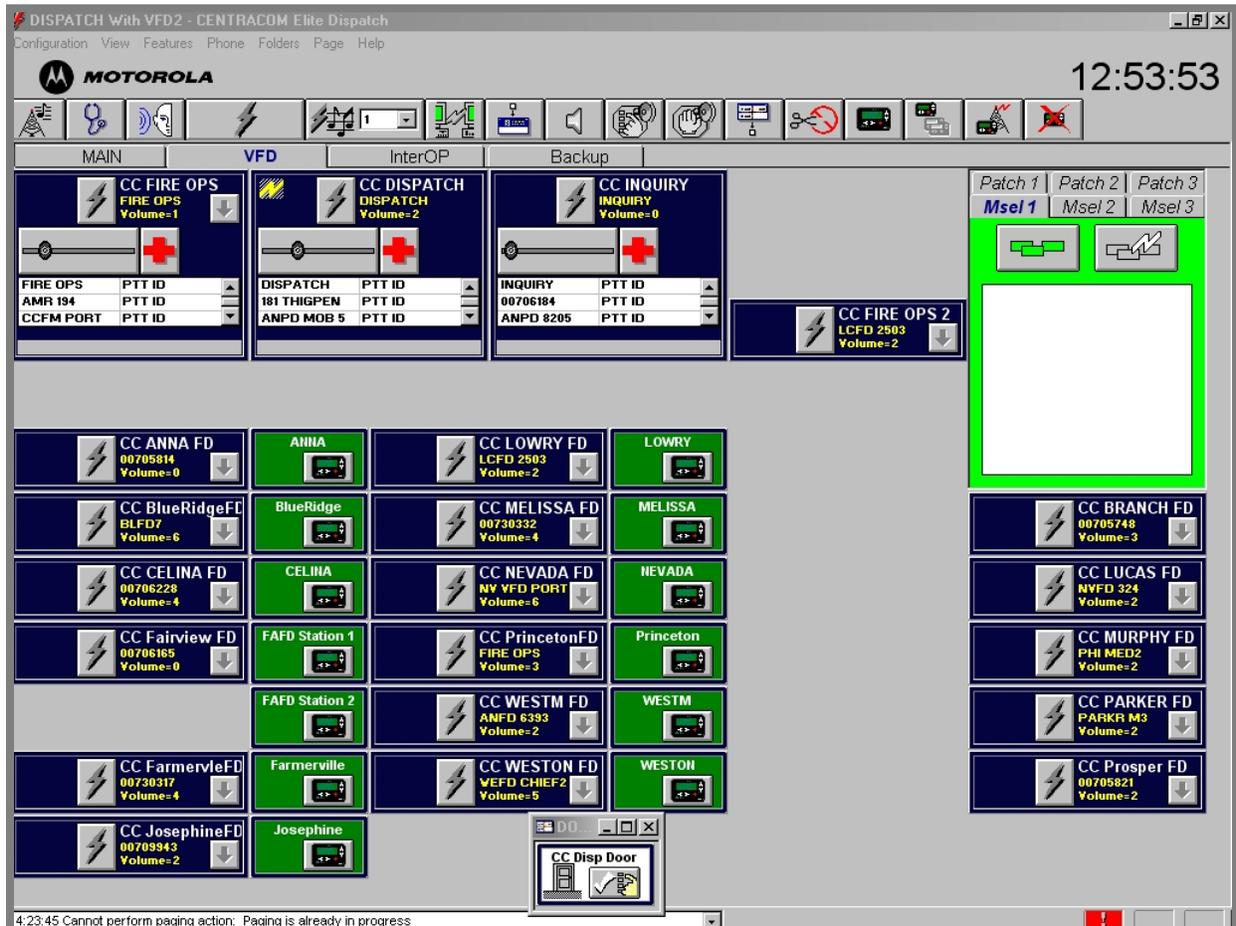
Each console position is configured similarly with the particular usage of the position defined by the “folder” selected. There are four different folders or “screens” set up on the consoles that have the particular talkgroups needed to support the functionality for that position. Each of these folders are broken down in the tables below with a listing of the talkgroups and channel resources available in each folder and a description of what each resource is used for:

Console “Main” Folder Channel Resources	
Talk Group / Channel Resource Name	Talk Group / Channel Resource Usage
CC Dispatch	This is a common talkgroup in all law enforcement radios used for dispatching and when officers check out on traffic calls.
CC Field OPS	This is a common talkgroup in all law enforcement radios but primarily used for CCSO operations.
CC PD1	This is a common talkgroup in all law enforcement radios primarily used during special events or ground operations for incidents.
CC PD2	This is a common talkgroup in all law enforcement radios primarily used during special events or ground operations for incidents.
CC Inquiry	This is a common talkgroup in all law enforcement used for gaining TLETS information or requests for information from the field to dispatch.
CC Services	This is a common talkgroup in all law enforcement radios primarily used for communications between warrant deputies and Records staff.
CC Fire OPS	This is a common talkgroup in most public safety radios and all fire department radios. It is used for ground operations and when multiple departments are providing mutual aid.
CC 911	This talkgroup is used when the EOC is activated.
DOJ East	This is a VHF channel with the control station located at the Wilmeth Road Tower Site. It is used for communications with federal agencies such as the DOJ, FBI, IRS/CID, and DEA. The control station is used to access a repeater system in downtown Dallas.
DOJ West	This is a VHF channel with the control station located at the Wilmeth Road Tower Site. It is used for communications with federal agencies such as the DOJ, FBI, IRS/CID, and DEA. The control station is used to access a repeater system in downtown Ft. Worth.
CC Fire OPS 2	This talkgroup is used by all fire departments for fire station and personnel alerting.
CC Court HS	This talkgroup is used by any CCSO staff assigned to the Collin County

Console "Main" Folder Channel Resources	
Talk Group / Channel Resource Name	Talk Group / Channel Resource Usage
	Courthouse.
CC Constable PCT1	This is a common talkgroup primarily used by Constables in Precinct 1.
CC Constable PCT2	This is a common talkgroup primarily used by Constables in Precinct 2.
CC Constable PCT3	This is a common talkgroup primarily used by Constables in Precinct 3.
CC Constable PCT4	This is a common talkgroup primarily used by Constables in Precinct 4.
Texas Law	This is a VHF base station located at the Wilmeth Road Tower Site used for communications over the VHF Texas Law channels (V-CALL & V-TAC Channels).
CC Common 1	This is a common talkgroup in all radios primarily used during special events or ground operations for incidents.
CC Common 2	This is a common talkgroup in all radios primarily used during special events or ground operations for incidents.
CC Investigate	This talkgroup is used primarily for all CCSO CIS Investigators.

Console Fire OPS "VFD" Folder Channel Resources	
Talk Group / Channel Resource Name	Talk Group / Channel Resource Usage
CC Fire OPS	This is a common talkgroup in most public safety radios and all fire department radios. It is used for ground operations and when multiple departments are providing mutual aid.
CC Dispatch	This is a common talkgroup in all law enforcement radios used for dispatching and when officers check out on traffic calls. This is a duplicated talkgroup from other console screens that allows operators the ability to assist in dispatching.
CC Fire OPS 2	This talkgroup is used by all fire departments for fire station and personnel alerting.
CC Anna FD	This is a fire grounds channel on the CC system used by Anna FD.
CC Blue Ridge FD	This is a fire grounds channel on the CC system used by Blue Ridge FD.
CC Celina FD	This is a fire grounds channel on the CC system used by Celina FD.
CC Fairview FD	This is a fire grounds channel on the CC system used by Fairview FD.
CC Farmersville FD	This is a fire grounds channel on the CC system used by Farmersville FD.
CC Josephine FD	This is a fire grounds channel on the CC system used by Josephine FD.
CC Lowery Crossing FD	This is a fire grounds channel on the CC system used by Lowery Crossing FD.
CC Melissa FD	This is a fire grounds channel on the CC system used by Melissa FD.
CC Nevada FD	This is a fire grounds channel on the CC system used by Nevada FD.
CC Princeton FD	This is a fire grounds channel on the CC system used by Princeton FD.
CC Westminster FD	This is a fire grounds channel on the CC system used by Westminster FD.

Console Fire OPS "VFD" Folder Channel Resources	
Talk Group / Channel Resource Name	Talk Group / Channel Resource Usage
CC Weston FD	This is a fire grounds channel on the CC system used by Weston FD.
CC Murphy FD	Murphy generally operates on the PAWM radio system but uses this fire grounds channel on the CC system for interoperability with other fire departments and communications with CCSO dispatch



"Fire OPS" Dispatch Console Screen Capture

Console "Back-up" Folder Channel Resources	
Talk Group / Channel Resource Name	Talk Group / Channel Resource Usage
8-CALL 90	This is the NPSPAC 800 MHz Mutual Aid conventional calling channel used to set up one of the TAC channels. The repeater station is located at the Wilmeth Road Tower Site.
8-TAC 91,92,93, & 94	This is the NPSPAC 800 MHz Mutual Aid conventional TAC channel repeater. It is a multi-channel station located at Wilmeth Road. Users are assigned one of these channels over the calling channel. Dispatch will assign the channel and then select the appropriate TAC channel remotely.

Console "Back-up" Folder Channel Resources	
Talk Group / Channel Resource Name	Talk Group / Channel Resource Usage
CC Court House	This talkgroup is used by any CCSO staff assigned to the Collin County Courthouse. This is duplicated for patching purposes to this screen.
Jail Back-up	This resource is used for direct wireline control of the back-up repeater located in the Jail. This channel is used if the trunked radio system fails.
B/U Dispatch	This is a control station programmed to operate over the CC Dispatch talkgroup in the dispatch center equipment room used if the direct link to the radio system fails.
B/U Inquiry	This is a control station programmed to operate over the CC Inquiry talkgroup in the dispatch center equipment room used if the direct link to the radio system fails.
B/U Fire OPS	This is a control station programmed to operate over the CC Fire OPS talkgroup in the dispatch center equipment room used if the direct link to the radio system fails.
B/U Jail Dispatch	This is a control station programmed to operate over the CC Jail Dispatch talkgroup in the dispatch center equipment room used if the direct link to the radio system fails.
B/U Field OPS	This is a control station programmed to operate over the CC Field OPS talkgroup in the dispatch center equipment room used if the direct link to the radio system fails.
Mutual Aid	This is a control station programmed to operate over the CC Mutual Aid talkgroup in the dispatch center equipment room used if the direct link to the radio system fails.
B/U Constable	This is a control station programmed to operate over the CC Constables talkgroup in the dispatch center equipment room used if the direct link to the radio system fails.
B/U Investigate	This is a control station programmed to operate over the CC Investigate talkgroup in the dispatch center equipment room used if the direct link to the radio system fails.

Console "Interop" Folder Channel Resources	
Talk Group / Channel Resource Name	Talk Group / Channel Resource Usage
Texas Law	This is a VHF base station located at the Wilmeth Road Tower Site used for communications over the VHF Texas Law channels (V-CALL & V-TAC Channels).
DOJ East	This is a VHF channel with the control station located at the Wilmeth Road Tower Site. It is used for communications with federal agencies such as the DOJ, FBI, IRS/CID, and DEA. The control station is used to access a repeater system in downtown Dallas.
DOJ West	This is a VHF channel with the control station located at the Wilmeth Road Tower Site. It is used for communications with federal agencies

Console "Interop" Folder Channel Resources	
Talk Group / Channel Resource Name	Talk Group / Channel Resource Usage
	such as the DOJ, FBI, IRS/CID, and DEA. The control station is used to access a repeater system in downtown Ft. Worth.

As previously stated, most of the interoperability radios are located at the Wilmeth Road Tower Site and are accessed through the Embassy Switch over the microwave link. These interoperability resources are described in the following table.

Interoperability Resources		
Interoperability Resource	Radio Equipment Type	FCC Call Sign
NPSAC MA 8CALL	Motorola MSF5000 Repeater wireline controlled	WPFD844
NPSAC MA 8TAC1,2,3,4	Motorola MSF5000 Multichannel Repeater wireline controlled	WPFD844
Texas Law VTAC Channels	Motorola MSR2000 Multichannel Base Station wireline controlled	WQBC290 (State of Texas MOU)
DOJ East	XTL5000 Console wireline controlled	
DOJ West	XTL5000 Console wireline controlled	
700 MHz NCTCOG Trunked Radio System	Motorola GTR 8000 wireline controlled	WQML346
PAWM, Frisco, Prosper, McKinney	XTL5000 Console wireline controlled	

1.3.7 Dispatch Logging Recorder System

The logging recorder system used is manufactured by Higher Ground and was recently installed in 2013. Logging of all of the talkgroups on the system is possible with the logging recorder configuration in that it is designed to monitor all of the trunked RF channels individually and track conversations by monitoring the active control channel.

The logging recorder uses the control channel in this described manner to track a conversation based on the talkgroup assignments. Though a conversation may take place by jumping to different RF channels, the control channel monitoring radio takes the data from the control channel and uses it to "build" the conversation in the logging recorder regardless of the RF channels on which the conversation takes place. As previously stated, the system was just recently installed and has Project 25 logging capabilities. The County intends to re-use this recording system in any future configurations.

1.3.8 Bi-Directional Amplifier Systems

The County utilizes Bi-Directional Amplifier Systems (BDA's) to enhance coverage in those buildings and facilities that exceed the signal loss characteristics shown in the coverage maps above. There are BDA systems in the County Jail facility and the Collin County Courthouse. There are multiple amplifiers used in the jail facility, the Juvenile Detention facility, and the Sheriff's Office Patrol lower level, with internal distributed antenna systems installed throughout the jail pods and service areas.

1.4 SUMMARY OF USER RADIOS ON COLLIN COUNTY SYSTEM

In order to provide an understanding of the capabilities of all of the equipment operating on the system, the following table has been developed. It summarizes the information shown above for each agency and department and then illustrates total quantities of radios with a certain capability

- **M = Mobile**
- **P = Portable**
- **CS = Control station or consolette**

Summary of Collin County User Radio Capabilities										
Agency	P25 Phase I Capable			P25 Phase II Capable			Analog Only			Totals
	M	P	CS	M	P	CS	M	P	CS	
CC Sheriff	91	178	16	0	0	0	9	27	1	322
CC Constables	30	14	0	0	0	0	9	7	0	62
CC Jail	7	146	6	0	0	0	0	4	0	163
CC Bailiffs	0	6	0	0	0	0	0	0	0	6
CC Juvenile Detention	0	45	0	0	0	0	0	0	0	45
County Courthouse Security	0	16	0	0	0	0	0	0	0	16
CC Homeland Security	0	5	2	0	0	0	0	8	0	15
CC Fire Marshal	5	10	1	0	0	0	6	3	0	25
CC District Attorney's Office	2	25	1	0	0	0	0	0	0	28
CC Probation	0	8	0	0	0	0	0	0	0	8
Anna Police Department	7	13	0	0	0	0	0	0	0	20
Anna Fire Department	9	26	0	0	2	0	4	29	0	70
Blue Ridge Fire Department	6	14	0	0	0	0	0	7	0	27
Branch Fire Department	13	7	1	0	0	0	0	27	0	48
Celina Police Department	9	6	1	0	0	0	3	14	0	33
Celina Fire Department	7	21	1	3	7	0	2	7	1	49
Fairview Police Department	7	10	0	0	0	0	1	3	0	21
Farmersville FD	1	7	0	0	0	0	4	15	0	27
Farmersville PD	7	7	0	0	0	0	2	12	0	28
Josephine PD	0	3	0	0	0	0	3	5	0	11

Summary of Collin County User Radio Capabilities										
Agency	P25 Phase I Capable			P25 Phase II Capable			Analog Only			Totals
	M	P	CS	M	P	CS	M	P	CS	
Josephine Fire Department	6	36	0	0	0	0	0	3	0	42
Lavon Police Department	6	8	1	0	0	0	0	7	0	22
Lowry Crossing FD	3	11	1	0	0	0	0	9	0	24
Melissa Police Department	1	5	1	0	0	0	9	12	0	28
Melissa Fire Department	5	11	0	0	0	0	2	30	0	48
Nevada Fire Department	9	18	0	0	0	0	1	27	0	55
Princeton Police Department	5	10	0	1	0	0	8	17	0	41
Princeton Fire Department	10	40	0	0	1	0	11	10	0	72
Westminster FD	4	3	0	0	1	0	4	23	0	35
Weston Fire Department	1	5	0	0	0	0	1	5	0	12
Farmersville ISD	0	1	0	0	1	0	0	0	0	2
CC Public Works	83	0	0	0	0	0	7	46	0	136
CC Animal Services	0	1	0	0	0	0	5	7	0	13
CC Facilities Maintenance	2	1	0	0	0	0	1	36	0	40
State & Federal Agencies	4	32	0	1	2	0	0	2	0	41
Totals	346	760	32	5	14	0	91	401	2	Total Units 1,655
	Total P25 Phase I Capable Radios 1,130			Total P25 Phase II Capable Radios 19			Total Analog only Radios 506			

SECTION 2 – P25 TRUNKED RADIO SYSTEM

2.1 GENERAL SYSTEM OVERVIEW

2.1.1 System Description

As noted in Section 1, Collin County is utilizing an 800 MHz analog trunked radio communication system that is now aging, does not provide adequate radio coverage, and is struggling to meet the ever growing needs of the County. The County has begun the effort to develop and implement the new standards-based P25 Phase 2 simulcast trunked radio system that will greatly improve communications and interoperability among all of the agencies in the County and with neighboring cities and counties.

Collin County is planning to allow all of the outside agencies that currently utilize the County's analog simulcast 800 MHz trunked radio system to use the new Project 25 Phase 2 system. Thus, the new system's infrastructure will be designed to support the coverage and capacity requirements of all radio users. Table 2.1.a below provides a list of the agencies and departments that are expected to utilize the Collin County replacement 700 MHz Project 25 Phase 2 radio system.

Table 2.1a: Agencies and Departments that will Use the Project 25 Phase 2 System

CC Sheriff	Farmersville PD
CC Constables	Josephine PD
CC Jail	Josephine Fire Department
CC Bailiffs	Lavon Police Department
CC Juvenile Detention	Lowry Crossing FD
County Courthouse Security	Melissa Police Department
CC Homeland Security	Melissa Fire Department
CC Fire Marshal	Nevada Fire Department
CC District Attorney's Office	Princeton Police Department
CC Probation	Princeton Fire Department
Anna Police Department	Westminster FD
Anna Fire Department	Weston Fire Department
Blue Ridge Fire Department	Farmersville ISD
Branch Fire Department	CC Public Works
Celina Police Department	CC Animal Services
Celina Fire Department	CC Facilities Maintenance
Fairview Police Department	State & Federal Agencies
Farmersville FD	

The replacement radio system developed through this project will represent a new era in wireless communications for Collin County. This RFP outlines the requirements for the new P25 trunked radio system. Proposers submitting a proposal in response to this RFP shall at a minimum submit a Primary Proposal that addresses these RFP requirements.

In Section 4, the County has provided details on the radio communications sites to be used in the system design. Proposers shall produce coverage predictions (as described in Section 3) using these sites. The sites are referred to as:

Table 2.1b: Simulcast Transmitter Sites to be Used By Proposer

1	Wilmeth	Existing SS tower
2	Copeville	Existing SS tower
3	Celina	Existing guyed tower
4	Verona	Existing guyed tower
5	West McKinney	Existing water tower
6	Plano	New Monopole
7	Allen	Existing water tower
8	Princeton	Existing water tower
9	Farmersville	New SS tower
10	Melissa	New SS tower

2.1.2 Definitions

For the purpose of the RFP, the following definitions are offered based on the premise that the trunked simulcast two-way radio system architecture being proposed contains these items. Proposers shall clearly explain the system architecture being provided and include this information in the narrative portion of the Proposal.

1. **Main Control Point:** Generally noted by the various vendors as the IP Core, Network Switching Center, Master Site, or Main Switch. The Main Control Point generally contains the P25 system's call processing controller(s), database servers, firewall computers, network system management servers, associated routers, WAN/LAN Ethernet switches, and other related hardware components.
2. **Simulcast Control Point:** Generally noted by the various vendors as the Simulcast Prime Site or Distributed Control Point. The Simulcast Control Point is the site that operates as the collection and distribution site for all two-way radio communications for the trunked simulcast system and generally contains the inbound traffic comparison processor and simulcast distribution equipment for the other remote trunked simulcast radio sites. It may also provide a backup P25 system call processing functionality, either utilizing sub-controllers or a distributed processing architecture.
3. **Simulcast Remote Site:** These are additional trunked radio sites that contain the trunked repeater stations, associated hardware, and subsystems. A Simulcast Control Point may include an associated Co-Located Simulcast Remote Site.

2.1.3 Basic Design Concepts

This RFP section describes high level requirements for the trunked radio system. More specific information for other elements of the system is included in the following sections of the RFP. Collin County plans to implement a new 700 MHz Project 25 Phase 2 trunked simulcast radio system that has the following characteristics:

1. A 700 MHz, standards-based Project 25 Phase 2 architecture.
2. A single simulcast cell that provides the radio system coverage as defined in Section 3 of this RFP.

3. Each of the sites within the simulcast cell shall initially be equipped with eight (8) RF channels. Thus the system shall provide fourteen simultaneous Project 25 Phase 2 talkpaths.
4. The system infrastructure as equipped must be fully capable of supporting both Project 25 Phase 1 and Phase 2 radio traffic "on the fly"(while under management control) when Phase 1 radios roam into the system. All of the eight RF channels shall support Phase 1 calls.
5. To improve system reliability, the system shall incorporate two geographically-separated Simulcast Control Points.
6. The system shall incorporate a single fully redundant Main Control Point. A second geographically separated main Control Point is not required with this proposal.
7. Site connectivity shall be accomplished via a new ring-protected MPLS microwave system as described in Section 5 of this RFP.
8. There shall be new state-of-the-art dispatch consoles for the Collin County Sheriff's Office.
9. The system shall easily accommodate future technology upgrades at minimum cost with the least disruption to system operation.
10. The system shall be modularly expandable without requiring a significant equipment replacement.
11. The system shall incorporate robust system reliability where no single-point-of-failure can cause a major communications outage.
12. The system shall be compliant with all applicable regulatory rules and actions.

2.1.4 RF Channels

Collin County's Consultant has evaluated Region 40 700 MHz channel allocations and has devised a preliminary channel plan for Proposers to use in their proposed system design. The eight channels in the table below were selected from channels assigned in CAPRAD based on the following criteria:

1. Not co-channel licensees elsewhere within 120 miles of the Collin County center.
2. No adjacent channel licensees or adjacent channel CAPRAD assignments within any county adjacent to Collin County..

Table 2.1.4a – 700 MHz Channels to be Used

Channel #	Frequency
257	770.60625
337	771.10625
393	771.45625
445	771.78125
565	772.53125

797	773.98125
837	774.23125
913	774.70625

Collin County will soon be submitting an application to Region 40 for these eight candidate channels listed above. For the purpose of proposal development Proposers shall assume that the County will be able to license these frequencies.

For transmitter combiners, the Proposer shall provide high-quality low-loss combining systems consistent with the stated radio coverage requirements. The combiner design is the responsibility of the Proposer. Any proposed transmitter combining systems shall be capable of supporting P25 Phase 1 and 2 operation without any modification. The number of transmitters and their frequencies associated with each combining system at each site shall be clearly stated and shown in block diagrams of the system design included in the proposal.

The Proposer shall also be responsible for the selection and design of the Receiver Multicouplers and tower mounted Pre-Amplifier systems for each of the trunked radio sites. Such designs shall be low-noise, fully expandable, with the expansion capability fully explained in the proposal. The receive antenna system shall be fully capable of supporting Phase 1 and 2 operation. The number of receive antennas (single vs. diversity) associated with each receiver antenna system at each site shall be clearly stated and shown in block diagrams of the receiver antenna system design included in the proposal.

The Proposer shall fully understand all relevant FCC rules and regulations pertaining to the 700 MHz frequencies, including any Regional Planning Committee (RPC) requirements, as noted in the Region 40 Plan for the frequency band. Any such requirements shall be factored into the radio coverage design of the system. For the initial system configuration, all eight 700 MHz channels shall be placed at each of the trunked simulcast sites.

2.1.5 One Vendor for Infrastructure and Subscribers (Initially)

The P25 Standards process has evolved significantly over the past six years. Aggressive competition now exists within the user radio market sector. However, much of the equipment and software for P25 trunked simulcast radio infrastructures is still vendor proprietary. In addition, vendors have added certain vendor-specific functionality above and beyond what has been incorporated into the P25 Standards. Accordingly, for the initial system procurement, the County prefers that the radio infrastructure and the user radios (mobile radios, handheld radios, and control stations) be manufactured by the same company. This will allow for proper performance verification of all proposed system capabilities and functionality and will reduce the chance of problems and vendor finger pointing during the detailed system acceptance testing process.

Note in the Pricing section of this RFP there are opportunities for vendors to submit “User Radio Only” (no infrastructure) proposals, as follows:

1. Vendors may submit “User Radio Only” (no infrastructure) proposals for the two Collin County agencies of Public Works and Facilities Maintenance.
2. Vendors may submit “User Radio Only” (no infrastructure) proposals for any of the non-Collin County agencies for which pricing is requested in the Pricing Section. However, vendors must include all requested information and costs.

In future user radio equipment purchases, the County will likely consider P25 mobile and portable radios from various vendors.

2.1.6 Optional Offerings

The County recognizes that there are existing P25 Phase 2 trunked radio systems currently in operation or currently under development near Collin County. The County recognizes that there may be an opportunity to share certain system elements with another agency, thereby potentially reducing the initial purchase cost of the new Collin County system. The County will entertain a cost reducing option based on the sharing of these system elements owned and operated by another agency. If such an option is included in the proposal, it shall be clearly priced separately using the structure of the Pricing section of this RFP, along with a brief description of all other system changes needed to accommodate that option, including but not limited to long term maintenance implications. Coverage and other operational requirements shall remain exactly the same for the optional configuration as required for the configuration that provides the County with its own Main Control Point.

2.1.7 New System Cutover

The new system will initially accommodate more than 1900 radio units. Thus, the new system must be developed, installed, and tested in a manner that provides for continued, uninterrupted full-featured communications via the existing Motorola Smartnet system during the P25 system cutover. Proposers shall include in their proposal a complete preliminary "System Cutover Outline" that lists the major steps that will be taken to ensure that existing two-way radio communications will be maintained during the commissioning and cutover to the new system followed during the decommissioning of the current system.

A well thought-out and detailed design and system cutover plan must be developed by the selected Contractor in cooperation with the County to ensure the continuous operation of both the new and current systems throughout system cutover. A thorough system training program will follow the system installation and acceptance testing period, in which the dispatchers, technical support staff and radio users will be trained in the proper use of the new system prior to system cutover. Proposers must factor this aspect into their proposals.

2.1.8 System Lifecycle and Technology Roadmap

Subsequent to acceptance, the new system is intended to support the County for at least the next fifteen (15) years without a major system upgrade. Proposals shall include a detailed Technology Roadmap for the system including but not limited to the radio infrastructure, dispatch console system and user radio equipment. The proposed Technology Roadmap shall include the proposed system, equipment, and software and shall extend out at least 15 years from the proposed system cutover date.

The purpose of the Technology Roadmap is to identify where the proposed system components will be in their product lifecycle at the time of system cutover and what useful service life can be expected from the proposed radio system before the vendor begins reducing product availability and support. The Technology Roadmap shall include product timelines and milestones for expected equipment, firmware or software upgrades or replacement.

2.1.9 Future System Expansion

Though the initial system will be configured with 10 talkpaths, it is still necessary for the Proposer to explain what will be required if the system needs to be expanded in the future and how such expansion would be accommodated. System configuration, functionality and flexibility must be sufficient to support the expected growth and changing needs of the County for at least a fifteen (15) year period. The proposal shall provide the following information “as equipped” for the proposed initial system configuration:

1. Maximum number of simulcast sites per simulcast cell
2. Maximum number of total sites for the proposed Main Control Point
3. Maximum number of talkpaths per cell
4. Maximum number of talkgroups for the proposed Main Control Point
5. Maximum number of radio unit ID’s (including radios and dispatch consoles) initially provided for the proposed Main Control Point. Note: If the number proposed system IDs for the Collin County system is limited to a particular number, that number must be sufficient to address the operational needs of all radio system users within the County and must also address expected radio interoperability needs with other agencies inside and outside of the County. In the event that there are limitations placed on proposed system IDs, the Proposer shall be very clear about what has been proposed initially as part of the base system and what the additional costs will be to acquire additional blocks of IDs in the future if needed.
6. Maximum number of dispatch sites allowed for the proposed Main Control Point
7. Maximum number of dispatch positions for the proposed Main Control Point

2.1.10 System Outage Avoidance

In order to avoid a system outage or a significant change in operational capabilities due to a complete failure of critical system elements, the trunked radio system shall be configured with redundant equipment in key areas that impact the delivery of wide-area system operation and trunked radio operation between personnel in the field, and between field personnel and their dispatch or office personnel. A single point of failure shall not inhibit or interrupt trunked simulcast operation. Specific redundancy requirements are addressed in Section 2.4.

2.2 P25 TRUNKED SIMULCAST OPERATION

2.2.1 General

1. Proposals shall completely describe the proposed wide-area system architecture and the levels of reliable guaranteed radio coverage and Delivered Audio Quality (DAQ) that it will provide within the required coverage area as defined in Section 3 of this RFP.
2. Wide-area coverage is defined as operation throughout an area that cannot be reliably covered by a single repeater site. Proposed simulcast designs shall be digitally synchronized and shall have the capability to connect audio and data between the control site and remote repeater sites via high-quality microwave radio as its primary form of interconnectivity.

3. The trunked radio system shall be capable of automatically optimizing all circuits utilized in the system to maintain high-quality simulcast audio and bit-error-rates (BER) required to provide stable and reliable performance in the in the talk-out direction. The automatic synchronization and level control adjustment shall compensate for any change in microwave path performance. The system shall be capable of maintaining the necessary parameters in order to ensure that the system's performance meets or exceeds the required coverage and audio quality requirements at all times.
4. A detailed written response to these items shall be included in the Proposer's narrative response to this RFP:
 - a. System Architecture - The trunked simulcast system architecture shall be described in detail, with written descriptions of all major system components and their functions. System and site block diagrams shall be provided to show the interconnection between system elements and the level of system redundancy incorporated into the system design.
 - b. Simulcast Time Delay Control - Once the path delays have been measured, the method by which audio path time delay will be automatically controlled and equalized shall be specified.
 - c. Audio Level Control – Method by which distributed system audio levels are controlled and maintained to ensure interference free simulcast operation.
 - d. Frequency Stability - The method by which the frequency of base station transmitters is maintained within the required tolerance range for satisfactory simulcast operation shall be specified, and this value shall be provided. For GPS based simulcast timing and synchronization Proposers shall discuss the steps taken to maintain synchronized long-term simulcast operation in the event loss of the GPS information from the GPS satellites.
 - e. Control of Sites - The method by which the simulcast remote sites are controlled and interfaced with the trunked system controller shall be described. Link type and bit rate shall be specified.

2.2.2 Inbound Traffic Comparison and Simulcast Audio/Data Distribution Equipment

1. General Requirements: Comparison of all sites inbound traffic shall be employed as part of any proposed trunked simulcast system. The Proposer shall provide and describe the means of selecting the best quality received signal from each of the proposed repeater sites.
2. Inbound Traffic Comparison: For each channel in the system, there shall be a processor that compares inbound traffic ("comparator") from each of the radio sites. The comparator shall act as the system-wide collector and distributor of system data and control signals for its associated RF channels. The comparator shall extract the best quality signal from the multiple signal sources and provide the means to deliver it to a single or multiple destination(s). The comparator shall incorporate frame diversity or an equivalent technology to utilize the best data frames of all of the inputs to construct a better output signal. The comparator may take the form of a hardware component and/or software within the system network.
3. Comparison Process: The Proposer shall include a detailed description of the methodology used in the inbound traffic comparison process. Alarm reporting and/or diagnostic capabilities of the processor that performs the process system shall be provided.

2.3 RELIABILITY AND REDUNDANCY

2.3.1 General

In addition to meeting day-to-day operational requirements, one of the most essential elements of a complex wide-area radio system is how the system performs during various failure conditions. Such conditions may arise through direct equipment failure or as a result of external events that may disable certain system components or the facilities that support them. The system must be designed with robust levels of redundancy, and the ability to provide continued trunked communications in the event that various system failures occur.

It is the intent of this specification to provide a trunked system that will not suffer the loss of full simulcast trunking capability as a result of the failure of a single system component, in particular, the Main Control Point and the Simulcast Control Point equipment. Sufficient redundancy, including geographic separation, shall be incorporated in the system design so that full trunking operation continues without interrupting on-going communications. Trunking capability is defined in this context as the ability of the system to properly assign voice channels to independent talkgroups, as required, and the ability of the system's radio user groups to remain functionally independent (i.e., full P25 trunked feature set with no loss of functionality).

Any system component or power distribution design that could render the system or 25% of its channel resources useless for communications from a single point of failure shall incorporate redundancy.

2.3.2 Specific Redundancy Requirements

1. Single Point Failure Avoidance: Simulcast trunking communications shall remain intact to the greatest extent possible during failures. System architectures in which single points of failure would disable seamless wide-area trunked communications are unacceptable.
2. Main Control Point Redundancy: All critical components of the Main Control Point and associated subsystems at the location of the Main Control Point shall be redundant in nature unless noted otherwise. These critical components must remain online continuously with parallel updating of critical system databases to provide minimal interruption of service in the event of failure. Switching from primary to backup operation must be fully automatic, including a manual override capability. An audible and visual indication of the failure, switchover and current system status shall be provided at the Dispatch Supervisor's console at the Sheriff's Office Dispatch Center. Proposers must specify the amount of time required between component failure and the resumption of normal operation with the backup controller.
3. Simulcast Control Point Redundancy: Because of the importance of maintaining synchronized transmitters at all of the simulcast repeater sites, the Simulcast Control Point is a "mission critical" portion of the radio system, more so than perhaps than any other system elements. Thus Proposers shall pay particular attention to the design of the Simulcast Control Point. The simulcast sub-system shall have primary and backup Simulcast Control Points that are geographically separated at different secured location. Both main and backup, or distributed processing architectures, must remain online continuously with parallel updating of critical system databases to provide minimal interruption of service in the event of a simulcast control point failure. Switching from the primary to the backup simulcast controller must be fully automatic, but include a manual override capability. An indication of the failure, switchover and current system status shall be provided via the system management system and at the Dispatch supervisory position at the Sheriff's Office dispatch center. Proposers shall fully explain the mechanics and operation of the switching system and the expected time required between switching from the primary

simulcast controller to the backup, or among distributed processing elements. The time required to switch back and return to normal operations as conditions permit shall be provided. Additionally, the “networked” nature of the Simulcast Control Point makes it particularly vulnerable to network component failures that can result in a large percentage of the system’s resources being taken out of service. For example, a network switch or hub failure may disable all of the talkpaths whose channels (inbound traffic comparators) are connected to the switch. To protect from these types of failures, it is required that a complete set of comparators be located with each of the geographically separated Simulcast Control Points that operate in a redundant fashion.

4. Simulcast Remote Site Redundancy: All critical components at the Simulcast Remote Sites shall be redundant in nature. This includes Site Routers, Remote Site Simulcast Controllers, and frequency standard/GPS equipment (if not incorporated in each repeater station). Switching from primary to backup operation must be fully automatic. Proposers must specify the amount of time required between component failure and the resumption of normal operation with the backup system.
5. Dispatch Connectivity Redundancy: Critical components linking the Dispatch Center to the radio infrastructure shall be redundant in nature. In a networked environment it is understood that “switches (or hubs)” that provide Ethernet connectivity to the individual dispatch consoles are a potential failure point for which a single point of failure can cause a disruption of multiple console positions. Proposers shall describe their proposed protection to avoid having a switch or router failure that could cause multiple dispatch console positions to fail.

2.3.3 Failure Mode Analyses

Proposers shall include a comprehensive analysis and discussion of system failure scenarios and reliability the safeguards proposed for the system solution being offered. Table 2.4.3a below addresses a number of failure modes that, at a minimum, shall be addressed. Proposers shall provide a thorough failure mode analysis and may supplement the items noted in the table as needed to demonstrate the system’s capabilities. A narrative response combined with high-level system diagrams (with failures marked / identified) is preferred for this analysis.

Table 2.3.3a – Structure for Comprehensive Failure Analysis & Reliability Features

<p>Failure</p>	<p>Impact to Radios How do radio units react and adapt to failure, how is normal operation hindered</p>	<p>Impact to Dispatch How does the dispatch centers react and adapt to failure, how is normal operation hindered</p>	<p>Protection Proposed protection components, fallback modes of operation, radio unit “failure friendly” features, estimated restoration time</p>	<p>Detection Where and how is failure detected, indication to radio units and dispatchers, indication to system manager</p>
<p>Main Control Point Describe all Main Control Point component failures individually. Please include a separate failure scenario for controllers, each piece of LAN/WAN equipment, all switches and routers, and servers.</p>				
<p>Communications Dispatch Console Systems Describe all system component failures related to the dispatch system individually. Please include a separate failure scenario for controllers, each piece of LAN/WAN equipment, all switches and routers,</p>				
<p>Simulcast Control Points Describe all Simulcast Control Point component failures individually. Please include a separate failure scenario for controllers, voting comparators, each piece of LAN/WAN equipment, all switches and routers.</p>				
<p>Simulcast Remote Sites Describe all system component failures related to site equipment individually. Please include a separate failure scenario for controllers, each piece of LAN/WAN equipment, all switches and routers.</p>				
<p>Connectivity - Provide a thorough analysis of the results of connectivity failures, including microwave path failures, microwave radio failures, and MPLS Router failures. Provide this for all</p>				

<p style="text-align: center;">Failure</p>	<p style="text-align: center;">Impact to Radios How do radio units react and adapt to failure, how is normal operation hindered</p>	<p style="text-align: center;">Impact to Dispatch How does the dispatch centers react and adapt to failure, how is normal operation hindered</p>	<p style="text-align: center;">Protection Proposed protection components, fallback modes of operation, radio unit "failure friendly" features, estimated restoration time</p>	<p style="text-align: center;">Detection Where and how is failure detected, indication to radio units and dispatchers, indication to system manager</p>
<p>link scenarios (to tower sites, dispatch sites control point sites, etc.).</p>				

2.4 TRUNKED SYSTEM FEATURES AND FUNCTIONS

1. **Access Time:** The system shall allow a transmitting unit access to an available "channel" and unmute a receiving unit's speaker with the transmitting unit's audio within 1.0 second of the transmitting unit's request for channel push-to-talk (PTT). Should system traffic be at a level where all channels are busy, the system will automatically give preference to higher priority units attempting access. The system shall indicate to the radio user that channels are busy, that the unit is placed in queue, and will be offered a channel in a call back mode.
2. **Unit Identification:** A real time display of push-to-talk unit identification at the dispatch positions and on receiving radio units shall be provided in an alphanumeric alias format.
3. **Emergency Button:** Mobile and portable units shall be equipped with a dedicated switch or function that allows for emergency access. The switch shall be easily accessed, but designed to minimize the chances for accidental activation. Upon emergency activation, the field unit shall transmit the Unit I.D. and/or alias and an emergency indication on a periodic basis until acknowledged by the dispatch console operator.
4. **Emergency Alarm and Call:** A display and an audible alert on the dispatch console upon activation of an emergency button or switch shall be provided. The display shall identify the unit ID of the radio initiating the emergency alarm. Automatic translation of this unit identification to correlate to an alphanumeric alias format is required. Upon activation of the "emergency unit's" PTT, a channel shall be assigned for a predetermined and variable amount of time. The emergency call hang-time shall be adjustable by the system manager.
5. **Emergency Alarm and Call Programmed Modes:** In the event all voice channels are occupied, the system shall be capable of functioning (via programming) in at least the following two (2) modes:
 - **Emergency Priority Queuing:** If all voice channels are occupied when an emergency call is made, then the unit initiating the emergency shall be placed at the top of the busy queue list and allowed access to the next available voice channel. The "emergency unit" shall be given the highest level of priority regardless of how many units are already in queue or what their priority is.

- **Emergency Preemption:** If all voice channels are occupied when an emergency call is made, the unit initiating the emergency shall be provided access to the voice channel that was supporting the lowest priority user currently "on the air". It is understood that until the current user de-keys, there will be RF contention between the emergency user and the current transmitting unit. However, once the "non-emergency" user de-keys, that radio unit shall be directed back to the signaling channel so the voice channel can then be assigned to the emergency user. The County understands the implications of the contending audio, but also realizes the possible advantages of obtaining a prompt channel grant in an emergency situation.
6. **Encrypted Mode:** All channels of the trunked simulcast system shall be installed and equipped to accommodate AES voice encryption. All subscriber units properly equipped with encryption shall be able to scan between and converse on encrypted and clear talk groups. All dispatch positions shall be capable of utilizing the encrypted channels. The range of the system in encrypted mode must equal the range of the system in clear mode.
 7. **Encryption Process:** The encryption process shall not degrade the audio quality of the system. Encryption shall be available in trunked, conventional and talkaround modes. Proposers shall state the number and type of encryption algorithms equipped with their proposed system and the encryption algorithm capacity of their radio units. Multiple keys must be accommodated.
 8. **Over-the-Air Rekeying (OTAR):** The system shall be capable of Over-The-Air-Rekeying (OTAR) of the encryption algorithm.
 9. **Encryption Key Management:** Proposers shall provide a thorough discussion of their methodology for managing encryption keys for the system. Proposers shall include and describe the minimum required Key Management equipment required to manage the proposed encryption.
 10. **Individual or Private Call:** Selected users and dispatchers shall have the ability to selectively communicate "privately" with another individual on the system regardless of what talkgroup either unit is in. The call shall allow the two users to utilize a single channel resource to communicate without the participation of other units in their respective talkgroups.
 11. **Individual or Private Call Display:** If the recipient of a private call has a display-type radio, the radio shall display the alphanumeric alias of the calling party. Respectively, the calling party shall be able to determine if the recipient did not receive the call or is not available for the call (i.e. recipients radio is turned off, out of range, etc.) by hearing a distinctive tone and receiving a message in their display.
 12. **Call Alert:** Selected users and dispatchers shall have the ability to selectively alert another individual user on the system regardless of what talkgroup either unit is in. The call shall allow an individual to alert another user with a distinctive tone and their individual ID/alias (on display radios only). The alert shall be accomplished over the signaling (control) channel and should not affect any voice channels on the system.
 14. **Call Alert Display:** If the recipient of a call alert has a display-type radio, the radio shall display the alphanumeric alias of the alerting party. Respectively, the alerting party shall be able to determine if the recipient did not receive or is not available for the alert (i.e. recipients radio is turned off, out of range, etc.) by hearing a distinctive tone and receiving a message in their display.

15. **Multi-Group Call:** Multi-Group talkgroups shall allow multiple talkgroups to be affiliated to a single multi-group. When a call is placed on the multi-group talkgroup, all talkgroups associated with the multi-group shall be assigned to a single voice channel for the conversation. Every user involved in the multi-group call shall have talk-back capabilities for the duration of the call. The system shall be programmable to allow for the following two (2) modes of operation:
 - **Ignore Mode:** If a user initiates a multi-group call, the call will immediately ignore calls in progress on affiliated talkgroups. The multi-group call will not wait for units in those talkgroups to de-key and therefore those transmitting units will not hear the multi-group call until they de-key.
 - **Wait Mode:** If a user initiates a multi-group call while calls are in progress on affiliated talkgroups, then the multi-group call will wait (busy-queued) until all participating talkgroups have finished their transmission. Initiating a multi-group call should transmission trunk all calls in progress on affiliated talkgroups in order to facilitate the multi-group call.
16. **Scan:** This function shall provide the ability to scan through multiple modes (talkgroups) within the same system. It shall also contain the capability to store and scan a list of conventional frequency pairs. Subscriber units shall be provided with multiple scan list capability. Each list shall contain at least ten (10) talkgroups or frequency pairs.
17. **Priority Scan:** This feature shall provide the ability to apply two priority levels to a defined scan list. While in the scan mode, a Priority One transmission shall be received regardless of the activity on the Priority Two (or other non-priority modes). A Priority Two message is heard over all (except Priority One messages) non-priority modes.
18. **Channel Access Priority Levels:** As a minimum requirement, the system shall provide user definable levels of access priority and such levels of priority shall be variable from any dispatch console in the system to allow assignment of specific talkgroup members to a higher system access priority for the duration of a special event or tactical operation. Access and control of priority levels shall be partitioned so as to allow separate control by the respective agency.
19. **Dynamic Talkgroup Reconfiguration:** Dynamic regrouping of mobile and portable radios shall be provided. This function shall allow units from different talkgroups to be regrouped into a common talkgroup via the signaling channel. Preprogramming of regrouping functions to allow rapid implementation of emergency plans shall be provided.
20. **Selective Disablement of Radio Field Units (often referred to as Radio Inhibit):** Selective disablement of individual mobile, portable, and control station radios shall be provided. Reactivation of such radios, which have been disabled, shall also be provided. These functions shall be performed via the signaling channel. Use and control of this feature is to be partitioned by manager user name and shall be provided at any manager user terminal.
21. **Time-Out Parameter Control:** Control of transmitter time out parameters shall be provided at any manager user terminal. Any valid manager logged in with this capability shall be able to control at a minimum:
 - Channel Hang Time;
 - Interfering Carrier Time (length of time channel remains enabled with an interfering carrier);
 - Remote Link Failure Time (length of time site remains enabled without a remote site data link);

- Channel Fade Time (length of time channels remains assigned without a carrier or data present), and
 - Emergency Call Time (length of channel hang time when an emergency call is initiated).
22. **System Programming:** Programming of system operational parameters shall be provided by operator terminals controlled by the trunked system management computer. These terminals shall provide for "user friendly" operation by trained personnel. Access to system programming functions shall be protected by hierarchical password security.
23. **System Management Partitioning:** System Manager partitioning shall allow for different agencies to control their user database independently of one another. Partitioning shall be defined and protected by a user name and a respective password. Partitioning shall allow access to, as well as prohibit users from, different sub-systems, programming and system management areas, and subscriber ID ranges (talkgroup and individual ID ranges).
24. **Over-The-Air-Programming (OTAP):** The system shall provide OTAP. Both the radio infrastructure equipment and all proposed subscriber radios shall be equipped with Over-The-Air-Programming (OTAP). The Proposer shall describe the system's capability for OTAP, including any limitations that occur when programming subscribers over-the-air vs. traditional programming methods. The Proposer shall describe the process by which the reprogramming takes place and the timeframe required to reprogram an individual radio and a group of 500 radios. Any assumptions used in determining the time needed to reprogram the 500 radios shall be stated in the proposal response to this item.
25. **Control Channel Updating:** The signaling channel shall continually transmit the current channel assignments of the system. This feature is intended to insure that radios "signing on", coming into range, or switching talkgroup modes are directed to the correct radio channel if a talkgroup call is in progress.
26. **Embedded Signaling:** Embedded or sub audible signaling shall be transmitted on assigned voice channels in order to prevent subscribers from being misdirected or allowed to transmit on an improperly assigned channel.
27. **GPS Location Monitoring:** The County may wish to deploy the GPS location monitoring feature available with new P25 trunked radio systems on the market today. Proposers shall provide all costs associated with equipping the system with GPS location capability, along with a complete description of their system, its capabilities, and monitoring point equipment.
28. **Cell Phone LMR Gateway:** As an option, Proposers shall provide the cost of a smartphone gateway that will allow a properly equipped smartphone to participate in talkgroup calls on the P25 Phase 2 radio system. Proposers shall include a brief description of this option.
29. **Inter Sub-System Interface:** A cost option shall be provided for an appropriately sized Project 25 Inter Sub System Interface (ISSI). Proposers shall detail the configuration and functionality of their ISSI option.
30. **Cyber Security:** Although the new P25 trunked radio system will be a closed network, it may still have vulnerable avenues through which cyber security breaches could occur. Accordingly, Proposers shall include a section in their response that describes the proposed system's protection

schemes against cyber-attacks. The discussion should include the network's vulnerable elements and potential malicious entry points.

2.5 SYSTEM MANAGER/INFORMATION MANAGEMENT SYSTEM

2.5.1 General

The system shall incorporate a graphical user interface (GUI) based system Manager/ Information Management System to be used to set or adjust selected system parameters and allow the supervisory personnel to effectively monitor, control and analyze system operation. Two Network Management Clients (user terminals) shall be provided initially. The system shall allow for the addition of Network Management Clients as needed. One Client shall be installed at each of the following locations:

- The Main Control Point Equipment Room
- The Collin County Sheriff's Office Dispatch Center
- Facilities Maintenance Central Plant Control Room (utilize existing fiber)
- Major Palmisano's Office (use existing computer if possible)

The Network Management Clients shall include a 24" LCD monitor, a keyboard, mouse, and printer. A printer for printing activity reports or other outputs produced by the System Manager/Information Management system is required at each location. The printer shall be a Hewlett Packard LaserJet or similar high-quality color laser printer. One printer will be provided and located with each of the Network Management Clients. Required system manager capabilities at a minimum shall include:

1. **System Management Partitioning:** System Manager Partitioning shall allow different agencies to control their user database independently of one another. Partitioning shall allow a user to view, set or modify subscriber information pertaining to a particular agency while restricting access to other agencies. The highest level manager shall be capable of viewing all information. Partitioning shall be defined and protected by a user name and a respective password. Partitioning shall allow access to as well as prohibit users from, different sub-systems, programming and system management areas, and subscriber ID ranges (talkgroup and individual ID ranges).
2. **System Configuration:** System Configuration shall enable the control all of the programmable features of the trunking controllers, radio infrastructure, and network components.
3. **Subscriber Management:** Subscriber Management shall allow an authorized operator to view, set, or modify the talkgroup ID's, and the unique ID permission.
4. **Manager Partitioning:** Manager Partitioning shall allow an authorized user to view, set or modify subscriber information pertaining to a particular agency while restricting access to other agencies. The highest level manager shall be capable of viewing all subscriber information. Partitioning shall allow access to, as well as prohibit users from, different sub-systems, programming and system management areas, and subscriber ID ranges (talkgroups and individual ID ranges).
5. **Diagnostic Management:** Diagnostic Management shall allow an operator to view current status and status history of the system, its sub-systems or system components. It shall also allow for diagnostics to be performed on the system's network devices.

6. **Dynamic Radio Commands:** Dynamic Radio Commands shall enable regrouping of system users, including the ability to predefine, store, and implement regrouping plans as needed. It shall also enable sending and receiving of status messages to and from subscriber units, and elective radio status information regarding radio's operating status (i.e. on/off, inhibited).
7. **Selective Inhibit/Uninhibit:** This shall provide for enabling/disabling of control stations, mobile and handheld radios. Field equipment shall be equipped to respond to the system manager commands.
8. **Activity Reporting:** System Activity Reporting shall be provided by individual radio unit, talkgroups, and system wide. A detailed description of the types of activity reports provided shall be included in the proposal. Typical reports shall include at a minimum PTTs, airtime used in a defined timeframe, busy-queued calls, time in the queue, emergencies declared, talkgroup activity, outside receiver interference detected, etc. as outlined in the following section.
9. **Graphical Channel Activity** – The system shall provide a graphical activity monitor to display the status and activity of all RF channels and talkpaths within the system.

2.5.2 System Reports

The following system generated reports shall be provided on-demand:

1. **System Usage Reports:** The system shall collect and process data with regard to system usage and provide a number of unique reports. Proposers shall describe how the data is parsed for displaying on the Network Management Terminals. Also, at a minimum, data to be archived on the system or routed to a file/printer shall include the following:
 - Error Event Log;
 - Number of Push to Talks (PTT's) per talkgroup per interval of time;
 - Number of PTT's per system per interval of time;
 - Number of calls by type/interval
 - Call duration by type of call;
 - Number of system busies/interval of time, and
 - Total busy time/interval of time.
2. **System Configuration Reports:** System Configuration Reports shall include, at the minimum:
 - Configuration information for all components in the system, and
 - Functional configuration of controllers, channels and sites.
3. **Subscriber Management Reports:** Subscriber Management Reports shall include, at a minimum:
 - Manager database (list of system managers);
 - Logged on managers;

- Regrouped radios;
 - Inhibited radios
 - Storm plans;
 - Commands (tasks)-in-Progress (regroups, inhibits),and
 - Subscriber configuration & attributes (by individual, talkgroup & multigroup)
4. **Channel Usage Reports:** Channel Usage Reports shall include, at a minimum:
- Identification of calling units by talkgroups and unit identification number;
 - Time of channel access;
 - Duration of transmission;
 - Classification of call;
 - Channel assigned, and
 - Site of Sub-system involved in a call.
5. **Fault Management Reports:** Fault Management Reports shall include, at a minimum:
- Current alarms;
 - Alarm history (daily, weekly, monthly);
 - Alarm history (by system component), and
 - Technician notes.
6. **Sample Reports:** Proposers shall include sample copies of these reports in their submitted proposals and state the data storage capacity of the proposed system in days and/or number of alarms.

2.5.3 Alarm Monitoring and Reporting System

An alarm monitoring package shall be provided to monitor system parameters and alarms. Both the trunked system alarms and the microwave alarms may be incorporated into one system provided that the microwave alarm functionality meets the requirements of Section 5 of this RFP.

The alarm system shall display alarm conditions of board level failures of all network elements on a single 24" LCD monitor. The system architecture shall be displayed using graphical system icons. Selecting an icon such as a repeater site shall open and reveal the next higher level of system detail, allowing the user to then select the equipment shelter or tower, and then a repeater or other piece of equipment, down to the board level. Alarms shall appear as flashing icons, representing the component and sub-systems affected. Flashing icons shall alternate between red and their normal appearance.

The Proposer shall describe their alarm monitoring system's capabilities for SNMP reporting of alarms to external systems and devices (i.e., cellular phone or PDA) and/or a web-based SNMP Manager. The County is

interested in understanding the flexibility the proposed system has in reporting and forwarding events and alarms to external devices.

The system shall allow the manager to view historical data on selected performance characteristics. Access to the management system shall be controlled through the use of an encrypted password (not displayed on the screen).

In their proposal, Proposers shall detail what alarms, conditions and parameters can be controlled and/or displayed through the System Management/Alarm Terminal. The list shall be comprehensive and include all Project 25 system alarms, all network alarms, all microwave radio and MPLS alarms, and all environmental alarms.

The selected Contractor shall be responsible for interconnecting and testing all alarm points to the proposed alarm systems, including but not limited to:

1. Sensors;
2. Contacts;
3. Wiring;
4. Programming,
5. Installation, and
6. Acceptance testing.

2.5.4 Alarm Terminal for Facilities Maintenance Department Central Plant Control Room

A Network Management/Alarm Terminal shall be provided in the Facilities Maintenance Department Central Plant Control Room (4600 Community Ave., McKinney) to provide selected alarms from the new radio system sites. The terminal shall have the ability to display only selected site alarms (primarily shelter environmental and generator alarms). Users of the terminal shall be prevented from accessing other functions of the terminal.

2.5.5 Software and Programming Accessories

Four (4) complete sets of programming software, cables, and required interface devices shall be provided for each model of software programmable equipment included in the system.

All PC-based software utilized in the new radio system shall be Windows based. Proposers are required to identify each software package that will not be compatible with this requirement. Proposers shall identify the proposed version of the Windows operating system provided in all windows based system computers.

At the time of system cutover, all system software shall be of the latest version available unless there is a compelling and acceptable reason that this requirement cannot be met.

2.5.6 Subscriber Radio Management and Diagnostics

In order to enhance the service and maintenance of user radios on the system, Proposers shall provide an over-the-air user radio diagnostic tool. This device shall be capable of being remotely monitored from any Network Management Client. The diagnostic tool shall include at a minimum the following features:

1. A single device that can be moved between sites with an option to implement multiple devices placed at different sites each networked to the user terminal placed at the radio shop.
2. Be connected to the new site interconnectivity system being deployed as part of this procurement.
3. The ability to monitor:
 - Received frequency error from field radios;
 - Maximum frequency deviation;
 - Transmitter modulation, and
 - FCC emission mask compliance.
4. The ability to store unit ID's and aliases and generate reports of problems / issues detected with subscriber radio equipment.

SECTION 3 – RADIO COVERAGE REQUIREMENTS

3.1 INTRODUCTION

The original Collin County two site trunked simulcast system was implemented in 1994. This system was upgraded and expanded in 2004 to four simulcast sites. This change from two sites to four sites resulted in a significant increase in radio coverage, and at the time served the County and its partner agencies well. Since then the population of Collin County has expanded by 35% and is continuing to grow and expand in all directions. Furthermore, in the past decade, the Public Safety Land Mobile Radio industry has experienced a shift in the level of radio coverage that is expected from the users of these communications systems. This shifting of expectations has been triggered by the cellular industry and the high levels of radio coverage, especially in-building radio coverage that the cellular infrastructures typically provide.

The expanding population of Collin County and the shift in radio coverage expectations are two primary factors that are driving the Replacement Radio System's requirement to provide substantially more radio coverage than the current 4 site simulcast system. A recent Needs Assessment performed for Collin County and its partner agencies revealed that an essential need for most users of the system is improved radio coverage, particularly in-building coverage. It is expected that the new radio system developed through this project will represent a substantial improvement in the two-way radio communications provided to the various departments and agencies.

The purpose of this section is to define the radio coverage requirements for the new Collin County Replacement Radio System. This section is intended to provide Proposers with a clear understanding of the expectations and requirements of Collin County.

As outlined in Section 2 of this RFP, the system will utilize 700 MHz channels operating in the P25 Phase 2 mode. The system must also be capable of reverting to P25 Phase 1 operation in order to support interoperability with Phase I only capable radios that may need to operate on the system for mutual aid purposes. The system shall operate in the simulcast mode using six (6) RF channels initially. The system's capacity may be expanded beyond the six channels in the future if needed. Final licensing of the actual six initial frequencies being used shall take place once a system design is finalized.

3.2 RADIO COVERAGE DEFINITION: MOBILE AND PORTABLE RADIO UNITS

Radio Coverage: Coverage is defined as the ability to successfully complete inbound (talk-in), field unit to dispatch communications, outbound (talk-out), dispatch to field unit communications, and field unit to field unit voice communications in a trunked repeat mode via the system infrastructure throughout the designated areas, standing still, and while in motion, with at least the minimum required level of audio quality, per TIA/TSB-88.1-D, and at the specified level of propagation reliability stated in this section of the RFP. This level of performance is required for digital and digitally encrypted modes of operation.

Audio Quality: For reference, the DAQ definitions, as defined in the latest version of the TSB-88 Bulletin are listed below:

Table 3.2a – DAQ Definitions

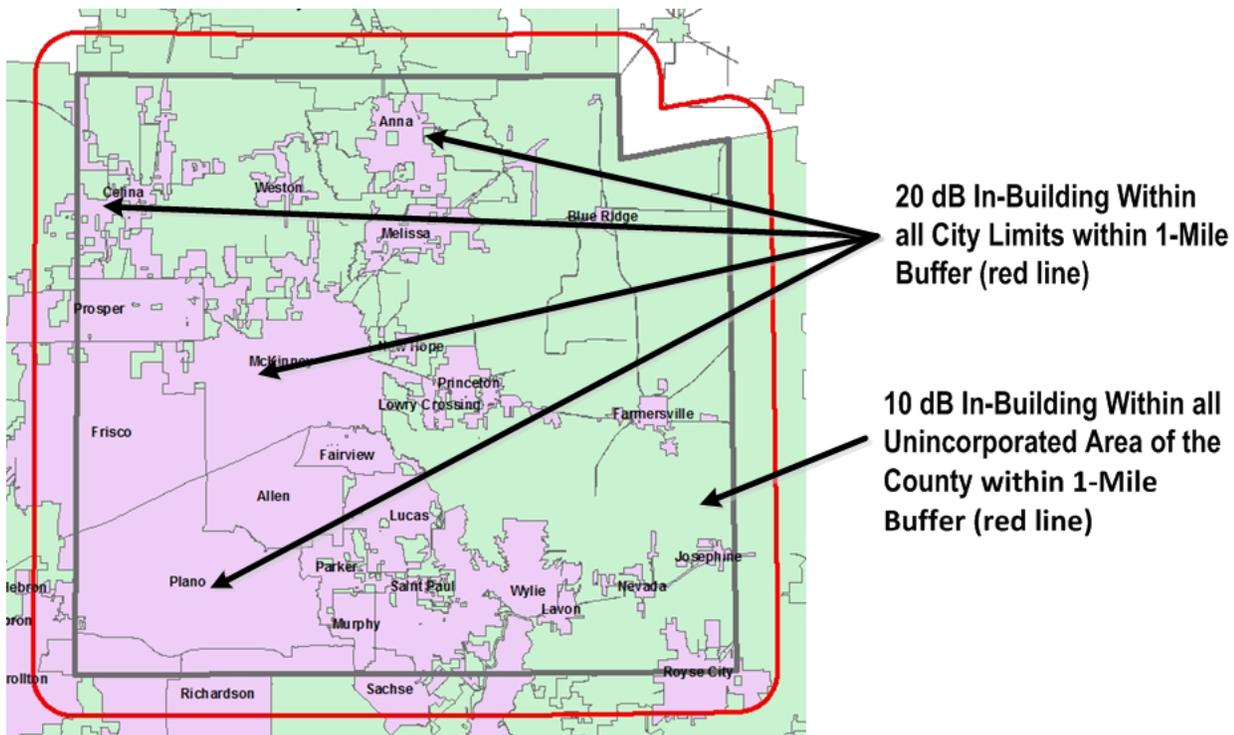
Delivered Audio Quality	Subjective Performance Description
DAQ 5.0	Speech easily understood.
DAQ 4.5	Speech easily understood. Infrequent Noise/Distortion.
DAQ 4.0	Speech easily understood. Occasional Noise/Distortion.
DAQ 3.4	Speech understandable with repetition only rarely required. Some Noise/Distortion.
DAQ 3.0	Speech understandable with slight effort. Occasional repetition required due to Noise/Distortion.
DAQ 2.0	Understandable with considerable effort. Frequent repetition due to Noise/Distortion.
DAQ 1.0	Unusable, speech present but unreadable.

Coverage Reliability: All references to coverage reliability in this document refer to area reliability. For example, the phrase "95% coverage" indicates that if the total service area requiring guaranteed coverage is segmented into test tiles, a minimum of 95% of the test tiles will yield a Delivered Audio Quality (DAQ) of at least a 3.4 per Table 3.2a above.

3.3 BASELINE COVERAGE GOALS

The baseline coverage goals for Collin County are depicted in Figure 3.3a below. Various levels of in-building radio coverage are required. A system infrastructure that provides a baseline coverage goal of at least 95% area reliability, a minimum of DAQ 3.4, and the in-building coverage levels shown below is desired for portable radios and antennas worn "on the belt" with an antenna height of three (3) feet, using a belt clip device. To avoid any ambiguity regarding the potential affects produced by various portable radio carrying or housing devices, i.e., "belt clips" versus "swivel cases", Collin County is requiring that the system design be based on a "belt clip" carrying device.

Figure 3.3a: Desired Radio Coverage Levels



ArcView “.SHP” files will be provided for Proposers to utilize in their coverage modeling and system designs.

On-Street Coverage: Portable “On-Street” radio coverage is also desired for the bounded area within the red line. It is expected that “On-Street” portable coverage will be addressed by the baseline system design. Proposers shall provide On-Street radio coverage analyses for portable radios as outlined in Section 3.5.

Coverage Performance: For the baseline coverage goal of 10 dB and 20 dB in-building, coverage into structures does not include stairwells, basements, underground or partially underground structures, or structures that have special shielding from radio frequency signals. However, there are specific Mandatory Buildings in which coverage is required in these areas.

3.4 PORTABLE COVERAGE IN MANDATORY BUILDINGS

In-building portable radio coverage is necessary within the 51 facilities listed in Table 3.4a below. These buildings will be tested separately. Each of these buildings shall have a minimum DAQ 3.4 for 95% of its test locations.

It is important to note that each listed building may encompass more than one structure. For example, an unattached parking garage is a separate structure from the building it is associated with. A school campus may have many discreet unattached structures. In general, multiple structures that are attached shall be treated as one building. If there are multiple structures within a given Mandatory Building property that are detached, then the 95% requirement shall be treated independently for each “structure.” Using the school campus example, Proposers shall not be allowed to “completely fail” one building, while making up for it by

adding in the remaining buildings on that campus. Coverage is required within all areas of each specific building including basements, parking garages, and stairwells.

As part of proposal development, Proposers are expected to evaluate each mandatory facility to determine whether the building will be provided with the required coverage reliability solely by the proposed radio system infrastructure, or will require supplemental methods to provide the required coverage reliability. Proposers shall not propose or rely on vehicular repeater systems or other similar systems to extend tactical on-scene radio coverage into heavy structures. Collin County will facilitate the Proposers' visiting these facilities at the Proposer's request.

Proposers shall provide in their proposal a summary table of their analyses, stating whether or not a supplemental coverage method is being proposed for each location and the method being employed (BDA, DAS, etc.). Proposers shall also provide costs individually for any supplemental coverage methods in their Pricing Proposal. Detailed information on how the buildings listed in the following tables will be Acceptance Tested may be found later in this section.

Table 3.4a – Mandatory Buildings

Ref #	Facility	Agency	Facility Address
1	Animal Services	Collin County	4750 Community Ave McKinney, Texas 75071
2	Central Plant	Collin County	4600 Community Ave McKinney, Texas 758071
3	Collin County Administration Building	Collin County	2300 Bloomdale Rd McKinney, Texas 75071
4	Collin County Courthouse	Collin County	2100 Bloomdale Rd McKinney, Texas 75071
5	Collin County McKinney Plaza	Collin County (Healthcare Services, Records, Texas Agrlife Extension Service	825 N. McDonald St McKinney, Texas 75069
6	Collin County Justice Center	Collin County (Sheriff's Office, HLS, Jail	4300 Community Ave McKinney, Texas 75071
7	Collin County Medical Examiner	Collin County	700B Wilmeth Road McKinney, Texas 75069
8	Collin County Sub-Courthouse	Collin County (Constable 2, Justice of the	406A Raymond Street Farmersville, Texas 75442

Table 3.4a – Mandatory Buildings

Ref #	Facility	Agency	Facility Address
		Peace)	
9	Juvenile Detention Center	Collin County	4700 Community Ave McKinney 75071
10	Collin County Sub-Courthouse	Collin County (Constable 4, Justice of the Peace)	8585 John Wesley Drive Frisco, Texas 75034
11	Collin County Sub-Courthouse	Collin County (Constable 3, Justice of the Peace, Tax Assessor-Collector)	920 E. Park Blvd Plano, Texas 75074
12	Collin County Sub-Courthouse	Collin County (County and District Clerk, Substance Abuse, Veteran Services)	900 E. Park Blvd Plano, Texas 75074
13	Collin County Sub-Courthouse	Collin County (Constable 2, Justice of the Peace)	2000 N. SH 78 Wylie, Texas 75098
14	Frisco Square Government Center	Collin County (Tax Assessor-Collector)	6101 Frisco Square Blvd Suite 2000 Frisco, Texas 75034
15	Collin County Elections	Collin County	2010 Redbud Blvd Suite 102 McKinney, Texas 75069
16	Juvenile Justice Alternative Education Program (JJAEP)	Collin County (School, Development Services, Engineering Fire Marshal, Juvenile Probation Services, Parks & Open Space	4690 Community Ave McKinney, Texas 75071

Table 3.4a – Mandatory Buildings

Ref #	Facility	Agency	Facility Address
17	Public Works Service Center	Collin County	700 A Wilmeth Road McKinney, Texas 75069
18	Child Advocacy Center (CAC)	Collin County	2205 Los Rios Blvd Plano 75074
19	Anna Police Department	Anna PD	101 S Powell Pkwy Anna, Texas 75409
20	Anna Fire Department	Anna FD	305 S Powell Pkwy Anna, Texas 75409
21	Anna City Hall	Anna PD	111 N Powell Pkwy Anna, Texas 75409
22	Celina Police Department	Celina PD	501 E. Pecan Street Celina, Texas 75009
23	Celina City Hall	Celina PD	142 North Ohio Celina, Texas 75009
24	Fairview PD / City Hall	Fairview PD	372 Town Place Fairview, Texas 75069
25	Josephine PD / City Hall	Josephine PD	108 W. Hubbard Josephine , Texas 75164
26	Josephine FD	Josephine FD	201 W. Hubbard Josephine, Texas 75164
27	Farmersville PD	Farmersville PD	134 N. Washington Street Farmersville, Texas 75442
28	Farmersville FD	Farmersville FD	134 N. Washington Street Farmersville, Texas 75442
29	Farmersville City Hall	Farmersville PD	205 S. Main Farmersville, Texas 75442
30	Lavon PD	Lavon PD	501 Lincoln Ave #B Lavon, Texas 75166
31	Lavon City Hall	Lavon PD	120 School Road Lavon, Texas 75166

Table 3.4a – Mandatory Buildings

Ref #	Facility	Agency	Facility Address
32	Nevada FD	Nevada FD	110 W FM 6, Nevada 75173
33	Melissa PD / City Hall	Melissa PD	3411 Barker Ave Melissa, Texas 75454
34	Melissa FD	Melissa FD	1933 East Melissa Road Melissa, Texas 75454
35	Princeton PD	Princeton PD	306 Main Street Princeton, Texas 75407
36	Princeton FD # 1	Princeton FD	501 Woody Drive Princeton, Texas 75407
37	Princeton FD # 2	Princeton FD	TBD
38	Princeton City Hall	Princeton PD	123 West Princeton Drive Princeton, Texas 75407
39	Blue Ridge FD # 1	Blue Ridge FD	203 W FM 545 Blue Ridge, Texas
40	Blue Ridge FD # 2	Blue Ridge FD	200 S. Main Blue Ridge, Texas 75424
41	Lowry Crossing FD	Lowry Crossing FD	1407 S. Bridgefarmer Road Lowry Crossing 75069
42	Westminster FD	Westminster FD	311 East Houston Westminster, Texas 75485
43	Weston FD	Weston FD	203 Main Street Weston, Texas 75097
44	Branch FD	Branch FD	7777 FM 546 Princeton, Texas 75407
45	Medical Center of McKinney (ER)	All	4500 Medical Drive McKinney, Texas 75071
46	Baylor Medical Center of McKinney (ER)	All	5252 W University Drive McKinney, Texas 75071

Table 3.4a – Mandatory Buildings

Ref #	Facility	Agency	Facility Address
47	Medical Center of McKinney Wysong Campus (Mental Health ward)	All	130 S. Central Expressway McKinney, Texas 75070
48	Nevada FD / Lavon Location	Nevada FD	501 A. Lincoln Street Lavon, Texas 75166
49	Wal-Mart (route to and inside the security office)	CCSO	2662 Lucas Road, Lucas 75002
50	Lucas City Hall	CCSO	665 Country Club Lucas, Texas 75002
51	Celina FD	Celina FD	1413 Preston Celina, Texas 75009

3.5 RADIO COVERAGE ANALYSES

3.5.1 Introduction

Radio system coverage prediction maps shall be produced through the use of a radio wave propagation model which has been developed on the basis of theoretical and empirical data, and which will take into account channel bandwidth, modulation schemes, delivered audio quality, coverage reliability, terrain irregularity, foliage, land use/land cover, building penetration losses, RF noise, and long and short-term signal variations. The model used for the purposes of the coverage prediction process shall be identified in the proposal, and the rationale for system gains and losses used must be provided. A table of system coverage parameters such as gains and losses utilized in each propagation analysis must be provided. A terrain database with 1 arc-second (30 meters) of resolution or better is required and the terrain data model used in the coverage analyses must be identified. The propagation analyses system must utilize both vertical and horizontal antenna patterns. The result of the analyses will be a set of radio coverage maps, which shall follow the criteria outlined below.

3.5.2 Radio Coverage Maps to be Provided

The following coverage maps shall be provided as part of the proposal, indicating to what extent the Proposer is guaranteeing the County's baseline coverage goals from Section 3.3. All maps shall depict a composite worst case scenario (talkout versus talkback). All RF coverage maps shall be provided in both printed and electronic formats.

- Mobile Radio Coverage for Project 25 Phase 2
- Portable On-Street for Project 25 Phase 2

- Portable in 10 dB Buildings for Project 25 Phase 2
- Portable in 20 dB Buildings for Project 25 Phase 2
- Portable in 30 dB Buildings for Project 25 Phase 2

Portable radio coverage maps provided in the proposal shall illustrate the full extent of the radio coverage footprint(s) derived from the proposed system including any portion that extends beyond coverage boundaries as depicted in this RFP. Coverage maps that abruptly stop at the service area borders are not acceptable. Each of the radio system users often travel outside of their normal service area for mutual aid and other interoperable communication reasons and they are interested in seeing what additional coverage will be available from the Collin County Replacement Radio System.

The borders of individual cities, as well as the "red line" boundary, shall be clearly shown on all coverage maps produced and presented in the Proposal. All coverage maps included in the Proposer's response shall be printed on paper such that the printed scale for the maps has resolution of 1" = 4 Miles, likely 11" x 17" paper.

Each coverage map shall include a legend with the following information, (alternately this information can be on an accompanying "parameter" cover sheet that clearly references the particular map.)

1. Type of coverage displayed on the individual map:
 - a. Portable on the street;
 - b. Portable in 10 dB buildings;
 - c. Portable in 20 dB buildings;
 - d. Portable in 30 dB buildings;
2. Location and height of the user radio's antenna
 - a. Portable radio (radio and antenna at belt level at 3 feet AGL)
 - b. Type of portable carrying device (belt clip)
3. Area Reliability %
4. Delivered Audio Quality (DAQ)
5. System Type
 - a. Digital Project 25 Phase 2
6. RF signal levels (ranges depicted in dBm, corresponding to the coverage colors displayed on the map)
 - a. Green – Portable coverage on the street;
 - b. Blue – Portable coverage Inside standard structures, up to 10 dB penetration loss;
 - c. Red – Portable coverage Inside heavy structures, up to 20 dB penetration loss, and
 - d. Yellow – Portable coverage inside heavy structures, up to 30 dB penetration loss.

7. For each coverage type (On-Street, 10 dB, 20 dB, 30 dB), Proposers shall state what percentage of each bounded area is covered.. Coverage outside of the Service Area Boundary shall not be included in these numbers.

Land Use/Land Cover Data: A separate map exhibit must be provided showing the land use/land cover (LULC) data used for this project. The source and publication date of the LULC database must be provided. The latest available data is preferred along with a color land use map showing where each use category was used. A table that describes each use category and lists the dB loss value associated with it shall accompany this map.

Simulcast Time Delay Interference: All coverage maps must account for (display) any harmful time delay interference (TDI), AKA delay spread, which may occur in the proposed system configuration if such interference falls within the coverage footprint shown on the map even if it occurs beyond the required coverage contours provided in Section 3.5. This means that forecasted areas of TDI must be clearly shown on the coverage maps in (grey) or be shown as “non-covered” areas. Additionally, a separate TDI map shall be provided solely depicting areas with potential TDI in (grey).

Quantity of Coverage Maps: Maps shall be provided for the composite simulcast system only. Individual simulcast repeater site maps are not required.

3.6 OVERVIEW OF RADIO COVERAGE TESTING PROCESSES

3.6.1 Introduction

Coverage testing shall be conducted as part of the System Acceptance Testing process to verify that the appropriate levels of coverage performance have been provided for the P25 trunked simulcast radio system.

The following two parameters shall be used throughout the DAQ testing:

- All DAQ tests shall be performed in the trunked "Project 25 Phase 2" mode of operation.
- All DAQ tests shall be performed in the clear (non-encrypted) mode.

Radio Coverage Testing Timeline: As part of the response to these requirements, the Proposer shall provide a projected timeline stating the expected duration of the coverage testing process. The Proposer shall include all elements of the testing program from set-up and calibration to the presentation of the final data. Each major task shall be denoted and a time assigned to the task along with the personnel requirements.

Coverage Testing Pricing: The Proposer shall quote a price for the radio coverage acceptance testing as a separate part of the pricing proposal. The pricing shall be segmented as follows:

1. Portable On-Street / Random Building coverage testing
2. Mandatory Building coverage testing

3.6.2 Equipment Preparation and Documentation

All mobile and portable radios supplied by the Contractor for the testing process shall be from the stock to be supplied to Collin County. The Contractor shall present the final design for all test instrumentation to Collin County for approval at least two months prior to starting the test. Collin County and its Consultants reserve the right to disapprove any instrumentation or procedures that do not comply with contractual requirements

or that do not provide valid test results. The Contractor has sole responsibility to provide instrumentation and procedures that are acceptable.

The radio coverage testing process will not begin until the P25 trunked simulcast radio system infrastructure has been properly installed, tested, fully optimized and the Contractor has provided the County a written certification that the system is actually ready for coverage testing to begin. At a minimum, the following items must be tested/measured/certified and reported to the County by the Contractor prior to the initiation of radio coverage testing.

- Repeater / transmitter output power and deviation for each channel
- Effective receiver sensitivity for each channel
- Transmit and receive frequency noise floor sweeps for each channel to identify harmful interference prior to the test
- Repeater antenna time delay reflectometry (TDR), VSWR and return loss sweeps for each antenna
- Measured insertion loss for the entire repeater transmit and receive path from each repeater to the associated transmit and receive antennas
- Noise Floor for each channel on each site
- Current certification of test equipment calibration for all equipment used to verify system performance

The County will review and approve the tests and measurements prior to initiating the Coverage Acceptance Testing program (CATP). The Contractor shall keep thorough records during the equipment testing process and shall provide a permanent record of the testing results to Collin County and its Consultant.

Once coverage testing begins, no adjustments shall be made to the repeaters, simulcast control, receiver voting system, antenna systems, mobile units, portable units, or test instrumentation without Collin County's approval in writing once Collin County has observed appropriate calibration of all units. If such changes are approved, Collin County reserves the right to require that a portion or all of the affected areas be retested.

The Contractor will devise a plan to ensure that well-charged portable batteries are used during all testing.

3.6.3 10 dB and 20 dB Attenuated Portable Radios

The Contractor shall prepare two portable radios, the same model series as those procured, with the following:

- One portable radio shall have 10 dB of attenuation for both transmit and receive operations.
- One portable radio shall have 20 dB of attenuation for both transmit and receive operations.

The attenuators shall not change the overall operation or performance of the radio other than to reduce its ERP and receiver sensitivity by the 10 and 20 dB amounts. The Proposer shall in its proposal describe its method for preparing these attenuated portable radios. The use of these radios in the coverage test is described later in this section.

3.6.4 Test Teams and Configurations

The coverage testing process will be staffed with a number of Dispatch teams located at the dispatch center, and a number of Field teams in vehicles. Collin County will provide staff for the coverage test teams (Dispatch and Field). Proposers in their response shall state the number of test teams required to complete the testing in the time allotted in their schedule for coverage testing. Each Field team will utilize an iPad or tablet computer for recording test results for all test calls. The Contractor shall provide the iPads for the testing event.

Each Dispatch team will be assigned a unique trunked talkgroup and will support two Field teams. The Contractor team will operate and maintain the iPad based record sheets.

The County reserves the right to utilize digital camcorders (provided by Collin County) to record the testing process if desired. County representatives would operate and manage the recording process and file management.

The test teams shall be staffed as follows:

Dispatcher Teams

Dispatch teams will be located at the Collin County Dispatch Center. Some Dispatch teams will utilize a dispatch console, while other Dispatch teams will be equipped with a portable radio (for portable-to-portable test calls). Each Dispatcher team will consist of:

- A Dispatcher – Collin County employee or representative, performs DAQ grading;
- A Test Monitor - Provided by the Contractor, performs DAQ grading, and
- A Test Monitor - Third party, such as the County's Consultant

Field Teams

Each Field team will be equipped with a portable radio. Each Field team will consist of:

- A Driver – Collin County employee or representative, performs DAQ grading.
- A Test Monitor - Provided by Contractor, performs DAQ grading.
- A Test Monitor - Third party, such as the County's Consultant

The Field teams will record all test results, including the grading given by the Dispatch teams.

3.6.5 Service Area Gridding

The Service Area to be tested is the area described earlier in this section. For test purposes, this area shall be divided into approximately 3,600 half-mile square grids.

Coverage shall be tested in all accessible grids. Grids that cannot be accessed will not be counted in the reliability calculation. Collin County may elect to pass certain grids if it is obvious that they are adequately covered. All accessible grids intersecting or contained within the defined coverage area will be tested.

Collin County will have the ability to assert during the coverage test that additional testing be performed in inaccessible grids that cover areas of particular interest. Collin County shall arrange for permission and escorts to enter such facilities.

3.6.6 Tests to be Performed in Each Grid

The Collin County Replacement Radio System coverage test will consist of the following tests in each grid. All tests will be split between the Dispatch teams assigned to dispatch consoles and Dispatch teams assigned to portable radios.

- **Portable On-Street Audio Quality**

Portable On-Street inbound and outbound Delivered Audio Quality (DAQ) tests shall be performed throughout the Service Area. For any given grid, both the inbound and outbound call must pass for the grid to pass. The pass/fail criteria shall be at least DAQ 3.4 and at least 95% area reliability for the area and coverage maps declared guaranteed by the Proposer.

- **Portable in Random Buildings Audio Quality**

In-Building coverage is extremely important to Collin County. Accordingly, the County and its partner agencies have developed a list of buildings shown in Table 3.6a below which is separate from the Mandatory Buildings. All of these buildings shall be tested as part (a subset) of the Random Building test. The procedures for testing these buildings as well as other elements of the Random Building test procedures are described in sections that follow.

In order to test the Proposer's design for in-building coverage, portable inbound and outbound Delivered Audio Quality (DAQ) tests shall be performed in Random Buildings throughout the Service Area. For any given test point, both the inbound and outbound calls (including Dispatch and radio-to-radio calls) must pass for the test point to pass. The pass/fail criteria shall be successful delivery of at least DAQ 3.4 and at least 95% of all random buildings tested pass, with at least 95% of the areas tested in each building passing, for the area and coverage maps declared guaranteed by the Proposer. Some test calls will be made from field personnel to and from Dispatchers with consoles, some will be from field personnel to and from Dispatchers with portable radios to accommodate the radio-to-radio portion of the testing process.

Table 3.6a – Random Buildings to be Tested

Ref #	Facility	Agency	Facility Address
1	Anna Early Childhood Center	Anna PD/FD	601 S. Sherley Ann, Texas 75409
2	Anna Middle School	Anna PD/FD	1201 North Powell Parkway Anna, Texas 75409
3	Joe K. Bryant Elementary	Anna PD/FD	2725 Bryant Farm Road Anna, Texas 754409
4	Anna Middle School	Anna PD/FD	1201 North Powell Parkway Anna, Texas 75409

Ref #	Facility	Agency	Facility Address
5	Sue E. Rattan Elementary	Anna PD/FD	1221 South Ferguson Parkway Anna, Texas 75409
6	Blue Ridge Elementary	CCSO/Blue Ridge FD	425 N. Church Street Blue Ridge, Texas 75424
7	Blue Ridge Middle School	CCSO/ Blue Ridge FD	710 Tiger Pride Circle Blue Ridge, Texas 75424
8	Blue Ridge High School	CCSO/Blue Ridge FD	11020 CR 504 Blue Ridge, Texas 75424
9	Celina Elementary School	Celina PD/FD	550 S. Utah Celina, Texas 75009
10	Celina Intermediate School	Celina PD/FD	507 E. Malone Street Celina, Texas 75009
11	Celina Middle School	Celina PD/FD	706 E. Pecan Street Celina, Texas 75009
12	Celina Junior High School	Celina PD/FD	710 E. Pecan Street Celina, Texas 75009
13	Celina High School	Celina PD/FD	3455 N. Preston Road Celina, Texas 75009
14	Hart Elementary School	CCSO	450 Country Club Road Lucas, Texas 75002
15	Lovejoy Elementary School	CCSO	256 Country Club Road Fairview, Texas 758002
16	Puster Elementary School	CCSO	856 Stodard Road Fairview, Texas 75069
17	Sloan Creek Intermediate School	CCSO	440 Country Club Road Fairview, Texas 75069
18	Willow Springs Middle School	CCSO	1101 West Lucas Road Lucas, Texas 75002
19	Lovejoy High School	CCSO	2350 Estates Parkway Lucas, Texas 75002
20	Tatum Elementary	Farmersville PD/FD	405 N. Washington Street Farmersville, Texas 75442
21	Intermediate School / Farmersville	Farmersville PD/FD	807 N. Main Street Farmersville, Texas 75442
22	Junior High School / Farmersville	Farmersville	501 Hwy 78 N.

Ref #	Facility	Agency	Facility Address
		PD/FD	Farmersville, Texas 75442
23	High School / Farmersville	Farmersville PD/FD	499 Hwy 78 N. Farmersville, Texas 75442
24	NeSmith Elementary / Community ISD	CCSO/Nevada FD	801 Presidents Blvd Lavon 75166
25	McClendon Elementary / Community ISD	CCSO/Nevada FD	601 FM 1138 North Nevada, Texas 75173
26	Edge Middle School / Community ISD	CCSO/Nevada FD	615 FM 1138 North Nevada, Texas 75173
27	Community High School	CCSO/Nevada FD	620 FM 1138 North Nevada, Texas 75173
28	Melissa Ridge Intermediate School	Melissa PD/FD	3233 W. Fannin Road Melissa, Texas 75454
29	Melissa Middle School	Melissa PD/FD	2950 Cardinal Drive Melissa, Texas 75454
30	Melissa High School	Melissa PD/FD	3150 Cardinal Drive Melissa, Texas 75454
31	Harry McKillop Elementary	Melissa PD/FD	3509 Liberty Way Melissa, Texas 75454
32	Princeton High School	Princeton PD/FD	1000 E. Princeton Drive Princeton, Texas 75407
33	Clark Junior High School	Princeton PD/FD	301 Panther Parkway Princeton, Texas 785407
34	Huddleston Intermediate School	Princeton PD/FD	301 North 5 th Street Princeton, Texas 75407
35	Godwin Elementary School	Princeton PD/FD	1019 North 6 th Street Princeton, Texas 75407
36	Harper Elementary School	Princeton PD/FD	8080 CR 398 Princeton, Texas 750407
37	Lacy Elementary School	Princeton PD/FD	224 East College Street Princeton, Texas 75407
38	Special Programs Building	Princeton PD/FD	300 Mabel Avenue Princeton, Texas 75407
39	Multi-iPurpose Building	Princeton PD/FD	960 Bois D'Arc Princeton, Texas 75407
40	Bodwell C.A.T.E.	Princeton	301 N. 5 th Street

Ref #	Facility	Agency	Facility Address
		PD/FD	Princeton, Texas 75407

- **Outbound Signal Level and Bit Error Rate**

Outbound Signal Strength and Bit Error rate (BER) testing shall also be performed throughout the Service Area for informational purposes. Below is a synopsis of a suggested methodology.

1. For Signal Strength testing, a mobile radio is utilized to capture received signal level dBm for every grid. The signal level for each grid will then have the 10 dB and 20 dB attenuation applied to each grid measurement to establish the projected “target” signal level for a portable worn on the belt with a belt clip, with 20 dB of additional de-rating applied in 20 dB grids, and 10 dB of additional de-rating applied in 10 dB grids. Proposers shall state in their proposal the “target” dBm values.
2. For BER testing, two separate mobile radios are utilized, one for 20 dB In-Building areas and one for 10 dB In-Building areas. Each mobile shall have an attenuator in-line to accurately represent the de-rating required for a portable worn on the belt with a belt clip, with 20 dB of additional de-rating applied in one mobile radio, and 10 dB of additional de-rating applied in the second mobile radio. Proposers shall state in their proposal the “attenuator dBm values” for each BER mobile.

A complete description of the testing instrumentation shall be provided in the Proposer’s proposal. Additionally, the Proposer shall indicate what type of signaling is being used for the talk-out BER signal test and its origin (generating source). At the minimum, the signal level testing shall be done with automated test instrumentation installed in the vehicle. The test package shall automatically record the position of the test vehicle (by means of GPS positioning) at the time of a reading, and record the signal strength/BER. The signal shall be measured in such a manner to allow for at least 500 signal samples to be taken over 40 wavelengths for each test grid, with the sampling rate adjusted for the vehicle’s speed. The mobile antenna for the test package shall be a quarter-wave antenna with magnetic mount and shall be mounted on the trunk deck of the vehicle.

3.6.7 Tests to be Performed in Mandatory Buildings

Portable inbound and outbound Delivered Audio Quality (DAQ) tests shall be performed throughout the Mandatory Buildings listed in the Mandatory Buildings table above. For any building listed that is actually multiple unattached structures (a campus, parking garage, etc.), all structures in the location shall be tested, and the 95% requirement shall be treated independently for each “structure.”

The pass/fail criteria for these buildings shall be successful communications with a minimum DAQ 3.4 for 100% of all buildings (structures) tested, and 95% of each building’s (structures) test locations. The Mandatory Buildings coverage is deemed to meet the coverage requirements if all of the Mandatory Buildings are scored as pass.

3.6.8 Test Procedures

- **Test Calls**

Upon entering each grid, test calls are placed to and from Dispatch teams and Field teams for each of the tests. The field team test message shall consist of identification of the location being tested, as well as a

short message representative of typical public safety call durations (approximately 8-15 words from a periodical or magazine.). The test message response from the dispatch team will consist of 8 – 15 words from a periodical or magazine.

Each successful test point must deliver audio quality of at least DAQ 3.4 both in the inbound and in the outbound directions. For any given test point, both the inbound and outbound call must pass for the test point to pass. A failure in either the inbound or outbound direction will constitute a failed test call, subject to a test retry.

• **Portable on Street and Random Buildings Test Procedures**

Upon entering a grid, the Field Team will:

1. Determine if a building listed in Table 3.6a is contained within the grid. If yes, then that will be the Random Building selected for the grid.
2. If the grid does not contain a building listed in Table 3.6a, then the team will determine if the grid is in any City Limits (must test a 20 dB Building) or outside of any City Limits (must test a 10 dB building).
3. The team will locate a Random Building that is consistent with the characterizations given in Table 3.6b below for the appropriate Random Building category.
4. If the team is within a City Limits and there is not a 20 dB category building in the grid, then the team shall attempt to locate a 10dB category building in which to perform the test. Teams shall avoid testing in buildings like those characterized in the 30 dB category.
5. If no Random Building can be found by the test team for a grid, then the test team shall perform an inbound and outbound Audio Quality test using the appropriate “Attenuated Portable Radio” and record the results. This test will then serve as the Random Building test for that grid.

Table3.6b – Random Building Characteristics

Building Category	Examples of Buildings
Random Buildings with 10 dB or less of loss	<ul style="list-style-type: none"> • Convenience store • Valero, Shell, Chevron, etc. gas station • Strip Center with large windows • Restaurant with large windows
Random Buildings with 20 dB or less of loss	<ul style="list-style-type: none"> • Strip Center with no windows • Multi-story building with windows • Middle & Elementary Schools • Bank Building • Home Depot, Lowes, Wal-Mart
Random Buildings with 30 dB or less of loss	<ul style="list-style-type: none"> • Multi-story building with small or few windows • Mall Department store • Multi-story Hospital • Large concrete or heavily constructed building

The Field Team will first perform the Portable On-Street Audio Quality test outside of the selected random building, and then proceed to perform the Portable in Random Building Audio Quality test. Upon entering the Random Building, the testing will be conducted as described in Table 3.6b below:

Table 3.6c - Random Building Test Procedure

The building's lowest indoor floor that is completely above ground level will be tested. Test points will include at least one point at each of the furthest accessible locations in the four corners, and one in the center of the floor.

Beyond the initial five test points, additional test points evenly distributed throughout the floor shall be tested so that there is no more than 100 foot spacing between test points. The results of each test point shall be recorded separately and may utilize a retry if necessary as described below. All test locations will be above ground level.

- If more than 5% of the test points fail, then the building will be more thoroughly tested by performing a test with minimum of 20 test points, evenly spread throughout the first floor, following a 50 foot spacing guideline. If more than 5% of the test points still fail, then additional test points may be performed on each floor. If the more thorough test results in an overall failure rate of more than 5% (2/20, 2/30, 3/40, etc.), then the Random Building is scored a fail.

If any building listed in Table 3.6a has multiple unattached structures (a campus, parking garage, etc.), all structures in the location shall be tested, and the 95% requirement shall be treated "collectively" for all structures, resulting in one pass/fail record for that Random Building.

If there is more than one building listed in Table 3.6a contained within a grid, then all will be tested as part of the Random Building test process. However, only the building closest to the center of the grid will count in the pass/fail calculation. The other building(s) will be tested and results presented for informational purposes only so the agencies are aware if any coverage issues exist within these facilities.

Any Random Building test points that fail must be recorded with a location description sufficient to go back to that same failed point at a later date.

- **Mandatory Buildings Test Procedures**

Upon entering the Mandatory Building, the testing will be conducted as described in Table 3.6c below. Test points shall include all areas of the building. Basements, multi-level basements, stairwells, and parking garages will all be included as test locations.

Collin County may pass a building prior to completion of its testing if it is obvious that the building is adequately covered.

Table 3.6d - Mandatory Building Test Procedure

The buildings listed as "Mandatory Buildings" shall be tested for 95% reliability. Valid test points shall include all areas of the building. The building's lowest two floors (even if one or both are basements or parking garages) will be tested. Each floor shall have at least 20 test points, with at least one point at each of the furthest accessible locations in the four corners. Beyond the initial twenty test points, additional test points evenly distributed throughout each floor shall be tested so that there is no more than 50 foot spacing between test points.

Elevators, basements, and stairwells must also be included as test locations. Parking garages, if part of the Mandatory Building property, shall also be tested. The results of each test point shall be recorded separately and may utilize a retry if necessary as described below.

If after testing the lower two floors for any specific building (or group of attached buildings), there are more than 5% test point failures, a more thorough test will be required. At this time the next floor, moving up, will be tested following the same test point procedures.

If more than 5% of the cumulative test points on the last two floors still fail, then the next floor, moving up, will be tested. This process of moving up and testing additional floors will continue until:

The cumulative failures are 5% or less - or - All floors have been tested

- **Test Retry**

Each portable failed radio test point will be allowed a retry. In the event that the first On-Street, Random Building, or Mandatory Building test point is unsuccessful, the Field team will be permitted a second (final) attempt, within five (5) feet from the previous test. If the final attempt to communicate fails (no access or audio quality below DAQ 3.4), that test location will be deemed a failure. A successful final attempt will be considered a successful retry.

If a test team realizes that a particular voice test was unsuccessful due to operator error (i.e. volume set too low, not speaking into microphone, on wrong talkgroup, etc.), then the test team will correct the operator error and perform the test again. Such an occurrence would not be counted as a retry.

All retries will be counted. The number of successful retries counted as a “pass” may constitute no more than 5% of the test grids for any of the DAQ tests.

- **Test Grading**

There will be two DAQ graders for each Dispatcher team and two for each Field team, one from the County and one from the Contractor. The third party representative is observing and recording the testing with a camcorder, as well as serving as a test monitor. The Contractor is serving as the record keeper and navigator. If both graders agree that the voice quality does not meet the defined DAQ 3.4 criteria, then that test location fails, and a retry shall commence. All test grading shall be recorded on templates devised for the iPads. Upon making an entry, recorded results will be cross-checked by a different team member.

If a DAQ score differs between the two testers on the same test team and results in a failing score from only one tester, then the third party representative will cast a decisive vote.

- **Daily Data Collection**

At the end of each test day, the Contractor shall provide a copy of all recorded test data (i.e., iPad Files and raw data), to Collin County or their representative. Any special software (software not commercially available) required to read the test results shall be provided to Collin County.

3.6.9 Protection from Excessive Grid Failures in a Particular Area

It is unacceptable to implement a radio system that has an unusually high number of failed grids within a particular area, while still meeting the overall coverage reliability goals. Proposers shall devise and include in

their responses a methodology and plan of ensuring that the County is protected from the scenario of having an unusually high number of failed grids within a particular area. One such methodology that has been accepted and effective in the past is some adaptation of the "Supergrid" concept.

If during the process of performing the coverage test, the test management team determines there are an unusually high number of failed grids within a specific vicinity, then the test management team shall halt testing in that area and attempt to diagnose the issue for potential radio system infrastructure problems, portable radio issues, etc.

3.6.10 Results Preparation

After all testing has been completed; the Contractor will evaluate the test results by compiling all of the data gathered for each test scenario. The Contractor will provide a summary of the test results and the extent to which the following were successful:

- A minimum of 95% of grids passed the Portable On-Street Audio Quality inbound and outbound tests with a DAQ of 3.4 or higher.
- A minimum of 95% of Random Buildings evaluated passed, with 95% of each building's inbound and outbound test locations having a DAQ of 3.4 or higher. The results of grids without a Random Building that utilized the "Attenuated Portable Radio" will also be included in this calculation. If the Random Building test reliability does not meet the 95% reliability requirement, the Contractor shall have the ability to conduct alternate tests for any failed Random Buildings utilizing the "Attenuated Portable Radio" to perform inbound and outbound Audio Quality testing. In this case, one location will be selected near the building at which to perform the test. The results of this alternate test will then replace the failed Random Building test.
- For the Mandatory Buildings, 95% of each building's (or each structure, if a Mandatory Building has multiple unattached structures) test locations passed with a DAQ of 3.4 or higher.

The formula for calculating Area Reliability for each test configuration shall be as follows:

$$\% \text{ Area Reliability} = \left[\frac{\text{Passed Test Points (no retry)} + \text{Passed Test Points (retry}^*)}{\text{Total Tested Points}} \right] \times 100$$

** Successful retries may constitute no more than 5% of the test points in any given test.*

SECTION 4 – COMMUNICATIONS SITES

4.1 PREFERRED COMMUNICATIONS SITES

Collin County currently has four (4) repeater sites in operation. All four of these sites shall be used as P25 simulcast repeater sites in the Proposer's system design, along with seven (7) additional sites as indicated below. Proposers shall produce maps showing their predicted coverage as detailed in Section 3 for this eleven (11) site (no more and no less) simulcast system.

Some of the current facilities at these sites may be used for the new P25 system. Table 4.1b states what facilities shall be reused in the Proposers design, versus what needs to be proposed as new. If the Proposer is confident that any existing shelters may be reused in their design, the utilization of the existing shelter(s) may be proposed as a cost reduction option in the Pricing section. The existing shelters must be used in their system design with no detriment to the system performance, and under the same maintenance and warranty policy as would be provided if the facilities were being replaced. As noted previously, the County's current trunked system must remain in full operation until the new P25 system has been installed, optimized, acceptance tested, and placed into normal day-to-day operation, so the shelter's electrical and HVAC systems must support both the old and the new systems for a period of time.

	Site	Location	Tower	Shelter	Generator
1	Wilmeth Road	33 13 51 96 37 07	Existing 420' SS Proposers may use existing tower for new system.	Existing 32' x 12' New Shelter required.	250KW Diesel, 360 Gal Tank Proposers may use existing generator for new system.
2	Farmersville	33 10 33.9 96 22 18.5	New 300' Self-Supporting Tower required.	New Shelter required.	New generator required
3	Copeville	33 04 46.4 96 24 58.9	Existing 180' SS New 300' Self-Supporting Tower required.	Existing 16' x 12' New Shelter required. (Proposers should consider using existing shelter as a cost reduction option only)	50KW Diesel, 120 Gal Tank Proposers may use existing generator for new system.
4	Verona	33 16 41.2 96 26 51.7	Existing 400' Guyed. Proposers may use existing tower for new system.	Existing 16' x 12' New Shelter required. (Proposers should consider using existing shelter as a cost reduction option only)	50KW Diesel, 120 Gal Tank Proposers should use existing generator for new system.

5	Celina	33 20 57 96 45 08	Existing 338' Guyed. Proposers may use existing tower for new system.	New Shelter required. (Proposers should consider using existing shelter as a cost reduction option only)	50KW Diesel, 120 Gal Tank Proposers should use existing generator for new system.
6	Allen	33 05 10 96 37 45	Existing 180' Water Tower Proposers may use top of water tower for new system's antennas.	New Shelter required.	New generator required
7	Anna	33 21 50 96 33 26	New 350' Self-Supporting Tower required.	New Shelter required.	New generator required
8	Plano – Comm Pkwy	33 04 11 96 49 48	Existing 250' Guyed. Proposers may use existing tower for new system.	New Shelter required.	New generator required
9	Plano – Avenue N	33 01 01 96 41 39	Existing 250' Guyed. Proposers may use existing tower for new system.	New Shelter required.	New generator required
10	Princeton	33 11 25 96 30 05	Existing 180' Water Tower Proposers may use top of water tower for new system's antennas.	New Shelter required.	New generator required
11	West McKinney	33 11 18 96 45 11	Existing 180' Water Tower Proposers may use top of water tower for new system's antennas.	New Shelter required.	New generator required

4.2 GENERAL REQUIREMENTS

1. The Contractor will be responsible for all site development required in this document.
2. The Contractor shall provide 2 printed copies and 2 complete electronic copies of all site development documents to the County.
3. The Contractor shall perform all work necessary to provide the required site development documents for approval by the County (or the cities when in an incorporated area) for the development of repeater and microwave sites that meet all City, County, State and/or Federal requirements. The documentation shall provide the necessary antenna mounting structures, equipment rooms or shelters and all required environmental conditioning, security, power, standby power, access roads, foliage control, lighting, and cable support structures.
4. The Contractor shall be responsible for preparing specifications and site development documents for a complete and fully operable installation which shall be in compliance with the latest version of
 - The National Electrical Code

- Local building codes
- Environmental laws
- Zoning and planning regulations or ordinances
- Land use restrictions
- FAA and FCC rules and regulations
- State, City, and County regulations governing road access and entry
- OSHA guidelines
- All other applicable local, state or Federal codes, regulations, laws and/or ordinances.

The Contractor shall prepare all specifications, plans, documents, and required forms and exhibits required to obtain the necessary approvals from each of the above entities.

5. Materials specified by the Contractor shall be new and of high quality as defined in relevant industry standards. The Contractor shall not make substitutes unless prior written approval has been obtained from the Collin County team.
6. The Contractor will be required to assume full responsibility for the specification of materials and equipment employed in construction of the project and agrees to make no claims against any of the County/Cities for damages to such materials and equipment except for that which is caused by the County/Cities involved, their employees or agents. The Contractor shall be responsible for managing the storage of all materials that they purchase or that they receive from the County/Cities and shall receive all delivered items by suppliers at the job site or at a staging area (to be provided by the Contractor).
7. The Contractor shall oversee clean up and remove from the work site on (at least) a daily basis all rubbish and construction debris, resulting from his own and/or from the site development contractor's work. The Contractor shall supply a dumpster or similar trash storage/removal device when the amount of construction debris generated exceeds a normal trash can volume. Upon completion of all work, the entire job site areas shall be left clean and free of trash, debris, mud, dirt, dust, scrap materials, and excess materials. Floors in radio equipment shelters and rooms shall be clean, mopped and polished to the satisfaction of the County team upon completion of installation and construction work.
8. The Contractor shall coordinate the work of the site development contractor(s) to ensure that interference between electrical conduits, cable support trays, grounding wire, structural members, and radio system work shall be avoided so that the project is completed within budget, in a professional manner, and on schedule.
9. The Contractor shall maintain up-to-date marked-up prints of the Project Drawings. Markings indicating changes to the drawings shall be red or green and clearly visible. Two (2) complete printed and bound sets of "As-built" drawings shall be furnished to the County team at the completion of the project. Two (2) electronic sets of "As-built" Project Drawings shall also be supplied on DVD media reproducible in AutoCAD in both DXF and DWG formats (latest release).
10. All sites shall be implemented and/or upgraded if necessary to meet these grounding, lightning, and surge protection specifications. For sites where existing equipment shelters and/or existing towers are to be used, and for the existing dispatch sites, Proposers shall include in their proposal all costs

for any upgrades required to meet these specifications and any other specifications required by the Contractor to warranty the system.

11. Standard requirements for the installation of radio communications sites shall include the adherence to the following standards (at a minimum). :

- a. **T1.334-2002**, *Electrical Protection of Communications Towers and Associated Structures*
- b. **T1.313-2003**, *Electrical Protection for Telecommunications Central Offices and Similar Type Facilities*
- c. **T1.333.2001**, *Grounding and Bonding of Telecommunications Equipment*
- d. **ANSI-J-STD-607-A-2002**, *Commercial Building Grounding and Bonding Requirements for Telecommunications*
- e. **ANSI/NFPA 780-2004**, *Standard for the Installation of Lightning Protection Systems*
- f. **Motorola R56**, *Standards and Guidelines for Communications Sites*
- g. **NEC**, *National Electrical Code*

In any instance where requirements differ between these standards, the most stringent shall apply.

12. A component of the system acceptance test plan to be monitored by the Contractor and the County will be the testing of all grounding systems installed, or utilized, for equipment associated with this procurement. This includes grounding at all base stations, control stations, communication centers, microwave terminals, and repeater sites associated with this procurement.
13. All grounding systems shall be tested before commercial power is connected to the site using an AEMC or equivalent clamp-on ground resistance tester or Biddle 500V Null Megger or equal (3-terminal fall-of-potential method). The resistance to ground of all tie-in connections to the building's ground sources shall measure 5 Ohms or less under all conditions.
14. Ground tests shall be conducted in the presence of a County team representative, and results shall be recorded on a form approved by the County team. These forms shall be included as a part of the acceptance test documentation and are a component of final acceptance of the radio communications system.
15. Electrical equipment such as UPS, generator sets, A/C (air conditioning units), heater, etc. shall be wired in accordance with the manufacturer's wiring diagrams furnished with the equipment and applicable codes.
16. The County team will assist in arranging for commercial power installation to a meter located within fifty (50) feet of each simulcast repeater/microwave radio site. The agency involved will negotiate a utility easement or right of way, if needed, at each site.
17. The Contractor is responsible for all power installation on the equipment side of the meter. Power feeds to shelters shall be buried and shall enter the building through conduit and an elbow described in the equipment shelter specification.

4.3 SCOPE OF WORK

4.3.1 General Contractor Responsibilities

The Contractor shall be responsible for preparing plans and specifications for the following:

1. Procurement or furnishing of all services, and furnishing and installing all materials, necessary to complete the site development work.
2. Submittal for approval of all details, cuts, plans, and drawings of sites, site related equipment, and security/access control systems.
3. Monitor disposal and removal from the site, of all debris and refuse that results from performing the work.
4. Applications for and obtaining all required permits, including but not limited to, frequency coordination, FCC licensing, FAA submittals and approvals, building, electrical, soil disturbance, environmental issues, fire protection, fuel permits and safety permits.
5. Compliance with all applicable laws, codes, ordinances, and regulations in accordance with the requirements set forth in the specifications.

4.3.2 Sites at Which New Construction is Required

1. The standard configuration for sites will:
 - a. Serve as a base / repeater site for the trunked radio system;
 - b. In some cases, house mutual aid channel base repeaters;
 - c. House conventional VHF or UHF base stations / repeaters used for alerting or mutual aid purposes;
 - d. Support a new digital microwave system to interconnect the simulcast and dispatch sites;
 - e. Provide sufficient expansion capability to support future growth or new technologies, and
 - f. Sufficient additional space will be provided on the tower and in the radio equipment shelters (if new) to permit additional uses by the County. See tower and shelter specifications that follow for growth allocation details.
2. Generally the plans and specifications for site development work to be performed by the Contractor at each site (where existing facilities will not be used) includes of the following:
 - a. Prepare and submit plans for site civil improvements;
 - b. Furnish and install an electronic equipment shelter and appropriate concrete foundation;
 - c. Furnish and install a self-supporting communications tower and necessary base foundations;
 - d. Install electrical service into the radio equipment shelter;
 - e. Construct concrete walkways and ramps to the shelter entrance;

- f. Perform site preparation and improvements, including road improvement, grading, installation of fencing, installation of the grounding and surge suppression system;
- g. Furnish and install a standby power generator, automatic transfer switch, and full fuel supply;
- h. Furnish and install an uninterruptible power supply to provide power conditioning and standby service to critical electronic equipment
- i. Furnish and install a site alarm system including sensors, transducers, detectors and contacts all of which is to be properly connected to the alarm monitoring points.

4.3.3 Sites That Will Utilize Existing Towers and/or Equipment Shelters

1. Proposers are responsible for assessing existing tower site suitability, including any necessary upgrade or replacement costs in their proposals.
2. For all sites where existing towers/structures are to be used, prior to placing any equipment on the tower/structure, the Contractor will commission a structural analysis to be performed on the tower by a registered Professional Engineer experienced in radio communications tower design. The structural analysis shall demonstrate that the Contractor's installation plans comply with relevant revisions and sections of TIA/EIA-222G standards.
3. For all existing equipment shelters that the Proposer elects to use in the new radio system, the Proposer shall evaluate the existing HVAC units for suitability, and provide upgrade and/or replacement HVAC units as needed.

4.3.4 Electromagnetic Compatibility Studies

1. The Contractor is required to perform an Electromagnetic Compatibility study for each site at which equipment associated with this procurement will be installed. The study shall consider the effects of transmitter and receiver intermodulation, transmitter noise, and receiver desensitization between and among existing and proposed stations. The output of this study and recommendations shall be provided to the County team for review and approval, and shall be factored into the system design.
2. The Proposer shall provide transmit to transmit and transmit to receive antenna system isolation requirements for their system. Proposers shall indicate the amount of isolation that will be achieved by their design at each radio site.

4.3.5 Electromagnetic Emissions Exposure

1. All sites, whether existing or proposed, shall be designed, protected and posted by the Contractor to limit exposure to electromagnetic emissions (EME) in accordance with the Federal Communications Commission's (FCC) Bulletin OET-65 (Appendix D or most recent regulation adopted by the FCC), the Federal Communications Commission's exposure to Radio Frequency Electromagnetic Emissions.
2. The Contractor shall certify compliance with the Federal Communications Commission's (FCC) Bulletin OET-65 (Appendix D or most recent regulation adopted by the FCC). RF exposure limits at each site shall be evaluated, a paper study of the electromagnetic emissions produced by any or all of the antennas mounted thereon shall be conducted by the Contractor, verified and sealed by a registered Professional Engineer who is experienced in non-ionizing electromagnetic radiation

protection. The County team will review all site EME studies to evaluate compliance with the maximum permissible exposure (MPE) requirements of FCC Bulletin OET-65, the Federal Communications Commission's exposure to Radio Frequency Electromagnetic Emissions.

3. The Contractor's study shall define the total radiation levels possible based on both the proposed and existing antennas at the site. The Contractor's study should verify that the expected levels are within the MPE levels as specified in FCC Bulletin OET-65, the FCC Exposure to Radio Frequency Electromagnetic Emissions.
4. Should the study establish that the expected levels exceed the MPE, the Proposer shall bring the site into compliance at no additional cost to the participating agencies while maintaining the required radio system performance levels, particularly radio coverage.
5. Under no circumstances shall the levels outside of the site boundaries (i.e., site fenced area) exceed the MPE exposure levels for public exposure.
6. Once the system is on-the-air, the Contractor shall be expected to provide the services and equipment necessary to verify that the site is in compliance with EME emission levels as stated in FCC Bulletin OET-65 and then submit an RF Radiation Exposure Compliance certificate to the City's Project Manager.
7. The Contractor is responsible for posting all required signs for identification of the various threats of exposure. Posting of required signs by the Contractor will be done only after approval of the County team.

4.4 TOWER SITE WORK

4.4.1 General Contractor Responsibilities

The following tasks are specified for any site at which tower erection, modification, or equipment shelter installation is required. Plans and specifications for site work include:

1. Clearing, earthwork, excavating, backfilling, compacting and grading
2. Construction of access roads and drainage, including installation of stone base surfacing and erosion control measures
3. Installation of fencing and security gates
4. Foundation design and installation
5. Delivery and installation of shelters, including sidewalks, ramps, grounding systems, security systems, and ancillary equipment.
6. Delivery, installation, and commissioning of generators and fuel tanks, including completely filling the fuel tanks with fresh fuel.
7. Construction of towers as specified, including soil exploration, geotechnical reports, foundation design and construction, tower marking and lighting, grounding, and installation of antennas, transmission lines, cable ladders, waveguide bridges, anti-climbing devices, climbing ladders or step

bolts, and related equipment as well as any required environmental assessment and remediation needs.

8. Coordinate installation of commercial electrical power to the site
9. Permits and approvals required for site work
10. Proper signage including but not limited to emergency contact information, Antenna Structure Registration number, MPE signage, etc.

4.4.2 Stone Surfacing

The plans and specifications for site development prepared by the Contractor shall include the installation of stone surfacing within the fenced-in site area. Material shall be 1" broken stone with 10% binder material. Two layers of polypropylene liner shall be installed under the stone for foliage suppression. Prior to installation of any material, an EPA approved defoliant shall be applied over the area.

4.4.3 Fencing

1. Perimeter fencing shall be supplied at the new sites. The fencing shall surround both the tower and the shelter at the Melissa and Farmersville sites, but only surround the shelter at the water tower sites.
2. The Contractor shall supply a perimeter fencing system complete with all hardware, posts, rails, unions, security mesh panels infill panels to be expanded metal, 3/4" x 9 gauge, one (1) each walk through swing gate, one (1) each drive through slide gate and accessories necessary for a complete and aesthetically balanced installation. The fencing system and gates must come as a complete unit produced by a single manufacturer, including necessary erection accessories, fittings and fastenings.
3. The Contractor shall provide a fencing system design with the layout, locations, components, materials, dimensions, sizes, weights, finishes of components, installation and operational clearances, gate swings, post sizes, spacing and mesh type, gate details/dimensions, details of post anchorage, and post attachment/bracing. The design shall be certified by an engineer registered in the State of Texas. The fencing system, foundation and installation shall be engineered to withstand a sustained 90 mph wind load.
4. Fence posts shall be properly bonded to the site grounding system using an exothermic welding process (Cadweld).
5. The selected fence installation company must be trained and certified in the installation of all specified brands of equipment that make up the site fencing.

4.4.4 Security Equipment Requirements

Collin County is interested in equipping all repeater sites, both existing and new, with the security systems described below.

1. **Intrusion Alarm System:** Door contacts shall be included that are connected to the site alarm system that indicate when the door has been opened. These contacts shall be placed on every door of the new equipment shelter.
2. **Lighting:** There shall be dual floodlights with motion detection mounted on all 4 corners of the radio equipment building facing down each side.
3. **Closed-Circuit Television (CCTV) System:** Fixed position, color, digital CCTV cameras are to be installed at various locations inside and outside the shelters and areas at locations to be determined by the Contractor, and approved by the County. The cameras shall have the ability to capture and store images from cameras digitally to a digital video recorder as specified below.

Digital video recorders (DVR) shall:

- Include a monitor, and be placed within the shelter at a location determined by the Contractor, and approved by the County.
- Have the ability to record all cameras simultaneously with a storage capacity for a minimum of one year of recording. This storage can be internal, external or a combination of both in order to accommodate one year of data.
- Permit simultaneous recording and live viewing of cameras both offsite via password protected internet access and on site on a monitor provided with system.
- Permit simultaneous recording of cameras while viewing previously recorded images.
- Permit multiple cameras to be viewed simultaneously on a single monitor.
- Have the capability to be securely managed remotely over the internet through a web browser.
- All materials and equipment shall be standard, regularly manufactured equipment. All systems and components shall be thoroughly tested and proven in actual field use.
- Be IP-based and adhere to H.264 compression standards, and record in CIF, 2CIF, and 4CIF resolution
- Have archive/export capability to a DVD and external USB device.
- Feature a standard format which can be viewed on a laptop PC with the Microsoft Windows 7 operating system.

Cameras shall:

- Be high-resolution; Proposers shall provide the image resolution of each camera proposed.
- Be enclosed in weatherproof housings which incorporate vandal resistant features (for those to be installed outdoors)
- Cameras shall have day/night viewing capabilities. Proposer shall provide detailed explanation of night vision capabilities
- Camera mounting shall be reviewed with the County prior to installation.
- Be installed with cabling and cross connection to provide complete circuit from camera location to DVR head-end

4.5 TOWER SPECIFICATIONS

4.5.1 Reference Standards

Unless otherwise modified herein, materials, design and construction procedures shall be in accordance with Electronic Industries Association (EIA) Standard EIA-222-G (or latest version), Federal Aviation Administration (FAA) Advisory Circular AC 70/7460-1K or latest version, applicable ASTM concrete standards and all applicable codes.

4.5.2 Submittals

1. The Contractor shall prepare and submit for approval plans, specifications, scale drawings of the tower depicting its overall height, the number and height of sections, the horizontal spread of each section, guy points (if applicable), antenna loading at specified heights and obstruction lighting details.
2. The Contractor shall submit for approval a profile view of the tower, containing structural details and engineering notes.
3. Drawings shall be sealed by a Registered Professional Architect/Engineer (structural) licensed for practice in the State of Texas.

4.5.3 Radio Tower Basic Requirements and Loading

1. **Materials:** All steel materials used in the construction of the towers shall be new, shall be rated for their intended purpose, and shall conform to the provisions of EIA-222-G (or latest version) with respect to physical properties, manufacture, workmanship and factory finishes.
2. **Height:** As specified in Table 4.1.1b above, self-supporting towers with a height of 350 feet at Melissa and 300 feet in Farmersville shall be erected.
3. **Loads and Stresses** - The design of the tower shall take into account dead and live loads induced by the structure itself and all appurtenances, and all stresses applied to the tower and its appurtenances by wind forces. The minimum safety factors listed on EIA-222-G (latest version) shall apply under the most severe combination of dead load plus live loading. Each new tower shall be designed and constructed as a **Class III** tower in accordance with EIA-222-G.
4. **Appurtenances** - Appurtenances include, but are not limited to, the following: antennas, antenna mounts, antenna platforms, microwave antennas and radomes, tower-top amplifiers, lighting, transmission lines, transmission line hangers, cable ladder, climbing ladder and safety device, lightning rods (air terminals) and conductors, conduit, waveguide bridge, lighting control, and ice shields.
5. **Antenna & Transmission Line Loading for Simulcast Repeater Site Towers** - New radio towers that accommodate simulcast repeater sites shall be designed to support at a minimum the following:

Table 4.5.3a – New Repeater Site Tower Loading Minimum Requirements

Qty	Description	Part Number or Equivalent	Coaxial Cable Size / Type	Planned Usage
2	700/800 Transmit Antenna	RFS BMR10A	1 5/8" / LDF7-50A	Based on System Design
2	700/800 Receive Antenna	RFS BMR10A	1 1/4" / LDF6-50A	Based on System Design
2	VHF Omni-Directional Antenna	Comm-Scope DB224	7/8" / LDF5-50A	Future
2	6 GHz Microwave Dish (10') with Ice Shields	UHX10-59-P3A	CommScope EW90	Based on System Design
1	700/800 Tower-Top Amplifier with Test Port	429B-83H-01	1/2" / LDF4-50A	Based on System Design
3	900 MHz Scada Directional Antennas	RFS-10108-2	7/8" / LDF5-50A	Future
2	12' Face Sectorized Antenna Mount	C10-856-801	N/A	Future
24	Cellular Panel Antennas	932DG65T2EKL	7/8" / LDF5-50A	Future

**Actual Mounting heights based on Proposer's System Design*

6. **Antenna & Transmission Line Loading for Non-Simulcast Repeater Sites** - Any non-simulcast sites, such as dispatch sites with microwave radio, may require a new tower, monopole, or building-top structure. These towers or monopoles must meet the following minimum loading requirements:

Table 4.5.3b – New Non-Repeater Site Tower/Monopole Loading Minimum Requirements

Qty	Description	Part Number or Equivalent	Coaxial Cable Size / Type	Planned Usage
N	Microwave Dishes	Required for System Design		
2	Microwave Dishes Mounted @ 50% Height	PAD6	E60	Future
2	700MHz YAGI Mounted @ 40% Height	SY406-SF7SNF	7/8" / LDF5-50A	Future
2	700/800 Transmit Antenna Top Mounted	Sinclair SC412	1 1/4" / LDF6-50A	Future

7. **Wind Loading** - The structures shall be designed for horizontal wind pressures induced by 120 MPH basic wind speed with all appurtenances installed. Wind loading shall be calculated per EIA-222-G (latest version).
8. **Ice Loading** - The structures shall be designed per EIA-222-G (latest version) to withstand additional horizontal wind pressures and dead loading produced by the accumulation of ½" thickness of radial ice.
9. **Tower Twist, Sway and Displacement** - Each tower shall be designed to meet twist, sway and displacement specifications for all loading conditions as recommended by EIA-222-G (latest version) for the tower loading specified.

4.5.4 Transmission Line Support

1. Transmission lines shall be installed to minimize tower face wind loading. Andrew Cluster Mount 207030 or equivalent shall be used. The cable support shall be of galvanized steel construction, and shall have mounting hardware of stainless steel or galvanized steel construction. No drilling of the tower legs or cross bracing shall be required to install the cable support device.
2. Transmission lines shall be attached to the transmission line cable support using stainless steel hangers and adapters of the appropriate size for the transmission line supplied. Andrew Model 206706-1,2,3,4 snap-in kits (or equivalent) shall be used to attach the cable to the transmission line support.
3. Transmission lines shall be supported on the tower or ice bridge at intervals specified by the cable manufacturer but in no cases at intervals of more than six feet, or a smaller interval as indicated for the wind speed design of the tower with ½" radial ice. (7/8" Andrew LDF5-50A, if used, shall be supported at intervals of 5.5 feet or less; ½ " LDF4-50A shall be supported at intervals of three feet or less). Larger lines shall be supported per manufacturer's instructions, or a smaller interval as indicated for the wind speed design of the tower with ½" radial ice.
4. A waveguide bridge/ice shield shall be installed between the tower and the equipment room/shelter to support transmission lines and to protect them from ice falling from the tower or antennas. The waveguide bridge shall be designed to accept support devices to properly attach the transmission lines at the intervals specified. The waveguide bridge shall be installed close to ground level, below 3' if practical. The waveguide bridge shall be designed to match the height of the cable entry port on the equipment shelter. The waveguide bridge shall be supported by pipe columns if any horizontal span is 20 feet or greater, or if so required by local building codes. Galvanized steel construction shall be used for the waveguide bridge and its ancillary components. A grating type of waveguide bridge is required. Microflect waveguide cushions, hangers and crosses (or equivalent) are the preferred method of attachment to the waveguide bridge.

4.5.5 Lighting and Controls

1. **Lighting:** The towers shall be lighted and/or marked in accordance with the applicable chapters of FAA Advisory Circular AC 70/7460-1K, or latest revision, as required by the particular Aeronautical Study performed by the FAA for each tower.
2. **Controls:** Activation of any required lighting systems shall be via a light sensitive, photoelectric type switch and controller which will activate the lights at dusk (or other cloud darkened condition) and extinguish the lights at sunrise. If a dual lighting system is required at any site, the controller shall automatically switch from red lights at sunrise to strobe lights, and back to red lights when the sky darkens. Tower lighting must remain functional during the loss of commercial AC power and the site's auxiliary power generator is operational.
3. **Wiring:** Wiring for the tower lighting shall be provided and installed in conformance with the lighting manufacturer's specifications and in accordance with the NEC and local electrical codes. All cable ties used on the tower shall be stainless steel or Weather Resistant Black Acetal. Standard White or Black cable ties made of Nylon or Polypropylene shall not be used.

4. **Bulb Failure Indications:** The lighting control system shall be equipped to provide a single, form "C" dry contact closure alarm indication of bulb failure. Upon bulb failure, the site specific alarm condition shall be reported in the equipment shelter and by the P25 radio system's master alarm system.

4.5.6 Ice Shields

Each tower shall be equipped with steel mesh ice shields to be installed above each of the microwave antennas to fully protect them from falling ice. The ice shield shall cover the width and length of the microwave antenna and its waveguide between the antenna and tower face it is intended to protect.

4.5.7 Climbing Ladder

Radio towers shall be equipped with an OSHA compliant climbing ladder, safety cable, and climbing harness. The climbing ladder shall be attached to tower legs in a manner that will not interfere with the installation or maintenance of antennas, or installation of transmission lines on the cable ladder. Similarly, the placement of cable ladder structures shall not interfere with the climbing facility. The climbing ladder shall be equipped with an ability to lock-out the climbing facility to preclude unauthorized use. The climbing facilities shall meet all OSHA requirements.

4.5.8 Design Documentation

1. In accordance with ANSI/TIA-222-G, complete plans, assembly drawings, or other related documentation shall be supplied showing the necessary marking and details for the proper assembly and installation of the components, including the member sizes, design yield strength of the structural members and the grade of structural bolts required. Foundation reactions shall be based on factored loads.
2. The tower plans shall detail attachment heights, antenna quantities, antenna models or types, mount quantity and locations, mount types and line sizes that were included in the structural analysis.
3. At a minimum, the tower plans shall detail the following data that was used in the structural analysis for the site specified:
 - a. Basic wind speed (3 second gusts, 50 year return period) without ice.
 - b. Basic wind speed (50 year return period) with ice.
 - c. Design ice thickness (50 year return period).
 - d. Exposure category (B, C or D) for the site specified.
 - e. Structure classification (I, II or III) used to classify the structure. (Class III is required)
 - f. Topography category (1, 2, 3, 4 or 5).
 - g. Earthquake spectral response acceleration at short periods.
 - h. Foundation reactions for the loading combinations considered.

- i. Soil design parameters or source of data.
4. The required tower design documentation shall be approved, signed, dated, and sealed by a registered Professional Engineer qualified and licensed to design radio towers and practice in the State of Texas.
5. Upon completion of tower construction, the Contractor shall deliver to the County team two (2) complete original copies of the tower and foundation's as-built documentation, and two (2) copies in an electronic format compatible with AutoCAD 2013. Files shall be provided in Adobe PDF format, and in both DWF and DWG file formats.

4.5.9 Tower Manufacturer's Certification

1. All tower materials, hardware, and accessories shown on the plans and drawings shall be certified in writing by the tower manufacturer as being suitable for the purposes shown.
2. The manufacturer's certification shall include the following statement for each tower:

"This tower and foundation design meets or exceeds all requirements of the P25 Radio System Request For Proposals No. 2016-020 and ANSI/TIA-222-G."
3. The foundation and tower designs shall be approved, signed, dated, and sealed by a registered Texas Professional Engineer qualified in radio tower and foundation design and authorized pursuant to State of Texas law.

4.5.10 Site Preparation

1. The system Contractor shall be responsible for providing the towers, site preparation, installing suitable foundations, furnishing and installing all associated hardware and appurtenances, for performing all planning and installation of the tower, and for site restoration and cleanup. The Contractor shall be responsible for ensuring that each foundation, tower, and all associated hardware/appurtenances meets all design criteria, labor services, guarantees and installation requirements contained in the Proposer's specifications, or in national or industry standards to which such specification refers.
2. The work to be performed shall include site preparation, tower foundations, tower erection, climbing ladders, grounding systems, lighting protection systems, antenna support brackets, installation of antennas, transmission lines, ice shields, cable ladders, waveguide bridges, platforms, tower lighting controls, lightning rods (air terminals), and touch up of any damage to the galvanizing and/or paint.

4.5.11 Construction Requirements

1. **Soil Analysis**
 - a. For the purpose of the initial proposal only, Proposers can assume that soil conditions at all sites requiring new towers are "normal" soil. **However, the Proposer must state in its proposal the amount of concrete in cubic yards and its cement content ratio that is proposed for the Normal soil condition at each new tower proposed.** Prior to construction, the Contractor is responsible for conducting a geotechnical analysis at the locations of each tower leg, tower

foundation or guy anchor point. The soil analysis shall include field borings, laboratory testing, and a report containing a summary of the analysis with an evaluation and recommendations for structural foundations. The geotechnical investigation report shall include all information in accordance with ANSI/TIA-222-G, Annex G, Geotechnical Investigations (Normative). The report shall be generated and certified by a Registered Professional Engineer, licensed to practice in the State of Texas and qualified in the area of subsurface investigations for radio tower development purposes and engineering evaluation.

- b. The number of field borings to be performed at the site and their depths shall be appropriate for the antenna tower and loads described in this Statement of Work in accordance with ANSI/TIA-222-G Annex G: Geotechnical Investigations.

2. Submittal Data and Notification Requirements

- a. At no later than 30 calendar days prior to foundation excavations for the tower, the Contractor shall deliver signed and sealed copies of all required tower structure and foundation design documentation. Two (2) paper copies and 2 electronic copies shall be provided to the County team.
- b. These submittals are in addition to any documentation submittals that may be required by the local building official. The Contractor shall contact the appropriate local building official to determine what submittals are required and shall provide the required submittals.

3. Construction Notifications

For the tower structure, the Contractor shall notify the respective agencies as to construction status at the following times:

- a. Ten working days prior to start of tower installation - notify as to the start date of construction and estimated completion date of construction.
- b. The day the tower reaches the greatest height.
- c. The day tower installation is completed, including the status of the permanent obstruction lighting.

A building inspector where the tower is being constructed is required to be present during concrete pours and sample retrieval and for concrete sample testing. The Contractor is required to notify the respective agency in accordance with issued permit.

4. Foundation Design

Proposed pricing for the foundation design will be assumed to be based on "normal" soil conditions, and shall include the number of yards of concrete and its cement content ratio.

5. Site Plan

A site plan shall be prepared for each respective site. Approval by the site owner for each site at which construction of a tower and/or installation of an equipment shelter will be required. The Contractor shall install the tower and shelter in conformance with the approved site plan. The Contractor shall note that regardless of its size at the base, the tower shall be installed such that a minimum of a 30 foot

spacing is maintained between the building and the tower face or leg nearest the building where possible. Certain sites may not be able to accommodate this spacing. Sites that require a shorter spacing shall be identified in the proposal.

6. Power

The Contractor shall be responsible for connecting to the commercial AC power at the meter. Temporary power may be required for the obstruction lighting on the tower during construction. The Contractor is ultimately responsible for arranging and installing this temporary power. The FAA required lighting shall be installed while the tower is being erected.

7. FAA Notification

The Contractor shall be responsible for notifying the FAA of commencement of construction through the filing of appropriate forms. The Contractor is also responsible for notifying the FAA when the tower has reached its greatest height, and also when tower construction has been completed. Copies of these notifications shall be provided to the County team or point of contact.

8. Painting

If an FAA Aeronautical Study requires any tower to be painted, the paint shall be applied at the factory and touch up painting shall be properly applied as required at the site. (Obstruction lighting is preferred over painting). Touch-up galvanizing shall be done in dry weather. Galvanizing shall not be applied over wet surfaces.

9. Site Landscaping

- a. The Contractor will be responsible for landscape grading and sodding of the disturbed soil, as well as watering the sod for the first month.
- b. If planning authorities require foliage screening or other plantings at the tower sites, the Contractor shall arrange for professional planting of the required species and quantities of trees or shrubs, as well as watering the plants for the first month.
- c. The Contractor shall restore the other site areas to original condition following construction and installation activities.

4.6 SHELTER SPECIFICATIONS

4.6.1 General Description

Prefabricated, 30-caliber rifle resistant, Electronic Equipment Shelters, foundations, and ancillary equipment shall be furnished as specified herein where required.

4.6.2 Reference Standards

Unless otherwise modified herein, materials, design and constructions procedures shall be in accordance with ANSI/NFPA-70, The National Electrical Code and all applicable federal, state and local building codes.

4.6.3 Structural Requirements

1. Design Loading

The equipment building floor shall be designed per ASCE 7-88 Uniform Distributed Load of 300 pounds per square foot. The equipment building roof shall be designed per ASCE 7-88 Roof Load Specification of 150 pounds per square foot. The equipment building wind loading specification shall be per ASCE 7-88 Basic Wind Speed Specifications of 120 MPH.

2. Foundation

The building foundation shall be concrete slab, and installed in compliance with local building codes. A concrete walkway shall be installed between the shelter entry door and the gate to the fence surrounding the shelter to allow equipment to be brought into the shelter on hand trucks without tracking mud into the building.

3. Flooring

The floor section shall be constructed of steel reinforced concrete. All surfaces shall be smooth. The interior floor surface shall be commercial grade asphalt tile. Base molding shall be installed around all perimeter walls.

4. Roof Section

- a. The roof section of the equipment building shall be concrete with at least a $\frac{1}{8}$ " per foot drainage slope. Roofing shall be designed to prevent penetration by ice falling from the tower at the site. Proposers shall describe this roof protection in their proposals.
- b. The roof shall be designed in such a manner to prevent accumulation of water. The roof section shall provide a 2" minimum overhang on all sides. The roof shall be a cap and fit over the walls, leaving no exposed roof to wall joints.

5. Walls

The wall sections shall be steel reinforced solid concrete, 5000 PSI lightweight concrete is preferred. Construction shall be concrete aggregate exterior with Fireproof FRP interior walls. Interior walls shall be designed to allow mounting of electrical and electronic equipment using standard fasteners available from local hardware stores.

4.6.4 Shelter Features

1. Power

- a. AC power shall enter the shelter through an entrance elbow, which can be rotated to accommodate connection to conduit from the power company feed. A main cutoff switch shall be provided inside the shelter, followed by a distribution panel, which provides for a minimum thirty branch circuit breakers.
- b. The Equipment Room AC power shall be installed in EMT conduit with two duplex outlets mounted along the overhead cable ladder at the top of each equipment rack space, and at four foot intervals on each of the four interior walls of the equipment shelter (EMT conduit, grounded, duplex outlets). Each outlet shall be served on separate circuits. A minimum of two,

or the minimum required by local electrical codes (whichever is greater) duplex outlets shall be installed in the generator room of the shelter. Also, an outdoor GFCI duplex outlet supported by the generator shall be provided near the shelter entrance and on each exterior wall.

- c. All electronic equipment in the shelter shall be equipped with transient voltage suppressors.
- d. Outlets protected by the generator only shall also be provided, for tools or test equipment that may be used at the site and potentially cause a UPS circuit to trip due to a ground fault detection. Circuits protected by the generator only shall be clearly marked by red outlets. One quad outlet shall be provided every 10' along each "long" wall of the shelter. For example, walls 20' and less require one outlet near the middle of the wall length; walls greater than 20' (and less than 30') require 2 outlets, near the 1/3 and 2/3 length of wall, etc.
- e. All electrical equipment supplied shall be UL listed. The entire electrical installation and wiring shall be in strict compliance with the latest approved edition of the National Electrical Code and all state, county, and city codes and ordinances.

2. Building Size

Radio equipment shelters shall be sized to house all of the trunked radio site equipment and allow for future growth. At a minimum the shelter shall have planned space for three (3) additional full height equipment racks. Ceiling height shall be a minimum of nine feet. Enough space shall be provided to include both front and rear access to all equipment racks and cabinets, both included with the system and with future rack space allocations.

3. Doors

- a. Exterior doors, shall be of steel construction with a solid core, and shall be 30-caliber rifle resistant.
- b. The door frames shall be minimum 16 gauge galvanized steel, primed painted, and cast into the wall panel. The door entrance(s) shall consist of an 40"x84"x1 $\frac{3}{4}$ " 18-gauge galvanized steel, insulated, primed, painted brown and installed flush with door check, door stop, weather stripping and stainless steel ball bearing hinges. All exterior doors shall meet UL 752 Level 4 standards. The lockset shall be protected on the exterior by anti-prying plate. Hinges shall be tamper resistant to prevent removal of the pins from outside the building.
- c. A drip awning with a minimum 4' protrusion from the outer wall shall be installed over each door to prevent water from dripping into the building.
- d. Doors shall be sealed using adjustable weather stripping, and an adjustable saddle.
- e. Doors shall be equipped with a mortise lockset with an electric door strike and a single cylinder deadbolt lock.
- f. All radio equipment shelters shall be keyed the same. Eight (8) sets of keys each shall be provided.

4. Lighting

- a. There shall be sufficient interior lighting to provide a level of 75 foot-candles at 3 feet above the floor. Fluorescent fixtures using two standard four-foot tubes per fixture shall provide interior light. The switch for the light fixtures shall be located inside and on the latch side of the entry door. Light fixtures shall be installed to the front and rear of electronic equipment racks to provide sufficient lighting for service personnel to perform equipment maintenance.
- b. Exterior lighting shall be provided adjacent to the entry door to the shelter in a manner to avoid shading by the open door. A photoelectric switch that allows automatic illumination and extinguishment at twilight and sunrise shall control this lighting. Exterior lighting shall be heavy duty, shatter and tamper resistant.
- c. There shall be four (4) dual weatherproof floodlights with motion detectors installed on the exterior shelter walls near the corners in a clockwise or counterclockwise orientation, to minimize "blind spots." Lights shall be installed so that they are facing along the length of the wall.

5. **A/C Power**

The AC service shall be sized to accommodate the fully-loaded system plus 100% reserve capacity.

6. **HVAC**

- a. Low ambient temperature air conditioning equipment shall be provided. Electric heat strips or other devices shall be provided which will maintain the interior temperature of the shelter between 55 and 75°F when outside temperatures range from -5°F to 115°F. Relative humidity shall be maintained at a level acceptable to the equipment to be furnished in this procurement, typically a range of 55% (+/- 10%) relative humidity.
- b. Shelters shall be equipped with a minimum of two (2) external vertical air conditioning units installed with a standard lead/lag controller to cycle between the two (2) units.
- c. One auxiliary exhaust fan system for every 150 square feet of floor space shall be installed including motorized louvers, thermostat, timer, and hood with permanent expanded metal dust filter and exhaust insect screen in both the equipment and generator rooms.
- d. Exterior HVAC equipment shall be enclosed in security cages designed to prevent copper theft or general vandalism. This shall be provided on a site by site basis as an option depending on the location.

7. **Alarms**

- a. The following alarm inputs associated with the site shall be installed and connected to the site security system. The alarm system layout will be standardized for all shelters.
 - 1) Fire/Smoke Detector
 - 2) Shelter Door Open Alarm (each door)
 - 3) Site Gate Open Alarm (each gate)

- 4) Site Intrusion Alarm (multiple motion detectors as required)
- 5) Shelter Hi-Temp
- 6) Shelter Low-Temp
- 7) Auxiliary Exhaust Fan Run
- 8) Commercial AC Power Fail
- 9) High and Low Humidity Sensors
- 10) Floor Water Sensors

8. Waveguide Entry

Waveguide openings, with modular wall/roof feed through plates shall be installed in the wall of the shelter adjacent to the waveguide/ice bridge from the tower, and in horizontal alignment with interior cable ladders arranged over the equipment rack space. The entry panel shall be a modular design, have a 1 hour fire rating for floor and wall penetrations, and be water and gas pressure rated up to 4 bars. The feed through plate shall be equipped to seal the coaxial transmission lines to be supplied pursuant to this procurement. All unused entry ports shall be sealed.

9. Cable Tray

A cable tray with a minimum width of 12 inches shall be installed over all equipment rack spaces, to any MDF panels, and to any future equipment expansion space in the shelter. Cable tray sections shall be bonded to one another and to the building perimeter ground (split halo) by #2 AWG copper wire and compression fittings.

10. Security Screens

Security screens to prevent unauthorized entry shall protect all ventilation openings.

11. Fire Protection Systems

- a. Each new equipment shelter shall be provided with a 20-pound CO2 fire extinguisher.
- b. New radio equipment shelter shall also be provided with an automatic fire protection system. The system must provide the following when excessive heat is detected:
 - 1) Activates a local, resettable, audible and visual alarm.
 - 2) Reports the detection of fire to the new P25 system's alarm reporting system.
- c. The fire suppression system shall be activated upon detection of excessive heat and will extinguish the fire with an agent suitable for electronic equipment.
- d. A means to manually activate and/or deactivate the fire protection system must be provided in each shelter.

- e. The automatic fire protection system must comply with all applicable fire codes, building codes and safety laws, and regulations.

4.7 GENERATOR SPECIFICATIONS

4.7.1 General Requirements

1. Plans and specifications for standby power generators shall be furnished by the Contractor at all sites to be constructed pursuant to this procurement. Generators shall be mounted within a separate room of the equipment shelter in accordance with the manufacturers' specifications for shock and vibration mounting, ventilation, cooling, fuel supply and electrical connections.
2. It shall be the responsibility of the Contractor to provide plans and specifications to install and test a complete and operational standby power generator and automatic transfer switch in each electronic equipment shelter to be supplied pursuant to this procurement. The equipment shall be new and factory tested @ 0.8 power factor for 3 hours.
3. The following sub-sections provide detailed requirements for proposed new generators and associated equipment and services.

4.7.2 Documentation

The following documentation shall be supplied for each generator set and transfer switch provided:

1. Specification and data sheets for the exact manufacturer, type and model of generator and transfer switch supplied pursuant to this procurement, including all applicable options and accessories;
2. Manufacturer's certification of prototype testing;
3. Manufacturer's warranty documents;
4. Shop drawings showing plan and elevation views of the equipment;
5. Interconnection wiring diagrams showing all external connections required; with field wiring terminals marked in a consistent point-to-point manner;
6. Manufacturer's installation instructions;
7. Operator's and maintenance manuals that outline routine maintenance and troubleshooting procedures
8. Transfer switch manual and wiring diagram.
9. The above documentation shall be included in each copy of the as-built documentation delivered to the County team.

4.7.3 Warranty

A no-deductible warranty, which provides for onsite service by a factory authorized service contractor, shall be provided. This warranty shall provide coverage against all defects in materials and workmanship for a period of at least one (1) year from the radio system's final system acceptance date.

4.7.4 Start Up Service

A factory authorized service representative shall provide initial start-up service and shall conduct acceptance testing at each site at which the equipment is installed. This testing shall be witnessed by a County team representative. Test records shall be furnished to the County team in both printed and electronic format.

4.7.5 Type of Generator

The generator shall be configured for outdoor installation and shall be furnished complete with all accessories and equipment needed for the proper operation of the unit. These shall include, but not be limited to, starting batteries, battery racks, battery chargers, battery cables, cooling systems, residential grade exhaust silencers with exhaust pipes and rain caps, automatic load transfer controls, electrical surge protection, automatic frequency regulators, vibration isolators, fuel lines, fuel regulators, fuel filter/water separators, fuel storage tanks, conduits, junction boxes, wiring, instrument panels, remote alarm panels mounted inside equipment buildings, mounting bases, and fuel leakage detectors.

4.7.6 Generator Requirements

1. Ratings

Output power rating of the generator shall be sized to support the full forecasted load of the equipment shelter, including both air conditioners running in the cooling mode, plus 30% reserve capacity.

2. Engine

The generator manufacturer is left up to the Proposer, but the generator engine must be a Cummins.

3. Site conditions

- a. **Ambient Temperatures** - The outdoor mounted generator is to be fully operational at outdoor environmental conditions experienced in Collin County, Texas.
- b. **Voltage Regulation** - $\pm 2\%$ of rated voltage for constant load between no load and full load
- c. **Frequency Regulation** - .5% from steady state no load to steady state rated load
- d. **Single Step Load Pickup** - 100% of rated output power, less applicable derating factors, with the engine-generator at operating temperature.

4. Generator Set Control

- a. The generator shall be an automatic and manual remote start type compatible with the automatic transfer switch to be supplied pursuant to this procurement.
 - 1) **Cranking control** — Shall provide a minimum of three cranking cycles of at least 15 seconds before lockout and activation of an over crank alarm condition.
 - 2) **Generator Protection Controls** — per NFPA 110
- b. The generators shall shut down and lock out upon:

- 1) Failure to start (over crank);
 - 2) Over speed;
 - 3) Low lubricating oil pressure, and
 - 4) High engine temperature.
- c. Alarm contacts shall be provided to allow transmission of status on fault alarms for any of the above conditions, plus low oil pressure pre-warning, high coolant temperature pre-warning, low coolant, low fuel, an alarm indication when the generator set is running, and when the generator is on-line under load conditions. These alarm contacts shall be wired into and shall be reported by the P25 system's alarm system being supplied pursuant to this procurement. Form C alarm contacts shall be provided and connected to the alarm system to report loss of AC power, AC power on, low battery voltage, and high battery voltage.
- d. Meters shall be provided on the generator to indicate output voltage, output current, running time, and frequency/RPM. An AC rheostat shall be supplied for voltage adjustment.

5. Fuel Supply

- a. Generators shall operate on diesel fuel. The fuel tanks shall be sized to provide a full load 48 hour backup time, but not less than 100 gallons. The fuel tank shall be filled before conducting acceptance tests. Proposed diesel fuel systems shall meet all applicable codes, standards and requirements for such systems.
- b. Fuel tanks and fuel line locations and installations shall meet all environmental, building, and fire safety codes that apply.
- c. The fuel supply shall be located in the base of the generator. The generator and fuel tank shall each be separately connected to the site ground system at the nearest point.
- d. Fuel leak detectors shall be interfaced to the alarm reporting system.

6. Exhaust System

A residential grade exhaust silencer shall be installed on the generator.

7. Battery and Charger

A lead acid starting battery rated for the engine type to be supplied shall be furnished and installed with the generator set. This battery shall be float charged by an appropriate sized voltage regulated charger, which is powered by 120 volts AC. Float, taper, and equalize charge settings shall be provided.

8. Cooling System

- a. A radiator-cooled engine is required. The radiator shall be filled with a water and coolant mixture in accordance with the engine manufacturer's recommendations.
- b. A thermostatically controlled water jacket coolant heater shall be provided and installed in accordance with the manufacturer's recommendations.

4.7.7 Transfer Switch

1. An automatic transfer switch, which provides switching of the equipment shelter electrical load between commercial power and generator power, shall be supplied and installed for each generator set. The transfer switch shall be completely factory assembled and shall contain electronic controls designed for surge voltage isolation, with voltage sensors on all phases of both input power sources. Permanently attached manual control handles shall also be installed on the transfer switch. The switch shall provide positive mechanical and electrical interlocking and mechanically held contacts. Quick-make and quick-break contact mechanisms shall be provided for manual transfer under load
2. The manual transfer switch shall be wired to an appropriately sized Appleton external power receptacle to allow for the use of a transportable power generator in the event that a complete loss of site power occurs
3. The transfer switch shall be installed in a key locking, UL listed, NEMA cabinet to be mounted on a wall in equipment shelter. The switch shall be fully wired and integrated with the engine generator set in accordance with the manufacturers' requirements and applicable national and local electrical and fire codes.
4. All transfer switches and accessories shall be U.L. listed and labeled, tested per U.L. Standard 1008 and CSA Approved.
5. Transfer switches shall be double-throw electrically and mechanically interlocked and mechanically held in both positions.
6. Main switch contacts shall be high pressure silver alloy. Contact assemblies shall have arc chutes for positive arc extinguishment. Arc chutes shall have insulating covers to prevent interphase flashover. Form C contacts shall be provided in each position for alarm reporting purposes. These contacts shall be connected to the P25 system's alarm system for reporting transfer status.
7. The transfer switch shall be rated for continuous operation in ambient temperature ranges of -40 to +70 degrees Celsius. Transfer switches shall be rated to carry 100% of the rated current in the enclosure.
8. Transfer switch control shall be solid state and designed for a high level of immunity to power line surges and transients. The device shall be tested in accordance with IEEE Standard 587-1980 (or latest revision). Controls shall have optically isolated logic inputs, and isolation transformers for AC inputs. Relays shall be installed on all outputs.
9. Solid-state under voltage sensors shall simultaneously monitor all phases of the standby power source and the commercial power source. Pick up and drop out voltage settings shall be adjustable. Voltage sensors shall allow for adjustment to sense partial loss of voltage on any phase.
10. Controls shall be provided with solid-state over-voltage sensors, adjustable from 100-130% of nominal input voltage to monitor the source. An adjustable time delay shall be provided.
11. Automatic controls shall signal the engine-generator to start upon signal from normal source sensors. A time delay start, variable from at least 0 to 5 seconds, shall be provided to avoid nuisance start-ups. Battery voltage starting contacts shall be gold, dry type contacts, which have been factory, wired to a field wiring terminal block.

12. The switch shall transfer when the emergency source reaches the set point voltage and frequency. A time delay shall be provided for transfer, which is variable from 0 to 120 seconds.
13. The switch shall retransfer the load to commercial power after time delay retransfer. This time delay shall be variable (adjustable) from 0 to 30 minutes to avoid short engine run times. The retransfer time delay shall be immediately bypassed if the emergency generator fails.
14. A control shall automatically signal the engine generator to stop after a time delay, which shall be adjustable from at least 0 to 10 minutes; with the time starting on return to commercial power.
15. Power for transfer operation shall be from the source to which the load is being transferred.
16. Diagnostic indicators shall be provided to allow the last successful step in the sequence of control functions to be pinpointed. The present status of the control functions shall also be indicated. These functions, at a minimum, shall include:
 - a. Source 1 OK
 - b. Start generator set
 - c. Source 2 OK
 - d. Transfer timing
 - e. Transfer complete
 - f. Retransfer timing
 - g. Retransfer complete
 - h. Timing for stop
17. Front Panel Control Devices - A key operated selector switch shall be provided which will provide the following functions:
 - a. **Test** — to simulate commercial power loss to allow testing of the generator set with or without transfer of the load.
 - b. **Normal** — leaves the switch in its normal operating position
 - c. **Retransfer** — a momentary position, which will provide an override of the retransfer time delay and cause immediate return to the commercial power source (if available).
18. Exerciser Clock - The transfer switch shall be equipped with a programmable exerciser clock which allows setting the day, time and duration of a generator set exercise/test period. Tests under load or with no load shall be selectable.

4.8 UNINTERRUPTIBLE POWER SUPPLY (UPS)

4.8.1 UPS General Requirements

1. All repeater sites shall include an Uninterruptible Power Supply (UPS). The Proposer shall describe the UPS's protection from inverter failures, internal switching failures, and any UPS malfunction that could cause the site to lose power.
2. The UPS shall be sized for 4 hours of full operation with all equipment energized and all repeater channels continuously keyed. The Main Control Point shall sustain full operation for a minimum of a 4-hour period. For other sites, there shall be a cost reduction option to reduce the backup operating time to 2 hours. Existing dispatch center power systems shall be evaluated by the Proposer to determine the adequacy for supporting the new system equipment proposed.
3. The UPS shall incorporate single or three phase (as appropriate) input and output over current protection. A maintenance bypass switch shall be provided to allow the unit to be taken fully out of service allowing for commercial power to be fed to the load. The system shall be "on-line" ferroresonant transformer technology or as an alternate; static Pulse Width Modulated (PWM) technology. The UPS shall be UL 1778 and 1449 listed. Acceptable vendors are Best Power Technology Inc., or an approved equivalent.
4. It shall be the responsibility of the Contractor to provide plans and specifications to install and test a complete and operable UPS system for each radio site included pursuant to this procurement. Equipment shall be new, factory tested, and shall be installed in the equipment shelter prior to delivery to the site.

4.8.2 UPS Documentation

1. The following documentation shall be supplied for each UPS supplied:
 - a. Specification and data sheets depicting dimensions, weight, location of conduit entry, grounding and wiring requirements and details for bolting assembly frames to floor;
 - b. Schematic wiring diagrams showing input and output protective devices and field connections, battery connections, interconnect wiring, controls and instruments;
 - c. Manufacturer's certified standard test data;
 - d. Manufacturer's warranty documents;
 - e. Manufacturer's installation instructions, and
 - f. Manufacturer's Operating and Maintenance Manuals

4.8.3 UPS Warranty

A no-deductible warranty, which provides for onsite service by a factory authorized service contractor shall be provided. This warranty shall provide coverage against all defects in materials and workmanship for a minimum period of one (1) year from the final system acceptance date of the radio communications system. The Proposer shall state the number of years that the batteries are warranted.

4.8.4 UPS Start Up Service

A factory authorized service representative shall provide initial start-up service and shall conduct acceptance testing at each site at which the UPS is installed. Test records shall be furnished to the County team.

4.8.5 UPS Ratings

1. UPS shall be continuous, "On-Line, No-Break" static type employing the latest state-of-the-art solid state components incorporating microprocessor based Pulse Width Modulated (PWM) technology or Ferro resonant transformer design. The UPS system shall consist of free standing cabinets consisting of a rectifier section, inverter section, batteries, solid state transfer switch, isolation transformer, manual synchronized make-before-break bypass switch and input and output over current protective devices. Also included are all status and alarm displays, remote interface communicator compatible with the P25 system's alarm reporting system), control devices, meters, components, cabling and connectors. Alarm monitoring shall be provided at the UPS site and shall be sent to the P25 system's alarm reporting system.
2. UPS and associated components shall be housed in heavy-duty reinforced steel freestanding finished cabinets. Batteries shall be housed in the UPS or, if necessary, in a matching cabinet.
3. UPS rating shall be 240 volt \pm 10% single phase input and 120/240 \pm 3% single phase, three wire output, output frequency range of 0.1 Hz (or better), battery back-up time of 240 minutes with a cost reduction option of 120 minutes @ full load for 0.8 (lag) P.F. computer type loads. Temp. 0-40 degrees Celsius, Rel. Humidity 0-95% non-condensing, noise level: 60 dBA approx. @ 3' and noise reduction greater than 60 dB (normal mode) and 120 dB (common mode). UPSs' shall be sized to support their designated loads, + 25% growth.

4.8.6 Description and Operation

1. The capacity of the solid state rectifier section shall be sufficient to maintain the battery in a fully-charged condition and continuously supply the required load through the inverter while floating the battery.
2. The system offered shall not include any switching device or devices which will interrupt the continuity of power in any way.
3. The output voltage of the UPS shall be maintained within \pm 3% over the nominal output voltage under any load conditions within the UPS's rating and ambient temperature range specified.
4. The sine wave output shall have a maximum of 5% total harmonic distortion over the entire range of output voltage at any load at any power factor.
5. Automatic Frequency regulation shall maintain the output frequency to within \pm 0.1 Hz for all combinations of temperature, input voltage variation, and load variation. The output shall not follow the reference source beyond \pm 0.3% Hz of nominal frequency. When input returns to normal, the UPS shall automatically synchronize to the line frequency.
6. The components shall be selected to provide sufficient voltage capability and ample current-carrying capacity to furnish reasonable margin for handling over-currents and minor voltage variations. In no case shall components be operated at more than 80% of the device's maximum steady state rating.

7. The UPS shall be capable of withstanding without failure, short circuit currents, and surges of magnitude and duration in accordance with ANSI/IEEE Standard C62.41, categories A and B.
8. The UPS shall be capable of carrying 100% of the rated UPS output current continuously and shall be capable of carrying 125% of rated output current for approximately 10 minutes.
9. The system transient response shall be $\pm 5\%$ from nominal peak voltage for 100% load step. Voltage recovery shall be within 4 mSec. to $\pm 3\%$ of nominal voltage.
10. The battery system shall be of the lead acid maintenance-free sealed, non-gaseous type with a minimum ten (10) year life.
11. The rectifier shall maintain a DC output voltage regulation of $\pm 1\%$ with a maximum of 2% RMS ripple. Rectifier shall be of the solid-state full wave SC bridge design to limit AC wave-shape distortion on the power system.
12. At a minimum, over current protection (10 KAIC circuit breakers or 100 KAIC C.L. Fuses) shall be provided for:
 - a. AC Input
 - b. Rectifier Input
 - c. Inverter Input
 - d. AC Output
 - e. Battery Input

4.8.7 UPS Accessories

1. The following items shall be mounted on the instrument panel of the UPS cabinet via microprocessor based LED or equal display (including lights/meters) for the following characteristics:
 - a. Mode Select Switch (UPS Normal, UPS Bypass & Battery Modes)
 - b. Input AC Voltage
 - c. Battery DC Voltage
 - d. Rectifier DC Voltage
 - e. Output AC Voltage
 - f. Output AC Amperage
 - g. Output AC Frequency
 - h. Synchronizing verification
 - i. Low Battery DC Voltage Indication
 - j. Static Switch Position Indication
 - k. Manual By-Pass Mode Indication
 - l. Float-Equalize switch/timer DC Circuit Indication

- m. % Rated Load Indication
 - n. Battery back-up time available in Minutes
2. The following conditions shall have audible and visual alarms in addition to dry contacts that shall be connected to the alarm system by the Contractor:
 - a. Low & High Battery Voltage
 - b. Automatic Bypass Operation
 - c. Emergency Operation (UPS on Battery)
 - d. Rectifier/Inverter Failure
 - e. Common Trip Alarm (form "C")
 3. All external power and control connections shall be terminated on terminal blocks and identified clearly on wiring diagrams.
 4. The UPS cabinet and battery cabinet (if not in UPS cabinet) shall be provided with a ¼" x 1" copper ground bus with mechanical type lug connector #6-#1/0 AWG copper ground cable. UPS manufacturer shall indicate on applicable drawing(s) requirements for neutral-ground bonding per UL Listing qualifying as "Separately Delivered System" per NEC Article 250.

SECTION 5 – RADIO SYSTEM INTERCONNECTIVITY

5.1 GENERAL INFORMATION

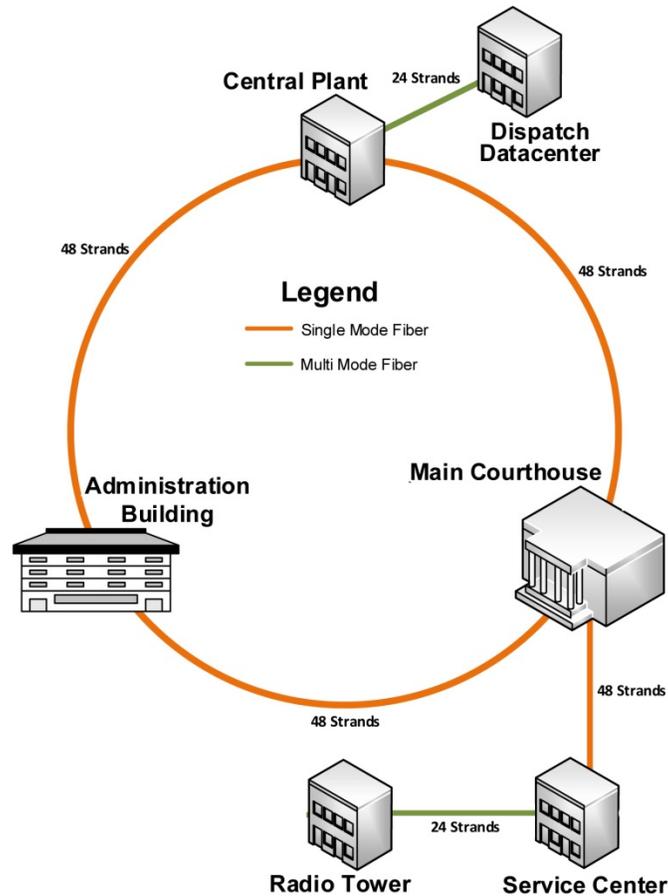
5.1.1 Implementation General Requirements

Collin County is requiring that the Proposers include the design and cost for a complete MPLS based ring-protected microwave system, which will connect to each of the simulcast radio sites and the County Dispatch Center. The MPLS microwave network will be the primary means of connectivity for the new P25 Radio System. As noted in Section 1, the County has an existing 6 GHz microwave loop between the four radio tower sites, with an 18 GHz spur between the Sherriff's Office Communications Center and the Wilmeth tower. These links will be decommissioned as the new system is cutover.

5.1.2 Existing Fiber Network

The County has an existing fiber network that connects many County owned facilities. The only portion of the fiber being utilized in the current radio system is the link from Facilities Maintenance Department Central Plant (4600 Community Ave., McKinney) to the Collin County Sheriff's Office Communication Center (Dispatch). The current radio system then utilizes a microwave spur from the Central Plant monopole to the Wilmeth site. Figure 5.1.2a below depicts the fiber layout. Note in the figure that "Radio Tower" is the Wilmeth site tower and "Central Plant" is where the current monopole resides.

Figure 5.1.2a – Existing Fiber Diagram



In the replacement radio system the utilization of this fiber network will be expanded. Connectivity to the Main Control Point at Wilmeth will be as follows:

1. The primary link from the Main Control Point to Dispatch will be via a new MLPS microwave hop from Wilmeth to the Central Plant monopole. Fiber will then be utilized from Central Plant to Dispatch.
2. A secondary link shall be implemented to back up the primary link that utilizes the existing fiber network from the Wilmeth radio tower site all the way to Dispatch. Note from the fiber exhibit that this route will traverse both single-mode fiber and multi-mode fiber. Proposers are required to provide the auto-switching equipment that enables the primary link and the secondary link to provide seamless redundancy switching.
3. The new radio system requires a Network Management/Alarm Terminal in Dispatch. Connectivity from the Main Control Point to this terminal will be via the new MLPS microwave hop from Wilmeth to the Central Plant monopole. Fiber will then be utilized from Central Plant to Dispatch. A secondary link is not required for this terminal.
4. The new radio system requires a Network Management/Alarm Terminal in the Central Plant Control Room. Connectivity from the Main Control Point to this terminal will be via the new MLPS

microwave hop from Wilmeth to the Central Plant monopole. A secondary link is not required for this terminal.

5. Proposers are required to provide and integrate all required fiber network interface equipment to support their proposed system and the above connectivity requirements. Fiber strands will be sole-purposed for the radio system, so new media conversion equipment is required. Collin County's IT Department will allow whatever media conversion equipment vendor the Proposer chooses. Fiber interface equipment must be configured to protect from single points of failure. Proposers shall include a description of their proposed fiber interface equipment, explaining the specific equipment and configurations that protect from single points of failure.
6. Proposers shall include in their proposal a diagram depicting the connectivity described above.

5.1.3 Existing Central Plant Monopole

The Collin County Central Plant Service Center has a monopole that supports a microwave hop connecting the existing radio system Wilmeth site to the Facilities Maintenance Central Plant. The monopole is conveniently located to provide access to the County's fiber network and therefore connectivity to the Sheriff's Office Communication Center. Proposers shall incorporate this site within their proposed MPLS ring-protected microwave network.

5.1.4 Basic Requirements

1. This section defines the basic requirements for the major equipment items comprising the digital microwave network. Minor equipment and hardware including wiring, connectors, cabling, fuses, circuit breakers, brackets, fasteners, DC power systems/converters or conditioners, and other items which are necessary to provide a complete and fully functioning system must also be furnished and installed by the Contractor.
2. The Contractor must be responsible for the design and delivery of the digital microwave system, as well as installation, optimization, and performance verification testing of the complete network.
3. The topology of the microwave system must be designed by the Contractor to efficiently achieve the connectivity required by the proposed P25 Radio System.
4. Ring protection must be used to provide the greatest system reliability and protection against catastrophic equipment failure or loss of a complete site. It is highly desired that all sites be on the ring if possible.
5. If any microwave "spurs" are employed in the design, they must incorporate built-in redundancy to improve link reliability. This redundancy shall be detailed in the proposal.

5.1.5 Capacity

1. The MPLS microwave backhaul network must be designed for at least 50 Mbps throughout the ring. If a higher microwave network capacity can be obtained without impacting microwave antenna sizes and without significant cost increases, the County will consider the higher capacity.
2. The microwave network must efficiently use the available spectrum and bandwidth, while meeting the capacity requirements of the interfaces to repeater sites, network control equipment, and any other components or network resources, which may be identified.

5.2 TECHNICAL DESIGN

5.2.1 Ethernet and Internet Protocol

1. The Microwave network will be provisioned for the Ethernet based P25 Radio System network traffic.
2. Ethernet traffic must be true Ethernet. Ethernet over T1 or T1 over Ethernet is not allowed due to latency concerns.

5.2.2 Multi-Protocol Label Switching (MPLS)

1. MPLS must be implemented in all backhaul networks to insure that Public Safety traffic has top priority over other traffic.
2. The microwave terminals proposed by the Proposer shall be capable of transporting Ethernet packets from end to end of the Microwave network.
3. The Proposer shall propose MPLS Router equipment capable of supporting proper operation of the system while providing the following MPLS service:
 - a. Aggregation of multiple services;
 - b. Fast Re-Route (FRR);
 - c. Link Aggregation Groups (LAG);
 - d. Interfaces for 10/100/1000 Ethernet, and
 - e. Provide Traffic Management and QOS.
4. Proposer shall provide all network engineering services required to configure and implement the MPLS services for the P25 mission critical traffic and other lower priority traffic, in manner that prefers and protects the P25 traffic.

5.2.3 Redundancy and Reliability

1. In order to implement a highly reliable mission critical communications network, Collin County requires route reliability of six (6) nines (99.9999%) using the formula in 5.2.3(4).
2. Wherever ring protection is not provided, microwave frequencies that are not subject to rain outage must be used and radios must be configured as MHSB or MHSB with space diversity, if required. Spurs must not extend more than one hop from an access point on the microwave ring.
3. Redundancy of the microwave radio network must be provided such that no single failure will disrupt normal operation, assuming normal ring availability.
4. The Contractor shall calculate and provide the route availabilities at full bandwidth using the below formula:

Equipment: $N U_e [U_o]$

$$\text{Path: } N U_p [(N-1)U_p + U_o]$$

Where N = Number of sites

U_e = equipment unavailability for each link.

U_p = path unavailability for each link.

U_L = Loop-switch or other ring switch equipment unavailability.

$$U_o = (N-1) U_e + U_L$$

5.2.4 Microwave Path Reliability and Design

1. Path design data must be provided for all proposed paths in the system proposal. This design data must include path profiles, reliability calculations, radio and antenna details, and all other supporting data.
2. Proposer must include a tree growth factor of **20 ft.** to be added to measured tree heights at critical points along all microwave paths. Path profile data sheets included with final path engineering documents must clearly denote the tree growth factor used at each critical point. For calculating path clearances on non-diversity paths or top dishes on space diversity paths, use of classic heavy route criteria of 100%F1 @ $K=4/3$ and 30% F1 @ $K=2/3$ must be used. For diversity paths (top to bottom dishes), clearance must be as provided for in ITU-R Rec. P.530-11.
3. All paths in the system, including rings and spurs, must be designed for a minimum two-way path reliability of 99.9999% per year using the Vigants-Barnett model. The 10^{-6} BER receiver threshold at full capacity bandwidth must be used as the outage point. Note that adaptive modulation is permissible in the network so long as the Committed Information Rate does not drop below the required 50 Mbps capacity requirement.
4. Minimum fade margin for any path must be 38 dB.
5. All paths in the system, including spurs and rings, must have a required long-term, un-faded RBER (residual bit error rate) of $<10^{-11}$.
6. All paths in any band where rain outage is a significant factor, must be designed for a minimum two-way rain availability of 99.9999% per year, using the parameters and methods of Crane 96 with the latest published rates or charts. The 6 GHz band is preferred for all ring paths.
7. Contractor must be responsible for performing physical path surveys to locate obstructions on the paths and to ensure that proper path clearances are maintained in the design. Contractor must guarantee the paths clear of any and all obstructions and that reflections are not an issue.
8. Contractor must be responsible to provide all personnel, maps, proper instrumentation, and any other equipment or material necessary to perform the physical path and site surveys.
9. In executing the path surveys, if a particular location along the path is already developed with existing structures not likely to be rebuilt or extended/expanded, the Contractor must state the pre-existence of these objects. In addition, Contractor must search for existing construction plans, permits, etc., for proposed structures (towers, buildings, landfill, stockpiles, etc.) along the projected path. If new or existing structures are proposed to grow in height, the Contractor must consider the future construction in microwave path calculations.

10. The Contractor must provide the results of the physical path surveys for every path. These submittals must provide, as a minimum, the following information:
 - a. Verified site geodetic coordinates in NAD83 formats.
 - b. Verified ground elevations along paths.
 - c. Obstruction descriptions, heights and locations along microwave paths.
 - d. Path profile characteristics, path clearances at critical points along the path, potential reflection points, and natural/manmade shielding along the paths are to be identified /noted and discussed in detail.
11. The Contractor must provide results of physical site surveys of every site. These submittals must provide, as a minimum, the following information and material:
 - a. Verified site geodetic coordinates in NAD83 formats.
 - b. Verified site elevations.
 - c. General site characteristics: access, nearest utility power location, soil conditions, surrounding land features, and optimum positioning for new towers.
 - d. Location map plotted on United States Geological Survey (USGS) 7.5 minute map.
 - e. Proposed plot plan.

5.3 MICROWAVE RADIO EQUIPMENT REQUIREMENTS

5.3.1 Microwave Equipment

1. The Contractor must develop a system layout and frequency plan which will provide the most reliable propagation using available frequencies, while appropriately considering rain fading characteristics and other design issues associated with the various frequency bands and the Collin County environment. Six (6) GHz microwave links are preferred throughout the system. The successful contractor will be responsible for the planning, design and licensing of each of the microwave paths used in the system.
2. The RF paths planned for the digital microwave network must utilize FCC Part 101 frequencies assigned for full-period service in available 6, upper 6, and 11 GHz frequency bands. If 11 GHz frequencies must be used in some cases, the paths shall operate in the vertical polarity.
3. To the greatest extent possible, consideration must be given to minimizing differences in product lines and equipment types within the microwave system while maximizing availability and performance.

5.3.2 Microwave Radio Specifications

1. All microwave radio equipment must be indoor equipment installed in 7-foot tall, self-supporting, EIA standard, 19" equipment racks. Absolutely no Split-mount microwave equipment will be allowed.

2. Each rack must have a separate fuse panel with alarm and a ground bar.
3. Redundant equipment must have dual, independent power feeds from separate circuit breakers to ensure that no single point of failure will cause a disruption of service.
4. All indoor microwave site equipment must operate within the full specification requirements over a temperature range of 0° to 55° C with up to 95% humidity (non-condensing).
5. All work on towers must be done by certified (and licensed if required) tower climbers utilizing standard safety requirements with a spotter on the ground. The successful Contractor assumes all risk and liability regarding installation worker's safety.
6. The microwave and ancillary equipment must be designed and manufactured for continuous duty operation in a fixed station application, be of all solid-state design, and have an expected operational service life of at least 15 years with proper maintenance and service.
7. All radios must be compliant with FCC Rules and Regulations, Part 101 and be type-accepted for their intended use, specifically including spectral density requirements.
8. MHSB receivers where required must be provided with an asymmetrical RF directional coupler having less than 1 dB of loss to the preferred receiver and 7-10 dB to the non-preferred receiver.
9. Switching between redundant receivers in MHSB or SD configurations must employ hitless switching, causing no errors in the data throughput.
10. Microwave radios configured as MHSB, must have the capability to automatically switch far end transmitters via a control signal through the reverse path when the BER of both receivers' BER Degradation falls below 10⁻⁶. Radios configured for space diversity must include an adjustment to equalize delay (Differential Absolute Delay Equalization) DADE for different waveguide lengths for space diversity antennas.
11. Radios must be installed in a manner that is accessible to general maintenance personnel. Microwave network equipment that is only accessible by climber certified personnel IS NOT allowed.
12. Minimum additional functional requirements for each microwave radio must include:
 - a. Forward error correction
 - b. Time domain and slope equalizer
 - c. Automatic Transmitter Power Control (ATPC)

5.3.3 Diagnostics, Controls, Alarms, and Monitoring

1. All microwave radios must have local, on-site provisioning, control, and monitoring capability via a keypad, craft interface terminal, or simple computer terminal provided at each site. This capability must:
 - a. Allow configuration of software-programmable radio parameters, monitoring of radio status and faults, observation of various traffic performance measurements, including alarm history and chart data of RX levels over time.

- b. Provide access to the same information from any other radio at any site in the system.
 - c. Operate independently of the centralized SNMP Network Management System (NMS), specified elsewhere in this RFP.
2. The Proposer must supply a list of alarms, programmable parameters, and manner of access for each type of microwave radio.
 3. At least eight (8) external alarms must be provided for each site, in addition to those internal ones employed for radio and MPLS Router alarm and control. Each external alarm or control interface must use a dry contact interface.
 4. Radio status and performance information must also be made available via an SNMP NMS.

5.3.4 Microwave Radio Network Management Systems (NMS)

1. An NMS must be provided for the microwave radio network. The NMS must have at least two (2) points of access to its respective operating radio network, such that no single point of failure or ring operation will disrupt communication between the masters and their respective operating equipment network. There shall be two (2) NMS terminals located at:
 - Main Control Point Equipment Room
 - Collin County Dispatch Center Equipment Room
2. The NMS terminals must:
 - a. Be powered by 120 VAC/60 Hz from a UPS provided by Proposer to carry the planned load for at least four (4) hours;
 - b. Include a dedicated PC or workstation, with full capability to easily and effectively view all system graphics, monitor the status of any alarms, and operate any control points on the system;
 - c. Contain a graphical user interface (GUI), views including, at a minimum, an overall system map, a site detail of each site and an equipment rack or subsystem, suitable for viewing details of individual equipment shelf or module status;
 - d. Provide time-date-site-event logging and storage of individual alarms, faults, or status changes with sufficient storage capacity to record all events for a period of at least 40 days;
 - e. Include any and all PC's, monitors, mice, storage devices, servers, modems, routers, switches, cables, connectors, software and any other items or accessories necessary to make each master fully operational;
 - f. Include software and hardware as needed for configuration and provisioning management as well as performance monitoring of its respective network. and
 - g. Include long-term storage hardware and software tools for all logged alarms to be stored for a minimum of 10 years, while allowing efficient searching and retrieval of events for trend and after-action event analysis.

5.3.5 General Equipment Requirements for All Microwave Sites

1. All materials, design, and construction procedures must be in accordance with all applicable Federal, State, and local building codes
2. Shielding and filtering must be provided to prevent interference from, or to, other radio frequency equipment installed near or in the vicinity of the proposed equipment. The equipment must meet or exceed spurious frequency emissions, conducted, or radiated, as outlined in Part 15 of the FCC Rules and Regulations, Subpart J, Class B Computing Devices. Equipment must be operationally compatible with the other equipment at the sites including but not limited to the following types of equipment located adjacent to the microwave radio equipment:
 - a. VHF Base/Mobile Stations;
 - b. UHF Base/Mobile Station;
 - c. 700 MHz Base / Repeater Stations;
 - d. 700/800 MHz Hand-held Radios;
 - e. VHF/UHF Hand-held Radios;
 - f. DC Power Systems
 - g. Smoke detectors and heat sensors, and
 - h. Personal computers, servers, routers, etc.

5.3.6 DC Power System

1. All microwave site equipment (radios, alarms, except the waveguide dehydrator) must be powered by a positive-ground, 48-volt battery system furnished by the Contractor. Each system must include batteries, battery rack, or mounting hardware, float-type battery charger, low voltage disconnect, and DC load center. If the proposed batteries are not sealed, and eye wash station must be included.
2. The entire DC power system must be sized to accommodate the number of electrical circuits and the electrical load of the equipment specified in this project plus a future growth of 50% of load and circuits.
3. Each battery charger must:
 - a. Be modular and sized to power the full load (including the future growth identified above), as well as recharge a fully discharged battery plant in less than 24 hours;
 - b. Have sufficient filtering and regulation to power all or any portion of the load without the need for batteries;
 - c. Be provided with dual AC input circuits and circuit breakers (such that there will be no single point of failure), DC circuit breaker, DC voltmeter, DC current meter, current limiting, and high voltage shutdown circuitry and continuous float voltage adjustment;

- d. Have separate dry-contact alarm points for, at a minimum, low voltage, high voltage, charger failure, and loss of AC input;
 - e. Operate from 208 or 240 VAC, as appropriate to the site installation, and
 - f. Employ redundant rectifier modules, provided on a 1:N basis, such that no single failure will overload the remaining system, even with future growth included.
4. Each battery system must:
 - a. Be modular and of the stationary, sealed, valve-regulated, maintenance-free type;
 - b. Be designed for a minimum 10-year life expectancy; Proposer shall state the number of years that the batteries are warranted.
 - c. Have sufficient capacity to provide a minimum of 8-hours operation of the microwave site equipment including the future growth identified above;
 - d. Include a secure mounting rack or facilities and include protection from ruptured battery cells, and
 - e. Not require venting facilities or a special battery room.
 5. A wall-mounted DC load center with circuit breakers must be provided with the DC power system to provide protected DC distribution to all -48 VDC-powered equipment, including future growth.
 6. An automatic low-voltage disconnect must be provided to protect the batteries from over discharging.

5.4 MICROWAVE ANTENNA SYSTEMS

5.4.1 Microwave Antenna System Requirements

1. Microwave antennas must be selected by Contractor and be FCC-Part 101-Category "A" compliant, parabolic dishes.
2. All microwave antennas, regardless of size and frequency band, must be provided with protective radomes, standard four-inch pipe mounts, dual side struts and ice shields unless installed at the top of the structure and where ice from other structures cannot do damage.
3. Antennas, side struts, ice shield mounts, transmission lines, and grounds must be attached to the tower in accordance with the manufacturer's instructions and relevant EIA/TIA standards.
4. Antenna systems must use standard waveguide sizes and rectangular flanges of a consistent type to the maximum extent practical, to minimize sparing and tool costs.
5. All transmission lines must be either pressurized jacketed copper elliptical waveguide or jacketed copper coaxial cable in continuous lengths without splices, and must be installed in accordance with manufacturers' specifications.
6. Where transmission lines consist of elliptical waveguide, it must be of premium quality, use pre-tuned connectors, and include rigid and flexible waveguide sections that provide a measurable return loss equal

to or greater than 23 dB, as measured at the antenna port of the radio. Flex waveguide must not be used outdoors.

7. An AC-powered, automatic dehydrator of the mechanical, non-desiccant type, and all accessory equipment, including line monitoring for each waveguide and an overpressure relief valve, must be provided for every microwave site with a pressurized feedline.
8. The dehydrator must provide the necessary capacity for all of the waveguides and feedhorns with an anticipated leak rate of 1%, and provide sufficient capacity to maintain a stable pressure during a 19°C (35° F) temperature drop in 60 minutes.
9. All dehydrators must provide dry contact alarms for at least low pressure, high humidity, and excess run time alarms.

SECTION 6 – DISPATCH CONSOLES

6.1 OVERVIEW OF DISPATCH CONSOLES

6.1.1 Introduction

The purpose of this section of the RFP is to provide the requirements of the Collin County Sheriff's Office Communication Center facilities that will be deployed with the new P25 trunked radio system. The Collin County Sheriff's Office Communication Center is located at 4300 Community Blvd., McKinney, TX

Please note that additional detail regarding the dispatch console equipment requirements has been provided Section 13 – Pricing. Proposers shall review the communications consoles and equipment at the current Communications Center to familiarize themselves with the current console system environment. Site visits will be scheduled to provide the Proposers an opportunity to see the facilities on a first-hand basis.

A new Dispatch Console system shall be proposed that employs a state-of-the-art IP network architecture with GUI-based operator and supervisory positions. The operator positions shall be "user friendly", highly reliable, and incorporate radio control in a manner that shall provide for efficient and simple operation for the dispatchers and department personnel in any combination of configurations and functions available. The proposed system shall provide all of the necessary functions to control and monitor the radio system and related subsystems.

The proposed dispatch console system shall be a high-tier product specifically designed for use in a large-scale Public Safety/Mission Critical communications environment and shall be modularly expandable to support expected growth by the individual entities. The system shall be fully compatible with the associated Project 25 based trunked radio system infrastructure.

Collin County understands that much of the equipment and software for P25 trunked simulcast radio infrastructures is still vendor proprietary and that various vendors have added vendor specific functionality above and beyond what has been incorporated into the P25 Standards. Accordingly, for the initial system procurement, Collin County prefers that the dispatch console systems and the radio infrastructure be manufactured by the same company. This will allow for proper performance verification of all proposed system capabilities and functionality and will reduce the chance for problems and vendor finger pointing during the detailed system acceptance testing process.

6.1.2 Collin County Sheriff's Office Dispatch

The Collin County Sheriff's Office Communications Center currently has four (4) radio dispatch operator positions. In the new P25 system, the Sheriff's Office requires the following:

- Four (4) new IP-based radio dispatch operator positions to replace the four current positions;

One (1) new IP-based radio dispatch operator position to support a fifth position (Supervisor) in the dispatch area. New dispatch furniture is not required with this procurement. Collin County will require a conventional network interface into their new dispatch console system to support radio interoperability via the conventional stations depicted in Table 6.1.2a. The electronics and/or network equipment required to interface these conventional stations must be located at the Collin County Sheriff's Office Dispatch Center.

Table 6.1.2a: Collin County Sheriff's Office Dispatch Conventional Interface Requirements

Conventional Interface To:	Quantity	Station Location ??
New 700 MHz P25 Phase 2 Trunked Control Stations for "Site Trunking" Backup	20	Collin County SO Communications Center
DOJ East VHF Control Station	1	Wilmeth Road Site
DOJ West VHF Control Station	1	Wilmeth Road Site
Texas Law VTAC Mutual Aid VHF Base Station	1	Wilmeth Road Site
Existing 8CALL/8TAC 800 MHz Mutual Aid Base Stations	2	Wilmeth Road Site
New 7CALL/7TAC 700 MHz Mutual Aid Base Stations	2	Wilmeth Road Site
New 700/800 MHz P25 Phase 2 Control Stations for Interop with PAWM, McKinney, Frisco, Rockwall County, Garland, and Denton County	7	Collin County SO Communications Center

6.2 DISPATCH CONSOLE FUNCTIONAL REQUIREMENTS

6.2.1 General

1. The console system shall be designed to enhance the dispatchers' ability to communicate effectively with field personnel, perform resource management tasks and to minimize the effort and concentration required for efficient use and control of the trunked radio system. This shall in part, be accomplished through the use of high quality, LCD monitors for selecting dedicated channel and talkgroup control windows representing all base stations, repeaters, talkgroups, alert paging and auxiliary functions at each console.
2. To minimize operator confusion and the chance of errors being made, all channels, talkgroups and individual ID's shall be referred to and displayed by alphanumeric names. Numeric only references for talkgroup or channel names shall not be acceptable. Manually cross-referencing a channel name to a number shall not be acceptable for any dispatch operation.
3. It is desired that all control functions displayed be user configurable so that they can be organized on the viewing screen in the most efficient and flexible manner possible. The use of printed, paste-on and/or snap-on, mechanically engraved labels is specifically excluded under this specification.
4. Once customized for the individual user, screen configurations may be saved and easily recalled by a dispatcher when desired.
5. Each function within each channel/talkgroup control representation, and all other functions controlled through the console shall be color-coded with user definable color choices. These functions shall include but not be limited to audio activity indicators, transmit push-to-talks, volume controls, alarm conditions, etc. Keyboard/mouse operations shall be used to select and use all dispatch functions. Touch screen is not required.
6. All console positions shall have Supervisor Override capability for training and other purposes at any console.

6.2.2 Console System Reliability

1. Due to the critical nature of the Public Safety and Local Government services provided by the County and its Partner agencies, a high degree of console system reliability is required. The console system, to the greatest extent possible, shall:
 - a. Provide automatic on-going self-testing and diagnosis;
 - b. Be automatically self-correcting;
 - c. Alert the operator and dispatch supervisors in the event of component or sub-system failure;
 - d. Allow continued system operation in the event of failure of a console sub-system, through isolation of the defective sub-system and use of redundant components, and
 - e. Provide an audible and visual “trouble signal” upon a trunked system failure impacting communications as require by the National Fire Protection Association (NFPA 1221).
2. 24-hour dispatch centers such as the one included in this procurement are mission-critical and cannot be disabled. A high degree of modularity is required to reduce the number of sub-systems affected by a single component failure. The ability to repair, reprogram or replace sub-systems without impacting dispatch operations shall be provided and discussed in the proposal, as continued console operation is necessary during repairs.
3. Proposers shall recommend the spare modules and parts needed to promptly restore the console system to full service following potential sub-system failures. These costs shall be included in the overall system's recommended spare parts listing to be provided in the Pricing Section of the proposal.
4. The console system shall be interfaced with the simulcast infrastructure (including other interoperability radios), P25 System Management and Alarm System, and supply statistics and diagnostics identifying console sub-system issues and failures for the purpose of making service related inquiries.
5. The console system shall notify all Operator and Supervisory positions of a link failure between the console infrastructure and the Master Control Point.

6.2.3 Fallback Operation

1. In the event that primary and backup network links between the console system and the radio infrastructure are lost, or any failure otherwise causing all dispatch positions to be disconnected from the P25 simulcast trunked system, the console system shall revert to a fallback mode of operation utilizing on-site RF control stations to communicate with field personnel. Collin County understands that in this mode of operation, some of the trunked system's capabilities will not be available. In the Proposer's response to the Section 2 Comprehensive Failure Analysis & Reliability Features, the proposal must clearly address and describe what normal operational capabilities will not be available under link failure scenarios.
2. The fallback control stations shall be assigned to a dedicated channel select folder (screen) at the operator positions. When link connectivity is lost, a link failure message shall prominently appear

on the LCD display to notify the operator that the console system is no longer in contact with the radio infrastructure. The operator can then select the fallback operation folder (screen) and then the desired radio talkgroup to communicate with field personnel via the console and fallback control stations. The RF control stations connected to the dispatch console will utilize one (1) talkgroup each, thus it is not a requirement to switch talkgroups for the RF control stations from the dispatch console. It is also not a requirement for the RF control stations to pass PTT ID to the dispatch console.

3. There shall be a separate bank of fallback control stations provided for the dispatch center. They shall be rack mounted and installed in the equipment room at the dispatch center. Control stations shall utilize control station combiners where practical to minimize the number of antenna systems required.

6.2.4 Console Network Equipment Reliability

1. To the extent possible, the routers and switches associated with the dispatch console system shall be redundant, have redundant components, and provide redundant links back to the Main Control Point to prevent single points of failure disabling a large segment of the console system.

6.2.5 Dispatch Center Uninterruptible Power System (UPS)

1. Collin County currently has an APC UPS system that provides battery backup for all equipment in the dispatch area. There are two APC Symmetra LX 16KVA UPSs placed side by side. Call taker and radio dispatch equipment is staggered across the two UPSs to balance the load. At this time the two UPSs are loaded only 28% and 35%.

These existing UPSs will be able to accommodate the load of the new radio system dispatch equipment, even during the implementation period when both the old and the new dispatch consoles must remain operational. Thus proposers are not required to propose a new UPS for dispatch, but only the wiring of the existing UPSs into the new dispatch console equipment.

6.2.6 Console Operator Position Functionality

1. **Console Position PC Equipment** - Each of the radio dispatch consoles shall provide all controls that apply to the various channel/talkgroups and auxiliary functions for the console. Operator positions shall be PC based, utilizing modern, robust PC equipment and software operating systems in current production at the time the system is staged in order to help provide long service and equipment life. The PC shall be equipped with a heavy-duty keyboard and mouse, and an LCD display with a 24" diagonal measurement screen. The operator position software application shall be Windows based. The proposal shall identify the proposed operating system and provide a description of the PC equipment proposed for the project.
2. **User login accounts** – Each operator position and Supervisory position shall require a valid user login and security password to access the console system and its capabilities. The system shall provide multiple levels of access security for different levels of system usage.
3. **Talkgroup/Channel Select** – Each talkgroup or channel shall be capable of independent selection by the dispatcher. The channel window shall provide a visual window indication when the corresponding channel is selected and when that talkgroup is transmitting.

4. **Select Speaker** – A select speaker shall provide audio from the selected channels/talkgroups, with an independent volume control. A volume level display shall be provided for each channel as well as a select speaker audio level adjustment that ranges from silent to full volume. The option for the audio to not be completely silenced from a particular channel or talkgroup shall also be described.
5. **Unselect Speaker** – An unselect speaker shall provide audio from unselected channels/ talkgroups, with an independent volume control for the unselect speaker.
6. **Transmit Function** – A color-coded transmit push-to-talk (PTT) function shall be provided to control the selected transmitter(s) and/or talkgroup(s). The PTT function shall be capable of being enabled by a PTT button on the headset, a PTT indication on the LCD display, and by a foot switch at the position. As stated elsewhere in these specifications, for training and management purposes two headset jacks shall be included with each operator position, each of which shall operate identically.
7. **Station Channel Selection** – Controls shall be provided for all conventional channel interfaces for selecting between eight (8) different frequencies (modes) for a given conventional station.
8. **Station Repeat Enable/Disable** - Controls shall be provided for all conventional channel interfaces for enabling and disabling the repeat function for a given conventional station.
9. **PTT ID Display and PTT ID History** – The PTT ID of the last subscriber unit to transmit must be prominently displayed on the GUI. By scrolling, the dispatcher shall be able to immediately see a history of the last 50 PTT ID's.
 - a. A separate PTT ID display must be provided for the selected channel, and for each talkgroup and conventional channel.
 - b. PTT ID entries must also display a time stamp.
 - c. If the PTT ID has been assigned an alphanumeric alias, the alias must be displayed rather than an electronic serial number or Trunking ID code that would require the dispatcher to manually look up the user assigned to that radio.
 - d. Aliases must be maintained in a single, common database accessible from all workstations.
 - e. Aliases must support a minimum length of no less than sixteen characters.
 - f. Aliases may contain any character defined in the ASCII character set.
10. **CTCSS Monitor or Disable Function** – This shall disable the receiver's CTCSS decoder of the selected base / repeater station(s) for monitoring purposes.
11. **Console Clock** – A console clock shall display time in a twelve or twenty four-hour format (user selectable) and day of the year (HH:MM:SS day) at each operator position. The Proposer shall evaluate existing Communications Center time sync systems and propose a methodology for the new dispatch consoles to sync with existing CAD, logging, and network systems.
12. **VU Meter or Display** – This shall present a visual indication of transmit audio levels.

13. **Keypad** – The console shall contain a keypad or screen representation of a keypad for numeric data entry.
14. **Microphone** – A high-quality microphone shall be provided, high fidelity, frequency response 20 Hz – 10,000 Hz or more, with a maximum of 1% distortion at normal sound pressure levels.
15. **Intercom** – An easy to use console intercom function shall be provided between all operator and supervisory positions in the dispatch center. A visual display shall be provided to identify both the calling and called parties by console name. Multiple simultaneous intercom conversations between individual consoles shall be possible.
16. **Talkgroup/Channel Cross Patch** – This function shall allow cross-patching talkgroups and channels to permit intercommunications. As participants are added or deleted, there shall be no variation in audio levels or quality. All patched audio shall be digitally processed. A patch shall utilize a single trunked channel resource when patching more than one talkgroup together. Dispatch Consoles must have the capability to patch between:
 - a. Any trunked talkgroup and one or more other trunked talkgroups;
 - b. One or more trunked talkgroups and one or more conventional channels;
 - c. Any conventional channel and one or more other conventional channels;
 - d. There shall be no limit to the number of talkgroups or channels that may be included in a single patch. There shall be three types of console patches:
 - Hard – permanently pre-programmed patches, which the dispatcher cannot modify.
 - Soft – predefined patch, which may be activated or deactivated from the console.
 - Dynamic patch – temporary patch created and controlled at the console level.
 - e. Active hard patches must be displayed to the console operators through the console workstation GUI, but the console operator must not have the capability to knock down the patch.
 - f. A soft patch may be added to or removed from a hard patch at any time and in the same manner as the soft patch.
 - g. Talkgroups and conventional channels may be added to or removed from an existing hard or soft patch.
 - h. Often-used patch configurations may be stored and recalled for later use. Recall of a stored patch configuration must be through the console workstation GUI via a drop-down box or other method convenient to the console operator.
17. **Talkgroup Call** – The console system shall support trunked talkgroup calls on any talkgroups programmed into the system, with appropriate management approvals.
18. **Trunked Announcement Group Calls** – The console system shall support trunked announcement group calls on any announcement groups programmed into the system, with appropriate management approvals.

19. **Trunked Emergency Calls** – The console system shall support trunked emergency calls from any user radio programmed into the system, with appropriate management approvals.
20. **Private Call** – Selected users and dispatchers shall have the ability to selectively communicate “privately” with another individual on the system regardless of what talkgroup either unit is in. The call shall allow the two users to utilize a single channel resource to communicate without the participation of other units in their respective talkgroups. Private calls will be visually identified on the dispatch console and on the user's radio for management purposes.
21. **Selective Alert** – Selected users and all dispatchers shall have the ability to selectively send and receive alerts to and from an individual user on the system regardless of what talkgroup either unit is on. The call shall allow an individual to alert another user with a distinctive tone and their individual ID (ID on display radios only). The alert shall be accomplished over the signaling (control) channel and shall not affect any voice channels on the system.
22. **Remote Monitoring** – During an emergency situation, it may be necessary to open (enable) the microphone of a user radio. Proposers shall describe how that functionality is achieved.
23. **All Mute** – All console positions shall provide a one button “All Mute” function that will temporarily mute or un-mute all incoming radio traffic audio to that position. An adjustable time-out-timer shall automatically cancel the all mute function after a pre-determined time has elapsed.
24. **ID Display Queuing** – The console shall provide for queuing of at least ten plain ID's (ID scroll list) on the channel window for standard and emergency calls.
25. **Maximum Number of Aliases** – Proposers shall state the maximum number of unit and talkgroup aliases that can be displayed on the console and that are available on the system.
26. **Unselect All Receiver Mute Function** – A function that will immediately mute the received audio from all unselected channels shall be provided. This condition shall be indicated visually, and be automatically canceled by a user adjustable time-out timer.
27. **Simultaneous Select** – Controls shall be provided that allows the operator to manually select any combination of console controlled channels or talkgroups for simultaneous transmissions (multi-select). Three selectable combinations shall be allowed at the discretion of the dispatcher. The combined transmission shall utilize a single trunked channel when involving more than one talkgroup. All selected channel receive audio is routed to the Select speaker and headset(s).
28. **Instant Transmit Function** – Each operator position (including Supervisors) shall provide an instant transmit function which will allow the dispatcher to quickly key up a talkgroup by depressing the instant transmit “button”.
29. **Emergency/Reset** – All consoles shall be capable of declaring and receiving emergency alerts from user radios and other operator positions operating on the trunked radio system regardless of the status of the channel control window. Emergency messages shall be indicated by a flashing red ID, an emergency ID character and an audible alert. Dispatcher acknowledgment of the message shall silence the audible alert and stop the flashing display. The console system shall be capable of queuing multiple emergency messages in the display stack and the emergency ID character shall continue to flash until all messages have been viewed by the dispatcher. The most recent emergency declaration shall be displayed and the dispatcher shall be able to easily scroll through

the queue to view queued emergencies. If no console is monitoring the talkgroup, the dispatch console must be capable of routing the emergency signal in the following manners:

- a. All Consoles;
- b. No Consoles (emergency signal is discarded);
- c. One or more consoles which have been pre-selected to receive emergency signals from that talkgroup in the event the talkgroup is un-monitored;
- d. The disposition of emergency signals from un-monitored talkgroups must be configurable by an authorized System Administrator on a talkgroup-by-talkgroup basis;
- e. The routing of emergency signals may be changed at any time by an authorized System Administrator without the need for a re-start of software or hardware;
- f. Changes must take place immediately;
- g. The response time to display the emergency condition at the console position(s) must not exceed three (3) seconds;
- h. The display must identify PTT ID alias (if one is defined) of the subscriber unit initiating the emergency signal. Otherwise, the PTT ID must be displayed;
- i. The audible and visual alerts must continue to be activated until the operator of one or more consoles acknowledge the emergency signals. Acknowledgement of the alarm at one console must silence other consoles, but must not cancel the emergency condition;
- j. A separate action (other than the acknowledgement) must be required to “clear” the emergency and return the system to normal operation;
- k. Acknowledgement of the alarm must send an electronic message to the initiating subscriber unit, which, if it is so programmed, must cause it to activate a light or another display to indicate that a dispatcher has acknowledged the emergency signal;
- l. The electronic acknowledgement must not take the place of, or interfere with, a voice acknowledgment that may be made by the dispatcher;
- m. The emergency condition must be cleared by either of the following methods (both methods must be available and functional).
 - An action by the dispatcher through the console workstation, or.
 - An action by the user through the user’s subscriber unit.
- n. The Emergency feature shall be programmable to allow the alert message to be delivered and displayed in predefined ways, including display on the current talkgroup in use by the person declaring the emergency, and display on a separate pre-defined talkgroup.

30. **Alert Tones** – The console system shall provide to the operator a minimum of five distinct over-the-air tones (three preset and two user configurable) to be used for alerting purposes. Each alert tone

shall be immediately broadcast on the selected talkgroup, group call or all call, when activated. Tones shall be presented in the headset as side-tone audio only, at a reduced volume level to confirm that the tone was generated and sent. The operator shall have the ability to import and assign WAV files to an alert tone button. The following selections shall be available as a minimum:

- a. **Alert 1:** 1000 Hz Steady Alert Tone
 - b. **Alert 2:** Warbling Tone
 - c. **Alert 3:** Pulsed Alert Tone
31. **Paging Encoders** – Each console operator position and Supervisory positions shall include a multi-format paging / signaling encoder that is accessible through the data entry keypad and a one button per station encoder panel. The encoder shall be capable of encoding industry standard two-tone sequential and DTMF signaling formats.
 32. **Preprogrammed Single Button Function Paging** – Each console shall be capable of supporting 250 pre-programmed single-button paging functions.
 33. **Talkgroup/Channel Busy Indicator** – Consoles shall have channel busy indicators to visually indicate that the channel is in use by another console.
 34. **Individual Volume Adjust** – Shall be provided for each talkgroup or channel on the console. Associated color-coded status indicators shall continuously show whether the channel is in the full or adjustable volume mode. The volume control shall be automatically bypassed when a channel is placed in select status.
 35. **Channel Name** – Designated channel control modules or windows shall include a minimum of twelve character alphanumeric display symbols to identify the channel.
 36. **Talkgroup/Channel Cross Mute** – Consoles shall include a cross mute feature, which precludes voice communication from a dispatcher's microphone being repeated over loudspeakers at other consoles in the dispatch center.
 37. **Supervisory Control** – The supervisors' consoles shall provide takeover control to prevent other dispatch consoles from keying repeaters or base stations for each channel supported by parallel consoles. Supervisory consoles shall be capable of overriding transmissions from other consoles and field units.
 38. **Repeat Disable** – The Supervisors' positions shall be equipped with the ability to disable received audio from being repeated, as needed.
 39. **Headset and Jack** – Proposers shall describe wireless dispatcher headsets available for use with the proposed operator positions. The headset jacks shall support both radio and telephone audio operation in the new console system.
 - a. The console operator position shall provide independent level settings for audio input from the headset microphone and the console microphones, such that dispatchers may freely switch operation between microphones without affecting dispatch audio volume or quality.

- b. Dual headset jacks shall be provided at each console operator position. The jacks shall provide TX and RX audio and PTT as well as telephone support. Separate headset volume controls for radio and telephone audio output shall be provided. Insertion of headset or telephone handset plug into jack will automatically disable the console microphone.
40. **Footswitch** – Each of the console operator positions shall be equipped with a dual footswitch. The footswitch shall be heavy duty, designed for Public Safety use, and shall be designed so as not to skid on a smooth flooring surface.
41. **Priority/Emergency Channel Marker** – A low volume tone pulsed at user defined intervals must be available to indicate that the channel/talkgroup is handling emergency traffic. The tone must be easily distinguishable from other tones used for other functions.
42. **Individual Alert Capability** – Dispatcher console workstations must have the ability to initiate Individual Alerts to any subscriber unit, regardless of current talkgroup affiliation. The desired subscriber unit must be selected by the PTT ID alias, if one is defined, or by the PTT ID.
43. **Individual Call Capability** – Dispatcher console workstations must have the ability to initiate an Individual Call to any subscriber unit, regardless of current talkgroup affiliation. The desired subscriber unit must be selected by the PTT alias, if one is defined, or the PTT ID.
44. **End-to-End Encryption** - The console system shall provide a high level of security by providing end-to-end AES encryption of selected talkgroups that are configured for encrypted operation. The system must provide an Encrypted/Clear selector for each talkgroup.
- a. The talkgroup control window must indicate clearly and prominently whether the talkgroup is currently in the encrypted or clear mode,
 - b. Talkgroups must be programmable to be either encrypted or clear by default. Manual selection of encrypted or clear by the dispatcher must override the default programming.
45. **Instant Recall Recorder (IRR)**
- a. Each of the console operator positions and Supervisory positions shall be equipped with an instant recall recorder capable of allowing the operator to quickly retrieve and playback recent radio traffic and recent telephone calls at the operator position. The recorder playback display must be integrated as part of the Radio Dispatch Console screen. The recorder shall be capable of recording and replay of the latest incoming radio traffic from any radio channel or system talk group selected on the radio dispatch console for transmission and the latest radio transmissions received on the selected talkgroup or channel at that position.
 - b. The IRR must be capable of storing at least 30 minutes (proposer shall state maximum available at the proposed cost) of message material in solid state dynamic RAM or on a hard drive to allow instant access to recorded information. Simultaneous record and playback shall be possible, with incoming calls taking priority. Recording shall begin whenever an audio signal or off-hook telephone condition is presented to the recorder input. The system shall enable an operator to save a message for future referral or re-recording.
 - c. The system shall be capable of playing a message back at reduced speed, without a change in voice pitch. The range in speed variation shall be at least 2:1, but a greater range is desirable.

- d. The control panel shall contain at least the following controls:
 - Fast Forward;
 - Fast Rewind;
 - Pause;
 - Restore;
 - Save;
 - Clear, and
 - Volume Control.
- e. Proposers shall describe what will be displayed in the IRR control window such as the alphanumeric display showing such information as message length, message ID, radio user ID or alias, number, date, time.

6.3 FIRE STATION ALERTING SYSTEMS

6.3.1 Introduction

There are currently eleven (11) Volunteer Fire Departments in Collin County. Nevada FD has two (2) Fire Stations and Celina FD has recently broken ground to build a second Station, which will be operational by the time the proposed system is in place, making a total of fourteen (14) stations to be alerted. The stations and Fire Fighters are alerted in the following manner.

Following creation of the CAD Fire Dispatch Incident, CAD makes an automatic recommendation for the Station(s) to be alerted. As soon as this recommendation is approved by the Dispatcher, the CAD system, provided by Integrated Computer Systems in McKinney, TX, automatically transmits messages to the Firefighters assigned to the Station(s) to be alerted.

The message may be sent in two different methods; (a) through the use of an “Active 9-1-1” system which sends the CAD incident data to the Firefighters Smartphone or (b) to the Firefighters Smartphone using the individuals Yahoo Email account.

Following the CAD transmission to the Firefighters Smartphone, the Dispatcher moves to the Dispatch Radio Console, selects one of two Fire Department Talk Groups and an icon for that individual Fire Station and, from the Radio Console sends out (twice) a two-tone alert to the selected Station. The Dispatcher then continues to use the selected Talk Group to orally announce the Fire Dispatch incident particulars. Over half of the Stations are manned 24/7 so the tone alerting is a critical part of the overall system.

The eleven (11) Fire Departments within Collin County are listed in the table below.

Table 6.3.1a Fire Departments Throughout Collin County

Fire Station	Address
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City of Anna FVD	305 South Powell Parkway, Anna, TX
City of Blue Ridge VFD # 1	203 West FM 545, Blue Ridge, TX
City of Blue Ridge VFD # 2	200 S. Main, Blue Ridge, TX
City of Celina VFD	1413 Preston, Celina, TX
City of Farmersville VFD	134 North Washington St., Farmersville, TX
City of Josephine VFD	201 West Hubbard Rd., Josephine, TX
City of Lowery Crossing VFD	1407 Bridgefarmer Rd., Lowery Crossing, TX
City of Melissa VFD	1933 East Melissa Rd., Melissa, TX
City of Nevada VFD – Station # 1	110 West FM 6, Nevada, TX
City of Nevada VFD – Station # 2	501A Lincoln St., Lavon, TX
City of Princeton VFD - Station # 1	510 Woody Dr., Princeton, TX
City of Princeton VFD - Station # 2	TBD
City of Weston VFD	203 Main St., Weston, TX
City of Westminster VFD	311 East Houston St., Westminster, TX

6.3.2 Requirements for New Fire Stations Alerting System

There are currently eleven (11) Volunteer Fire Departments in Collin County. Nevada FD has two (2) Fire Stations. The Collin County two-tone analog Fire Station Alerting system will no longer function in a P25 Digital radio system. Accordingly, Proposers shall include a state-of-the-art replacement Fire Alerting System in their proposal that is compliant with the station alerting guidelines in NFPA 1221. The basic requirements of the new Fire Alerting System are outlined below:

1. The new Fire Station Alerting system must provide, at a minimum, the same functionality as the current radio system provides.
2. The new Fire Alerting System shall provide fire alerting to the existing fourteen (14) Fire Stations listed in the table above, and shall be expandable to at least twenty (20) Fire Stations in total.
3. The new Fire Station Alerting system must provide fire alerting signals from the Collin County Communications Center, at all dispatch operator positions.
4. The new Fire Station Alerting system user interface may be integrated into the radio dispatch console screen or may provide a separate user interface from the radio dispatch screen.
5. The new Fire Station Alerting system must provide an “All Call” that will instantly alert all stations and must provide the same functional capabilities as the current system has.
6. The connectivity for the new Fire Station Alerting system is left up to the Proposer, as long as single points of failure are avoided. The current system utilizes 800 MHz radio for station signaling and the verbal information relating to the dispatch incident is followed using the same 800 MHz Talk Group. As part of your response to this RFP, provide a detailed description of your proposed Fire Station

Alerting solution, along with itemized cost and any brochure level information available that may further clarify your proposal.

6.4 VOICE LOGGING RECORDER SPECIFICATIONS

6.4.1 Background Information

Collin County will be installing a new P25 digital two-way radio system, which must be connected to a Voice Logging Recorder. The County currently operates a "Higher Ground Capture 911 1.v.7" Logging Recorder. For additional technical information related to the existing Voice Logger, contact Mr. Bill Behar (bbehar@comelectronics.com) of Commercial Electronics, 1318 North Brazos, San Antonio, TX. It shall be the Proposers responsibility to review the existing Logger to determine if it can be upgraded to support the new P25, Phase II radio system recording requirements while continuing to record the existing, connected services and circuits. If an upgrade is possible, then your cost quotation must include, as a separate line item, the proposed cost for the upgrade.

If it is not possible to upgrade the existing Voice Logging Recorder, then you must propose a Voice Logging Recorder which can record your proposed radio system and meet the requirements described in Section 2.0 of this document.

The Higher Ground Voice Logging Recorder is equipped for 160 channels and currently records the following:

- Six (6) analog 800MHz Trunked Radio Channels. These will need to be retained while testing the new P25 system.
- Thirty-three (33) VoIP telephone lines.
- Five (5) 9-1-1 Call Take positions
- Ninety-five (95) Trunked Radio Talk Groups from LORI/LOMI Cards in the CEB. In the new P25 system, the radio traffic from these Talk Groups should be captured by the Logger and "De-Trunked" as part of the search capability to search on Time/Date, Talk Group, and Radio ID or Alias.
- The Logger also provides Instant Recall Recording (IRR) capability, which is displayed on the current Radio Dispatch Console screen.
- Additionally, the current Logger has the capability of screen capturing CAD Dispatch Incident Screens and associating the screen captures with the voice recordings of the incident (telephone and radio).

6.4.2 Upgraded/New Voice Logging Recorder Requirements

In addition to the provision of current capabilities, the upgraded/new Voice Logging Recorder must provide the additional channel capabilities below:

- Eight (8) new P25 Trunked Phase 2 TDMA radio channels (depending on logger configuration, may require two recording channels for each TDMA voice channel).

- Forty (40) new conventional channels; Backup Control Stations, NPSPAC, National Mutual Aid and VHF

6.4.3 Voice Logger Requirements in a Replacement Logging Recorder

If the existing Higher Ground logging recorder must be replaced, then the replacement logging recorder must also be a Higher Ground logging recorder. In addition to current capabilities, any replacement logger must conform to the following specifications:

1. A logging recorder is required in order to log all talkgroup audio traffic from the trunked radio system, and all voice traffic from the 9-1-1 Call Take positions. Proposers shall clearly explain their particular solution.
2. The system shall be a state-of-the-art IP network architecture based logging system with GUI based operational controls and administrative control that is "user friendly", highly reliable, and incorporate audio logging in a manner that shall provide for efficient and simple operation by the dispatchers and department personnel in any combination of functions available in the system. At a minimum, the new system shall provide time stamped recordings that include the following:
 - a. Date of the recorded transmission
 - b. Time of the recorded transmission
 - c. Radio Talkgroup of the recorded transmission
 - d. Radio system ID's of transmissions within the recording
 - e. The system shall have the capability of reconstructing trunked radio system conversations.
 - f. The ability to record analog radio resources that might include back-up control stations or interoperability base / control stations.
3. Recorder inputs shall be available to interface with the E9-1-1 Telephone System., If the current recorder is to be replaced, it is essential that responding Proposers be familiar with the current system and duplicate all of its current features as well as those required with the new system.
4. The recorder system shall interface to a P25 Phase 2 trunked radio system that has eight (8) total channels, thus fourteen (14) total talkpaths.
5. Proposers shall provide information about their storage methods offered in their solution with a complete description of its initial capacity and expansion capabilities.
6. Proposers shall provide a thorough description of the solution proposed.
7. All equipment supplied under this specification must be completely operational when installed. After the equipment has been tested and accepted by the County, the Contractor must provide repair parts and labor for a minimum period of one year following the P25 system acceptance and must replace any parts, which become broken or defective, except because of accident or misuse during such period at no additional charge.

8. The equipment furnished under this specification must be designed for continuous duty operation 24 hours per day, 365 days per year. If additional servers are required, they must be equipped with an internal, hot swappable, RAID-5 hard disk configuration, and hot swappable power supplies.
9. The RAID-5 disks must be capable of storing 500,000 talkpath-hours of Project 25 Phase 2 voice.
10. The System must be capable of recording and "de-trunking" all of the trunked radio system channels. "De-Trunking" includes the ability to search for replay by, at a minimum, date, time, talkgroup, radio ID, or radio alias name. Conventional channels must also be recorded. This may include control / base stations.
11. Concurrent Users – Access for monitor/replay functions must be available for a minimum of six (6) concurrent users.
12. Search Parameters – The user should be capable of defining any available search parameter. Proposer should list all parameters capable of being defined, and which parameters are not capable of being defined.
13. Tagging and Filing Multiple Recordings – The system Search & Replay software must be capable of "Tagging" a single recording in a manner which will allow a search by that individual "Tag." It must also be capable of saving large number of recordings into a single file, the Proposer will define the maximum number/size of recordings in the Proposal. It must be capable of allowing Naming of the file up to 32 alphanumeric characters and playing the recordings from the file, when selected, in date/time sequence. It must allow additional recordings to be added at any time after the file has been created.
14. Non-Affecting Operation – The system must continue to record all channels during any mode or multiple remote accesses to the Search and Replay operations. The Search and Replay operations must not affect the continuity of recording operations in any manner.
15. Security Levels – The system must provide at least five levels of security with assignable password and user ID protection for each access capability.
16. The system must be capable of setting customizable parameters per channel when no recording has taken place for a defined and adjustable (from at least one hour to twenty four hours) time period. An alarm will be sent when the condition has been met (e.g., "No Recording at Fire Dispatch Position Number 6 for the past hour"). The new system must detect and report any differences between the data collected, as well as alarm when the backup system is being used.
17. Error Record Log – The system must provide an error log to maintain records of all alerts, faults, error messages, and conditions. The system should also track and make an audit trail of all user access and maintenance functions, recording who accessed the system, at what time and date and for what purpose.
18. Diagnostic Center – The Proposer shall describe any automatic failure reporting capabilities if available such as automatic placement of a report to a Contractor-supplied diagnostic center in the event of a failure or alert. When this feature is incorporated into the system, the Contractor or Contractor's designated representative will initiate a service call to dispatch a service technician.

19. Real-Time Channel Monitoring – The system must provide real-time channel monitoring at all system access locations.
20. Diagnostic Help Screens – The system must provide diagnostic help screens to assist in areas such as alarm definition and operations such as how to change recording media.
21. Review Back-up – The system must provide a review capability, allowing backup in at least five (5) second increments.
22. Media Remaining Indicator – The system must provide a media remaining indicator measuring actual time remaining or actual percent of time remaining on the media, along with 10% and 5% visual and audible time remaining warnings.
23. Hot Spares – As an option to the County, the Proposer must include pricing for an optional pre-installed “Hot Spare” drive within the RAID array, which will automatically replace a failed drive.
24. On-Site Spare Parts Kit: Provide cost of On-Site Spare Parts Kit and recommended components.
25. Redundant Server Capability: If the proposed system upgrade can be equipped with a redundant (backup) server that will automatically activate in case of primary server failure, provide the cost and describe how it is activated and what alarms are provided upon activation.
26. Archive to Network Attached Storage (NAS): If Proposer can provide the capability to archive recorded data to a Customer Provided NAS, describe how this is accomplished, and provide the cost to do so. This function must occur over the Customer network. Solutions using transcribed DVD disks are not acceptable.
27. Record retention. The current system records about 270 hours of information per month. Collin County needs storage capability to retain these records for a period of three (3) years.

SECTION 7 – EQUIPMENT SPECIFICATIONS

7.1 TECHNICAL SPECIFICATIONS – FIXED EQUIPMENT

7.1.1 Main Control Point Trunking Controllers and Servers

1. Functional requirements for the Main Control Point trunking controllers are detailed in Section 2 of this RFP.
2. **Environmental:** It is expected that the Main Control Point trunking controllers and servers will be of an architecture that requires a temperature and humidity controlled environment.
 - a) Operating Temperature: 10° to 35° C
 - b) Operating Humidity: 10% to 95% non-condensing
3. **Radio Frequency Fields:** Equipment shall be properly shielded to allow proper operation in equipment rooms or buildings occupied by base station transmitters, with associated strong RF fields.
4. **Duty Cycle:** Equipment proposed shall be rated for continuous duty.
5. **Unit ID Capabilities:** The system shall be equipped with a minimum of 50,000 radio user licenses. The Proposer shall also describe what is required and the associated costs to add additional IDs in the future.
6. **Alarms and Diagnostics:** The trunking controllers and servers shall provide monitoring and trouble alarms for key operational parameters. The Proposer shall describe how these functions are being provided.
7. **Equipment Brochures:** Brochures that describe the equipment, and list the specifications, shall be included in the Proposal for each type of controller used in the system.

7.1.2 Simulcast Control Point Trunking Controllers

1. Functional requirements for the Simulcast Control Point trunking controllers are detailed in Section 2 of this RFP.
2. **Environmental:** It is expected that the Simulcast Control Point trunking controllers will be located in an equipment shelter making them more susceptible to temperature and humidity variations.
 - a) Operating Temperature: -30° to 60° C; and
 - b) Operating Humidity: 10% to 95% non-condensing.
3. **Radio Frequency Fields:** Equipment shall be properly shielded to allow proper operation in equipment rooms or buildings occupied by base station transmitters, with associated strong RF fields.
4. **Duty Cycle:** Equipment proposed shall be rated for continuous duty.

5. **Alarms and Diagnostics:** The trunking controllers and servers shall provide monitoring and alarms for key operational parameters. The Proposer shall describe how these functions are being provided.
6. **Equipment Brochures:** Brochures that describe the equipment, and list the specifications, shall be included in the Proposal for each type of controller used in the system.

7.1.3 Inbound Traffic Comparison Process

1. A methodology shall be provided to collect all incoming voice and trunked data traffic received by the trunked repeater stations at the various sites in the trunked simulcast system. Via a comparison process, the system shall derive the best quality signal to redistribute to the simulcast transmitters and to the dispatch consoles.
2. As described in Section 2 of this RFP, the system shall include geographically separated components that provide this comparison process to provide a high level of failure protection.
3. If the comparison process is performed by a dedicated hardware device, the device shall provide a visible front panel indication of the operation of the voting comparison regarding the number of receivers (per talkpath) that are receiving a signal and the receiver selected as the “voted and selected” receiver. In addition, a “receiver fail” indication shall be provided for each voting receiver and for each talkpath in the event the receiver is not functioning as part of the voting process. If a front panel indication is not available, the Proposer shall describe what means is available to provide an on-site an indication that the comparator is functioning.
4. The comparison process shall allow for shifting between P25 Phase 2 and P25 Phase 1 operation automatically upon detection of the call type.
5. The Proposer shall thoroughly describe their proposed system’s methodology for providing these requirements.
6. The comparison process shall employ a form of diagnostics and configuration management capability and this capability shall be described in the proposal.

7.1.4 Trunked Network Equipment

1. The County requires a network that employs VoIP and IP simulcast technology for all system services on the network. The proposer shall describe the proposed systems, proposed IP architecture, and shall state whether the proposed components (routers, switches, etc.) are commercial off-the-shelf (COTS) devices or have been modified in any manner that would make those devices no longer available from a variety of procurement sources. Any modifications to a manufacturer’s standard item of equipment shall be explained and its impact on operation, serviceability and maintainability noted. The County prefers components that can operate effectively and with little or no failures for the extended and continuous use environment consistent with public safety operations.

2. Network equipment includes, but is not limited to, the following:
 - a. Site routers;
 - b. Site LAN/WAN switches;
 - c. Site servers;
 - d. Firewalls;
 - e. Site audio switches;
 - f. System/site controllers; and
 - g. Other network components unique to the trunked system architecture.
3. For the Proposal, all such network equipment shall be identified by manufacturer and by model number. In addition, the operating system software version used by each network equipment item shall be noted, as well as the software version of any application specific software required by the individual item of equipment.
4. Network Time Synchronization:
 - a. For all network and trunked radio sites that require a time and/or frequency source, the Proposer shall provide an ultra-stable modular frequency and time standard. The device shall utilize highly stable rubidium oscillators that are disciplined via the GPS system. Once synchronized to GPS, the device shall employ software algorithms to maintain an extremely high degree of precision for all outputs. The Proposer shall state and clearly explain the need for and the type and number of time sources needed and proposed in the system.
 - b. The time and frequency system shall employ, at a minimum, the following:
 - 1) A redundant configuration with dual GPS antenna system, GPS receivers, oscillators and power supplies;
 - 2) Hot swappable, plug-in functional modules;
 - 3) Low phase and spurious noise on sine wave outputs; and
 - 4) USB and Ethernet network interface with fault sense and alarm capability. The presentation of any alarms to the network/system management and alarm reporting system shall be fully explained.
 - c. The device being proposed shall be described in detail in the Proposal and an equipment brochure shall be included that provides the manufacturer's information and lists the specifications of the time and frequency system;
 - d. The proposer shall identify the amount of time the Master Time source can maintain accuracy and appropriate simulcast synchronization without a GPS signal and stay within acceptable specifications needed to maintain normal trunked system operation.

7.1.5 Repeaters – 700 MHz

1. Trunked radio repeaters are to operate within the entire 700 MHz Public Safety band and shall be continuous duty, solid state, transmitter/receiver combinations. The trunked repeater stations shall be equipped with receiver voting which will operate in conjunction with the system's voting comparators. The repeaters shall accommodate the mounting in either 19" open racks or equipment cabinets.
2. Metering shall be provided for the repeaters to monitor all points in the transmitter and receiver circuitry needed to maintain, align and adjust these radios. The methodology for metering shall be described in the Proposal.
3. All equipment, at time of delivery, shall be FCC type accepted for the proposed application, and Proposals shall provide the type acceptance numbers in their Proposals. Any proposed radios that are not yet FCC type accepted shall be disclosed in the proposal.
4. It is essential that all equipment including receivers, transmitters, terminated circulators, filters, watt meters and any other RF carrying assemblies be supplied with high quality type "N", "HN", "LC", Series "C", BNC, DIN or EIA flange constant impedance connectors or approved equivalent. No adapter shall be utilized with equipment or assemblies to convert from one type of connector to the specified types.
5. The stations' receiver and transmitter antenna systems shall utilize separate antennas and transmission lines in accordance with the Proposer's recommendations. In any event, the receiver and transmitter must be capable of simultaneous operation with the antenna configuration supplied without any degradation to the system. Also, of the radio equipment shall be protected from other co-site in-band and out-of-band transmitters and shall permit full duplex continuous operation without degradation at each site in the system, with all co-site transmitting equipment activated.
6. Additional Repeater technical specifications are listed in Table 7.2.3a later in this RFP section.

7.1.6 Antenna Systems:

1. **Trunked Radio Site Antennas:** The Proposer shall select the transmit and receive antennas required for their system design in order to obtain the coverage footprints and signal density as shown on maps provided in the proposal.
 - a. Separate transmit and receive antennas shall be used at each site and shall be selected by the Proposer so as to provide optimum radio coverage.
 - b. Appropriate antenna mounting hardware, including any mounting brackets, shall be supplied and shall be fabricated from 17-7 PH stainless steel or equivalent.
 - c. As part of system implementation, to ensure that antennas and lines meet specifications after installation, all trunked station antennas and transmission lines shall be sweep tested with a Time Domain Reflectometer (TDR) or approved antenna system analyzer. A test sweep shall also be made using a frequency domain reflectometer or approved antenna system analyzer at the operating frequencies with the antenna attached. A chart recording of test measurements shall be made and retained in the Site Log. No Variable Standing Wave Ratios (VSWR) in excess of 1.25:1 is permitted.

- d. The Proposer shall note that the four existing trunked radio towers must support both the existing and new antenna systems during the implementation period, and shall confirm this capability per the requirements in Section 4.
2. **Transmission Lines:** All RF transmission lines used at the trunked radio sites shall be low density foam (LDF) transmission lines or equivalent for any cable runs exceeding 15 feet for receive or transmit purposes. Proposers shall utilize industry practices to select the appropriate size transmission line for each installation. Lines shall be selected to minimize line loss as needed to meet coverage requirements.
- a. For short runs, i.e., less than 15 feet, “super-flexible” or equivalent cables are authorized.
 - b. All connectors used shall be high quality type "N", "HN" Series "C", "LC", BNC, DIN, EIA flange, or approved equivalent and must be fully compatible with directly associated equipment or jumpers in the system. Care should be taken to ensure that the power rating of all connectors is not exceeded by the system’s Effective Radiated Power (ERP). Connectors must be of non-ferrous construction. No splices or adapters shall be used under any circumstance. However, it is permissible to utilize different connectors on opposite ends of a cable to avoid the use of adapters. When transforming from one diameter cable to another, it is acceptable to use flange reducers, so long as the cable VSWR specification is achieved.
 - c. Care must be exercised in the installation of all connectors. A loss in excess of 0.25 dB per connector is not acceptable. In addition, any connectors/connections used outdoors must be protected from corrosion and be fully weatherproof. The use of vinyl tape is not acceptable for any purpose whatsoever.
 - d. The Proposer shall determine and install the correct transmission line lengths for each site and understand the specifics of each site that may call for special routing and/or installation of the transmission lines. All cables must be secured with stainless steel clamps and hardware consistent with conditions at the site. The use of coaxial adapters and/or splices is prohibited.
3. **Transmitter Combiner:** The Proposer may employ any type of suitable transmitter combiner that meets or exceeds the following parameters:

Table 7.1.6a – Transmitter Combiner

General	Expandable transmitter combiners shall be provided which will provide multiple inputs. The Proposer shall examine the transmit frequencies specified in Section 2 to ensure a low loss combining system. Multiple combiners may be needed given this requirement.
Power Rating	The combiner shall provide sufficient operating margin to allow the operation of multiple transmitters at the full output power selected by the Proposer with all transmitters keyed continuously
Isolation	Transmitter isolation required as a result of an E.M.C. Study performed by the Contractor shall be an integral part of the combiner. Isolators shall be equipped with RF terminating

	loads rated for the full output power of the transmitter
Frequency Separation	The combiner shall accommodate a minimum of 250 kHz frequency spacing
VSWR	1.25:1 or less
Mechanical	Shall be mounted in a self-supporting 19" steel relay rack
Insertion Loss	4.0 dB maximum, per channel (lower loss if preferred)
IMD and Harmonic Products	-70 dB minimum
Full Performance	-30° to +60° C

4. **Transmitter Combiner Information:** The Proposal shall include the manufacturer and model number of the combiners used at all sites.
5. **Receiver Multicoupler and Tower Top Amplifier:** The Proposer may employ any type of multicoupler or amplifier and associated tower mounted pre-amplifier, which meets or exceeds the following parameters:

Table 7.1.6b – Tower Top Amplifier

General	Use of a tower mounted low noise amplifier with a receiver multicoupler is required at each fixed site
Gain	Minimum 10 dB
Noise Figure	2.0 dB or better
Third Order Intercept Point	+18 dBm or better
Mechanical	Shall be housed in a gasket sealed weather resistant housing designed for mounting to the tower structure with galvanized steel U-bolts. Consideration shall be given to the galvanic effect of this box in interacting with the antenna structure.
Power Supply	If needed by the TTA, DC power shall be passed to the amplifier via the center conductor of the coaxial transmission line. The AC Power Supply shall be 120 Volts, 60 Hertz.
Amplifier Bypass / Redundant Amplifiers	The system shall be capable of a bypass around the amplifier system such that the main line, jumper assemblies, and antenna may be tested. Instead of a bypass, redundant amplifiers may be provided; however, in any case, means to test the amplifier from the equipment shelter shall be provided.

Amplifier Failure Protection	The system shall be equipped with protection from a primary amplifier failure. The Proposal shall state the protection methodology employed. Any performance degradation as a result of the failure shall be explained.
Window (bandpass) Filter	The TTA shall be equipped with a narrow bandwidth pass type filter than will accommodate the frequencies that will be used in the system per this RFP.
Test Port and Test Line	The system shall be equipped with a test port and test line to allow the frequency performance of the tower-mounted amplifier system to be tested from the equipment shelter.
Lightning & Surge Protection	Protection of the AC and DC power supplies and RF input of the amplifier shall be provided by a combination of gas tubes, Zener diodes and M.O.V.'s, and proper grounding of the enclosure. Minimum Rating @ 50,000 Amps, 30 strokes.
Metering	Metering of the DC power supply shall be provided in the equipment shelter or equipment cabinet or room.

Table 7.1.6c – Receiver Multicoupler

General	Shall be expandable and provide output ports for at least sixteen (16) ports.
Lightning Protection	The RF input to the device shall be protected with a gas tube type lightning arrester, which will pass the DC required to power the tower mounted amplifier if required. Minimum Rating @ 50,000 Amps, 30 strokes.
Mechanical	Shall be mounted in a 19" rack with other equipment at the site. DC metering of the tower mounted amplifier power supply, if applicable, shall be rack mountable.
Preselector	A receiver preselector shall be provided to attenuate out of band signals by at least 40 dB and have a bandwidth that allows minimum attenuation to the desired band of frequencies while attenuating undesired frequencies.
Gain	Gain through the multicoupler system shall be field adjustable.
Noise Figure	2 dB or lower
1 dB Compression Point	18 dBm minimum
3rd Order Intercept Point	30 dBm minimum
Receiver-to- Receiver Isolation	25 dB minimum
Full Performance	-30° C to +60°C

7.2 TECHNICAL SPECIFICATIONS - USER EQUIPMENT

7.2.1 Mobile Radios

1. **Mobile Radios:** Mobile radios shall be capable of performing all functions and features of the system, as noted in this RFP. See Section 13 – Pricing. Mobile radios shall have the capability of being programmed to operate on the new Collin County system as well as on nearby Project 25 Phase 1 and Phase 2 systems, given that the proper programming and permissions are in place. Individual departments or agencies may request specific features, and these are noted in Section 13. At a minimum, mobile radio units shall meet the requirements as noted in the following paragraphs and Proposers are to provide equipment that best meets the “tier” of radio as identified in the Section 13 - Pricing worksheets.
2. **Programming:** Radio programming shall be provided by direct connection to a computer equipped with the proper programming software. Radio programming shall also be provided through over-the-air programming (OTAP) provided via the simulcast radio infrastructure.
3. **Serial Numbers:** All mobile radios shall have a multi-digit unique serial number. These shall be of such type, and located in such a position that their removal or alteration is as difficult to do and as obvious to spot as economically feasible. As part of implementation services, the selected Contractor shall provide a complete inventory listing of all equipment delivered with unique serial numbers by department/agency, and must also maintain a copy in its records to facilitate system support and future purchases. The equipment inventory shall be provided in both printed and electronic formats. Electronic versions shall be provided in Microsoft Access format.

Data Fields shall, at a minimum, include Manufacturer, Description, Model number, Serial number, Unit ID, and VIN number for mobile radio installations.

4. **Exterior Construction:** The mobile radio exterior housing shall be made of plated or painted steel or aluminum of sufficient gauge to provide for adequate physical and RF protection and theft deterrence.
5. **Cabling:** The interconnecting cable, including + and - DC power, shall be of such construction that frequent exposure to hydraulic fluids and petroleum based oils will cause minimal damage such as cracking or softening of the cable jacket.
6. **TOT:** A variable transmitter time-out-timer must be provided to limit key-down time.
7. **Basic Functionality:** Mobile radio equipment proposed shall incorporate the latest available technology and shall be fully functional in the vehicular environment. This shall include, but not be limited to, RF immunity, DC input voltage fluctuations, noise introduced in the DC line, and typical usage impact. Any degradation of functional parameters of the equipment supplied due to normal or emergency operation of the vehicle in which it is installed shall be corrected by the Contractor.
8. **Construction:** If needed, external heat radiators shall be used to keep the RF power devices within conservative operating temperature, without allowing airborne contaminants to enter the interior portion of the radio. The housing shall be devoid of any louvers or other openings thereby protecting the radio set from dirt, dust, moisture, and splashing water.
9. **Accessories:** All open-air mobile units and all external headsets, microphones and speakers must be weatherproofed and suitable for outdoor mounting. All installation cabling, brackets, etc., must be part of this procurement.

10. **Control Heads:** Control head mounting locations shall be subject to the approval of the particular department being supplied. Mobile antennas and cabling to trunk or dash mounted units must be supplied as part of this procurement, replacing any existing cabling and antennas.
11. **DC Power:** The mobile radio shall be capable of operation from a nominal 12-Volt DC primary power source, with positive action reverse polarity protection to avoid damage if the radio were to be incorrectly installed. In that event, the only damage allowed shall be blown fuses if the radio is turned "ON". The radio set shall operate from a negative ground primary source and shall be wired to the "cold" side of the vehicle ignition switch. All power should be derived directly from the vehicle battery, without using active components. Primary power input shall be adequately fused to assure fast and positive action.
12. **Talkgroup Scan:** Some mobile radios will require priority-scanning capability. These units shall be capable of scanning a minimum of ten (10) talkgroups. Proposers shall identify the maximum number of talkgroups that can be placed in a scan list. The operator shall be readily able to select the talkgroups to be scanned, to designate and change the priority channel, and to enable or disable the scanning mode.
13. **Emergency Alarm Switch:** Mobile radio control heads shall be equipped with an emergency switch which will encode a unit identification and emergency status message when depressed. This indication shall be placed onto the system immediately, and shall be decoded and displayed at the pre-designated dispatch console(s).
14. **Status Tones:** Shall provide audible indication of the following conditions:
 - a. System busy;
 - b. Call back when channel available;
 - c. Time out timer activation;
 - d. Access to system denied;
 - e. Out of trunked radio system range;
 - f. Site trunking indication; and
 - g. Other reduced capability indicator.

NOTE: To avoid user confusion during emergency operations, no single tone shall represent more than one function or condition.

15. **Control** – The following items shall pertain to mobile unit control requirements;
 - a. Displays - Shall be clearly labeled and shall be backlit (variable) for nighttime visibility;
 - b. Microphone - Palm type, with push to talk switch;
 - c. Selector Switches - Rotary selectors and volume controls are preferred instead of rocker buttons;
 - d. An "on-off" switch shall control primary power to the radio set;
 - e. A volume control shall regulate the audio level of the speaker from zero to full volume;

- f. Indicators (either incandescent, LED, or LCD devices) shall be provided which indicate "radio set on" and "transmitter carrier on" functions;
 - g. A channel or talkgroup selector switch; and
 - h. Mounting - Shall provide for mounting on vertical or horizontal plane mounting surface.
16. **Service Facilities:** A central metering jack/interface shall be provided for connecting a test apparatus to the radio for measuring transmitter and receiver circuitry and alignment.
17. **Transmission Lines and Antennas:** As part of the standard package, a roof or trunk mount antenna shall be proposed as noted in the table below. All mobile RF connections must be weatherproof and corrosion resistant.

Table 7.2.1a – Mobile Radio Antenna

Mounting:	¾" Hole Roof Top Mount
Gain:	Unity referenced to a Quarter Wave
Cable:	Low loss public safety grade, minimum 15' in length
Connector:	To Match Mobile Radio

18. **Multiple Product Tiers - Mobile Radios:** Multiple tiers of mobile radios are being requested by Collin County departments. Section 13 - Pricing provides details on the tiered feature sets required for each agency/department.
19. Additional mobile radio technical specifications are listed in Table 7.2.3a that follows.
20. **Control Stations:** "Control station" refers to a mobile radio based desktop office radio with a user interface consisting of a desk microphone and internal speaker, and that is equipped with a power supply and antenna network. These stations can be remotely controlled, local controlled, or both. Control stations may be wall mounted, rack mounted, placed on an equipment rack shelf or used on a tabletop or desk. Some of these stations will be controlled/operated by the individual radio dispatch centers, whereas others may be controlled by a "remote controller" or directly by an operator using the associated microphone and controls directly on the unit (local control). "Remote controller" refers to a desktop unit/controller/deskset interfaced to the control station by some means of connectivity. RF control stations being supplied shall meet the same specifications described above for mobile radios. Control Station types required by the County are depicted in the Pricing Section of this RFP.

7.2.2 Portable Radios

1. **Portable Radios:** Portable radios shall be capable of performing all functions and features of the system, as noted in this RFP. See Section 13 – Pricing. Portable radios shall have the capability of being programmed to operate on the new Collin County system as well as other nearby Project 25 Phase 1 and Phase 2 systems, given that the proper programming and permissions are in place. Individual departments or agencies may request specific features, and these are identified in Section 13. At a minimum, portable radio units shall meet the requirements as noted in the following paragraphs and Proposers are to provide equipment that best meets the "tier" of radio as identified in the Section 13 worksheets.

2. **Programming:** Portable radios shall be programmed in a direct connection to a computer equipped with the proper programming software. Radio programming shall also be provided through over-the-air programming (OTAP) provided via the simulcast radio infrastructure.
3. **Serial Numbers:** All portable radios shall have a multi-digit unique serial number. These shall be of such type, and located in such a position that their removal or alteration is as difficult to do and as obvious to spot as economically feasible. As part of implementation services, the selected Contractor must provide a paper copy and an electronic copy (inventory) of a complete listing of all equipment delivered with unique serial numbers by department/agency, and must also maintain a copy in its records to facilitate system support and future purchases.
4. **Intrinsically Safe:** Proposers shall provide an intrinsically safe option for portable radios, accessories, and batteries that allow for their use in hazardous locations per the latest recognized standards. The Proposer shall describe the Class and Groups of hazardous (classified) locations where these units may operate.
5. **TOT:** A variable transmitter time-out-timer must be provided to limit key-down time.
6. **Talkgroup Scan:** Some portable radios will require priority-scanning capability. These units shall be capable of scanning a minimum of ten (10) talkgroups. Proposers shall identify the maximum number of talkgroups that can be placed in a scan list. The operator shall be readily able to select the talkgroups to be scanned, to designate and change the priority channel, and to enable or disable the scanning mode.
7. **Emergency Alarm Switch:** Portable radios shall be equipped with an emergency switch which will encode a unit identification and emergency status message when depressed. This indication shall be placed onto the system immediately, and shall be decoded and displayed at the pre-designated dispatch console(s).
8. **Status Tones:** Shall provide audible indication of the following conditions:
 - a. System busy;
 - b. Call back when channel available;
 - c. Time out timer activation;
 - d. Access to system denied;
 - e. Out of trunked radio system range;
 - f. Site trunking indication; and
 - g. Other reduced capability indicator.

NOTE: To avoid user confusion during emergency operations, no single tone shall represent more than one function or condition.
9. **Service Facilities:** A central metering jack/interface shall be provided for connecting test apparatus to the radio for measuring transmitter and receiver circuitry alignment.
10. **Multiple Product Tiers - Portable Radios:** Multiple tiers of portable radios are being requested by County departments Section 13 (Pricing) of this RFP provides details on the tiered feature sets required for each agency/department.

11. **Portable Accessories:** The County is interested in evaluating the various portable accessories available for the proposed portable radios. If there is a catalog of portable accessories available, please include this with the proposal.
12. Additional portable radio technical specifications are listed in Table 7.2.3a in this RFP section.

7.2.3 Additional Technical Specifications for Repeaters, Mobiles, and Portables

Table 7.2.3a – Additional Technical Specifications for Public Safety Radios

Spec	Repeater	Mobile	Portable
Temperature	-30° to +60° C (Full Performance)	-30° to +60° C (Full Performance)	-30° to +60° C (Full Performance)
Humidity	90% @ 50° C	95% @ 50° C	95% @ 50° C
Shock & Vibration	n/a	MIL 810 C/D/E/F/G	MIL 810 C/D/E/F/G
Tx Frequency Stability	+/- .1 ppm (30° to +60° C)	+/- .8 ppm (30° to +60° C)	+/- .8 ppm (30° to +60° C)
Tx Audio Response	n/a	+1, -3 dB	+1, -3 dB
Tx Audio Distortion	n/a	1%	1%
Tx Spurious & Harmonic	-70 dB	-70 dB	-70 dB
Tx FM Noise	-50 dB	-44 dB	-44 dB
Rx Frequency Stability	+/- .1 ppm (30° to +60° C)	+/- .8 ppm (30° to +60° C)	+/- .8 ppm (30° to +60° C)
Rx Selectivity (12.5 kHz)	-60 dB	-70 dB	-70 dB
Rx Intermod Rejection	-80 dB	-82 dB	-78 dB
Rx Spurious & Image Rejection	-100 dB	-90 dB	-70 dB
Rx Audio Response		+1, -3 dB	+1, -3 dB
Rx Audio Output		15 Watts @ 1% Distortion	1000 mW @ 1.1% Distortion

Table 7.2.3b – Additional Technical Specifications for non-Public Safety Radios

Spec	Mobile	Portable
Temperature	-30° to +60° C (Full Performance)	-30° to +60° C (Full Performance)
Humidity	95% @ 50° C	95% @ 50° C
Shock & Vibration	MIL 810 C/D/E/F/G	MIL 810 C/D/E/F/G
Tx Frequency Stability	+/- 1.5 ppm (30° to +60° C)	+/- 1.5 ppm (30° to +60° C)
Tx Audio Response	+1, -3 dB	+1, -3 dB
Tx Audio Distortion	1%	1%
Tx Spurious & Harmonic	-60 dB	-60 dB
Tx FM Noise	-44 dB	-44 dB
Rx Frequency Stability	+/- 1.5 ppm (30° to +60° C)	+/- 1.5 ppm (30° to +60° C)

Rx Selectivity (12.5 kHz)	-66 dB	-66 dB
Rx Intermod Rejection	-75 dB	-75 dB
Rx Spurious & Image Rejection	-80 dB	-70 dB
Rx Audio Response	+1, -3 dB	+1, -3 dB
Rx Audio Output	15 Watts @ 1% Distortion	500 mW @ 1% Distortion

SECTION 8 – IMPLEMENTATION

8.1 IMPLEMENTATION GENERAL REQUIREMENTS

1. System implementation shall include the complete installation, optimization, and acceptance testing of all elements of the replacement radio system and supporting subsystems. The current systems in place supporting existing communications must not be disturbed or interrupted during the implementation, testing and cutover process.
2. Proposers should consider that the implementation of this system is a significant undertaking. Careful planning of all aspects of the project, including the installation of equipment, system testing, training, and cutover of the agencies and departments onto the new system are required to ensure a successful project. Proposers shall include with their proposals a high-level project plan for the overall project schedule, a work breakdown structure, project communications procedures, quality assurance, and change control procedures.
3. The project plan will be a dynamic document in that it will be continually updated and evaluated as the project progresses. A finalized version of the detailed project plan and schedule will be required of the Contractor after the Detailed Design Review has been completed and will be a condition to proceed with the implementation phase.

8.1.1 Project Schedule

1. The Proposer shall provide a tentative project schedule in the proposal that includes, at a minimum, the following topics.
 - a. Contract executed / Notice to Proceed;
 - b. Detailed Design Review;
 - c. Order Processing;
 - d. Civil A&E and Construction separately for each site;
 - e. Microwave physical path surveys;
 - f. System staging;
 - g. Infrastructure installations at all sites (RF sites, dispatch, and control points);
 - h. Infrastructure and microwave acceptance testing;
 - i. Coverage testing;
 - j. System and operational training for selected personnel;
 - k. Radio field unit user training;
 - l. Radio field unit installation;

- m. 30-day operational test;
 - n. Transition to Service
 - o. System Acceptance, Warranty begins;
 - p. Completion of transitioning the remaining departments and agencies to the system; and
 - q. Project completion.
2. The initiating entry of the Proposer's timeline shall be the County's Notice to Proceed (NTP). All other events will be referenced in number of days from the NTP.
 3. At the successful completion of system staging, the fixed network will be shipped upon approval by the County. Such approval will not be unnecessarily withheld.
 4. The fixed network equipment shall be delivered to the County by a method specifically designed to safely transport sophisticated electronic equipment. Upon arrival at the destination, all equipment will be received and inventoried by the Contractor, including software versions. Any interim storage required for the equipment is the responsibility of the Contractor. Title to and risk of loss for the equipment shall pass to the County only when the County actually receives and accepts the equipment.
 5. When the Contractor believes that the system is ready for the Functional Acceptance Test, it shall provide to the County a written certification that the system has been properly installed, optimized, and is ready for Functional Acceptance Testing to begin. The Contractor, along with the County and its representatives, will test the system according to the agreed upon Functional Acceptance Test procedures.
 6. Upon successful completion of the Functional Acceptance Test, and upon written certification by the Contractor that the system is ready for the Coverage Acceptance Test, the Contractor, along with the County and its representatives, will test the system according to the agreed upon Coverage Acceptance Test procedures.
 7. Upon successful completion of the Coverage Acceptance Test, and upon written notification by the Contractor that the system is ready for the 30-Day Operational test and the initial user training and radio field unit transitions have been successfully completed, the Contractor will initiate the 30-Day Operational Test.
 8. If the system performs as specified for 30 consecutive days, and the remainder of the acceptance tests and have been successfully completed and punch listed items have been resolved, then the system infrastructure will be considered accepted.
 9. Upon successful completion of all of the department/agency transitions, the decommissioning of existing equipment, resolution of all punch-listed items, and County approval of all final system documentation, the Contractor may submit a written request to the County for Final System Acceptance.

8.1.2 Work Breakdown Structure

1. The Work Breakdown Structure shall provide the detailed task listing of the physical work to be accomplished by the Contractor and Collin County. The initial work breakdown structure shall be a high-level block diagram or a numbered list of the tasks to be accomplished throughout the project. The detailed work breakdown structure will be due three (3) weeks after the Detailed Design Review. The work breakdown structure outlines the work needed to develop and implement the system. The tasks must be detailed enough so that all items are included and tracked, but it shall not be so detailed as to be cumbersome. The Work Breakdown Structure can be a part of the Project Schedule, but it must include the following:
 - a. Project task descriptions and durations;
 - b. Predecessors;
 - c. Responsibility for supporting work tasks, if any;
 - d. Responsibility for completion of work tasks;
 - e. Date scheduled for work to begin; and
 - f. Date scheduled for completion.

8.1.3 Project Communication Plan

1. The Contractor shall work with Collin County to develop a mutually agreeable communication plan that includes contact information for the members of the project team and escalation procedures to be followed if an issue arises which may put the project or a portion of the project at risk. The communication plan must also show all levels of project reporting throughout the project lifecycle.
2. The County requires a regularly scheduled weekly project meeting that shall be conducted by the assigned Project Manager starting immediately after the contract signing. Items to be included in the communication plan:
 - a. Project Team contact information
 - b. Escalation procedure
 - c. Scheduled meetings
 - 1) Meeting cycles;
 - 2) Meeting agendas;
 - 3) Meeting report sample; and
 - 4) Required attendees by title (engineer, user, executive, etc.).
 - d. Project status reports
 - 1) Status report cycle;

- 2) Content to be provided in the status report;
 - 3) Status report sample; and
 - 4) Status report recipients.
- e. Secure web site for document and information sharing and collaboration
4. If requested by the County team, the Project Manager will be required to periodically attend Commissioners Court meetings to provide updates on the project.

8.1.4 Quality Assurance Plan

1. The Proposer shall discuss its Quality Assurance Plan and the steps to be taken to demonstrate that system implementation is proceeding in a manner that is consistent with the County's expectations, RFP requirements, and relevant industry standards. The QA plan shall include physical inspection points needed and should include the following:
 - a. The Detailed Design Review;
 - b. System design documentation;
 - c. Equipment staging;
 - d. Equipment inspection and inventory;
 - e. Steps of inspection throughout the implementation process:
 - 1) The site is ready for construction;
 - 2) When pouring concrete;
 - 3) Tower erection;
 - 4) During placement of shelters;
 - 5) Before installing electronic equipment;
 - 6) After installation of electronic equipment;
 - 7) Before installation of antennas; and
 - 8) After installation of antennas.
 - f. As-built documentation; and
 - g. Final acceptance.
2. The County team and the Contractor shall have the appropriate representatives inspect and approve the quality of work before moving to the next step. Inspection points must be a part of the Project Schedule.

8.1.5 Change Control Process

As with all projects of this size and complexity there will likely be some changes to the original scope of work. An important part of managing a project is to prevent, track, and document changes. The proposal will include the procedures to minimize or stop "scope creep", identify potential problems that can change the schedule or project cost, and track and record changes that are agreed upon by the County team and the Contractor. The proposal will include a sample change control document.

8.1.6 Transition and Cutover Plan

1. The transition and cutover process is critical to the success of implementing the new system. The County team will work closely with the Contractor to develop a successful plan. The Contractor will be expected to understand the operations of the departments and agencies to be cutover to the new system and to develop a mutually acceptable step-by-step plan that will minimize problems and disruptions.
2. During transition, the County must not have communications on the existing systems disrupted. The Proposer must consider the use of loaner radios, gateways, RF patches, timing, training and/or any other appropriate method to minimize the chance of disrupting radio communications.
3. A detailed transition and cutover plan will be required from the Contractor sixty (60) days prior to system cutover. The cutover plan must include a fallback plan to revert back to the old systems if there is a problem during the cutover phase.

8.1.7 Extension of Project Schedule

1. Final Project Acceptance must be completed within the time specified by the Proposer in the project schedule submitted with the proposal.
2. Project extensions will be granted if delays are experienced as the result of:
 - a. Actions taken by the County, or their agents;
 - b. Changes ordered by the County that materially impact the schedule;
 - c. Difficulties experienced in obtaining FCC, FAA or zoning approval of proposed facilities, assuming approval requests were filed in a timely manner, and diligently pursued; and
 - d. Road repairs, mishaps, strikes, Acts of War, Acts of God, riots, lockouts, or extended inclement weather which would delay equipment or limit access to any site at which work will be required.
3. Should the Contractor fail to complete the project within the specified completion schedule, the sum of \$1,500.00 per calendar day will be deducted from the monies due the Contractor for purchase of the equipment/services. This sum shall not be considered as a penalty, but rather as reasonable liquidated damages, since it would be impracticable or extremely difficult to fix the actual damages. An extension of time may be allowed for delays beyond the control of the Contractor at the discretion of the County.
4. The Contractor shall submit requests for time extension(s) to the County, in writing. The request shall describe the type of delay, the cause and its apparent impact on contract delivery/completion schedules.

SECTION 9 – INSTALLATION AND DOCUMENTATION

9.1 GENERAL REQUIREMENTS

1. All installation work performed shall be in accordance with laws and regulations of the U.S. Department of Labor, the State of Texas, and local government agencies.
2. At a minimum, the Contractor shall provide at least one experienced, qualified Project Manager completely dedicated to the project. The Project Manager shall oversee all aspects of system implementation, including site preparation, equipment programming, staging, installation, etc. Other individuals may assist the Project Manager in various functions such as reporting, accounting, testing, optimization, etc., but this individual shall have primary responsibility for the performance of the system.
3. It shall be the responsibility of the Contractor to provide the design, equipment, software, and services to successfully install the new Collin County replacement radio system as described in this RFP. System optimization, troubleshooting, and adjustment of each subsystem shall be the Contractor's responsibility. Installation shall include the removal of existing mobile radio equipment and ancillary subsystems that will be replaced under this procurement. All equipment removed from service shall be kept together with any associated parts, cables, accessories, etc. Care shall be taken to prevent damage to any equipment, parts, cables or accessories, so that the equipment can be reused if needed. The Contractor shall inventory these items as they are collected, and shall be transported to a storage facility designated by the County.
4. To the extent possible, the existing radio communications systems shall remain fully operational during installation of the new system and until successful completion of the 30-Day Operational Test. Because the existing systems support current operations, interruptions in service due to Contractor or Contractor activities cannot be tolerated. If interruptions in service are deemed by the Contractor to be unavoidable, written notification detailing the nature and duration of such interruptions shall be provided to the County for review and approval. In the event that the Contractor or associated subcontractor causes a major outage resulting in loss of one or more repeater sites, or the Collin County dispatch console system, the Contractor shall be assessed \$5,000 for each site/console occurrence, and for each day that the outage continues.
5. Any equipment or parts required to provide a complete and operational system, and not specifically mentioned herein, shall be provided by the Contractor without any claim for additional payment.
6. Mobile installations performed in vehicles that are equipped with air-bag protection devices shall be installed in a manner that will not in any way impede the ability of the air bag to protect the occupants during a collision.
7. When applicable, Contractor must prepare and submit required documents for plan review and building permits and inspections in each local jurisdiction.

9.2 COMMUNICATION SITES

9.2.1 Communications Sites - General

The Contractor shall be responsible for the proper installation of all of the necessary components associated with the communications system described in these specifications. The Contractor shall furnish all tools, test equipment, supplies, and services necessary to provide a fully operational and accepted communications system for the County.

9.2.2 Trunked Base/Repeater Systems

1. The installation of the radio frequency equipment will be provided by the Contractor at the designated location(s) within the equipment shelters at the base station sites. The Contractor shall supply and install all required equipment, accessories, punch-blocks, terminal strips and/or cables needed to interface to new and/or existing facilities.
2. All audio and control cable/wiring to and from the radio equipment shall be shielded.
3. All external equipment inter-cabling, whether NETWORK, RF, AC, AUDIO or CONTROL cables and/or wiring, shall be labeled with pre-printed adhesive wire labels and be clearly visible. Markers shall be placed at each end, adjacent to the connector, plug or terminus. This data shall be recorded in the installation documentation.
4. All equipment cables or cable bundles within the shelter, to the greatest extent feasible, will be neatly tied by means of plastic tie wraps and secured by clamps to flat surfaces. All cables shall be installed in a symmetrical manner; drooping, stretched, or unsupported cables will not be acceptable. Any system cabling that is not neatly installed in an organized and symmetrical manner will be removed and reinstalled at the cost of the Contractor.
5. All cable/wiring bundles exiting the equipment must do so through the top of the equipment cabinets or racks. Rubber grommets or other suitable protection shall be used at cabinet knockouts to protect the cable/wiring. Splicing of NETWORK, AC, AUDIO or CONTROL cable/wiring will not be permitted.

9.2.3 Antennas & Transmission Lines

1. For each RF cable provided, the coaxial antenna transmission line shall be cut to the proper length. The radio equipment end of this line shall terminate at a point where the lengths of jumper cables are kept as short as possible.
2. The ends of rigid transmission line shall not be connected directly to the antenna, to any RF equipment interference protection, or multiplexing devices. Appropriate RF jumper cables shall be used and installed.
3. Transmission line runs inside equipment shelters or buildings shall be supported and marked, every 3 feet, with cable trays or stainless steel cable hangers. Multiple cable runs shall not be bundled together, but rather, shall be strung and supported adjacent to each other.
4. All coaxial RF jumper cables shall be high quality, low loss, and with low interference generating connectors. The size and type of the cables shall be selected by the Proposer and shall be consistent for all radio sites and applications.
5. Appropriate jumper cables shall be used to interconnect all interference protection or multiplexing devices with the coaxial antenna transmission line and radio frequency equipment.

6. A jumper cable shall be used to interconnect the antenna(s) to the top end of the coaxial antenna transmission line. Jumper cables used to reach a side arm mounted antenna shall be shaped to form a drip loop. Jumper cable interconnections shall be weather proofed by installation of 3M cold shrink weather proofing kits or equivalent. The use of vinyl tape is not acceptable for this purpose.
7. All antenna jumper cables shall be cut to length and shall use type 'N male' connectors except as dictated by the connector supplied with the antenna.
8. All coaxial cables exiting the equipment cabinets (if used) shall do so through cabinet feed-throughs.
9. Following installation, all repeater site and microwave antenna systems shall be sweep-tested using Time Domain Reflectometry (TDR) for proper operation following system installation. Test results shall for each antenna system be presented to the County for review and approval.

9.3 DISPATCH CONSOLES

9.3.1 General

1. The installation of the new dispatch consoles and associated equipment shall be provided by the Contractor at the designated locations specified in Section 6, Dispatch Centers.
2. The Contractor shall supply and install all required termination blocks, terminal strips, and/or cables needed to interface the new console electronics to existing facilities such as radio equipment, clocks, telephone equipment, logging recorder equipment, auxiliary function activators, control circuits, Fire Station Alerting systems, VHF Paging systems, and CAD systems.
3. All new console inter-cabling, including those that are to terminate at existing punch blocks, shall be labeled with pre-printed adhesive wire markers. The markers shall be placed at each cable end, adjacent to the connector or plug. All cables and/or cable bundles will be hidden from view and will be neatly secured by means of plastic tie wraps.
4. All inter-cabling to the operator positions shall be provided with sufficient slack to permit movement of at least 5 feet in any direction. As stated previously, all cabling within console furnishings shall adhere to the cable management systems within the console furniture. Lengths of cable shall be provided to accommodate raisings and lowering of console furniture work surfaces. Headset jacks, and any other radio system peripherals shall conform to the console furniture system.

9.3.2 Functional Interface Requirements

1. The Contractor shall be responsible for configuring and providing the functional interface(s) between the radio system and the communications consoles.
2. The functional interface is expected to include, at a minimum, the following:
 - a. Adjustments of input signal level(s) to consoles;
 - b. Adjustments of output signal level(s) to consoles;
 - c. Adjustments of output signal level(s) from any required base station interfaces;

- d. Adjustments of input signal level(s) to audio distribution networks from corresponding base station interfaces;
- e. Verification of necessary base station control format(s), and
- f. Adjustments of the level and duration of the output signal(s) from the corresponding base station interface.

9.4 MOBILE RADIO INSTALLATION

9.4.1 Mobile Installation - General

1. It is a requirement that the Contractor be capable of performing all mobile radio installations at a location provided by the Contractor, which has an indoor secured facility, or at a location(s) provided by the County. Pricing shall include all appropriate costs. The facility provided by the Contractor shall be located within the County, and shall be subject to County approval.
2. The Contractor shall remove the existing radio unit (unless instructed not to) when installing the new trunked mobile radio. When removed, the existing radio, its control head, antenna, and wiring harness shall be placed in an individual storage box with a label indicating the agency, department, unit number it was removed from, make, model, and serial number of radio, frequency band, and date removed.
3. At a mutually agreed time prior to installation, the Contractor will be provided information regarding the physical placement of the mobile radios in vehicles for each agency / department. This work may in some cases include relocation of existing equipment. The County has several types of vehicles in service that will require installation of new radio equipment. The Contractor shall work with the County to inspect the different vehicles involved to determine the exact installation requirements prior to installing any vehicle radios.
4. For trunk mount applications, the radio will be mounted in the trunk or other designated area with the control head mounted within easy reach of the driver, typically between the seats, in some cases in an existing equipment console or stack. The radio itself shall be positioned on a mounting device, including the mounting plates, base plates, brackets, etc., designed for mobile communication applications. The finished assembly shall be secured and remain in a fixed and motionless position under all operating conditions. In dash mount applications, the entire radio and microphone will likely be mounted within easy reach of the driver. The radio installation will include an appropriate mounting bracket or plate that will secure the radio in a fixed position near the driver.
5. All coaxial cable connectors shall be soldered to associated cables or to interface circuitry. Crimp-style connectors for this application are not acceptable. Low-loss Teflon or approved equivalent antenna cable is required.
6. All wiring shall be appropriately dressed and connectorized in accordance with appropriate engineering practices. Each main radio power lead shall be attached to its own in-line fuse rated to support the maximum current drain of the associated circuit and shall be connected as close as practical to the existing power source or to the vehicle battery using approved methods and hardware. Obtaining power by connecting to existing radio equipment or any other device is unacceptable.

7. All cabling that is exposed shall be dressed with an appropriate flexible tubing and secured to the vehicle by attachment to appropriate stationary supports using solid copper wire or fasteners. Plastic tie wraps should be used within at least 2' of the end connection points in areas not directly exposed to the weather.
8. The cable length shall allow minor repositioning of the equipment to allow for changing operating conditions. A representative from each applicable agency shall inspect the first installation of radio equipment for each vehicle type it uses. Upon completion of each vehicular installation a qualified technician shall successfully conduct and complete an operational performance test that will be approved via signature by the designated County representative.
9. The County will periodically make random inspections throughout the mobile installation process.

9.5 AS-BUILT INSTALLATION DOCUMENTATION

9.5.1 As-Built Documentation Requirements

1. Thorough "as built" documentation shall be provided by the Contractor and delivered to the County's Project Manager. Three (3) copies of the documentation shall be provided in 3-ring binders and on CD media in the original software format, including AutoCAD, Excel, and Word for drawings, spreadsheets, and text.
2. At a minimum, the following "as built" documentation shall be included in each set:
 - a. A general system description that includes the overall system layout, architecture, its operating and failure modes, and the exact location where all system elements are installed;
 - b. System block diagrams;
 - c. Site layouts and floor plans of each equipment site and dispatch facility, to scale;
 - d. Rack face drawings for all racks, to scale;
 - e. Drawings showing cable tray location details, to scale;
 - f. Site construction documents
 - g. Shelter civil construction documents
 - h. Tower structural analyses and build documents
 - i. Microwave Network documentation as follows;
 - Complete Set of System Configuration Drawings, including an index listing;
 - Final Design Equipment List, organized by site;
 - Final Design Equipment List, organized in a sortable, Excel spreadsheet format with equipment line items as rows and site designations as columns;
 - Path Reliability and Design Actual Measurements

- Microwave Radio Measurements
 - Physical Path Survey Reports
 - MPLS Engineering Documentation and Configuration parameters
- j. Radio propagation coverage maps;
 - k. System Acceptance Testing documentation (Functional and Coverage testing);
 - l. All external equipment inter-cabling lists, whether NETWORK, RF, AC, AUDIO or CONTROL cables and/or wiring, consistent with the field cable labels;
 - m. Interconnection drawings that show all connections between sub-assemblies, such as terminal boards, panel assemblies or other equipment, and which external connections are made, shall be provided;
 - n. Numbering and labeling lists of all cabling associated with remote control units
 - o. Numbering and labeling lists of all connections to termination blocks associated with the control consoles
 - p. Numbering and labeling lists of all interconnecting cabling between repeaters, the central control, any remote site controllers or processors, alarm circuits, leased telephone company circuits, and the microwave system;
 - q. A log of level settings for all control circuits
 - r. A record of telephone circuits by circuit number and telephone number for service on these circuits
 - s. Documentation and labeling lists of transmission line routing and antenna mounting at all fixed sites, with detailed drawings showing all mounting hardware and accessories
 - t. Complete set of maintenance and operations manuals shall be provided for the system as a whole and for each category of equipment purchased in association with this project. In addition, a complete set of maintenance and operations manuals shall be placed in a secure location at each of the radio system sites
 - u. Manuals for OEM hardware for each component of the system
 - v. Any unique wiring configurations or circuit modifications that are not part of the standard equipment documentation provided shall be included. All information as described in the previous paragraph shall be included, in addition to the theory and method of operation
 - w. A complete inventory of all provided equipment and software including model numbers, serial numbers, and version numbers.
 - x. Final fleetmap configuration, with all group I.D.'s and aliases
 - y. A complete roster of unit I.D.'s and aliases

- z. Documentation of final programming configuration for all software programmable equipment
 - A soft copy and printed copy of all equipment programming templates used in the system
 - Copies of the Hardware Acceptance Test Plan, with all recorded measurements
10. Upon successful completion of all of the department/agency transitions and burn-in period, the Contractor shall begin demobilization and removal of existing infrastructure equipment that is not being used as part of the new system. The Contractor shall provide a list of equipment to be removed at least two weeks prior to the planned removal date. Infrastructure equipment shall include, but is not limited to, base/repeater stations, dispatch consoles, associated control cables, combiners, multicouplers, antennas, and transmission lines. Equipment sites shall be cleaned of any existing mounting hardware, grounding straps, wiring, etc., that are no longer needed. The sites shall be left in a clean and orderly condition subject to the County's inspection and approval.
11. Old infrastructure equipment will be conspicuously labeled with the following information:
- a. Site name and description;
 - b. Description;
 - c. Associated accessories or options;
 - d. Frequency information (VHF, UHF); and
 - e. Any asset tags shall be recorded and inventoried.
12. Infrastructure equipment from the existing system will not be damaged during removal or transport. The equipment shall be transported to a location designated by the County within Collin County.

SECTION 10 – ACCEPTANCE TESTING

10.1 ACCEPTANCE TESTING

10.1.1 Acceptance Testing - General

1. Proper operation of the new trunked radio system is essential, both initially and in the long term. To help assure that the system is ready for agency use, the County and the selected Contractor will jointly undertake a structured Acceptance Testing Plan (ATP) to verify proper installation, optimization, and performance of the system and its components. Radio coverage performance is an important part of the ATP process. Detailed information about the coverage testing process has been included in Section 3 of this RFP.
2. As part of the Acceptance Testing Plan, the County team is requiring both factory acceptance testing and post-delivery on-site field testing in the County to verify operational compliance.
3. An outline of the tests to be performed is included in the sections that follow. However, the final lists of tests to be performed for both the Factory Acceptance Testing and the Field Acceptance Testing will be agreed upon during implementation but prior to execution of the tests. At this time, the County may request that additional tests be performed.

10.1.2 Factory Acceptance Testing

1. Due to the size and complexity of the P25 system, the County team is requiring that the system be “staged” at a facility where system issues & problems that may arise during system development can be identified and corrected prior to shipment of the system infrastructure to the County.
2. During the Detailed Design Review, the Contractor and the County will agree upon which elements of the system will be staged. The County may request that special subsystems be sent to the staging facility and tested with the infrastructure (Fire Station Alerting systems, Logging Recorder systems, etc.).
3. The Contractor shall provide a staging area to facilitate system assembly and testing. The staging area shall be in a secured facility specifically designed for the staging of large-scale Public Safety radio communication systems and equipment in a clean, climate and RF controlled environment. Outdoor installation bays are not an acceptable location for system staging.
4. Representatives from the County shall be invited attend and participate in the system staging event. The Contractor will assemble and stage the system. Once the system is ready for customer inspection and testing, the Contractor will notify the County’s Project Manager that the system is ready for review. The County’s Project Manager and the Contractor will arrange a mutually agreeable date and time for the staging event. All reasonable effort should be made to avoid the scheduling of system staging during or around holidays, particularly Thanksgiving and Christmas.

The County and its Partner personnel attending the staging event will handle their own travel costs. Such costs shall not be included in the proposed system pricing.

5. The system staging and testing process shall simulate, as closely as possible, the final configuration of the system. The system layout within the staging area shall, to the reasonable extent possible, be

laid out geographically as it will be in the field. This will permit the County to become familiar with the system layout and facilitate testing the appropriate system features while on-site.

6. Once the County team has arrived at the staging facility, the first on-site activity of staging will be for the Contractor to provide a presentation describing the staging event and schedule. The presentation will identify what equipment has been staged, and how the system viewing and testing process will be conducted.
7. At the conclusion of system testing, a certified printed copy and an electronic copy of the system acceptance testing report shall be submitted to the County's Project Manager for approval before the equipment is released for shipment to Collin County. The County reserves the right to approve or disapprove shipment of the system infrastructure after system staging based on staging test results.
8. Upon approval from the County to begin shipping the system infrastructure, the Contractor shall provide appropriate shipping and transportation via a method specifically designed for the safe transportation and successful delivery of such equipment.

10.2 FIELD ACCEPTANCE TESTING AND PROOF OF PERFORMANCE

10.2.1 Field Testing - General

1. Following final installation and optimization of the system and all subsystem components, the installation, performance and operational tests shall be performed by the Contractor and witnessed by the County, interested representatives of the County as appropriate and the Consultant to verify proper operation of all subsystems, features, and capabilities of the system. Physical inspections of all sites will be conducted to observe the quality and correctness of equipment and facility installations. Following physical inspections, the Contractor and the County team will perform and successfully complete acceptance testing prior to final system acceptance. The Field Acceptance Testing should essentially repeat the System Staging Test, except that it will be performed on location within the County, and will perform testing of certain components that were not tested at the Staging facility.
2. The Contractor shall provide all test equipment required for the ATP, and all such test equipment must be in current calibration with appropriate calibration records.
3. The Proposer shall provide a detailed Coverage Acceptance Test Plan (CATP) with their proposal. This CATP shall adhere to the requirements of the Radio Coverage Requirements section of this RFP.
4. The Proposer shall provide an outline of the proposed Functional Acceptance Test Plan (FATP). Detailed test scripts are not required for the proposal, but will be required prior to contract execution.

10.2.2 Functional Acceptance Tests

1. The Functional Acceptance Tests will, at a minimum, include the following test procedures:
 - a. Verification that all equipment has been delivered and properly installed in an appropriate manner in accordance with this RFP and the system contract.

- b. Demonstration that delivered equipment meets specifications. Some equipment will be checked on a spot basis since testing every piece of equipment in the system is not practical.
- c. Verification that all functions and features are performed according to specifications and contract.
- d. Verification that required system redundancy functions properly;
- e. Successful completion of dispatch console testing, and
- f. Successful completion of a 30-day system burn-in test.

10.3 P25 SYSTEM RELIABILITY FEATURES & FUNCTIONALITY

10.3.1 System Reliability Features Overview

1. The Contractor shall devise a plan for testing the system's redundancy and fallback modes of operation. Examples of tests to be performed include:
 - a. Commercial power failure at the system's Main Control Point to demonstrate proper operation of auxiliary power systems;
 - b. Commercial power failure at repeater of the repeater and microwave sites, proper operation of the auxiliary power systems, and the system as a whole;
 - c. Automatic switching to backup equipment, and return to the normal configuration;
 - d. Response time for transition to backup system, and return to the normal configuration;
 - e. Trunked signaling channel failure, and proper response;
 - f. Repeater failures and appropriate alarm reporting functions;
 - g. Trunked site failure, and proper alarm reporting & system response;
 - h. Primary and backup Main Control Point Controller failure and proper system response;
 - i. LAN/WAN equipment failures;
 - j. Simulcast frequency standard failure;
 - k. Field radio behavior under system failure modes;
 - l. Loss of connectivity to:
 - 1) Repeater sites (demonstrate ring protection)
 - 2) Repeater sites (total loss of connectivity)
 - 3) Dispatch sites (demonstrate ring protection)
 - 4) Dispatch sites (total loss of connectivity)

10.3.2 Radio System Features and Functionality

Each of the following items shall be included in the functional acceptance test plan at a minimum.

1. Trunked Radio System Functions

- a. Automatic unit identification;
- b. System access time: encrypted and non-encrypted calls;
- c. Emergency alarm function, with and without all voice channels busy;
- d. Talkgroup selection & operation (mobile, portable and control station);
- e. Radio regrouping from control terminal;
- f. Call queuing and proper operation of priority levels;
- g. Emergency access to voice channel, w/ all channels busy;
- h. Operation of equipment alarm functions;
- i. Operation of talk-group database;
- j. Over-The-Air-Programming (OTAP)
- k. Encryption operations;
- l. Over-The-Air-Rekeying (OTAR), and
- m. Interfaces as appropriate to other radio systems for interoperability purposes.

2. Communications Console Functions

- a. Proper installation and operation of the console system;
- b. Proper operation of all talkgroup and conventional channel on-screen controls and functions;
- c. Proper operation of all signaling and encoding functions;
- d. Proper display of Unit ID and alias database functionality;
- e. Proper display and operation of emergency call/alarm processing;
- f. Adjustment of all audio levels for best audio quality;
- g. Proper operation of volume and mute controls;
- h. Proper operation of headset interfaces and volume controls;
- i. Proper operation of cross patch functions;

- j. Proper operation of simul-select functions;
- k. Proper operation of Man-Down feature;
- l. Proper operation of instant call recorder/playback units;
- m. Proper operation of relay controlled external devices;
- n. Proper operation of clocks, meters or other displays contained in console;
- o. Proper operation of operator positions, speakers, headset jacks, displays, keyboard, mouse, and touch screens;
- p. Proper operation of Fire Station Alerting system, and
- q. Proper operation of Logging Recorder.

3. System Management System

- a. System configuration;
- b. Subscriber access management;
- c. Manager partitioning;
- d. Diagnostic management;
- e. Dynamic radio commands;
- f. Selective inhibit/uninhibit;
- g. Activity reporting;
- h. User database maintenance;
- i. Activity monitor;
- j. Automatic backup controller database updating;
- k. Alarm Monitoring and Diagnostic Functionality
 - 1) Current alarms;
 - 2) Alarm history (daily, weekly, monthly);
- l. Disablement of Failed Voice Channels upon:
 - 1) Low forward power;
 - 2) High reflected power;
 - 3) Unidentified carrier on unassigned voice channel, and

- 4) Voter receiver failed;
- m. System Usage Reports
- 1) System configuration;
 - 2) Configuration information for all components in the system, and
 - 3) Functional configuration of controllers, channels and sites;
- n. Subscriber Management
- 1) Manager database (list of system managers);
 - 2) Logged on managers;
 - 3) Regrouped radios;
 - 4) Inhibited radios;
 - 5) "Storm" plans;
 - 6) Commands (tasks)-in-Progress (regroups, inhibits);
 - 7) Subscriber configuration and attributes;
 - 8) Channel Access Priority Levels;
 - 9) Control of Time-Out Parameters;
- 1) Channel Hang Time (message trunking);
 - 2) Interfering Carrier Time (length of time channel remains enabled with an interfering carrier);
 - 3) Remote Link Failure Time (length of time site remains enabled without a remote site data link);
 - 4) Channel Fade Time (length of time channels remains assigned without a carrier or low speed data present), and
 - 5) Emergency Call Time (length of channel hang time when an emergency call is initiated).

4. Site Installation Quality

- a. Site appearance;
- b. Cabling neatness
- c. Labeling;
- d. Completeness, accuracy, and readability of documentation and drawings;
- e. Removal of old equipment;

- f. Baseline documenting of repeater measurements, and
- g. Baseline documenting of antenna system measurements.

10.3.3 Site Grounding and Bonding Verification

1. Due to the critical need for a high quality grounding system, special attention will be paid to the proposed grounding system designs, installation, and performance. The ATP will include thorough inspections of the grounding and bonding systems installed as part of this project. Proper materials and installation practices shall be utilized in accordance with the requirements provided in the Communication Sites section.
2. All installed site grounding facilities that are to be installed below ground shall be LEFT EXPOSED (NOT BURIED) until inspected and approved by the Consultant and the appropriate County / city Inspector and / or project team representatives. Grounding facilities that are installed and buried without proper inspection shall not be approved. Due to the ongoing problems with copper theft, the Contractor will coordinate the installation of buried grounding system components with the County so that the installations can be inspected and buried promptly to minimize the chance of copper theft.
3. As part of the proposed Acceptance Testing Plan, the Contractor shall provide a grounding and bonding test plan in accordance with grounding requirements provided in the Communications Sites section.

10.4 MPLS MICROWAVE NETWORK TESTING AND INSPECTION

10.4.1 Microwave System Tests

1. Acceptance testing of the microwave system must include, but not necessarily be limited to the following tests and inspections. Each test must be performed, at least once, whether as part of the manufacturer's manufacturing and quality assurance program or as part of any contract resulting from this RFP. Regardless of when performed, complete documentation of each test and its results, signed by the Contractor must be shipped with each corresponding piece of equipment.
2. The results of the tests and the associated punch list of outstanding items for re-testing, if any, must be signed by both parties and forwarded to the Collin County team for review and acceptance. Any outstanding items must be resolved within seven (7) working days and these items must be re-tested. If the outstanding items have an effect on other previously performed tests, then re-testing of those tests must also be included.
3. Microwave Radio specific tests:
 - a. Verify radio nameplate/label and provisioning with system documentation,
 - b. Receiver Checks: frequency, sensitivity, AGC calibration, MHSB switching, alarm verification to NMS,
 - c. Transmitter Checks: frequency, power, MHSB switching, alarm verification.
4. Antenna system specific tests:

- a. Each path must be aligned and tested to conform with engineering design and path survey calculations.
 - b. Each antenna waveguide must be swept and plotted in accordance with manufacturer's specifications at the time of contract execution. Measured return loss must be a minimum of 23 dB across the entire frequency band of interest.
 - c. Antenna waveguide must be pressurized in accordance with manufacturer's specifications at the time of contract execution and leak down tests will be performed to ensure leak rate does not exceed manufacturer's specifications at the time of contract execution.
 - d. Verify waveguide pressure alarm to system alarm display.
 - e. Verify the correct antenna sway brace configurations.
 - f. Verify proper grounding and waveguide support
5. Microwave Power Plant specific tests and adjustments:
- a. Measure and record individual cell and power plant total output voltages.
 - b. Verify float voltage on charger.
 - c. Set and verify alarm thresholds on battery charger in accordance with manufacturer's specifications at the time of contract execution. Verify alarm indication on system alarm display.
6. Radio equipment specific tests:
- a. Transmitter: Using calibrated test equipment, measure, and record transmit power and frequency; verify operation of ATPC, if and where used.
 - b. Receiver: Using calibrated test equipment, measure, and record RF receiver local oscillator frequency; Receive Signal Level (RSL). Verify MHSB, and/or space diversity error-less receiver switching and operation of reverse path protection, as applicable.
7. Overall RF system testing:
- a. Using calibrated test equipment; including BER test sets, perform a transmitter fade margin test on each path in both directions. Measure and record the 10⁻⁶ BER threshold and relevant AGC voltages and RSL readings. Results must be tabulated, compared with calculated predictions, summarized, and signed by Contractor's test team and submitted to the County's Project Manager for approval.
 - b. The BER test must be performed for 12 hours per TX and RX on each microwave hop. The Contractor may daisy chain the hops during the test, but if a bit error occurs the test must be repeated.
 - c. Test Ethernet quality using RFC 2544, ITU-T Y.1564, and other such tests
8. Microwave alarm system testing:

- a. Verify reporting to system alarm display.
- b. Verify proper display, acknowledging, logging, and storage of all alarms.

10.4.2 MPLS System Tests

1. MPLS functionality;
2. VPLS functionality;
3. Network QoS queue verification;
4. Network resiliency / availability;
5. Traffic verification;
6. MPLS Router alarm reporting, and
7. Fast Reroute functionality.

10.5 ACCEPTANCE TESTING DOCUMENTATION AND RECORDS

1. Within 30 days of successful completion of the Acceptance Testing Plan, the Contractor shall provide the County with a complete set of test documentation, including the testing procedures utilized, testing dates, testing locations, project participants, weather conditions, a description of testing irregularities or problems encountered, and testing results. Any punch listed items that have not been resolved within the 30 day window shall be listed along with the proposed resolution and timeframe for completion.
2. The documentation shall include a complete inventory database of all equipment sold to the County for this project. The data base shall be in a Microsoft Access or Excel format, and shall be segmented into equipment types and location. For infrastructure equipment, the information must include an item description, the manufacturer, model, serial number, and latest software load and version. Equipment passwords for access to secured equipment shall also be provided to the County team.
3. For user radio equipment, radios shall be identified by agency / department and include a description, manufacturer, model, serial number, latest software load and version and flash code.
4. ATP documentation shall be provided in 3-ring binders as well as in electronic format (Adobe PDF) on DVD media to the County's Project Manager.

10.6 30 DAY OPERATIONAL TEST

1. A thirty (30) consecutive day operational system test without a major failure, hardware/software changes, etc., will be required as part of system acceptance. For the purpose of the 30-day operational test, a portion of the system users will be placed on the system to help identify system issues that may arise and need attention. The specific agenda that will participate in the test will be discussed and mutually agreed to a month or so prior to the commencement of the test. Typically, personnel who are not involved in critical operations are selected for the operational test. Usually, at the point in the project, most agencies are interested in having some of their staff "try the system

out” on a voluntary basis. Full Public Safety operations on the new system will not commence until Final System Acceptance has occurred.

2. The 30-day operational test, or Burn-In period, shall be scheduled to start upon written notification to the County that the system is ready for the burn-in test and the initial user training and radio field unit transitions have been successfully completed.
3. If the system performs as specified for 30 consecutive days, and the remainder of the acceptance tests and have been successfully completed and punch listed items have been resolved (including as-built documentation), then the system infrastructure will be considered accepted. Any major failure or hardware/software change that occurs, at the discretion of the County’s project manager, may reset the 30 day operational test clock. The project manager’s decision to reset the clock will be based, in part, upon the source and severity of the failure and/or hardware/software change, as well as the operational impact suffered by the users.

SECTION 11 – WARRANTY & SYSTEM MAINTENANCE

11.1 WARRANTY

1. Collin County is requiring a 2-year “System Warranty” for the Replacement Radio System. The Warranty shall encompass all contracted elements including, but not limited to the following:
 - a. Radio system infrastructure equipment
 - b. Microwave network equipment
 - c. Towers and their ancillary elements
 - d. Shelters and their ancillary elements
 - e. Generators
 - f. Uninterruptible power systems
 - g. Logging recorder systems
 - h. Fire station alerting systems
 - i. Site security systems
 - j. Software and Firmware
 - k. Firmware
 - l. Services
 - m. Installation and grounding to meet the requirements of this RFP and the Contractors standards
2. For all of the above elements the warranty shall begin at final system acceptance. Any deviations from this warranty start date must be clearly delineated in the Proposal.
3. Proposers shall clearly state in their Proposal if the warranty period for any elements exceeds 2-years from final system acceptance and provide the warranty period.
4. The warranty for user radio equipment consisting of mobile radios, portable radios, and RF control stations, shall include the first 2 years plus 1 additional year of extended warranty, for a total of 3 years. All three years must utilize the local service shop as a “first echelon” evaluation for the radio units. If Depot based warranty is proposed for any of the 3 years then the local service shop must also be proposed as the coordinating point for shipping and receiving all radio units processed for depot services. The County will purchase and maintain spare mobile, portable, and control station radios that will be used as an “instant replacement” should a user radio require servicing. Should a user radio need repair, the Contractor shall facilitate the programming and delivery of a County-provided spare radio to the County to ensure a rapid replacement of the failed radio. Following delivery of the replacement radio the Contractor shall have the bad radio repaired and returned to the system user. A repair report documenting the scope of work and preventative maintenance conducted on the radio shall be supplied to the County designee(s). For user radio equipment the warranty shall begin upon beneficial use of the user radio equipment, agreed upon by the County and the Contractor.

5. All test equipment used in the provision or delivery of warranty and maintenance services provided to the County, shall, at all times, be functioning properly and have current equipment calibration certificates. Technicians using the equipment shall be properly trained to utilize the equipment. Technicians that are dispatched or assigned to service the facilities of the County shall be familiar with the equipment, sub-systems and systems and their unique configuration.
6. The Contractor shall be the single point of contact for all warranty claims.
7. Warranty repairs, parts, labor, and shipping, and third party subcontractor costs for all elements shall be made at no cost to the County. Note that if any service performed under warranty requires a tower crew to climb the tower for any reason, this shall be included as part of the warranty with no cost to the County. The County shall not pay any out of pocket warranty or maintenance costs to any Contractor or Subcontractor during the warranty period.
8. The County reserves the right to closely monitor and observe warranty repair service.
9. If it becomes necessary for the County to contract with another entity for warranty repairs, due to the inability or failure of the Contractor to perform such repairs, the Contractor shall promptly reimburse the County for all invoices to perform such repairs, within 30 days from presentation of such invoices. This shall only occur after the Contractor has been given written notice, reasonable time, and fair opportunity to respond and correct the problem.
10. During the warranty period, the Contractor shall maintain adequate staff and spare parts inventory, both located within the area to assure prompt warranty service. Response times during the warranty period are detailed below.
11. The Contractor shall certify that its proposed service facilities shall, within the time required herein be able to diagnose any system failure, that repair will be completed at the earliest possible opportunity upon receipt of necessary parts, and any system critical part or sub-system part that is not locally stocked as a spare part will be available on an express basis within no more than twenty-four hours after a failure becomes known to the Contractor.
12. During the 2 year warranty period, the Contractor shall be responsible for preventative and remedial maintenance of the communication system and all supporting subsystems and elements.
13. As much as practical, i.e., in a manner that does not delay restoring the system from an outage, the appropriate County technical personnel may accompany Contractor personnel to sites or facilities when performing infrastructure maintenance and repairs to increase their knowledge level.

11.2 MAINTENANCE

1. The Contractor may be requested to provide for the on-going upkeep, maintenance and repair of the 700 MHz P25 trunked simulcast system, and designated sub-systems, once the initial 2 year system warranty has expired. The Proposer shall follow the maintenance requirements specified in the Pricing section of this RFP in determining the levels and types of maintenance to propose.
2. Maintenance shall include keeping all system and equipment software, and to some extent hardware, current and up to date. The Proposer shall follow the maintenance requirements specified in the Pricing section of this RFP in determining the levels and types of maintenance to propose. Any code in any network components that causes a failure must be corrected by the

Contractor. This includes software upgrades and/or replacement of hardware or other components as required to assure the system is operating properly.

3. Note that if any service performed under the maintenance contract requires a tower crew to climb the tower for any reason, this shall be included as part of the warranty with no cost to the County. The County shall not pay any out of pocket warranty or maintenance costs to any Contractor or Subcontractor during the warranty period. This includes repairs for the Project 25 infrastructure as well as the microwave system.
4. The Proposer shall include support provided via their remote "Technical Support Center" (TSC) that allows the Contractor's Radio Shop, or other designated support services, access to qualified technical support personnel who will address repair, troubleshooting, and maintenance issues regarding hardware and software issues that may be encountered when maintaining the P25 700 MHz trunked simulcast system and associated sub-systems. This service shall be available on a 24 hour, 365 day "call-in" basis. The Proposer shall provide a section in their proposal Section 8 - System Installation, Warranty and Maintenance, the capabilities and availability of their Technical Support Center.

11.3 SERVICE FACILITIES

1. The Proposer shall provide in its system proposal the name, location and capabilities of the service facility(s), which will provide any or all of the system installation, warranty, service, and maintenance, both initially and on a continuing basis.
2. Proposers shall include a thorough description of the proposed service facilities, the size and location of the facilities, the size and qualifications of its overall staff and the number of trained and qualified personnel in the Collin County area, the number of years in business and a list of at least five (5) customers (with names and telephone numbers) who operate systems of similar size and complexity for whom similar installation and maintenance services have been performed.
3. The Proposer shall specifically identify what experience the proposed service provider(s) and its staff currently have in working on the specific type of system that is proposed to Collin County, i.e., a P25, Phase 2 TDMA trunked simulcast public safety system and the associated sub-systems (including the proposed microwave system) identified in this RFP. This information is required to demonstrate to the County that the proposed local service facilities are capable of installing, optimizing, and maintaining the proposed system.
4. It is possible that this Project 25 Phase 2 system will have mobile and portable radio units operating on it from varying manufacturers. It would benefit the County to know and understand the capabilities and qualifications of your proposed service provider with regards to template development, programming, installing, and the overall servicing and maintaining of various Project 25 Phase 2 mobile and portable radio manufacturers. The Proposer shall provide a section in their proposal Section 8 - System Installation, Warranty and Maintenance, that lists the radio unit manufacturers with which it is capable and qualified to provide the services of template development, programming, installing, and the overall servicing and maintaining of these radio units.

5. The Proposer shall describe the ongoing level of factory engineering and service support that will be available to the local service facility during the installation and maintenance of the system and specifically where that support is located. The Proposer shall also detail the hours of operation and the response times for factory support, should it be required by the local service facility. The factory support referenced here will be provided directly to the local service facility for assistance in fulfilling the terms of the installation and (optional) maintenance agreements.

11.4 MAJOR AND MINOR FAILURE DEFINITIONS FOR WARRANTY AND MAINTENANCE

1. A Major Failure is defined by the following:
 - a. Any Main Control Point controller failure causing a switch to redundant Main Control Point controller, or otherwise causing the Simulcast subsystem to enter a "Site Trunking Mode";
 - b. Any subsystem or microwave failure resulting in the Simulcast subsystem reverting to "Site-Trunking" or "Conventional Failsoft mode of operation" for any length of time;
 - c. Loss of a Simulcast Control Point controller or failure of switchover to a backup Simulcast Control Point controller or distributed processing elements;
 - d. A failure resulting in any simulcast sub-system reverting to "Site-Trunking", i.e., the simulcast system is no longer interconnected to the Main Control Point and/or dispatch console systems;
 - e. Loss of two (2) or more System Manager/Alarm Terminals;
 - f. Loss of two (2) or more dispatch console operator positions;
 - g. Total failure of the logging recorder and/or logging recorder interface at any one of the trunked communications console system locations;
 - h. Loss of any of the simulcast repeater sites;
 - i. A trunked repeater site antenna system failure adversely affecting multiple channels;
 - j. Any component or module failure which results in loss of 20% or more of trunked channel resources;
 - k. HVAC system failure at repeater sites, the Main Control Point, or a Simulcast Control Point site;
 - l. UPS system failure at failure at repeater sites, the Main Control Point, or a Simulcast Control Point site;
 - m. Sustained loss of a microwave link that is part of the system.
2. A Minor Failure is defined by the following:
 - a. Loss of single trunked repeater station at any one site;
 - b. Loss of one (1) System Manager/Alarm Terminal;
 - c. Loss of one (1) Dispatch console operator position;

- d. Any component or module failure which results in loss of the availability of a single trunked channel resource.

11.5 SERVICE RESPONSE – WARRANTY AND CONTRACTED MAINTENANCE PERIOD

1. All system infrastructure components as defined in section 11.1(1) above shall be provided service twenty-four (24) hours per day, seven (7) days a week. On-Site response to a major system failure, as defined above, shall be made within two (2) hours of notifying the Contractor's Radio Shop or other source of failure indication via network monitoring by the Contractor. Response to minor system failures, as defined above, shall be made within eight (8) hours. The term "Response" is defined as having a factory-certified technician on-site at the location where the failure occurred.
2. The Proposer shall include in the Pricing section a list of recommended essential infrastructure spare parts to be purchased by the County to assure rapid restoration of systems operations in the event of equipment and/or component failure. Replacement stock shall also be available via emergency request with expedited delivery within twenty-four (24) hours of the equipment failure.
3. Mobile and portable equipment shall be serviced in the Contractor's service facility or factory depot. Repairs shall be completed within three (3) business days.
4. Proposers shall certify that infrastructure replacement parts shall be available for a minimum period of ten (10) years following the date of product discontinuance by the Contractor. Mobile, portable, and control station radio parts and accessories shall be available for at least seven (7) years after the date of product discontinuance.

SECTION 12 – TRAINING

12.1 SYSTEM TRAINING

The success of the new Collin County radio system will be closely tied to an effective user training program. If the radio system users in the field and in dispatch do not fully understand how to properly use the new system and equipment it will likely create the perception that the new system does not function properly, and can lead to a mistaken lack of confidence in the new radio system. To help avoid that problem, this section provides the County's expectations and requirements for conducting and completing a comprehensive multi-level user training program prior to system cutover. The Proposer's training proposal must specify the amount of classroom training to be provided for all levels of training. A syllabus of the training program must be provided in your proposal. The County reserves the right to videotape training classes and use the recordings later for training purposes.

For proposal development purposes, the following levels of training are to be proposed for consideration by the County:

- Radio user training based on a train-the-trainer approach;
- Dispatcher training provided directly by the Contractor's training personnel;
- System management training provided directly by the Contractor's training personnel, and
- System technician training provided directly by the Contractor's technical personnel.

Once a Contractor has been selected, the County and the successful Contractor will work together to further refine the training program to help ensure that it fully meets the needs of the project participants. Prior to final system acceptance and cutover to the new radio system, the Contractor shall provide and conduct the finalized version of the system training program.

The program will include both "Train-the-Trainer" courses and other courses in which Contractor personnel will directly train the system users. Train-the-Trainer courses are preferred when hundreds of personnel from the County and the other agencies using the system must be trained on the use of the new system and the associated user radios and accessories.

The "Train-the-Trainer" program for Level 2 – Operators (Field personnel) shall be used to ultimately train a total of approximately 800 field personnel employed by the County and other agencies within the County. Each entity has identified a specific number of personnel listed below who are to be trained as Trainers who will then train their own personnel.

Dispatcher training and System Manager training are more complex and will require more training time and highly skilled trainers to effectively instruct personnel on the many details involved in the proper use of the dispatch console systems and the management of the overall system operation. Accordingly, training in these categories is more involved and will be provided directly by the Contractor.

Beyond those levels of training, Technician Level training is even more complex and usually requires one or more weeks of on-site training at a Contractor location which provides detailed hands-on training on a live P25 trunked radio system to diagnose and repair / correct system problems. The County may or may not purchase the Technician Level training, but it is interested in evaluating that level of training and its associated cost.

Proposers shall provide a listing and description of the Technician Level training courses that are available along with the associated costs for each training module.

12.2 USER TRAINING

Level 1 – Executives

Executives can be any user or non-user of the system who needs to have a high-level understanding of the new radio communication system, its operation, fleetmaps (radio channels), and radio interoperability capabilities.

Personnel in this category typically include:

- Elected Officials
- County Management personnel
- Emergency Management Planners
- Supervisory Personnel
- Project Managers.

Level 2 – Operators (Field personnel)

The operator is the person that actually uses a portable (handheld) radio, a mobile (vehicle mounted) unit or a control station (a fixed desktop radio). The operator may be a daily user or a user only during emergencies and exercises.

Personnel in this category typically include:

- Sheriff's Office personnel
- Fire Department personnel
- EMS personnel
- Emergency Managers
- Public Works other Local Government personnel.

Level 3 – Dispatcher/Console Operator

The Dispatch/Console Operator directs communications during daily operations and emergency situations. The Dispatch/Console Operator needs a detailed understanding of both console operation and agency operations.

Personnel in this category include:

- Dispatcher/Console Operators

- Dispatch Supervisors.

12.3 TECHNICAL TRAINING

Level 4 – 1st Echelon Technician

The 1st Echelon Technician is a person that interfaces with the radio user to triage the radio problem situation and determine the nature of the problem (bad microphone, bad antenna, bad battery, etc.) and whether or it can be quickly corrected on the spot. If the problem cannot be corrected quickly, the radio unit will be exchanged with a replacement radio and the defective radio will be subsequently repaired.

Personnel in this category typically include:

- Mobile and portable radio programmers
- Mobile radio unit installers
- Help desk personnel
- Bench technicians.

Level 5 – System Technician

The System Technician is responsible for preventive maintenance, troubleshooting and repair of the system infrastructure. The System Technician develops and updates the system fleetmaps, investigates system issues and supports the System Manager.

Examples of personnel that fall into this category level include:

- County two-way radio RF infrastructure technicians
- Microwave technician
- Dispatch console technician
- Fleetmap and subscriber programming manager
- Power system technician.

Level 6 – System Manager

System Managers are technical managers that are responsible for managing radio user access, compiling and preparing radio system status and activity reports, maintaining system configuration databases and monitoring and reporting the overall health of the system. The System Manager is responsible for the successful day-to-day and emergency operation of the P25 trunked radio system.

12.4 COURSE DESCRIPTIONS

12.4.1 Collin County Radio System Overview Course

This course will provide a high-level overview of the new Collin County radio system. This course is to be designed for system users and non-users, and is intended to provide the attendees with a basic understanding of the new radio system as a whole. It will help elected officials, county management personnel, and others obtain a high-level understanding of the new system and its capabilities. It will be provided in the Train-the-Trainer format allowing the County to provide a solid basic understanding of the system.

The System Overview course will include, at a minimum, the following topics:

- A high-level overview of the new system's capabilities (radio coverage, repeater sites, dispatch centers, system redundancy, user features, and system management.)
- A comparison of old and new systems, and
- A discussion of proper radio procedures.

12.4.2 Operator Training (Radio Users)

This course shall provide a comprehensive training program for field users based upon the Train-the-Trainer approach. Participants will have been successfully trained if they can then successfully train their own personnel.

The training of trainers shall begin after Fixed Network Equipment (FNE) system acceptance testing has been completed. Tentatively, radio users will be trained after all Training Instructors and Dispatchers have been trained.

The Operator course will include, at a minimum, the following topics:

- The System Overview Course
- Area of radio system operation; radio coverage provided
- Operation of all relevant user radio features and functions
- Operation and control of mobile and portable radios
- Operation and control of control stations (desktop radios in office locations) as appropriate
- Proper radio procedures
- System failure and backup modes (what to do if system problems arise)
- Basic troubleshooting techniques if the radio does not seem to operate properly or at all, and
- Proper handling and care of the radio equipment, batteries and accessories.

12.4.3 Dispatch/Console Operator Training

Dispatch console training shall be provided by Contractor personnel who are subject matter experts in radio system and dispatch console operation.

The Proposer shall propose a recommended number of dispatch console training classes to thoroughly train all dispatch personnel for Collin County.

The training session will be conducted for all of the dispatch personnel a week or two prior the new console system being placed in service. This will be conducted in a classroom environment, using training aids and the County radio dispatch consoles. A qualified subject matter expert shall teach these classes using training aids such as videos, system diagrams, and training manuals showing functionality. There shall be handouts available for all attendees, and dispatcher operator training manuals for future reference and follow up training.

12.4.4 1st Echelon Technician

Collin County will have at least one person designated to serve as a 1st Echelon Technician. The Contractor shall provide training to the 1st echelon personnel who will facilitate accurate problem identification to initiate an efficient and effective course of action for user radio replacement or repairs.

As shown earlier, this level of training can encompass different types of personnel. For example Help Desk personnel (if any) or Fleet Management personnel with some radio experience will need to have a working understanding of the most common user radio problems likely to occur.

The 1st Echelon training program shall include, at a minimum, the following topics:

- A thorough understanding of the use of mobile, portable, and control station radios and accessories
- Basic troubleshooting techniques to determine whether the problem can be resolved quickly on the spot or whether the radio needs to be replaced and sent to a repair facility
- Programming of portable, mobile and control stations should a replacement be needed
- Triage testing of radio units for proper operations using a service monitor / test set
- Adjusting user radios to operate within specifications using radio software and a service monitor test set
- Disassembly / reassembly of radio units
- Identifying radio units needing repair in-house or at the factory
- Monitoring system management software
- Basic system infrastructure diagnostic techniques.

12.4.5 System Technician Training

The County may have an experienced in-house trunked radio system Technician who will need to attend Technician training courses to become familiar with P25 system maintenance, programming, problem diagnosis and correction. This Technician shall also be involved in the oversight of the new radio system as it is being installed and optimized.

The proposed System Technician training program shall include the recommended level of technician training to enable the County's Technician to properly manage and if needed maintain the system.

The System Technician training shall include, at a minimum, the following topics:

- A detailed system overview
- Block diagram and circuit descriptions
- Operational theory of the system and all system subsystems and components
- Principles of analog and digital transmission
- Proper operation of system features and functions
- System failure modes
- System diagnostic capabilities and alarms
- Installation and turn-on procedures
- Operation of all required test equipment
- Alignment and optimization testing procedures
- Detailed troubleshooting procedures
- Unit/module replacement procedures
- Detailed repair procedures
- Detailed maintenance procedures
- Proper record-keeping
- Detailed review of system the documentation structure, numbering system, and documentation control process
- Detailed preventative maintenance procedures.

This training program shall be conducted with substantial hands-on involvement using equipment provided by the Contractor or third party suppliers as part of this system.

12.4.6 System Manager Training

The System Manager training course will be a comprehensive program designed to familiarize the Radio System Manager with all available features, reports, and diagnostics.

The System Manager course must include, at a minimum, the following topics:

- A system overview
- Operational theory of all system components

- Available functionality
- All available system reports and report generation
- Available diagnostics
- Detailed discussion of system failure modes that may occur
- Basic troubleshooting techniques
- Development and maintenance of system databases
- Detailed discussion of the system alarm system
- Hands-on familiarization with all of the above
- Fleetmapping of the system
- Disabling /enabling user radios
- Radio interoperability both internal to the system and with external agencies in the surrounding areas.

12.5 TRAINING LOCATIONS

The County prefers that whenever possible the system training occur in the Dallas Metropolitan area, preferably within Collin County. That said, the County recognizes that some of the more technical portions of the training may be more effective if they are conducted at a Contractor's facility that is specially equipped with relevant tools and operating system components. Contractors shall identify recommended locations for the various training modules to be provided, keeping in mind that local training is highly preferred.

The Contractor shall provide all necessary training equipment, computers, projectors, radio units, manuals, workbooks and test equipment needed to complete the training. For scheduling purposes, the County will work with the Contractor to populate the training schedule. A single point of contact will be provided to the Contractor for training coordination as well as for all training activities. Appropriate documentation of the attendees' completion of the training modules will be provided to the County. At the conclusion of each training class an evaluation form shall be provided for the attendees to provide feedback regarding the effectiveness of the class. This feedback will be reviewed prior to the next course to determine if a curriculum change may be needed.

Classroom Instruction

Classrooms of the appropriate size and environment will be provided by the County in accordance with a predetermined schedule.

Customized Materials

The training materials for each course will vary. The Contractor shall provide the appropriate training material as indicated on the Course Summary at the end of this section.

Documentation for System Overview, Operator Training and Dispatch/Console Operator Training must be prepared specifically for the configuration of the new Collin County radio system. All instruction books shall be clearly written and illustrated to instruct the students in the proper use of all system features available for specific equipment and operation. Operators manuals provided in hard copy will also be provided in electronic PDF (Portable Document Format) to be read with the Adobe Acrobat Reader software. Every radio and every dispatch console position shall include a printed training / user manual.

12.6 TRAINING COURSE SUMMARY

Collin County Radio System Overview Course (Train the Trainer)	
Number of sessions	2
Number Students/session	10
Course Duration	(To be specified by Proposer)
Training Material / Quantity	(To be proposed by Proposer)
Training Audience Level	1, 2, 3, 4, 6
Delivery	Classroom / Lecture
Location	D/FW area, Collin County preferred
Operator Training (Train the Trainer)	
Number of sessions	5
Students/session	12
Course Duration	(To be proposed by Proposer)
Training Material / Quantity	(To be proposed by Proposer)
Training Audience Level	2, 3, 4, 6
Delivery	Classroom / Hands-On Instruction
Location	D/FW area, Collin County preferred
Dispatch Console Systems	
Number of sessions for County	3
Students/session	10
Course Duration	(To be proposed by Proposer)
Training Material / Quantity	(To be proposed by Proposer)
Training Audience Level	3, 6
Delivery	Console Position / Hands-On Instruction
Location	D/FW area, Collin County preferred
1st Echelon Technician Training	
Number of sessions	2
Students/session	5
Course Duration	(To be proposed by Proposer)
Training Material / Quantity	(To be proposed by Proposer)
Training Audience Level	4, 6
Type	Classroom / Hands-On Instruction
Location	D/FW area, Collin County preferred
System Technician	
Number of sessions	1
Students/session	2

Course Duration	(To be proposed by Proposer)
Training Material / Quantity	(To be proposed by Proposer)
Training Audience Level	5, 6
Type	Classroom / Hands-On Instruction
Location	(To be proposed by Proposer)
System Manager Training	
Number of sessions	1
Students/session	4
Course Duration	(To be proposed by Proposer)
Training Material / Quantity	(To be proposed by Proposer)
Training Audience Level	5, 6
Type	Network Manager / Hands-On Instruction
Location	D/FW area, Collin County preferred

SECTION 13 – PRICING

13.1 INTRODUCTION

Collin County may or may not request Best and Final Offers, therefore Proposers are encouraged to provide their best pricing at the time of proposal submission. Any discounts, trade-ins, cost incentives or signing bonuses that the Proposer intends to extend to the County should be contained in this Pricing section. Proposers must submit all pricing for the proposed system using the following pricing worksheets. These worksheets will serve as the basis for the proposed pricing of all equipment and all services including, but not limited to, system staging, equipment delivery, freight to Collin County, installation, programming, optimization, project management, engineering, training, testing, travel and per-diem, supplies, etc. As needed, Proposers should supplement the pricing section to adequately portray and describe the proposed architecture. Proposers should be as descriptive as possible and include equipment model names, supplier names and model numbers for 3rd-party equipment, etc. Equipment shelter sizes, tower heights, UPS and generator sizes, etc. must be included in the worksheets.

Please round all costs to the nearest dollar.

13.2 MAIN CONTROL POINT

Main Control Point – Collin County Service Center (Co-Located with Wilmeth Road Tower)			
Description (please add text to make more descriptive to system proposed)	Qty	Unit Cost	Extended Cost
Main Control Point Trunking Controller (Redundant) <i>(Include User ID Licenses for 50,000 radio users)</i>	1	\$	\$
Main Control Point LAN, WAN Equipment	Lot	\$	\$
Main Control Point Servers Equipment	Lot	\$	\$
Network Management/Alarm Terminals <ol style="list-style-type: none"> 1. The Main Control Point Equipment Room 2. The Collin County Sheriff's Office Dispatch (utilize existing fiber) 3. Facilities Maintenance Central Plant Control Room (utilize existing fiber) 4. Major Palmisano's Office (use existing computer if possible) 	3	\$	\$
Main Control Point Alarm Monitoring Equipment	Lot		
Main Control Point Total AES (for all channels) and any Required Key Management Equipment	Lot	\$	\$
Main Control Point OTAR Equipment and Software <i>(ensure that OTAR licenses are included for every user radio proposed on this new system)</i>	Lot	\$	\$
Main Control Point Multikey Equipment and Software	Lot	\$	\$
Main Control Point Network Management Agency Partitioning	Lot	\$	\$
Process Both TDMA/FDMA for 8 Channels	Lot	\$	\$
Main Control Point UPS with 4 Hour Full-Load Backup Time <i>(state size and full load backup time here, include capacity for Wilmeth Simulcast Control Point equipment)</i>	1	\$	\$
Main Control Point Outdoor Diesel Generator <i>(use existing generator)</i>	0	\$	\$
Main Control Point Equipment Shelter <i>(state size)</i>	1	\$	\$
Main Control Point Tower <i>(use existing tower)</i>	0	\$	\$
Services: Installation, Project Management, Engineering, Optimization, Programming, and other Services Related to Main Control Point		\$	\$
Total Main Control Point Equipment and Services			\$

13.3 MPLS MICROWAVE NETWORK

<i>MPLS Licensed Microwave Network – Ring Protected</i>			
Description (please name sites in each hop, but price by hop, not by site)	Qty	Unit Cost	Extended Cost
Site 1 to Site 2 Hop Equipment		\$	\$
Site 3 to Site 4 Hop Equipment		\$	\$
.		\$	\$
.		\$	\$
Site N to Site N Hop Equipment		\$	\$
Services: Installation, Project Management, Engineering, Optimization, Programming, and other Services Related to MPLS Microwave Network		\$	\$
Total MPLS Microwave Network Equipment and Services			\$

13.4 SIMULCAST SITE #1 - SIMULCAST CONTROL POINT

Simulcast Site #1: Simulcast Control Point – Wilmeth Road <i>Eight P25 Phase 2 Channels (14 Talkpaths)</i>			
Description (please add text to make more descriptive to system proposed)	Qty	Unit Cost	Extended Cost
Simulcast Control Point Trunking Controller	Lot	\$	\$
Simulcast Control Point LAN, WAN Equipment	Lot	\$	\$
Simulcast Control Point Inbound Traffic Comparison Equipment	8	\$	\$
Simulcast Control Point Sync/GPS Equipment	Lot	\$	\$
Simulcast Co-Located Remote Base Stations	8	\$	\$
Simulcast Co-Located Remote LAN, WAN Equipment	Lot	\$	\$
Simulcast Co-Located Remote Antenna System	Lot	\$	\$
Simulcast Subsystem Alarm Monitoring Equipment	1	\$	\$
Simulcast Control Point UPS with 4 Hour Full-Load Backup Time <i>(included in Main Control Point pricing)</i>	0	\$	\$
Simulcast Control Point Outdoor Diesel Generator <i>(use existing generator)</i>	0	\$	\$
Simulcast Control Point Tower <i>(use existing tower)</i>	0	\$	\$
Simulcast Control Point Equipment Shelter <i>(proposed with Main Control Point pricing)</i>	0	\$	\$
Grounding Upgrades Required by Proposer (indoor and outdoor)	Lot	\$	\$
Simulcast Control Point – Site Civil Work	Lot	\$	\$
Services: Installation, Project Management, Engineering, Optimization, Programming, and other Services Related to Simulcast Control Point/Co-Located Remote Site		\$	\$
Total Simulcast Site #1 (Wilmeth Road Simulcast Control Point) Equipment and Services			\$

13.5 SIMULCAST SITE #2 - SIMULCAST CONTROL POINT GEOGRAPHICALLY SEPARATED

Simulcast Site #2: Simulcast Control Point – Farmersville - (Proposer may determine that a different site is more suitable as a Simulcast Control Point) Eight P25 Phase 2 Channels (14 Talkpaths)			
Description (please add text to make more descriptive to system proposed)	Qty	Unit Cost	Extended Cost
Simulcast Control Point Trunking Controller	Lot	\$	\$
Simulcast Control Point LAN, WAN Equipment	Lot	\$	\$
Simulcast Control Point Inbound Traffic Comparison Equipment	8	\$	\$
Simulcast Control Point Sync/GPS Equipment	Lot	\$	\$
Simulcast Co-Located Remote Base Stations	8	\$	\$
Simulcast Co-Located Remote LAN, WAN Equipment	Lot	\$	\$
Simulcast Co-Located Remote Antenna System	Lot	\$	\$
Simulcast Subsystem Alarm Monitoring Equipment	1	\$	\$
Simulcast Control Point/Simulcast Remote Site UPS with 4 Hour Full-Load Backup Time <i>(state size and full load backup time here)</i>	1	\$	\$
Simulcast Control Point Outdoor Diesel Generator <i>(state size and type of generator and tank size)</i>	1	\$	\$
Simulcast Remote Site Tower 300' Self-Supporting <i>(state tower manufacturer)</i>	1	\$	\$
Simulcast Control Point Equipment Shelter <i>(state size and type of shelter)</i>	1	\$	\$
Simulcast Control Point – Site Civil Work	Lot	\$	\$
Services: Installation, Project Management, Engineering, Optimization, Programming, and other Services Related to Simulcast Control Point/Co-Located Remote Site		\$	\$
Total Simulcast Site #2 (Farmersville Simulcast Control Point) Equipment and Services			\$

13.6 SIMULCAST SITE #3 - REMOTE SITE

Simulcast Site #3: Remote Site – Copeville <i>Eight P25 Phase 2 Channels (14 Talkpaths)</i>			
Description (please add text to make more descriptive to system proposed)	Qty	Unit Cost	Extended Cost
Simulcast Remote Site Base Stations	8	\$	\$
Simulcast Remote Site LAN, WAN Equipment	Lot	\$	\$
Simulcast Remote Site Sync/GPS Equipment	Lot	\$	\$
Simulcast Remote Site Antenna System	Lot	\$	\$
Simulcast Remote Site Alarm Monitoring Equipment	1	\$	\$
Simulcast Remote Site UPS with 4 Hour Full-Load Backup Time <i>(state size and full load backup time here)</i>	1	\$	\$
Simulcast Remote Site Outdoor Diesel Generator <i>(use existing generator)</i>	0	\$	\$
Simulcast Remote Site Tower 300' Self-Supporting <i>(state tower manufacturer)</i>	1	\$	\$
Simulcast Remote Site Equipment Shelter <i>(state size and type of shelter)</i>	1	\$	\$
Grounding Upgrades Required by Proposer (indoor and outdoor)	Lot	\$	\$
Simulcast Remote Site – Site Civil Work	Lot	\$	\$
Services: Installation, Project Management, Engineering, Optimization, Programming, and other Services Related to Simulcast Remote Site		\$	\$
Total Simulcast Site #3 (Copeville Remote Site) Equipment and Services			\$

13.7 SIMULCAST SITE #4 - REMOTE SITE

Simulcast Site #4: Remote Site – Verona <i>Eight P25 Phase 2 Channels (14 Talkpaths)</i>			
Description (please add text to make more descriptive to system proposed)	Qty	Unit Cost	Extended Cost
Simulcast Remote Site Base Stations	8	\$	\$
Simulcast Remote Site LAN, WAN Equipment	Lot	\$	\$
Simulcast Remote Site Sync/GPS Equipment	Lot	\$	\$
Simulcast Remote Site Antenna System	Lot	\$	\$
Simulcast Remote Site Alarm Monitoring Equipment	1	\$	\$
Simulcast Remote Site UPS with 4 Hour Full-Load Backup Time <i>(state size and full load backup time here)</i>	1	\$	\$
Simulcast Remote Site Outdoor Diesel Generator <i>(use existing generator)</i>	0	\$	\$
Simulcast Remote Site Tower <i>(use existing tower)</i>	0	\$	\$
Simulcast Remote Site Equipment Shelter <i>(state size and type of shelter)</i>	1	\$	\$
Grounding Upgrades Required by Proposer (indoor and outdoor)	Lot	\$	\$
Simulcast Remote Site – Site Civil Work	Lot	\$	\$
Services: Installation, Project Management, Engineering, Optimization, Programming, and other Services Related to Simulcast Remote Site		\$	\$
Total Simulcast Site #4 (Verona Remote Site) Equipment and Services			\$

13.8 SIMULCAST SITE #5 - REMOTE SITE

Simulcast Site #5: Remote Site – Celina <i>Eight P25 Phase 2 Channels (14 Talkpaths)</i>			
Description (please add text to make more descriptive to system proposed)	Qty	Unit Cost	Extended Cost
Simulcast Remote Site Base Stations	8	\$	\$
Simulcast Remote Site LAN, WAN Equipment	Lot	\$	\$
Simulcast Remote Site Sync/GPS Equipment	Lot	\$	\$
Simulcast Remote Site Antenna System	Lot	\$	\$
Simulcast Remote Site Alarm Monitoring Equipment	1	\$	\$
Simulcast Remote Site UPS with 4 Hour Full-Load Backup Time <i>(state size and full load backup time here)</i>	1	\$	\$
Simulcast Remote Site Outdoor Diesel Generator <i>(use existing generator)</i>	0	\$	\$
Simulcast Remote Site Tower <i>(use existing tower)</i>	0	\$	\$
Simulcast Remote Site Equipment Shelter <i>(state size and type of shelter)</i>	1	\$	\$
Grounding Upgrades Required by Proposer (indoor and outdoor)	Lot	\$	\$
Services: Installation, Project Management, Engineering, Optimization, Programming, and other Services Related to Simulcast Remote Site		\$	\$
Total Simulcast Site #5 (Celina Remote Site) Equipment and Services			\$

13.9 SIMULCAST SITE #6 - REMOTE SITE

Simulcast Site #6: Remote Site – Allen <i>Eight P25 Phase 2 Channels (14 Talkpaths)</i>			
Description (please add text to make more descriptive to system proposed)	Qty	Unit Cost	Extended Cost
Simulcast Remote Site Base Stations	8	\$	\$
Simulcast Remote Site LAN, WAN Equipment	Lot	\$	\$
Simulcast Remote Site Sync/GPS Equipment	Lot	\$	\$
Simulcast Remote Site Antenna System	Lot	\$	\$
Simulcast Remote Site Alarm Monitoring Equipment	1	\$	\$
Simulcast Remote Site UPS with 4 Hour Full-Load Backup Time <i>(state size and full load backup time here)</i>	1	\$	\$
Simulcast Remote Site Outdoor Diesel Generator <i>(state size and type of generator and tank size)</i>	1	\$	\$
Simulcast Remote Site Tower <i>(use existing water tower)</i>	0	\$	\$
Simulcast Remote Site Equipment Shelter <i>(state size and type of shelter)</i>	1	\$	\$
Grounding Upgrades Required by Proposer (indoor and outdoor)	Lot	\$	\$
Services: Installation, Project Management, Engineering, Optimization, Programming, and other Services Related to Simulcast Remote Site		\$	\$
Total Simulcast Site #6 (Allen Remote Site) Equipment and Services			\$

13.10 SIMULCAST SITE #8 - REMOTE SITE

Simulcast Site #7: Remote Site – Anna <i>Eight P25 Phase 2 Channels (14 Talkpaths)</i>			
Description (please add text to make more descriptive to system proposed)	Qty	Unit Cost	Extended Cost
Simulcast Remote Site Base Stations	8	\$	\$
Simulcast Remote Site LAN, WAN Equipment	Lot	\$	\$
Simulcast Remote Site Sync/GPS Equipment	Lot	\$	\$
Simulcast Remote Site Antenna System	Lot	\$	\$
Simulcast Remote Site Alarm Monitoring Equipment	1	\$	\$
Simulcast Remote Site UPS with 4 Hour Full-Load Backup Time <i>(state size and full load backup time here)</i>	1	\$	\$
Simulcast Remote Site Outdoor Diesel Generator <i>(state size and type of generator and tank size)</i>	1	\$	\$
Simulcast Remote Site Tower 350’ Self-Supporting <i>(state size and type of tower)</i>	1	\$	\$
Simulcast Remote Site Equipment Shelter <i>(state size and type of shelter)</i>	1	\$	\$
Grounding Upgrades Required by Proposer (indoor and outdoor)	Lot	\$	\$
Services: Installation, Project Management, Engineering, Optimization, Programming, and other Services Related to Simulcast Remote Site		\$	\$
Total Simulcast Site #7 (Anna Remote Site) Equipment and Services			\$

13.11 SIMULCAST SITE #8 - REMOTE SITE

Simulcast Site #8: Remote Site – Plano Comm Pkwy <i>Eight P25 Phase 2 Channels (14 Talkpaths)</i>			
Description (please add text to make more descriptive to system proposed)	Qty	Unit Cost	Extended Cost
Simulcast Remote Site Base Stations	8	\$	\$
Simulcast Remote Site LAN, WAN Equipment	Lot	\$	\$
Simulcast Remote Site Sync/GPS Equipment	Lot	\$	\$
Simulcast Remote Site Antenna System	Lot	\$	\$
Simulcast Remote Site Alarm Monitoring Equipment	1	\$	\$
Simulcast Remote Site UPS with 4 Hour Full-Load Backup Time <i>(state size and full load backup time here)</i>	1	\$	\$
Simulcast Remote Site Outdoor Diesel Generator <i>(state size and type of generator and tank size)</i>	1	\$	\$
Simulcast Remote Site Tower <i>(use existing tower)</i>	0	\$	\$
Simulcast Remote Site Equipment Shelter <i>(state size and type of shelter)</i>	1	\$	\$
Grounding Upgrades Required by Proposer (indoor and outdoor)	Lot	\$	\$
Services: Installation, Project Management, Engineering, Optimization, Programming, and other Services Related to Simulcast Remote Site		\$	\$
Total Simulcast Site #8 (Plano Comm Pkwy Remote Site) Equipment and Services			\$

13.12 SIMULCAST SITE #9 - REMOTE SITE

Simulcast Site #8: Remote Site – Plano Avenue N <i>Eight P25 Phase 2 Channels (14 Talkpaths)</i>			
Description (please add text to make more descriptive to system proposed)	Qty	Unit Cost	Extended Cost
Simulcast Remote Site Base Stations	8	\$	\$
Simulcast Remote Site LAN, WAN Equipment	Lot	\$	\$
Simulcast Remote Site Sync/GPS Equipment	Lot	\$	\$
Simulcast Remote Site Antenna System	Lot	\$	\$
Simulcast Remote Site Alarm Monitoring Equipment	1	\$	\$
Simulcast Remote Site UPS with 4 Hour Full-Load Backup Time <i>(state size and full load backup time here)</i>	1	\$	\$
Simulcast Remote Site Outdoor Diesel Generator <i>(state size and type of generator and tank size)</i>	1	\$	\$
Simulcast Remote Site Tower <i>(use existing tower)</i>	0	\$	\$
Simulcast Remote Site Equipment Shelter <i>(state size and type of shelter)</i>	1	\$	\$
Grounding Upgrades Required by Proposer (indoor and outdoor)	Lot	\$	\$
Services: Installation, Project Management, Engineering, Optimization, Programming, and other Services Related to Simulcast Remote Site		\$	\$
Total Simulcast Site #9 (Plano Avenue N Remote Site) Equipment and Services			\$

13.13 SIMULCAST SITE #10 - REMOTE SITE

Simulcast Site #9: Remote Site – Princeton <i>Eight P25 Phase 2 Channels (14 Talkpaths)</i>			
Description (please add text to make more descriptive to system proposed)	Qty	Unit Cost	Extended Cost
Simulcast Remote Site Base Stations	8	\$	\$
Simulcast Remote Site LAN, WAN Equipment	Lot	\$	\$
Simulcast Remote Site Sync/GPS Equipment	Lot	\$	\$
Simulcast Remote Site Antenna System	Lot	\$	\$
Simulcast Remote Site Alarm Monitoring Equipment	1	\$	\$
Simulcast Remote Site UPS with 4 Hour Full-Load Backup Time <i>(state size and full load backup time here)</i>	1	\$	\$
Simulcast Remote Site Outdoor Diesel Generator <i>(state size and type of generator and tank size)</i>	1	\$	\$
Simulcast Remote Site Tower <i>(use existing water tower)</i>	0	\$	\$
Simulcast Remote Site Equipment Shelter <i>(state size and type of shelter)</i>	1	\$	\$
Grounding Upgrades Required by Proposer (indoor and outdoor)	Lot	\$	\$
Services: Installation, Project Management, Engineering, Optimization, Programming, and other Services Related to Simulcast Remote Site		\$	\$
Total Simulcast Site #10 (Princeton Remote Site) Equipment and Services			\$

13.14 SIMULCAST SITE #11 - REMOTE SITE

Simulcast Site #11: Remote Site – West McKinney <i>Eight P25 Phase 2 Channels (14 Talkpaths)</i>			
Description (please add text to make more descriptive to system proposed)	Qty	Unit Cost	Extended Cost
Simulcast Remote Site Base Stations	8	\$	\$
Simulcast Remote Site LAN, WAN Equipment	Lot	\$	\$
Simulcast Remote Site Sync/GPS Equipment	Lot	\$	\$
Simulcast Remote Site Antenna System	Lot	\$	\$
Simulcast Remote Site Alarm Monitoring Equipment	1	\$	\$
Simulcast Remote Site UPS with 4 Hour Full-Load Backup Time <i>(state size and full load backup time here)</i>	1	\$	\$
Simulcast Remote Site Outdoor Diesel Generator <i>(state size and type of generator and tank size)</i>	1	\$	\$
Simulcast Remote Site Tower <i>(use existing water tower)</i>	0	\$	\$
Simulcast Remote Site Equipment Shelter <i>(state size and type of shelter)</i>	1	\$	\$
Grounding Upgrades Required by Proposer (indoor and outdoor)	Lot	\$	\$
Services: Installation, Project Management, Engineering, Optimization, Programming, and other Services Related to Simulcast Remote Site		\$	\$
Total Simulcast Site #11 (West McKinney Remote Site) Equipment and Services			\$

13.15 COLLIN COUNTY SHERIFF'S OFFICE COMMUNICATION CENTER

<p><i>Collin County Sheriff's Office Communication Center</i> <i>a primary offering, all dispatch consoles will be located in the current dispatch room. Please provide an alternate cost to locate the dispatch consoles in a different room in the rear area of the Sherriff's Office. The current equipment room will remain the location of the "backroom electronics" in both instances. Additional detail may be acquired during the "site visits."</i></p>			
Description (please add text to make more descriptive to system proposed)	Qty	Unit Cost	Extended Cost
IP-Based LCD Dispatch Consoles	5	\$	\$
Audible and Visual Indication on all Consoles for Site Trunking	5	\$	\$
Dispatch Console LAN/WAN/Electronics	Lot	\$	\$
Instant Recall Recorders (one per console)	3	\$	\$
Conventional Interface for Thirty-Four (34) Conventional Stations	Lot	\$	\$
Racked Fallback 700MHz RF Control Stations Linked to Conventional Interface for "Site Trunking" Backup	20	\$	\$
Wireless Headsets (Plantronics CA-12)	20	\$	\$
Telephone/Radio Cross Mute Functionality for Headset	Lot	\$	\$
Higher Ground Logging Recorder <i>(please state whether new Higher Ground or upgrade to existing Higher Ground and provide Model #)</i>	1	\$	\$
Replacement UPS with 4 Hour Full-Load Backup Time (not required)	0	\$	\$
Grounding Upgrades Required by Proposer	Lot	\$	\$
Services: Installation, Project Management, Engineering, Optimization, Programming, and other Services Related to Dispatch Equipment		\$	\$
Total Collin County Sheriff's Office Communication Center Equipment and Services			\$

13.16 FIRE STATION ALERTING SYSTEM

<i>Please propose and describe a complete Fire Station Alerting solution. All dispatch positions at Collin County Sheriff's Office Communication Center shall have alerting capabilities to all Fire Stations. All Fire Stations shall have the required equipment to properly decode and acknowledge alerts, as well as process audio and relay alerts.</i>		
Description (please add text to make more descriptive to system proposed)	Qty	Extended Cost
Collin County Sheriff's Office Communication Center – Fire Station Alerting Solution <i>(list components included here, include all services in cost to allow for deletions)</i>		\$
Nevada Fire Station 1 - Fire Station Alerting Solution <i>(list components included here, include all services in cost to allow for deletions. Do same for all stations below as well)</i>		\$
Nevada Fire Station 2 - Fire Station Alerting Solution		\$
Celina Fire Station - Fire Station Alerting Solution		\$
Anna VFD Fire Station - Fire Station Alerting Solution		\$
Blue Ridge VFD Fire Station - Fire Station Alerting Solution		\$
Farmersville VFD Fire Station - Fire Station Alerting Solution		\$
Josephine VFD Fire Station - Fire Station Alerting Solution		\$
Lowery Crossing VFD Fire Station - Fire Station Alerting Solution		\$
Melissa VFD Fire Station - Fire Station Alerting Solution		\$
Princeton VFD Fire Station - Fire Station Alerting Solution		\$
Weston VFD Fire Station - Fire Station Alerting Solution		\$
City of Westminster Fire Station - Fire Station Alerting Solution		\$
Total Fire Station Alerting Equipment and Services		\$

13.17 ACCEPTANCE TESTING

<i>Acceptance Testing</i>	
	Cost
Field Acceptance Testing <ul style="list-style-type: none"> • Functional Acceptance Tests • System Reliability Features • Radio System Features and Functionality • Site Grounding and Bonding Verification • MPLS Microwave Network testing 	\$
Coverage Acceptance Test – Portable On-Street Test	\$
Coverage Acceptance Test – Random Buildings Test	\$
Coverage Acceptance Test – Required Buildings Test	\$
Coverage Acceptance Test – Signal Level Test	\$
Total Acceptance Testing	\$

13.18 CONVENTIONAL EQUIPMENT

Conventional Equipment	<i>Site Name:</i>		
Description (please add text to make more descriptive to system proposed)	Qty	Unit Cost	Extended Cost
7CALL/7TAC 700 MHz Conventional Repeater with Antenna System	2	\$	\$
Services: Installation, Project Management, Engineering, Optimization, Programming, and other Services Related to Interoperability and Conventional Equipment		\$	\$
Total Conventional Equipment and Services			\$

13.19 RECOMMENDED SPARES

<i>Please list and price Proposer-recommended spare equipment separately so that the County understands the extent of spare equipment contained in the system. The County recognizes that spares are required for proper warranty service and ongoing maintenance of the system. Please provide spares even for equipment that is proposed with redundant components.</i>	
	\$
	\$
	\$
	\$
	\$
	\$
	\$
	\$
	\$
	\$
	\$
	\$
	\$
	\$
Total Recommended Spares	\$

13.20 TRAINING

<i>Describe and price the Training plan based on Section 12 of this RFP and the Proposer's recommendations.. Be descriptive on each line item so that the County and its Partner agencies understand the extent of training proposed in the system.</i>	
	\$
	\$
	\$
	\$
	\$
	\$
	\$
	\$
	\$
Total Training	\$

13.21 PROGRAMMING EQUIPMENT

<i>Please provide the following Programming Equipment to support the proposed system..</i>		
Mobile, Portable, and Control Station Radio Programming Equipment <ul style="list-style-type: none"> • Software • Cables @ Interface Devices • Laptop Computer Please describe the software subscription here (does it include version upgrades?).	2 Complete Sets	\$
Total Programming Equipment		\$

13.22 TEST EQUIPMENT

<i>Please list and price the recommended Test Equipment to support the proposed system.</i>	
No Test Equipment is Required	\$

13.23 COLLIN COUNTY SHERIFF'S OFFICE

Collin County Sheriff's Office Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	100		\$	\$	\$
Trunk Mount	100		\$	\$	\$
Dual Control Head	0		\$	\$	\$
External Speaker	100		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		200	\$	\$	\$
P25 Phase 2 Operation	100	200	\$	\$	\$
Dual Band (700/800, VHF)	0	0	\$	\$	\$
500 Modes Minimum	100	200	\$	\$	\$
Full Color LCD Alphanumeric Side Display	100	200	\$	\$	\$
Full Keypad	0	0	\$	\$	\$
Partial Keypad	100	200	\$	\$	\$
Dual Mic Noise Cancelling		200	\$	\$	\$
High Noise Reduction		200	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		200	\$	\$	\$
Color (Hi Visibility Yellow)		0	\$	\$	\$
Intrinsically Safe		0	\$	\$	\$
PTT-ID	100	200	\$	\$	\$
Emergency Alert	100	200	\$	\$	\$
Priority Scan	100	200	\$	\$	\$
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	100	200	\$	\$	\$
Text Messaging	0	0	\$	\$	\$

Collin County Sheriff's Office Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Bluetooth Capability	0	200	\$	\$	\$
Radio Authentication	100	200	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	100	200	\$	\$	\$
AES Over The Air Rekeying (OTAR)	100	200	\$	\$	\$
Over The Air Programming (OTAP)	100	200	\$	\$	\$
Battery Type (prefer Lithium Polymer)		200	\$	\$	\$
Battery Life 10 Hours		200	\$	\$	\$
Single Unit Charger (1-Hour)		200	\$	\$	\$
Vehicular Charger		60	\$	\$	\$
Multi-Unit Charger		20	\$	\$	\$
Battery Conditioner		3	\$	\$	\$
Speaker Microphone (no antenna)		200	\$	\$	\$
Spare battery		200	\$	\$	\$
Belt Clip		200	\$	\$	\$
Swivel Belt Clip		200	\$	\$	\$
Leather Carrying Case		200	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Collin County Sheriff's Office Mobile and Portable Radios and Related Services					\$

13.24 COLLIN COUNTY CONSTABLES PRECINCT #1

Collin County Constables Precinct #1 Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	7		\$	\$	\$
Trunk Mount	7		\$	\$	\$
Dual Control Head	0		\$	\$	\$
External Speaker	7		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		9	\$	\$	\$
P25 Phase 2 Operation	7	9	\$	\$	\$
Dual Band (700/800, VHF)	0	0	\$	\$	\$
500 Modes Minimum	7	9	\$	\$	\$
Full Color LCD Alphanumeric Side Display	7	9	\$	\$	\$
Full Keypad	0	0	\$	\$	\$
Partial Keypad	7	9	\$	\$	\$
Dual Mic Noise Cancelling		9	\$	\$	\$
High Noise Reduction		9	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		9	\$	\$	\$
Color (Hi Visibility Yellow)		0	\$	\$	\$
Intrinsically Safe		0	\$	\$	\$
PTT-ID	7	9	\$	\$	\$
Emergency Alert	7	9	\$	\$	\$
Priority Scan	7	9	\$	\$	\$
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	7	9	\$	\$	\$
Text Messaging	0	0	\$	\$	\$

Collin County Constables Precinct #1 Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Bluetooth Capability	0	9	\$	\$	\$
Radio Authentication	7	9	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	7	9	\$	\$	\$
AES Over The Air Rekeying (OTAR)	7	9	\$	\$	\$
Over The Air Programming (OTAP)	7	9	\$	\$	\$
Battery Type (prefer Lithium Polymer)		9	\$	\$	\$
Battery Life 10 Hours		9	\$	\$	\$
Single Unit Charger (1-Hour)		9	\$	\$	\$
Vehicular Charger		9	\$	\$	\$
Multi-Unit Charger		0	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		9	\$	\$	\$
Spare battery		9	\$	\$	\$
Belt Clip		9	\$	\$	\$
Swivel Belt Clip		9	\$	\$	\$
Leather Carrying Case		9	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Collin County Constables Precinct #1 Mobile and Portable Radios and Related Services					\$

13.25 COLLIN COUNTY CONSTABLES PRECINCT #2

<i>Collin County Constables Precinct #2 Mobile and Portable Radios</i>					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	5		\$	\$	\$
Trunk Mount	5		\$	\$	\$
Dual Control Head	0		\$	\$	\$
External Speaker	5		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		5	\$	\$	\$
P25 Phase 2 Operation	5	5	\$	\$	\$
Dual Band (700/800, VHF)	0	0	\$	\$	\$
500 Modes Minimum	5	0	\$	\$	\$
Full Color LCD Alphanumeric Side Display	5	5	\$	\$	\$
Full Keypad	0	0	\$	\$	\$
Partial Keypad	5	5	\$	\$	\$
Dual Mic Noise Cancelling		5	\$	\$	\$
High Noise Reduction		5	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		5	\$	\$	\$
Color (Hi Visibility Yellow)		0	\$	\$	\$
Intrinsically Safe		0	\$	\$	\$
PTT-ID	5	5	\$	\$	\$
Emergency Alert	5	5	\$	\$	\$
Priority Scan	5	5	\$	\$	\$
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	5	5	\$	\$	\$
Text Messaging	0	0	\$	\$	\$

Collin County Constables Precinct #2 Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Bluetooth Capability	0	5	\$	\$	\$
Radio Authentication	5	5	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	5	5	\$	\$	\$
AES Over The Air Rekeying (OTAR)	5	5	\$	\$	\$
Over The Air Programming (OTAP)	5	5	\$	\$	\$
Battery Type (prefer Lithium Polymer)		5	\$	\$	\$
Battery Life 10 Hours		5	\$	\$	\$
Single Unit Charger (1-Hour)		5	\$	\$	\$
Vehicular Charger		5	\$	\$	\$
Multi-Unit Charger		0	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		5	\$	\$	\$
Spare battery		5	\$	\$	\$
Belt Clip		5	\$	\$	\$
Swivel Belt Clip		5	\$	\$	\$
Leather Carrying Case		5	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Collin County Constables Precinct #2 Mobile and Portable Radios and Related Services					\$

13.26 COLLIN COUNTY CONSTABLES PRECINCT #3

Collin County Constables Precinct #3 Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	11		\$	\$	\$
Trunk Mount	11		\$	\$	\$
Dual Control Head	0		\$	\$	\$
External Speaker	11		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		15	\$	\$	\$
P25 Phase 2 Operation	11	15	\$	\$	\$
Dual Band (700/800, VHF)	0	0	\$	\$	\$
500 Modes Minimum	11	15	\$	\$	\$
Full Color LCD Alphanumeric Side Display	11	15	\$	\$	\$
Full Keypad	0	0	\$	\$	\$
Partial Keypad	11	15	\$	\$	\$
Dual Mic Noise Cancelling		15	\$	\$	\$
High Noise Reduction		15	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		15	\$	\$	\$
Color (Hi Visibility Yellow)		0	\$	\$	\$
Intrinsically Safe		0	\$	\$	\$
PTT-ID	11	15	\$	\$	\$
Emergency Alert	11	15	\$	\$	\$
Priority Scan	11	15	\$	\$	\$
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	11	15	\$	\$	\$
Text Messaging	0	0	\$	\$	\$

Collin County Constables Precinct #3 Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Bluetooth Capability	0	15	\$	\$	\$
Radio Authentication	11	15	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	11	15	\$	\$	\$
AES Over The Air Rekeying (OTAR)	11	15	\$	\$	\$
Over The Air Programming (OTAP)	11	15	\$	\$	\$
Battery Type (prefer Lithium Polymer)		15	\$	\$	\$
Battery Life 10 Hours		15	\$	\$	\$
Single Unit Charger (1-Hour)		15	\$	\$	\$
Vehicular Charger		15	\$	\$	\$
Multi-Unit Charger		15	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		15	\$	\$	\$
Spare battery		15	\$	\$	\$
Belt Clip		15	\$	\$	\$
Swivel Belt Clip		15	\$	\$	\$
Leather Carrying Case		15	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Collin County Constables Precinct #3 Mobile and Portable Radios and Related Services					\$

13.27 COLLIN COUNTY CONSTABLES PRECINCT #4

Collin County Constables Precinct #4 Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	12		\$	\$	\$
Trunk Mount	12		\$	\$	\$
Dual Control Head	0		\$	\$	\$
External Speaker	12		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		17	\$	\$	\$
P25 Phase 2 Operation	12	17	\$	\$	\$
Dual Band (700/800, VHF)	0	0	\$	\$	\$
500 Modes Minimum	12	17	\$	\$	\$
Full Color LCD Alphanumeric Side Display	12	17	\$	\$	\$
Full Keypad	12	0	\$	\$	\$
Partial Keypad	12	17	\$	\$	\$
Dual Mic Noise Cancelling		17	\$	\$	\$
High Noise Reduction		17	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		17	\$	\$	\$
Color (Hi Visibility Yellow)		0	\$	\$	\$
Intrinsically Safe		0	\$	\$	\$
PTT-ID	12	17	\$	\$	\$
Emergency Alert	12	17	\$	\$	\$
Priority Scan	12	17	\$	\$	\$
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	12	17	\$	\$	\$
Text Messaging	0	017	\$	\$	\$

Collin County Constables Precinct #4 Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Bluetooth Capability	0	17	\$	\$	\$
Radio Authentication	12	0	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	12	17	\$	\$	\$
AES Over The Air Rekeying (OTAR)	12	17	\$	\$	\$
Over The Air Programming (OTAP)	12	17	\$	\$	\$
Battery Type (prefer Lithium Polymer)		17	\$	\$	\$
Battery Life 10 Hours		17	\$	\$	\$
Single Unit Charger (1-Hour)		17	\$	\$	\$
Vehicular Charger		17	\$	\$	\$
Multi-Unit Charger		0	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		17	\$	\$	\$
Spare battery		17	\$	\$	\$
Belt Clip		17	\$	\$	\$
Swivel Belt Clip		17	\$	\$	\$
Leather Carrying Case		17	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Collin County Constables Precinct #4 Mobile and Portable Radios and Related Services					\$

13.28 COLLIN COUNTY BAILIFFS

Collin County Bailiffs Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	0		\$	\$	\$
Trunk Mount			\$	\$	\$
Dual Control Head			\$	\$	\$
External Speaker			\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		19	\$	\$	\$
P25 Phase 2 Operation		19	\$	\$	\$
Dual Band (700/800, VHF)		0	\$	\$	\$
500 Modes Minimum		19	\$	\$	\$
Full Color LCD Alphanumeric Side Display		19	\$	\$	\$
Full Keypad		0	\$	\$	\$
Partial Keypad		19	\$	\$	\$
Dual Mic Noise Cancelling		19	\$	\$	\$
High Noise Reduction		19	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		19	\$	\$	\$
Color (Hi Visibility Yellow)		0	\$	\$	\$
Intrinsically Safe		0	\$	\$	\$
PTT-ID		19	\$	\$	\$
Emergency Alert		19	\$	\$	\$
Priority Scan		19	\$	\$	\$
Individual Call and Call Alert		0	\$	\$	\$
GPS Location		19	\$	\$	\$
Text Messaging		0	\$	\$	\$

Collin County Bailiffs Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Bluetooth Capability		19	\$	\$	\$
Radio Authentication		19	\$	\$	\$
AES Single-key Voice Encryption		0	\$	\$	\$
AES Multikey Voice Encryption		0	\$	\$	\$
AES Over The Air Rekeying (OTAR)		0	\$	\$	\$
Over The Air Programming (OTAP)		19	\$	\$	\$
Battery Type (prefer Lithium Polymer)		19	\$	\$	\$
Battery Life 10 Hours		19	\$	\$	\$
Single Unit Charger (1-Hour)		19	\$	\$	\$
Vehicular Charger		0	\$	\$	\$
Multi-Unit Charger		0	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		19	\$	\$	\$
Spare battery		19	\$	\$	\$
Belt Clip		19	\$	\$	\$
Swivel Belt Clip		19	\$	\$	\$
Leather Carrying Case		19	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Collin County Bailiffs Office Mobile and Portable Radios and Related Services					\$

13.29 COLLIN COUNTY COURTHOUSE SECURITY

Collin County Courthouse Security Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	0		\$	\$	\$
Trunk Mount			\$	\$	\$
Dual Control Head			\$	\$	\$
External Speaker			\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		16	\$	\$	\$
P25 Phase 2 Operation		16	\$	\$	\$
Dual Band (700/800, VHF)		0	\$	\$	\$
500 Modes Minimum		16	\$	\$	\$
Full Color LCD Alphanumeric Side Display		16	\$	\$	\$
Full Keypad		0	\$	\$	\$
Partial Keypad		16	\$	\$	\$
Dual Mic Noise Cancelling		16	\$	\$	\$
High Noise Reduction		16	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		16	\$	\$	\$
Color (Hi Visibility Yellow)		0	\$	\$	\$
Intrinsically Safe		0	\$	\$	\$
PTT-ID		16	\$	\$	\$
Emergency Alert		16	\$	\$	\$
Priority Scan		16	\$	\$	\$
Individual Call and Call Alert		0	\$	\$	\$
GPS Location		16	\$	\$	\$
Text Messaging		0	\$	\$	\$

Collin County Courthouse Security Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Bluetooth Capability		16	\$	\$	\$
Radio Authentication		16	\$	\$	\$
AES Single-key Voice Encryption		0	\$	\$	\$
AES Multikey Voice Encryption		16	\$	\$	\$
AES Over The Air Rekeying (OTAR)		16	\$	\$	\$
Over The Air Programming (OTAP)		16	\$	\$	\$
Battery Type (prefer Lithium Polymer)		16	\$	\$	\$
Battery Life 10 Hours		16	\$	\$	\$
Single Unit Charger (1-Hour)		16	\$	\$	\$
Vehicular Charger		0	\$	\$	\$
Multi-Unit Charger		1	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		16	\$	\$	\$
Spare battery		16	\$	\$	\$
Belt Clip		16	\$	\$	\$
Swivel Belt Clip		16	\$	\$	\$
Leather Carrying Case		16	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Collin County Courthouse Security Mobile and Portable Radios and Related Services					\$

13.30 COLLIN COUNTY HOMELAND SECURITY

Collin County Homeland Security Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	0		\$	\$	\$
Trunk Mount			\$	\$	\$
Dual Control Head			\$	\$	\$
External Speaker			\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		13	\$	\$	\$
P25 Phase 2 Operation		13	\$	\$	\$
Dual Band (700/800, VHF)		13	\$	\$	\$
500 Modes Minimum		13	\$	\$	\$
Full Color LCD Alphanumeric Side Display		13	\$	\$	\$
Full Keypad		0	\$	\$	\$
Partial Keypad		13	\$	\$	\$
Dual Mic Noise Cancelling		13	\$	\$	\$
High Noise Reduction		13	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		13	\$	\$	\$
Color (Hi Visibility Yellow)		0	\$	\$	\$
Intrinsically Safe		0	\$	\$	\$
PTT-ID		13	\$	\$	\$
Emergency Alert		13	\$	\$	\$
Priority Scan		13	\$	\$	\$
Individual Call and Call Alert		0	\$	\$	\$
GPS Location		13	\$	\$	\$
Text Messaging		0	\$	\$	\$

Collin County Homeland Security Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Bluetooth Capability		13	\$	\$	\$
Radio Authentication		13	\$	\$	\$
AES Single-key Voice Encryption		0	\$	\$	\$
AES Multikey Voice Encryption		13	\$	\$	\$
AES Over The Air Rekeying (OTAR)		13	\$	\$	\$
Over The Air Programming (OTAP)		13	\$	\$	\$
Battery Type (prefer Lithium Polymer)		13	\$	\$	\$
Battery Life 10 Hours		13	\$	\$	\$
Single Unit Charger (1-Hour)		13	\$	\$	\$
Vehicular Charger		0	\$	\$	\$
Multi-Unit Charger		0	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		13	\$	\$	\$
Spare battery		13	\$	\$	\$
Belt Clip		13	\$	\$	\$
Swivel Belt Clip		13	\$	\$	\$
Leather Carrying Case		13	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Collin County Homeland Security Mobile and Portable Radios and Related Services					\$

13.31 COLLIN COUNTY FIRE MARSHAL

Collin County Fire Marshal Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	7		\$	\$	\$
Trunk Mount	7		\$	\$	\$
Dual Control Head	7		\$	\$	\$
External Speaker	7		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		10	\$	\$	\$
P25 Phase 2 Operation	7	10	\$	\$	\$
Dual Band (700/800, VHF)	7	10	\$	\$	\$
500 Modes Minimum	7	10	\$	\$	\$
Full Color LCD Alphanumeric Side Display	7	10	\$	\$	\$
Full Keypad		0	\$	\$	\$
Partial Keypad	7	10	\$	\$	\$
Dual Mic Noise Cancelling		10	\$	\$	\$
High Noise Reduction		10	\$	\$	\$
Submersible to IP67 (1m for 30 min)		10	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		10	\$	\$	\$
Color (Hi Visibility Yellow)		0	\$	\$	\$
Intrinsically Safe		10	\$	\$	\$
PTT-ID	7	10	\$	\$	\$
Emergency Alert	7	10	\$	\$	\$
Priority Scan	7	10	\$	\$	\$
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	7	10	\$	\$	\$
Text Messaging	0	0	\$	\$	\$

Collin County Fire Marshal Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Bluetooth Capability	7	10	\$	\$	\$
Radio Authentication	7	10	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	7	10	\$	\$	\$
AES Over The Air Rekeying (OTAR)	7	10	\$	\$	\$
Over The Air Programming (OTAP)	7	10	\$	\$	\$
Battery Type (prefer Lithium Polymer)		10	\$	\$	\$
Battery Life 10 Hours		10	\$	\$	\$
Single Unit Charger (1-Hour)		10	\$	\$	\$
Vehicular Charger		10	\$	\$	\$
Multi-Unit Charger		3	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		10	\$	\$	\$
Spare battery		10	\$	\$	\$
Belt Clip		10	\$	\$	\$
Swivel Belt Clip		10	\$	\$	\$
Leather Carrying Case		10	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Collin County Fire Marshal Mobile and Portable Radios and Related Services					\$

13.32 COLLIN COUNTY DISTRICT ATTORNEY'S OFFICE

Collin County District Attorney's Office Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	3		\$	\$	\$
Trunk Mount	3		\$	\$	\$
Dual Control Head	0		\$	\$	\$
External Speaker	3		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		25	\$	\$	\$
P25 Phase 2 Operation	3	0	\$	\$	\$
Dual Band (700/800, VHF)	0	0	\$	\$	\$
500 Modes Minimum	3	25	\$	\$	\$
Full Color LCD Alphanumeric Side Display	3	25	\$	\$	\$
Full Keypad	0	0	\$	\$	\$
Partial Keypad	3	25	\$	\$	\$
Dual Mic Noise Cancelling		25	\$	\$	\$
High Noise Reduction		25	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		25	\$	\$	\$
Color (Hi Visibility Yellow)		0	\$	\$	\$
Intrinsically Safe		0	\$	\$	\$
PTT-ID	3	25	\$	\$	\$
Emergency Alert	3	25	\$	\$	\$
Priority Scan	3	25	\$	\$	\$
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	3	25	\$	\$	\$
Text Messaging	0	0	\$	\$	\$

Collin County District Attorney's Office Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Bluetooth Capability	0	25	\$	\$	\$
Radio Authentication	3	25	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	0	25	\$	\$	\$
AES Over The Air Rekeying (OTAR)	0	25	\$	\$	\$
Over The Air Programming (OTAP)	3	25	\$	\$	\$
Battery Type (prefer Lithium Polymer)		25	\$	\$	\$
Battery Life 10 Hours		25	\$	\$	\$
Single Unit Charger (1-Hour)		25	\$	\$	\$
Vehicular Charger		25	\$	\$	\$
Multi-Unit Charger		0	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		0	\$	\$	\$
Spare battery		25	\$	\$	\$
Belt Clip		25	\$	\$	\$
Swivel Belt Clip		25	\$	\$	\$
Leather Carrying Case		25	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Collin County District Attorney's Office Mobile and Portable Radios and Related Services					\$

13.33 COLLIN COUNTY PROBATION

Collin County Probation Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	0		\$	\$	\$
Trunk Mount			\$	\$	\$
Dual Control Head			\$	\$	\$
External Speaker			\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		6	\$	\$	\$
P25 Phase 2 Operation		6	\$	\$	\$
Dual Band (700/800, VHF)		0	\$	\$	\$
500 Modes Minimum		6	\$	\$	\$
Full Color LCD Alphanumeric Side Display		6	\$	\$	\$
Full Keypad		0	\$	\$	\$
Partial Keypad		6	\$	\$	\$
Dual Mic Noise Cancelling		6	\$	\$	\$
High Noise Reduction		6	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		6	\$	\$	\$
Color (Hi Visibility Yellow)		0	\$	\$	\$
Intrinsically Safe		0	\$	\$	\$
PTT-ID		6	\$	\$	\$
Emergency Alert		6	\$	\$	\$
Priority Scan		6	\$	\$	\$
Individual Call and Call Alert			\$	\$	\$
GPS Location		6	\$	\$	\$
Text Messaging		0	\$	\$	\$

Collin County Probation Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Bluetooth Capability		6	\$	\$	\$
Radio Authentication		6	\$	\$	\$
AES Single-key Voice Encryption		0	\$	\$	\$
AES Multikey Voice Encryption		0	\$	\$	\$
AES Over The Air Rekeying (OTAR)		0	\$	\$	\$
Over The Air Programming (OTAP)		6	\$	\$	\$
Battery Type (prefer Lithium Polymer)		6	\$	\$	\$
Battery Life 10 Hours		6	\$	\$	\$
Single Unit Charger (1-Hour)		6	\$	\$	\$
Vehicular Charger		6	\$	\$	\$
Multi-Unit Charger		6	\$	\$	\$
Battery Conditioner		6	\$	\$	\$
Speaker Microphone (no antenna)		6	\$	\$	\$
Spare battery		6	\$	\$	\$
Belt Clip		6	\$	\$	\$
Swivel Belt Clip		6	\$	\$	\$
Leather Carrying Case		6	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Collin County Probation Mobile and Portable Radios and Related Services					\$

13.34 COLLIN COUNTY JAIL

Collin County Jail Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	15		\$	\$	\$
Trunk Mount	15		\$	\$	\$
Dual Control Head	0		\$	\$	\$
External Speaker	15		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		130	\$	\$	\$
P25 Phase 2 Operation	15	130	\$	\$	\$
Dual Band (700/800, VHF)	0	0	\$	\$	\$
500 Modes Minimum	15	130	\$	\$	\$
Full Color LCD Alphanumeric Side Display	15	130	\$	\$	\$
Full Keypad	0	0	\$	\$	\$
Partial Keypad	15	130	\$	\$	\$
Dual Mic Noise Cancelling		130	\$	\$	\$
High Noise Reduction		130	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		130	\$	\$	\$
Color (Hi Visibility Yellow)		0	\$	\$	\$
Intrinsically Safe		0	\$	\$	\$
PTT-ID	15	130	\$	\$	\$
Emergency Alert	15	130	\$	\$	\$
Priority Scan	15	130	\$	\$	\$
Individual Call and Call Alert			\$	\$	\$
GPS Location	15	130	\$	\$	\$
Text Messaging	0	0	\$	\$	\$

Collin County Jail Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Bluetooth Capability	0	130	\$	\$	\$
Radio Authentication	15	130	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	15	0	\$	\$	\$
AES Over The Air Rekeying (OTAR)	15	0	\$	\$	\$
Over The Air Programming (OTAP)	15	130	\$	\$	\$
Battery Type (prefer Lithium Polymer)		130	\$	\$	\$
Battery Life 10 Hours		130	\$	\$	\$
Single Unit Charger (1-Hour)		130	\$	\$	\$
Vehicular Charger		0	\$	\$	\$
Multi-Unit Charger		9	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		130	\$	\$	\$
Spare battery		130	\$	\$	\$
Belt Clip		130	\$	\$	\$
Swivel Belt Clip		130	\$	\$	\$
Leather Carrying Case		130	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Collin County Jail Mobile and Portable Radios and Related Services					\$

13.35 COLLIN COUNTY JUVENILE DETENTION

Collin County Juvenile Detention Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	0		\$	\$	\$
Trunk Mount			\$	\$	\$
Dual Control Head			\$	\$	\$
External Speaker			\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		45	\$	\$	\$
P25 Phase 2 Operation		45	\$	\$	\$
Dual Band (700/800, VHF)		0	\$	\$	\$
500 Modes Minimum		45	\$	\$	\$
Full Color LCD Alphanumeric Side Display		45	\$	\$	\$
Full Keypad		0	\$	\$	\$
Partial Keypad		45	\$	\$	\$
Dual Mic Noise Cancelling		45	\$	\$	\$
High Noise Reduction		45	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		45	\$	\$	\$
Color (Hi Visibility Yellow)		0	\$	\$	\$
Intrinsically Safe		0	\$	\$	\$
PTT-ID		45	\$	\$	\$
Emergency Alert		45	\$	\$	\$
Priority Scan		45	\$	\$	\$
Individual Call and Call Alert		0	\$	\$	\$
GPS Location		45	\$	\$	\$
Text Messaging		0	\$	\$	\$

Collin County Juvenile Detention Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Bluetooth Capability		45	\$	\$	\$
Radio Authentication		45	\$	\$	\$
AES Single-key Voice Encryption		0	\$	\$	\$
AES Multikey Voice Encryption		0	\$	\$	\$
AES Over The Air Rekeying (OTAR)		0	\$	\$	\$
Over The Air Programming (OTAP)		45	\$	\$	\$
Battery Type (prefer Lithium Polymer)		45	\$	\$	\$
Battery Life 10 Hours		45	\$	\$	\$
Single Unit Charger (1-Hour)		45	\$	\$	\$
Vehicular Charger		0	\$	\$	\$
Multi-Unit Charger		2	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		45	\$	\$	\$
Spare battery		45	\$	\$	\$
Belt Clip		45	\$	\$	\$
Swivel Belt Clip		45	\$	\$	\$
Leather Carrying Case		45	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Collin County Juvenile Detention Mobile and Portable Radios and Related Services					\$

13.36 COLLIN COUNTY ANIMAL SERVICES

<i>Collin County Animal Services Mobile and Portable Radios</i>					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	5		\$	\$	\$
Trunk Mount	0		\$	\$	\$
Dual Control Head	0		\$	\$	\$
External Speaker	5		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		9	\$	\$	\$
P25 Phase 2 Operation	5	9	\$	\$	\$
Dual Band (700/800, VHF)	0	0	\$	\$	\$
100 Modes Minimum	5	9	\$	\$	\$
LCD Alphanumeric Side Display	5	9	\$	\$	\$
Partial Keypad	5	9	\$	\$	\$
Dual Mic Noise Cancelling	5	9	\$	\$	\$
High Noise Reduction		9	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		9	\$	\$	\$
Color (Hi Visibility Yellow)		0	\$	\$	\$
Intrinsically Safe		0	\$	\$	\$
PTT-ID		9	\$	\$	\$
Emergency Alert	5	9	\$	\$	\$
Priority Scan	5	9	\$	\$	\$
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	5	9	\$	\$	\$
Text Messaging	0	0	\$	\$	\$
Bluetooth Capability	0	9	\$	\$	\$

Collin County Animal Services Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Radio Authentication	5	9	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	0	9	\$	\$	\$
AES Over The Air Rekeying (OTAR)	5	9	\$	\$	\$
Over The Air Programming (OTAP)	5	9	\$	\$	\$
Battery Type (prefer Lithium Polymer)	0	9	\$	\$	\$
Battery Life 10 Hours		9	\$	\$	\$
Single Unit Charger (1-Hour)		9	\$	\$	\$
Vehicular Charger		9	\$	\$	\$
Multi-Unit Charger		0	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		9	\$	\$	\$
Spare battery		9	\$	\$	\$
Belt Clip		9	\$	\$	\$
Swivel Belt Clip		9	\$	\$	\$
Leather Carrying Case		9	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Collin County Animal Services Mobile and Portable Radios and Related Services					\$

13.37 CONTROL STATIONS (COLLIN COUNTY AGENCIES)

Control Station Radios					
<i>Note: The Control Stations listed below do not include those interfaced to Dispatch Consoles for Site Trunking Backup, and also do not include any that the Proposer would require in their Fire Station Alerting solution. Consolettes are mobile radios in a case with an integrated power supply.</i>					
Description <small>(add text to make more descriptive of models and options)</small>	Consolette	Mobile	Unit (Consolette)	Unit (Mobiles)	Extended
Project 25 700/800MHz Consolette <i>(provide radio series and model here)</i>	28		\$	\$	\$
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>		0	\$	\$	\$
Control Station Operation		0	\$	\$	\$
Trunk Mount (for ACU1000)		0	\$	\$	\$
P25 Phase 2 Operation	28	0	\$	\$	\$
Dual Band (700/800, VHF)	28	0	\$	\$	\$
500 Modes Minimum	28	0	\$	\$	\$
Full Color LCD Alphanumeric	28	0	\$	\$	\$
PTT-ID	28	0	\$	\$	\$
Emergency Alert	28	0	\$	\$	\$
Priority Scan	28	0	\$	\$	\$
Individual Call and Call Alert	28	4	\$	\$	\$
Radio Authentication	28	0	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	0	0	\$	\$	\$
Over The Air Programming (OTAP)	28	0	\$	\$	\$
Services: Installation, Programming, and other Services Related to Control Stations	Lot		\$	\$	\$
Control Station Radios and Related Services					\$

13.38 CONTROL STATION LOCATIONS

Control Station Radio Locations			
Note: The Control Stations listed below do not include those interfaced to Dispatch Consoles for Site Trunking Backup, and also do not include any that the Proposer would require in their Fire Station Alerting solution..			
Agency	Location	Consolette	Mobile Radio
CCSO JAIL	Jail	5	0
CCSO M/S	Minimum Security	1	0
CCSO Records / Warrants	Sheriff's Office	1	0
CCSO CIS	Sheriff's Office	1	0
CCSO Dispatch	Sheriff's Office	7	0
Court Holding	Main Court House	1	0
Constables Precinct 1	Office	1	0
Constables Precinct 2	Office	1	0
Constables Precinct 3	Office	2	0
Constables Precinct 4	Office	1	0
Collin County DA's Office	Main Courthouse	1	0
County Fire Marshal	Office located in CCJAE Building	3	0
Collin County Juvenile Detention	Juvenile Detention Center	1	0
Collin County Animal Services	Animinal Shelter	2	0
Public Works <i>(Pricing is Below)</i>	Service Center	2	0
Facility Maintenance <i>(Pricing is Below)</i>	Maintenance Center	3	0

13.39 PRICING SUMMARY

<p><i>This worksheet summarizes all of the previous the pricing worksheets to derive a Total Project Cost. Proposers are encouraged to provide cost reduction measures in the form of Trade-In allowances and/or other cost reduction Incentives. After establishing this "Base Total Project Cost", Proposers are also encouraged to provide creative and meaningful "Cost Reduction Options" which, in the Proposer's opinion, change the scope of equipment, features, and/or services in the project while still meeting the intent of the functional and coverage requirements.</i></p>	
Total Main Control Point (Collin County Service Center) Equipment and Services	\$
Total MPLS Microwave Network Equipment and Services	\$
Total Simulcast Site #1 (Wilmeth Road Simulcast Control Point) Equipment and Services	\$
Total Simulcast Site #2 (Farmersville Simulcast Control Point) Equipment and Services	\$
Total Simulcast Site #3 (Copeville Simulcast Remote Site) Equipment and Services	\$
Total Simulcast Site #4 (Verona Simulcast Remote Site) Equipment and Services	\$
Total Simulcast Site #5 (Celina Simulcast Remote Site) Equipment and Services	\$
Total Simulcast Site #6 (Allen Simulcast Remote Site) Equipment and Services	\$
Total Simulcast Site #7 (Anna Simulcast Remote Site) Equipment and Services	\$
Total Simulcast Site #8 (Plano Comm Pkwy Simulcast Remote Site) Equipment and Services	\$
Total Simulcast Site #9 (Plano Avenue N Simulcast Remote Site) Equipment and Services	\$
Total Simulcast Site #10 (Princeton Simulcast Remote Site) Equipment and Services	\$
Total Simulcast Site #11 (West McKinney Simulcast Remote Site) Equipment and Services	\$
Total Collin County Sheriff's Office Communication Center Equipment and Services	\$
Total Fire Station Alerting System Equipment and Services	\$
Total Acceptance Testing	\$
Total Conventional Equipment and Services	\$
Total Recommended Spares	\$
Total Training	\$
Total Programming Equipment	\$
Total Collin County Sheriff's Office Mobile and Portable Radios and Related Services	\$
Total Collin County Constables Precinct #1 Mobile and Portable Radios and Related Services	\$
Total Collin County Constables Precinct #2 Mobile and Portable Radios and Related Services	\$
Total Collin County Constables Precinct #3 Mobile and Portable Radios and Related Services	\$
Total Collin County Constables Precinct #4 Mobile and Portable Radios and Related Services	\$
Total Collin County Bailiffs Mobile and Portable and Related Services	\$
Total Collin County Courthouse Security Mobile and Portable Radios and Related Services	\$

Total Collin County Homeland Security Mobile and Portable Radios and Related Services	\$
Total Collin County Fire Marshal Mobile and Portable Radios and Related Services	\$
Total Collin County District Attorney's Office Mobile and Portable Radios and Related Services	\$
Total Collin County Probation Mobile and Portable Radios and Related Services	\$
Total Collin County Jail Mobile and Portable Radios and Related Services	\$
Total Collin County Juvenile Detention Mobile and Portable Radios and Related Services	\$
Total Collin County Animal Services Mobile and Portable Radios and Related Services	\$
Total Collin County Collin County Control Station Radios and Related Services	\$
Total Collin County Public Works Mobile and Portable Radios and Related Services (from below)	\$
Total Collin County Facilities Maintenance Mobile and Portable Radios and Related Services (from below)	\$
Total Base Project Cost before Cost Adjustments	\$
Trade-In Allowance	\$ ()
Cost Reduction Incentives	\$ ()
Total Base Project Cost after Cost Adjustments	\$
Total Base Project Cost after Cost Adjustments and Remove Public Works and Facilities Maintenance Mobiles, Portables, and Control Stations and Related Services	\$

13.40 COST REDUCTION OPTIONS

<p><i>After establishing this "Base Total Project Cost" Proposers are also encouraged to provide creative and meaningful "Cost Reduction Options" which, in the Proposer's opinion, change the scope of equipment, features, and/or services in the project while still meeting the intent of the functional and coverage requirements.</i></p>	
Total Base Project Cost <i>after Cost Adjustments (Trade-In, Incentives)</i>	\$
Delete AES Capability for all but Two (2) Channels	\$ ()
Reduce the "Equipped" Number of P25 Radio Unit IDs from 50,000 to 20,000	\$ ()
Reduce all UPS's from 4 Hr to 2 Hr Backup (Except Main Control Point)	\$ ()
Reduce the Number of AES Encrypted Channels from Six (6) to Two (2)	\$ ()
Cost Reduction Option #N (please describe)	\$ ()
Use Existing Shelter at Copeville, Celina, Verona Sites	\$ ()
Total Project Cost <i>after Cost Adjustments and Cost Reduction Options</i>	\$

13.41 GENERAL OPTIONS

<i>In the table below Proposers shall provide optional pricing for the items listed. These items should not be included in the Total Project Cost.</i>	
Cell Phone LMR Gateway (see RFP Section 2.5)	
Inter Sub System Interface (ISSI)	\$
Alternate Dispatch Consoles location in a different room in the rear area of the Sherriff's Office	\$
Additional IP-Based LCD Dispatch Console for Collin County Sheriff's Office Communication Center (each)	\$
Delete Mobile and Portable "Dual band" Capability (per unit cost)	\$
Delete Portable Radio Battery (per unit cost)	\$
Add GPS Location Option to Mobile Radio (per unit cost)	\$
Add GPS Location Option to Portable Radio (per unit cost)	\$
Add Bluetooth Option to Portable Radio (per unit cost)	\$
All Required Equipment, Routers, Licensing, Software to Provide ISSI	\$

13.42 PORTABLE RADIO ACCESSORIES

<i>In the table below Proposers shall provide optional pricing for the items listed. These items should not be included in the Total Project Cost. It is understood that it may not be practical to list all available accessories, but please list the most common and/or popular. Also, please provide an electronic catalog of available portable accessories.</i>	
Batteries (please describe)	\$
"	\$
"	\$
Battery Chargers (please describe)	\$
"	\$
"	\$
Wired, Bluetooth, Noise Cancelling Speaker Mics (please describe)	\$
"	\$
"	\$
Wired and Bluetooth Earpieces, Ear Mic/Receiver, etc. (please describe)	\$
"	\$
"	\$
Surveillance Accessories (please describe)	\$
"	\$
"	\$
Tactical Accessories (please describe)	\$
"	\$
"	\$
Carrying Accessories (please describe)	\$
"	\$
"	

13.43 RECOMMENDED MAINTENANCE

The basis for this form is that Year 1 is the warranty year for the proposed system. The Proposer must provide the following costs for Years 2-10 maintenance.

	Infrastructure Equipment (exclude Dispatch)	Microwave Radio Equipment	Dispatch Equipment including Fire Alerting and any proposed Logging Recorders (exclude Control Stations)	Mobile, Portable, and Control Station Equipment	Generators, UPSs, Other (please list)	Software Maintenance Agreement	Total for Each Year
Year 2							
Year 3							
Year 4							
Year 5							
Year 6							

13.44 MANUFACTURER MAINTENANCE AND SERVICE SUPPORT ITEMS

Collin County may wish to be "Self-Maintained" to an extent with the proposed system. The Proposer shall provide the following costs in support of this possibility.

	Factory Repairs of all proposed spare system components after the Year 1 warranty period, considering that all field maintenance would be provided by the County. This shall include system infrastructure, dispatch console equipment, microwave equipment, system management equipment, fire station alerting, and logging recorder equipment.	Technical Support Center technical /telephone support.	Local Technical Support	Recommended software / hardware refresh costs. Insert cost in recommended years.	Factory Repair of Mobile Radio	Factory Repair of Portable Radio	Factory Repair of Control Station / Console
Year 2							
Year 3							
Year 4							
Year 5							
Year 6							

13.45 LONG-TERM PRICING DISCOUNT %

The Proposer is required to provide guaranteed discount levels off of their List Price for various system segments for a period of Five (5) years AFTER FINAL SYSTEM ACCEPTANCE. Use the structure below and adapt as necessary comply with this request. The Trade-In is a suggested mechanism for offering additional savings over the guaranteed percentage off List Price. The Proposer may offer alternative mechanisms for additional savings.

System Segment	% Discount off List Price	Years Guaranteed
Infrastructure Components	%	
<i>Infrastructure Components Trade-In</i>		
3rd Party Infrastructure Components	%	
<i>3rd Party Infrastructure Components Trade-In</i>		
Subscriber Family # 1	%	
<i>Subscriber Family #1 Trade-In</i>		
Subscriber Family # N	%	
<i>Subscriber Family # N Trade-In</i>		

Standalone User Radio Pricing

Vendors may submit "User Radio Only" (no infrastructure) proposals for the following cost sheets. However, vendors must include all requested information and costs. It is expected that the non-Collin County agencies on the following cost sheets will procure their subscriber radios separately from the primary Collin County Replacement Radio System contract

13.46 COLLIN COUNTY PUBLIC WORKS

Collin County Public Works Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	0		\$	\$	\$
Trunk Mount	0		\$	\$	\$
Dual Control Head	0		\$	\$	\$
External Speaker	0		\$	\$	\$
“Consolette” Style Control Station <i>(at Service Center)</i>	2		\$	\$	\$
“Mobile Radio” Style Control Station	0		\$	\$	\$
Control Station Antenna System, Grounding	2		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		45	\$	\$	\$
P25 Phase 2 Operation	2	45	\$	\$	\$
Dual Band (700/800, VHF)	0	0	\$	\$	\$
100 Modes Minimum	2	45	\$	\$	\$
LCD Alphanumeric Side Display	2	45	\$	\$	\$
Partial Keypad	2	45	\$	\$	\$
Dual Mic Noise Cancelling		45	\$	\$	\$
High Noise Reduction		45	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		45	\$	\$	\$
Color (Hi Visibility Yellow)		0	\$	\$	\$
Intrinsically Safe		0	\$	\$	\$
PTT-ID		45	\$	\$	\$
Emergency Alert	2	45	\$	\$	\$
Priority Scan	2	45	\$	\$	\$
Individual Call and Call Alert	2	0	\$	\$	\$
GPS Location	0	45	\$	\$	\$

Collin County Public Works Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Text Messaging	0	0	\$	\$	\$
Bluetooth Capability	0	45	\$	\$	\$
Radio Authentication	2	45	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	0	0	\$	\$	\$
AES Over The Air Rekeying (OTAR)	0	0	\$	\$	\$
Over The Air Programming (OTAP)	2	45	\$	\$	\$
Battery Type (prefer Lithium Polymer)		45	\$	\$	\$
Battery Life 10 Hours		45	\$	\$	\$
Single Unit Charger (1-Hour)		45	\$	\$	\$
Vehicular Charger		0	\$	\$	\$
Multi-Unit Charger		2	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		45	\$	\$	\$
Spare battery		45	\$	\$	\$
Belt Clip		45	\$	\$	\$
Swivel Belt Clip		45	\$	\$	\$
Leather Carrying Case		45	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Collin County Public Works Mobile and Portable Radios and Related Services					\$

13.47 COLLIN COUNTY FACILITIES MAINTENANCE

Collin County Facilities Maintenance Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	6		\$	\$	\$
Trunk Mount	0		\$	\$	\$
Dual Control Head	0		\$	\$	\$
External Speaker	6		\$	\$	\$
“Console” Style Control Station <i>(at Maintenance Center)</i>	3		\$	\$	\$
“Mobile Radio” Style Control Station	0		\$	\$	\$
Control Station Antenna System, Grounding	3		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		51	\$	\$	\$
P25 Phase 2 Operation	9	51	\$	\$	\$
Dual Band (700/800, VHF)	0	0	\$	\$	\$
100 Modes Minimum	9	51	\$	\$	\$
LCD Alphanumeric Side Display	9	51	\$	\$	\$
Partial Keypad	9	51	\$	\$	\$
Dual Mic Noise Cancelling	9	51	\$	\$	\$
High Noise Reduction		51	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		51	\$	\$	\$
Color (Hi Visibility Yellow)		0	\$	\$	\$
Intrinsically Safe		0	\$	\$	\$
PTT-ID		51	\$	\$	\$
Emergency Alert	9	51	\$	\$	\$
Priority Scan	9	51	\$	\$	\$
Individual Call and Call Alert	0	0	\$	\$	\$

Collin County Facilities Maintenance Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
GPS Location	6	51	\$	\$	\$
Text Messaging	0	0	\$	\$	\$
Bluetooth Capability	0	51	\$	\$	\$
Radio Authentication	9	51	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	0	0	\$	\$	\$
AES Over The Air Rekeying (OTAR)	0	0	\$	\$	\$
Over The Air Programming (OTAP)	9	51	\$	\$	\$
Battery Type (prefer Lithium Polymer)		51	\$	\$	\$
Battery Life 10 Hours		51	\$	\$	\$
Single Unit Charger (1-Hour)		51	\$	\$	\$
Vehicular Charger		0	\$	\$	\$
Multi-Unit Charger		2	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		51	\$	\$	\$
Spare battery		51	\$	\$	\$
Belt Clip		51	\$	\$	\$
Swivel Belt Clip		51	\$	\$	\$
Leather Carrying Case		51	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Collin County Facilities Maintenance Mobile and Portable Radios and Related Services					\$

13.48 ANNA POLICE DEPARTMENT

Anna Police Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	8		\$	\$	\$
Trunk Mount	8		\$	\$	\$
Dual Control Head	0		\$	\$	\$
External Speaker	8		\$	\$	\$
“Console” Style Control Station <i>(at PD Office)</i>	1		\$	\$	\$
“Mobile Radio” Style Control Station	0		\$	\$	\$
Control Station Antenna System, Grounding	1		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		14	\$	\$	\$
P25 Phase 2 Operation	9	14	\$	\$	\$
Dual Band (700/800, VHF)	9	14	\$	\$	\$
500 Modes Minimum	9	14	\$	\$	\$
Full Color LCD Alphanumeric Side Display	9	14	\$	\$	\$
Full Keypad	0	0	\$	\$	\$
Partial Keypad	9	14	\$	\$	\$
Dual Mic Noise Cancelling		14	\$	\$	\$
High Noise Reduction		0	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		14	\$	\$	\$
Color (Hi Visibility Yellow)		0	\$	\$	\$
Intrinsically Safe		0	\$	\$	\$
PTT-ID	9	14	\$	\$	\$
Emergency Alert	9	14	\$	\$	\$

Anna Police Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Priority Scan	9	14	\$	\$	\$
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	8	14	\$	\$	\$
Text Messaging	0	0	\$	\$	\$
Bluetooth Capability	0	14	\$	\$	\$
Radio Authentication	9	14	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	9	14	\$	\$	\$
AES Over The Air Rekeying (OTAR)	9	14	\$	\$	\$
Over The Air Programming (OTAP)	9	14	\$	\$	\$
Battery Type (prefer Lithium Polymer)		14	\$	\$	\$
Battery Life 10 Hours		14	\$	\$	\$
Single Unit Charger (1-Hour)		14	\$	\$	\$
Vehicular Charger		0	\$	\$	\$
Multi-Unit Charger		1	\$	\$	\$
Battery Conditioner		1	\$	\$	\$
Speaker Microphone (no antenna)		14	\$	\$	\$
Spare battery		14	\$	\$	\$
Belt Clip		0	\$	\$	\$
Swivel Belt Clip		0	\$	\$	\$
Leather Carrying Case		0	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Anna Police Department Mobile and Portable Radios and Related Services					\$

A.1

13.49 ANNA FIRE DEPARTMENT

Anna Fire Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	8		\$	\$	\$
Trunk Mount	1		\$	\$	\$
Dual Control Head	1		\$	\$	\$
External Speaker	8		\$	\$	\$
“Console” Style Control Station <i>(at FD Office/Bay)</i>	2		\$	\$	\$
“Mobile Radio” Style Control Station	0		\$	\$	\$
Control Station Antenna System, Grounding	2		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		30	\$	\$	\$
P25 Phase 2 Operation	10	30	\$	\$	\$
Dual Band (700/800, VHF)	10	30	\$	\$	\$
500 Modes Minimum	10	30	\$	\$	\$
Full Color LCD Alphanumeric Side Display	10	30	\$	\$	\$
Full Keypad	10	30	\$	\$	\$
Partial Keypad	0	0	\$	\$	\$
Dual Mic Noise Cancelling		30	\$	\$	\$
High Noise Reduction		30	\$	\$	\$
Submersible to IP67 (1m for 30 min)		30	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		0	\$	\$	\$
Color (Hi Visibility Yellow)		30	\$	\$	\$
Intrinsically Safe		30	\$	\$	\$
PTT-ID	10	30	\$	\$	\$
Emergency Alert	10	30	\$	\$	\$

Anna Fire Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Priority Scan	10	30	\$	\$	\$
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	8	0	\$	\$	\$
Text Messaging	0	0	\$	\$	\$
Bluetooth Capability	0	0	\$	\$	\$
Radio Authentication	10	30	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	0	0	\$	\$	\$
AES Over The Air Rekeying (OTAR)	0	0	\$	\$	\$
Over The Air Programming (OTAP)	10	0	\$	\$	\$
Battery Type (prefer Lithium Polymer)		30	\$	\$	\$
Battery Life 10 Hours		30	\$	\$	\$
Single Unit Charger (1-Hour)		30	\$	\$	\$
Vehicular Charger		0	\$	\$	\$
Multi-Unit Charger		2	\$	\$	\$
Battery Conditioner		1	\$	\$	\$
Speaker Microphone (no antenna)		30	\$	\$	\$
Spare battery		30	\$	\$	\$
Belt Clip		30	\$	\$	\$
Swivel Belt Clip		0	\$	\$	\$
Leather Carrying Case		0	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Anna Fire Department Mobile and Portable Radios and Related Services					\$

13.50 BLUE RIDGE FIRE DEPARTMENT

Blue Ridge Fire Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	10		\$	\$	\$
Trunk Mount	0		\$	\$	\$
Dual Control Head	0		\$	\$	\$
External Speaker	10		\$	\$	\$
“Console” Style Control Station <i>(at FD Office/Bay)</i>	1		\$	\$	\$
“Mobile Radio” Style Control Station	0		\$	\$	\$
Control Station Antenna System, Grounding			\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		25	\$	\$	\$
P25 Phase 2 Operation	11	25	\$	\$	\$
Dual Band (700/800, VHF)	11	25	\$	\$	\$
500 Modes Minimum	11	25	\$	\$	\$
Full Color LCD Alphanumeric Side Display	11	25	\$	\$	\$
Full Keypad	11	25	\$	\$	\$
Partial Keypad	0	0	\$	\$	\$
Dual Mic Noise Cancelling		25	\$	\$	\$
High Noise Reduction		25	\$	\$	\$
Submersible to IP67 (1m for 30 min)		25	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		0	\$	\$	\$
Color (Hi Visibility Yellow)		25	\$	\$	\$
Intrinsically Safe		25	\$	\$	\$
PTT-ID	11	25	\$	\$	\$
Emergency Alert	0	25	\$	\$	\$

Blue Ridge Fire Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Priority Scan	11	25	\$	\$	\$
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	10	25	\$	\$	\$
Text Messaging	0	25	\$	\$	\$
Bluetooth Capability	10	25	\$	\$	\$
Radio Authentication	11	25	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	0	0	\$	\$	\$
AES Over The Air Rekeying (OTAR)	11	25	\$	\$	\$
Over The Air Programming (OTAP)	11	25	\$	\$	\$
Battery Type (prefer Lithium Polymer)		0	\$	\$	\$
Battery Life 10 Hours		25	\$	\$	\$
Single Unit Charger (1-Hour)		2	\$	\$	\$
Vehicular Charger		1	\$	\$	\$
Multi-Unit Charger		0	\$	\$	\$
Battery Conditioner		25	\$	\$	\$
Speaker Microphone (no antenna)		25	\$	\$	\$
Spare battery		25	\$	\$	\$
Belt Clip		0	\$	\$	\$
Swivel Belt Clip		0	\$	\$	\$
Leather Carrying Case		0	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Blue Ridge Fire Department Mobile and Portable Radios and Related Services					\$

13.51 BRANCH FIRE FIRE DEPARTMENT

Branch Fire Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	12		\$	\$	\$
Trunk Mount	3		\$	\$	\$
Dual Control Head	3		\$	\$	\$
External Speaker	7		\$	\$	\$
“Console” Style Control Station <i>at FD Office/Bay)</i>	1		\$	\$	\$
“Mobile Radio” Style Control Station	0		\$	\$	\$
Control Station Antenna System, Grounding	1		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		20	\$	\$	\$
P25 Phase 2 Operation	13	20	\$	\$	\$
Dual Band (700/800, VHF)	0	0	\$	\$	\$
500 Modes Minimum	13	20	\$	\$	\$
Full Color LCD Alphanumeric Side Display	13	20	\$	\$	\$
Full Keypad	0	0	\$	\$	\$
Partial Keypad	13	20	\$	\$	\$
Dual Mic Noise Cancelling		20	\$	\$	\$
High Noise Reduction		20	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		0	\$	\$	\$
Color (Hi Visibility Yellow)		25	\$	\$	\$
Intrinsically Safe		25	\$	\$	\$
PTT-ID	13	20	\$	\$	\$
Emergency Alert	13	20	\$	\$	\$

Branch Fire Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Priority Scan	13	20	\$	\$	\$
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	0	0	\$	\$	\$
Text Messaging	0	0	\$	\$	\$
Bluetooth Capability	0	0	\$	\$	\$
Radio Authentication	13	20	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	0	0	\$	\$	\$
AES Over The Air Rekeying (OTAR)	0	0	\$	\$	\$
Over The Air Programming (OTAP)	13	20	\$	\$	\$
Battery Type (prefer Lithium Polymer)		20	\$	\$	\$
Battery Life 10 Hours		20	\$	\$	\$
Single Unit Charger (1-Hour)		20	\$	\$	\$
Vehicular Charger		0	\$	\$	\$
Multi-Unit Charger		1	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		20	\$	\$	\$
Spare battery		20	\$	\$	\$
Belt Clip		0	\$	\$	\$
Swivel Belt Clip		20	\$	\$	\$
Leather Carrying Case		20	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Branch Fire Department Mobile and Portable Radios and Related Services					\$

13.52 CELINA POLICE DEPARTMENT

<i>Celina Police Department Mobile and Portable Radios</i>					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	7		\$	\$	\$
Trunk Mount	7		\$	\$	\$
Dual Control Head	0		\$	\$	\$
External Speaker	7		\$	\$	\$
“Console” Style Control Station <i>(at PD Office)</i>	1		\$	\$	\$
“Mobile Radio” Style Control Station	0		\$	\$	\$
Control Station Antenna System, Grounding	1		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		15	\$	\$	\$
P25 Phase 2 Operation	8	15	\$	\$	\$
Dual Band (700/800, VHF)	8	15	\$	\$	\$
500 Modes Minimum	8	15	\$	\$	\$
Full Color LCD Alphanumeric Side Display	8	15	\$	\$	\$
Full Keypad	8	15	\$	\$	\$
Partial Keypad	0	0	\$	\$	\$
Dual Mic Noise Cancelling		15	\$	\$	\$
High Noise Reduction		15	\$	\$	\$
Submersible to IP67 (1m for 30 min)		15	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		15	\$	\$	\$
Color (Hi Visibility Yellow)		0	\$	\$	\$
Intrinsically Safe		15	\$	\$	\$
PTT-ID	8	15	\$	\$	\$
Emergency Alert	8	15	\$	\$	\$

<i>Celina Police Department Mobile and Portable Radios</i>					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Priority Scan	8	15	\$	\$	\$
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	8	15	\$	\$	\$
Text Messaging	8	15	\$	\$	\$
Bluetooth Capability	0	0	\$	\$	\$
Radio Authentication	8	15	\$	\$	\$
AES Single-key Voice Encryption	8	15	\$	\$	\$
AES Multikey Voice Encryption	0	0	\$	\$	\$
AES Over The Air Rekeying (OTAR)	8	15	\$	\$	\$
Over The Air Programming (OTAP)	8	15	\$	\$	\$
Battery Type (prefer Lithium Polymer)		Lithium	\$	\$	\$
Battery Life 10 Hours		10 hrs +	\$	\$	\$
Single Unit Charger (1-Hour)		15	\$	\$	\$
Vehicular Charger		7	\$	\$	\$
Multi-Unit Charger		1	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		16	\$	\$	\$
Spare battery		7	\$	\$	\$
Belt Clip		15	\$	\$	\$
Swivel Belt Clip		0	\$	\$	\$
Leather Carrying Case		0	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Celina Police Department Mobile and Portable Radios and Related Services					\$

13.53 CELINA FIRE DEPARTMENT

<i>Celina Fire Department Mobile and Portable Radios</i>					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	9		\$	\$	\$
Trunk Mount	5		\$	\$	\$
Dual Control Head	4		\$	\$	\$
External Speaker	12		\$	\$	\$
“Console” Style Control Station <i>(at FD Office/Bay)</i>	1		\$	\$	\$
“Mobile Radio” Style Control Station	0		\$	\$	\$
Control Station Antenna System, Grounding	1		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		32	\$	\$	\$
P25 Phase 2 Operation	10	32	\$	\$	\$
Dual Band (700/800, VHF)	7	32	\$	\$	\$
500 Modes Minimum	10	32	\$	\$	\$
Full Color LCD Alphanumeric Side Display	10	32	\$	\$	\$
Full Keypad	0	25	\$	\$	\$
Partial Keypad	10	7	\$	\$	\$
Dual Mic Noise Cancelling		32	\$	\$	\$
High Noise Reduction		32	\$	\$	\$
Submersible to IP67 (1m for 30 min)		32	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		2	\$	\$	\$
Color (Hi Visibility Yellow)		30	\$	\$	\$
Intrinsically Safe		32	\$	\$	\$
PTT-ID	10	32	\$	\$	\$
Emergency Alert	10	32	\$	\$	\$

Celina Fire Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Priority Scan	10	32	\$	\$	\$
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	10	32	\$	\$	\$
Text Messaging	10	32	\$	\$	\$
Bluetooth Capability	0	0	\$	\$	\$
Radio Authentication	10	32	\$	\$	\$
AES Single-key Voice Encryption	10	32	\$	\$	\$
AES Multikey Voice Encryption	0	0	\$	\$	\$
AES Over The Air Rekeying (OTAR)	10	32	\$	\$	\$
Over The Air Programming (OTAP)	10	32	\$	\$	\$
Battery Type (prefer Lithium Polymer)		Lithuim	\$	\$	\$
Battery Life 10 Hours		10 hrs +	\$	\$	\$
Single Unit Charger (1-Hour)		20	\$	\$	\$
Vehicular Charger		20	\$	\$	\$
Multi-Unit Charger		2	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		32	\$	\$	\$
Spare battery		18	\$	\$	\$
Belt Clip		0	\$	\$	\$
Swivel Belt Clip		0	\$	\$	\$
Leather Carrying Case		0	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Celina Fire Department Mobile and Portable Radios and Related Services					\$

13.54 FAIRVIEW POLICE DEPARTMENT

Fairview Police Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	15		\$	\$	\$
Trunk Mount	15		\$	\$	\$
Dual Control Head	0		\$	\$	\$
External Speaker	0		\$	\$	\$
“Console” Style Control Station	0		\$	\$	\$
“Mobile Radio” Style Control Station	0		\$	\$	\$
Control Station Antenna System, Grounding			\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		20	\$	\$	\$
P25 Phase 2 Operation	15	20	\$	\$	\$
Dual Band (700/800, VHF)	0	0	\$	\$	\$
500 Modes Minimum	0	0	\$	\$	\$
Full Color LCD Alphanumeric Side Display	0	0	\$	\$	\$
Full Keypad	0	0	\$	\$	\$
Partial Keypad	0	20	\$	\$	\$
Dual Mic Noise Cancelling		0	\$	\$	\$
High Noise Reduction		20	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		20	\$	\$	\$
Color (Hi Visibility Yellow)		0	\$	\$	\$
Intrinsically Safe		0	\$	\$	\$
PTT-ID	0	0	\$	\$	\$
Emergency Alert	15	20	\$	\$	\$
Priority Scan	15	20	\$	\$	\$

Fairview Police Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	0	20	\$	\$	\$
Text Messaging	0	0	\$	\$	\$
Bluetooth Capability	0	20	\$	\$	\$
Radio Authentication	0	0	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	0	0	\$	\$	\$
AES Over The Air Rekeying (OTAR)	0	0	\$	\$	\$
Over The Air Programming (OTAP)	15	20	\$	\$	\$
Battery Type (prefer Lithium Polymer)		0	\$	\$	\$
Battery Life 10 Hours		20	\$	\$	\$
Single Unit Charger (1-Hour)		20	\$	\$	\$
Vehicular Charger		0	\$	\$	\$
Multi-Unit Charger		0	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		20	\$	\$	\$
Spare battery		0	\$	\$	\$
Belt Clip		0	\$	\$	\$
Swivel Belt Clip		0	\$	\$	\$
Leather Carrying Case		0	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Fairview Police Department Mobile and Portable Radios and Related Services					\$

13.55 FARMERSVILLE POLICE DEPARTMENT

Farmersville Police Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	8		\$	\$	\$
Trunk Mount	8		\$	\$	\$
Dual Control Head	0		\$	\$	\$
External Speaker	8		\$	\$	\$
“Console” Style Control Station	0		\$	\$	\$
“Mobile Radio” Style Control Station	0		\$	\$	\$
Control Station Antenna System, Grounding	0		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		12	\$	\$	\$
P25 Phase 2 Operation	8	12	\$	\$	\$
Dual Band (700/800, VHF)	0	0	\$	\$	\$
500 Modes Minimum	8	0	\$	\$	\$
Full Color LCD Alphanumeric Side Display	8	12	\$	\$	\$
Full Keypad	0	0	\$	\$	\$
Partial Keypad	8	12	\$	\$	\$
Dual Mic Noise Cancelling		12	\$	\$	\$
High Noise Reduction		12	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		12	\$	\$	\$
Color (Hi Visibility Yellow)		0	\$	\$	\$
Intrinsically Safe		0	\$	\$	\$
PTT-ID	8	12	\$	\$	\$
Emergency Alert	8	12	\$	\$	\$
Priority Scan	8	12	\$	\$	\$

Farmersville Police Department Mobile and Portable Radios					
Description (add text to make more descriptive of models and options)	Mobiles	Portables	Unit (Mobiles)	Unit (Portable s)	Extended
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	8	12	\$	\$	\$
Text Messaging	0	0	\$	\$	\$
Bluetooth Capability	8	12	\$	\$	\$
Radio Authentication	8	12	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	0	0	\$	\$	\$
AES Over The Air Rekeying (OTAR)	0	0	\$	\$	\$
Over The Air Programming (OTAP)	8	12	\$	\$	\$
Battery Type (prefer Lithium Polymer)		12	\$	\$	\$
Battery Life 10 Hours		12	\$	\$	\$
Single Unit Charger (1-Hour)		12	\$	\$	\$
Vehicular Charger		0	\$	\$	\$
Multi-Unit Charger		0	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		12	\$	\$	\$
Spare battery		12	\$	\$	\$
Belt Clip		12	\$	\$	\$
Swivel Belt Clip		12	\$	\$	\$
Leather Carrying Case		12	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Farmersville Police Department Mobile and Portable Radios and Related Services					\$

13.56 FARMERSVILLE ISD POLICE DEPARTMENT – NO RESPONSE FROM DEPT

Farmersville ISD Police Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	0		\$	\$	\$
Trunk Mount	0		\$	\$	\$
Dual Control Head	0		\$	\$	\$
External Speaker	0		\$	\$	\$
“Console” Style Control Station	0		\$	\$	\$
“Mobile Radio” Style Control Station	0		\$	\$	\$
Control Station Antenna System, Grounding	0		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		0	\$	\$	\$
P25 Phase 2 Operation	0	0	\$	\$	\$
Dual Band (700/800, VHF)	0	0	\$	\$	\$
500 Modes Minimum	0	0	\$	\$	\$
Full Color LCD Alphanumeric Side Display	0	0	\$	\$	\$
Full Keypad	0	0	\$	\$	\$
Partial Keypad	0	0	\$	\$	\$
Dual Mic Noise Cancelling		0	\$	\$	\$
High Noise Reduction		0	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		0	\$	\$	\$
Color (Hi Visibility Yellow)		0	\$	\$	\$
Intrinsically Safe		0	\$	\$	\$
PTT-ID	0	0	\$	\$	\$
Emergency Alert	0	0	\$	\$	\$
Priority Scan	0	0	\$	\$	\$

Farmersville ISD Police Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	0	0	\$	\$	\$
Text Messaging	0	0	\$	\$	\$
Bluetooth Capability	0	0	\$	\$	\$
Radio Authentication	0	0	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	0	0	\$	\$	\$
AES Over The Air Rekeying (OTAR)	0	0	\$	\$	\$
Over The Air Programming (OTAP)	0	0	\$	\$	\$
Battery Type (prefer Lithium Polymer)		0	\$	\$	\$
Battery Life 10 Hours		12	\$	\$	\$
Single Unit Charger (1-Hour)		0	\$	\$	\$
Vehicular Charger		0	\$	\$	\$
Multi-Unit Charger		0	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		0	\$	\$	\$
Spare battery		0	\$	\$	\$
Belt Clip		0	\$	\$	\$
Swivel Belt Clip		0	\$	\$	\$
Leather Carrying Case		0	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Farmersville ISD Police Department Mobile and Portable Radios and Related Services					\$

13.57 FARMERSVILLE FIRE DEPARTMENT

Farmersville Fire Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	8		\$	\$	\$
Trunk Mount	0		\$	\$	\$
Dual Control Head	0		\$	\$	\$
External Speaker	8		\$	\$	\$
“Console” Style Control Station <i>(at FD Office/Bay)</i>	1		\$	\$	\$
“Mobile Radio” Style Control Station	1		\$	\$	\$
Control Station Antenna System, Grounding	1		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		32	\$	\$	\$
P25 Phase 2 Operation	10	32	\$	\$	\$
Dual Band (700/800, VHF)	10	0	\$	\$	\$
500 Modes Minimum	10	32	\$	\$	\$
Full Color LCD Alphanumeric Side Display	10	32	\$	\$	\$
Full Keypad	0	0	\$	\$	\$
Partial Keypad	10	32	\$	\$	\$
Dual Mic Noise Cancelling		32	\$	\$	\$
High Noise Reduction		32	\$	\$	\$
Submersible to IP67 (1m for 30 min)		32	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		0	\$	\$	\$
Color (Hi Visibility Yellow)		32	\$	\$	\$
Intrinsically Safe		32	\$	\$	\$
PTT-ID	10	32	\$	\$	\$
Emergency Alert	10	32	\$	\$	\$

Farmersville Fire Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Priority Scan	10	32	\$	\$	\$
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	10	32	\$	\$	\$
Text Messaging	0	0	\$	\$	\$
Bluetooth Capability	0	32	\$	\$	\$
Radio Authentication	10	32	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	0	0	\$	\$	\$
AES Over The Air Rekeying (OTAR)	0	0	\$	\$	\$
Over The Air Programming (OTAP)	10	32	\$	\$	\$
Battery Type (prefer Lithium Polymer)		32	\$	\$	\$
Battery Life 10 Hours		32	\$	\$	\$
Single Unit Charger (1-Hour)		32	\$	\$	\$
Vehicular Charger		0	\$	\$	\$
Multi-Unit Charger		2	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		32	\$	\$	\$
Spare battery		32	\$	\$	\$
Belt Clip		32	\$	\$	\$
Swivel Belt Clip		32	\$	\$	\$
Leather Carrying Case		32	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Farmersville Fire Department Mobile and Portable Radios and Related Services					\$

13.58 JOSEPHINE POLICE DEPARTMENT – NO RESPONSE FROM DEPT

Josephine Police Department Mobile and Portable Radios / No response from Dept					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>			\$	\$	\$
Trunk Mount			\$	\$	\$
Dual Control Head			\$	\$	\$
External Speaker			\$	\$	\$
“Console” Style Control Station			\$	\$	\$
“Mobile Radio” Style Control Station			\$	\$	\$
Control Station Antenna System, Grounding			\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>			\$	\$	\$
P25 Phase 2 Operation			\$	\$	\$
Dual Band (700/800, VHF)			\$	\$	\$
500 Modes Minimum			\$	\$	\$
Full Color LCD Alphanumeric Side Display			\$	\$	\$
Full Keypad			\$	\$	\$
Partial Keypad			\$	\$	\$
Dual Mic Noise Cancelling			\$	\$	\$
High Noise Reduction			\$	\$	\$
Submersible to IP67 (1m for 30 min)			\$	\$	\$
Man Down Sensor			\$	\$	\$
Color (Standard)			\$	\$	\$
Color (Hi Visibility Yellow)			\$	\$	\$
Intrinsically Safe			\$	\$	\$
PTT-ID			\$	\$	\$
Emergency Alert			\$	\$	\$
Priority Scan			\$	\$	\$

Josephine Police Department Mobile and Portable Radios / No response from Dept					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Individual Call and Call Alert			\$	\$	\$
GPS Location			\$	\$	\$
Text Messaging			\$	\$	\$
Bluetooth Capability			\$	\$	\$
Radio Authentication			\$	\$	\$
AES Single-key Voice Encryption			\$	\$	\$
AES Multikey Voice Encryption			\$	\$	\$
AES Over The Air Rekeying (OTAR)			\$	\$	\$
Over The Air Programming (OTAP)			\$	\$	\$
Battery Type (prefer Lithium Polymer)			\$	\$	\$
Battery Life 10 Hours			\$	\$	\$
Single Unit Charger (1-Hour)			\$	\$	\$
Vehicular Charger			\$	\$	\$
Multi-Unit Charger			\$	\$	\$
Battery Conditioner			\$	\$	\$
Speaker Microphone (no antenna)			\$	\$	\$
Spare battery			\$	\$	\$
Belt Clip			\$	\$	\$
Swivel Belt Clip			\$	\$	\$
Leather Carrying Case			\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Josephine Police Department Mobile and Portable Radios and Related Services					\$

13.59 JOSEPHINE FIRE DEPARTMENT

Josephine Fire Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	6		\$	\$	\$
Trunk Mount	0		\$	\$	\$
Dual Control Head	0		\$	\$	\$
External Speaker	6		\$	\$	\$
“Console” Style Control Station <i>(at FD Office/Bay)</i>	1		\$	\$	\$
“Mobile Radio” Style Control Station	0		\$	\$	\$
Control Station Antenna System, Grounding	1		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		28	\$	\$	\$
P25 Phase 2 Operation	7	8	\$	\$	\$
Dual Band (700/800, VHF)	7	28	\$	\$	\$
500 Modes Minimum	7	28	\$	\$	\$
Full Color LCD Alphanumeric Side Display	7	28	\$	\$	\$
Full Keypad	7	28	\$	\$	\$
Partial Keypad	0	0	\$	\$	\$
Dual Mic Noise Cancelling		28	\$	\$	\$
High Noise Reduction		28	\$	\$	\$
Submersible to IP67 (1m for 30 min)		28	\$	\$	\$
Man Down Sensor		28	\$	\$	\$
Color (Standard)		0	\$	\$	\$
Color (Hi Visibility Yellow)		28	\$	\$	\$
Intrinsically Safe		28	\$	\$	\$
PTT-ID	7	28	\$	\$	\$
Emergency Alert	7	28	\$	\$	\$

Josephine Fire Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Priority Scan	7	28	\$	\$	\$
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	0	0	\$	\$	\$
Text Messaging	0	0	\$	\$	\$
Bluetooth Capability	0	0	\$	\$	\$
Radio Authentication	7	28	\$	\$	\$
AES Single-key Voice Encryption	7	28	\$	\$	\$
AES Multikey Voice Encryption	0	0	\$	\$	\$
AES Over The Air Rekeying (OTAR)	0	0	\$	\$	\$
Over The Air Programming (OTAP)	0	0	\$	\$	\$
Battery Type (prefer Lithium Polymer)		28	\$	\$	\$
Battery Life 10 Hours		28	\$	\$	\$
Single Unit Charger (1-Hour)		28	\$	\$	\$
Vehicular Charger		2	\$	\$	\$
Multi-Unit Charger		0	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		28	\$	\$	\$
Spare battery		14	\$	\$	\$
Belt Clip		28	\$	\$	\$
Swivel Belt Clip		0	\$	\$	\$
Leather Carrying Case		0	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Josephine Fire Department Mobile and Portable Radios and Related Services					\$

13.60 LAVON POLICE DEPARTMENT

Lavon Police Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	6		\$	\$	\$
Trunk Mount	6		\$	\$	\$
Dual Control Head	6		\$	\$	\$
External Speaker	6		\$	\$	\$
“Console” Style Control Station	0		\$	\$	\$
“Mobile Radio” Style Control Station	0		\$	\$	\$
Control Station Antenna System, Grounding	0		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		8	\$	\$	\$
P25 Phase 2 Operation	6	8	\$	\$	\$
Dual Band (700/800, VHF)	6	8	\$	\$	\$
500 Modes Minimum	6	8	\$	\$	\$
Full Color LCD Alphanumeric Side Display	6	8	\$	\$	\$
Full Keypad	6	0	\$	\$	\$
Partial Keypad	0	8	\$	\$	\$
Dual Mic Noise Cancelling		0	\$	\$	\$
High Noise Reduction		0	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		8	\$	\$	\$
Color (Standard)		8	\$	\$	\$
Color (Hi Visibility Yellow)		0	\$	\$	\$
Intrinsically Safe		0	\$	\$	\$
PTT-ID	6	8	\$	\$	\$
Emergency Alert	6	8	\$	\$	\$
Priority Scan	6	8	\$	\$	\$

Lavon Police Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	0	0	\$	\$	\$
Text Messaging	0	0	\$	\$	\$
Bluetooth Capability	0	0	\$	\$	\$
Radio Authentication	0	0	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	0	0	\$	\$	\$
AES Over The Air Rekeying (OTAR)	0	0	\$	\$	\$
Over The Air Programming (OTAP)	0	0	\$	\$	\$
Battery Type (prefer Lithium Polymer)		8	\$	\$	\$
Battery Life 10 Hours		8	\$	\$	\$
Single Unit Charger (1-Hour)		3	\$	\$	\$
Vehicular Charger		0	\$	\$	\$
Multi-Unit Charger		1	\$	\$	\$
Battery Conditioner		1	\$	\$	\$
Speaker Microphone (no antenna)		8	\$	\$	\$
Spare battery		8	\$	\$	\$
Belt Clip		0	\$	\$	\$
Swivel Belt Clip		0	\$	\$	\$
Leather Carrying Case		0	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Lavon Police Department Mobile and Portable Radios and Related Services					\$

13.61 LOWERY CROSSING FIRE DEPARTMENT

Lowery Crossing Fire Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	6		\$	\$	\$
Trunk Mount	0		\$	\$	\$
Dual Control Head	6		\$	\$	\$
External Speaker	6		\$	\$	\$
“Console” Style Control Station	0		\$	\$	\$
“Mobile Radio” Style Control Station	0		\$	\$	\$
Control Station Antenna System, Grounding	0		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		20	\$	\$	\$
P25 Phase 2 Operation	6	20	\$	\$	\$
Dual Band (700/800, VHF)	6	20	\$	\$	\$
500 Modes Minimum	6	20	\$	\$	\$
Full Color LCD Alphanumeric Side Display	6	6	\$	\$	\$
Full Keypad	6	6	\$	\$	\$
Partial Keypad	0	0	\$	\$	\$
Dual Mic Noise Cancelling		20	\$	\$	\$
High Noise Reduction		20	\$	\$	\$
Submersible to IP67 (1m for 30 min)		20	\$	\$	\$
Man Down Sensor		20	\$	\$	\$
Color (Standard)		0	\$	\$	\$
Color (Hi Visibility Yellow)		20	\$	\$	\$
Intrinsically Safe		20	\$	\$	\$
PTT-ID	6	20	\$	\$	\$
Emergency Alert	6	20	\$	\$	\$
Priority Scan	6	20	\$	\$	\$

Lowery Crossing Fire Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	6	20	\$	\$	\$
Text Messaging	0	6	\$	\$	\$
Bluetooth Capability	6	20	\$	\$	\$
Radio Authentication	6	20	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	6	20	\$	\$	\$
AES Over The Air Rekeying (OTAR)	0	0	\$	\$	\$
Over The Air Programming (OTAP)	0	0	\$	\$	\$
Battery Type (prefer Lithium Polymer)		20	\$	\$	\$
Battery Life 10 Hours		20	\$	\$	\$
Single Unit Charger (1-Hour)		20	\$	\$	\$
Vehicular Charger		6	\$	\$	\$
Multi-Unit Charger		2	\$	\$	\$
Battery Conditioner		2	\$	\$	\$
Speaker Microphone (no antenna)		20	\$	\$	\$
Spare battery		20	\$	\$	\$
Belt Clip		20	\$	\$	\$
Swivel Belt Clip		0	\$	\$	\$
Leather Carrying Case		0	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Lowery Crossing Fire Department Mobile and Portable Radios and Related Services					\$

13.62 MELISSA POLICE DEPARTMENT

Melissa Police Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	8		\$	\$	\$
Trunk Mount	0		\$	\$	\$
Dual Control Head	0		\$	\$	\$
External Speaker	8		\$	\$	\$
“Console” Style Control Station <i>(at PD Office)</i>	1		\$	\$	\$
“Mobile Radio” Style Control Station	0		\$	\$	\$
Control Station Antenna System, Grounding	1		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		15	\$	\$	\$
P25 Phase 2 Operation	9	15	\$	\$	\$
Dual Band (700/800, VHF)	0	0	\$	\$	\$
500 Modes Minimum	9	0	\$	\$	\$
Full Color LCD Alphanumeric Side Display	0	0	\$	\$	\$
Full Keypad	0	0	\$	\$	\$
Partial Keypad	9	15	\$	\$	\$
Dual Mic Noise Cancelling		15	\$	\$	\$
High Noise Reduction		0	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		15	\$	\$	\$
Color (Hi Visibility Yellow)		0	\$	\$	\$
Intrinsically Safe		0	\$	\$	\$
PTT-ID	9	15	\$	\$	\$
Emergency Alert	9	15	\$	\$	\$

Melissa Police Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Priority Scan	9	15	\$	\$	\$
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	0	15	\$	\$	\$
Text Messaging	0	0	\$	\$	\$
Bluetooth Capability	0	15	\$	\$	\$
Radio Authentication	9	15	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	0	0	\$	\$	\$
AES Over The Air Rekeying (OTAR)	0	0	\$	\$	\$
Over The Air Programming (OTAP)	9	15	\$	\$	\$
Battery Type (prefer Lithium Polymer)		0	\$	\$	\$
Battery Life 10 Hours		0	\$	\$	\$
Single Unit Charger (1-Hour)		0	\$	\$	\$
Vehicular Charger		8	\$	\$	\$
Multi-Unit Charger		0	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		0	\$	\$	\$
Spare battery		30	\$	\$	\$
Belt Clip		0	\$	\$	\$
Swivel Belt Clip		0	\$	\$	\$
Leather Carrying Case		0	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Melissa Police Department Mobile and Portable Radios and Related Services					\$

13.63 MELISSA FIRE DEPARTMENT

Melissa Fire Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	18		\$	\$	\$
Trunk Mount	2		\$	\$	\$
Dual Control Head	2		\$	\$	\$
External Speaker	10		\$	\$	\$
“Console” Style Control Station	1		\$	\$	\$
“Mobile Radio” Style Control Station	0		\$	\$	\$
Control Station Antenna System, Grounding	1		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		27	\$	\$	\$
P25 Phase 2 Operation	19	27	\$	\$	\$
Dual Band (700/800, VHF)	2	5	\$	\$	\$
500 Modes Minimum	19	27	\$	\$	\$
Full Color LCD Alphanumeric Side Display	19	27	\$	\$	\$
Full Keypad	0	0	\$	\$	\$
Partial Keypad	0	27	\$	\$	\$
Dual Mic Noise Cancelling		18	\$	\$	\$
High Noise Reduction		0	\$	\$	\$
Submersible to IP67 (1m for 30 min)		18	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		0	\$	\$	\$
Color (Hi Visibility Yellow)		18	\$	\$	\$
Intrinsically Safe		18	\$	\$	\$
PTT-ID	19	18	\$	\$	\$
Emergency Alert	19	18	\$	\$	\$
Priority Scan	19	18	\$	\$	\$

Melissa Fire Department Mobile and Portable Radios					
Description (add text to make more descriptive of models and options)	Mobiles	Portables	Unit (Mobiles)	Unit (Portable s)	Extended
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	19	18	\$	\$	\$
Text Messaging	0	0	\$	\$	\$
Bluetooth Capability	19	18	\$	\$	\$
Radio Authentication	19	18	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	0	0	\$	\$	\$
AES Over The Air Rekeying (OTAR)	0	0	\$	\$	\$
Over The Air Programming (OTAP)	19	18	\$	\$	\$
Battery Type (prefer Lithium Polymer)		0	\$	\$	\$
Battery Life 10 Hours		0	\$	\$	\$
Single Unit Charger (1-Hour)		0	\$	\$	\$
Vehicular Charger		2	\$	\$	\$
Multi-Unit Charger		3	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		0	\$	\$	\$
Spare battery		18	\$	\$	\$
Belt Clip		0	\$	\$	\$
Swivel Belt Clip		0	\$	\$	\$
Leather Carrying Case		0	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Melissa Fire Department Mobile and Portable Radios and Related Services					\$

13.64 NEVADA FIRE DEPARTMENT

<i>Nevada Fire Department Mobile and Portable Radios</i>					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	9		\$	\$	\$
Trunk Mount	0		\$	\$	\$
Dual Control Head	1		\$	\$	\$
External Speaker	2		\$	\$	\$
“Console” Style Control Station	2		\$	\$	\$
“Mobile Radio” Style Control Station	0		\$	\$	\$
Control Station Antenna System, Grounding	2		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		30	\$	\$	\$
P25 Phase 2 Operation	11	30	\$	\$	\$
Dual Band (700/800, VHF)	11	5	\$	\$	\$
500 Modes Minimum	11	0	\$	\$	\$
Full Color LCD Alphanumeric Side Display	11	0	\$	\$	\$
Full Keypad	11	10	\$	\$	\$
Partial Keypad	0	20	\$	\$	\$
Dual Mic Noise Cancelling		30	\$	\$	\$
High Noise Reduction		30	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		0	\$	\$	\$
Color (Hi Visibility Yellow)		30	\$	\$	\$
Intrinsically Safe		30	\$	\$	\$
PTT-ID	11	30	\$	\$	\$
Emergency Alert	11	30	\$	\$	\$
Priority Scan	11	30	\$	\$	\$

Nevada Fire Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	11	0	\$	\$	\$
Text Messaging	0	30	\$	\$	\$
Bluetooth Capability	11	5	\$	\$	\$
Radio Authentication	11	30	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	0	0	\$	\$	\$
AES Over The Air Rekeying (OTAR)	0	0	\$	\$	\$
Over The Air Programming (OTAP)	11	30	\$	\$	\$
Battery Type (prefer Lithium Polymer)		0	\$	\$	\$
Battery Life 10 Hours		30	\$	\$	\$
Single Unit Charger (1-Hour)		30	\$	\$	\$
Vehicular Charger		5	\$	\$	\$
Multi-Unit Charger		0	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		25	\$	\$	\$
Spare battery		30	\$	\$	\$
Belt Clip		30	\$	\$	\$
Swivel Belt Clip		0	\$	\$	\$
Leather Carrying Case		0	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Nevada Fire Department Mobile and Portable Radios and Related Services					\$

13.65 PRINCETON POLICE DEPARTMENT

Princeton Police Department Mobile and Portable Radios / NO RESPONSE FROM DEPT					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>			\$	\$	\$
Trunk Mount			\$	\$	\$
Dual Control Head			\$	\$	\$
External Speaker			\$	\$	\$
“Console” Style Control Station			\$	\$	\$
“Mobile Radio” Style Control Station			\$	\$	\$
Control Station Antenna System, Grounding			\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>			\$	\$	\$
P25 Phase 2 Operation			\$	\$	\$
Dual Band (700/800, VHF)			\$	\$	\$
500 Modes Minimum			\$	\$	\$
Full Color LCD Alphanumeric Side Display			\$	\$	\$
Full Keypad			\$	\$	\$
Partial Keypad			\$	\$	\$
Dual Mic Noise Cancelling			\$	\$	\$
High Noise Reduction			\$	\$	\$
Submersible to IP67 (1m for 30 min)			\$	\$	\$
Man Down Sensor			\$	\$	\$
Color (Standard)			\$	\$	\$
Color (Hi Visibility Yellow)			\$	\$	\$
Intrinsically Safe			\$	\$	\$
PTT-ID			\$	\$	\$
Emergency Alert			\$	\$	\$
Priority Scan			\$	\$	\$

Princeton Police Department Mobile and Portable Radios / NO RESPONSE FROM DEPT					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Individual Call and Call Alert			\$	\$	\$
GPS Location			\$	\$	\$
Text Messaging			\$	\$	\$
Bluetooth Capability			\$	\$	\$
Radio Authentication			\$	\$	\$
AES Single-key Voice Encryption			\$	\$	\$
AES Multikey Voice Encryption			\$	\$	\$
AES Over The Air Rekeying (OTAR)			\$	\$	\$
Over The Air Programming (OTAP)			\$	\$	\$
Battery Type (prefer Lithium Polymer)			\$	\$	\$
Battery Life 10 Hours			\$	\$	\$
Single Unit Charger (1-Hour)			\$	\$	\$
Vehicular Charger			\$	\$	\$
Multi-Unit Charger			\$	\$	\$
Battery Conditioner			\$	\$	\$
Speaker Microphone (no antenna)			\$	\$	\$
Spare battery			\$	\$	\$
Belt Clip			\$	\$	\$
Swivel Belt Clip			\$	\$	\$
Leather Carrying Case			\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Princeton Police Department Mobile and Portable Radios and Related Services					\$

13.66 PRINCETON FIRE DEPARTMENT

Princeton Fire Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	8		\$	\$	\$
Trunk Mount	0		\$	\$	\$
Dual Control Head	1		\$	\$	\$
External Speaker	2		\$	\$	\$
“Console” Style Control Station	2		\$	\$	\$
“Mobile Radio” Style Control Station	0		\$	\$	\$
Control Station Antenna System, Grounding	2		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		30	\$	\$	\$
P25 Phase 2 Operation	10	30	\$	\$	\$
Dual Band (700/800, VHF)	10	30	\$	\$	\$
500 Modes Minimum	10	30	\$	\$	\$
Full Color LCD Alphanumeric Side Display	10	30	\$	\$	\$
Full Keypad	0	9	\$	\$	\$
Partial Keypad	10	13	\$	\$	\$
Dual Mic Noise Cancelling		30	\$	\$	\$
High Noise Reduction		30	\$	\$	\$
Submersible to IP67 (1m for 30 min)		30	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		0	\$	\$	\$
Color (Hi Visibility Yellow)		30	\$	\$	\$
Intrinsically Safe		30	\$	\$	\$
PTT-ID	10	30	\$	\$	\$
Emergency Alert	10	30	\$	\$	\$
Priority Scan	10	30	\$	\$	\$

Princeton Fire Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	10	30	\$	\$	\$
Text Messaging	0	0	\$	\$	\$
Bluetooth Capability	0	0	\$	\$	\$
Radio Authentication	10	0	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	0	0	\$	\$	\$
AES Over The Air Rekeying (OTAR)	0	0	\$	\$	\$
Over The Air Programming (OTAP)	10	0	\$	\$	\$
Battery Type (prefer Lithium Polymer)		30	\$	\$	\$
Battery Life 10 Hours		0	\$	\$	\$
Single Unit Charger (1-Hour)		10	\$	\$	\$
Vehicular Charger		14	\$	\$	\$
Multi-Unit Charger		1	\$	\$	\$
Battery Conditioner		1	\$	\$	\$
Speaker Microphone (no antenna)		30	\$	\$	\$
Spare battery		6	\$	\$	\$
Belt Clip		30	\$	\$	\$
Swivel Belt Clip		30	\$	\$	\$
Leather Carrying Case		30	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Princeton Fire Department Mobile and Portable Radios and Related Services					\$

13.67 WESTMINSTER FIRE DEPARTMENT

Westminster Fire Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>	8		\$	\$	\$
Trunk Mount	0		\$	\$	\$
Dual Control Head	0		\$	\$	\$
External Speaker	8		\$	\$	\$
“Console” Style Control Station	1		\$	\$	\$
“Mobile Radio” Style Control Station	0		\$	\$	\$
Control Station Antenna System, Grounding	1		\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>		19	\$	\$	\$
P25 Phase 2 Operation	9	19	\$	\$	\$
Dual Band (700/800, VHF)	0	0	\$	\$	\$
500 Modes Minimum	9	19	\$	\$	\$
Full Color LCD Alphanumeric Side Display	9	19	\$	\$	\$
Full Keypad	0	0	\$	\$	\$
Partial Keypad	9	19	\$	\$	\$
Dual Mic Noise Cancelling		19	\$	\$	\$
High Noise Reduction		19	\$	\$	\$
Submersible to IP67 (1m for 30 min)		0	\$	\$	\$
Man Down Sensor		0	\$	\$	\$
Color (Standard)		0	\$	\$	\$
Color (Hi Visibility Yellow)		19	\$	\$	\$
Intrinsically Safe		0	\$	\$	\$
PTT-ID	9	19	\$	\$	\$
Emergency Alert	9	19	\$	\$	\$
Priority Scan	9	19	\$	\$	\$

Westminster Fire Department Mobile and Portable Radios					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Individual Call and Call Alert	0	0	\$	\$	\$
GPS Location	0	0	\$	\$	\$
Text Messaging	0	0	\$	\$	\$
Bluetooth Capability	0	0	\$	\$	\$
Radio Authentication	9	19	\$	\$	\$
AES Single-key Voice Encryption	0	0	\$	\$	\$
AES Multikey Voice Encryption	0	0	\$	\$	\$
AES Over The Air Rekeying (OTAR)	0	0	\$	\$	\$
Over The Air Programming (OTAP)	9	0	\$	\$	\$
Battery Type (prefer Lithium Polymer)		19	\$	\$	\$
Battery Life 10 Hours		19	\$	\$	\$
Single Unit Charger (1-Hour)		19	\$	\$	\$
Vehicular Charger		0	\$	\$	\$
Multi-Unit Charger		0	\$	\$	\$
Battery Conditioner		0	\$	\$	\$
Speaker Microphone (no antenna)		19	\$	\$	\$
Spare battery		19	\$	\$	\$
Belt Clip		19	\$	\$	\$
Swivel Belt Clip		19	\$	\$	\$
Leather Carrying Case		19	\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Westminster Fire Department Mobile and Portable Radios and Related Services					\$

13.68 WESTON FIRE DEPARTMENT – NO RESPONSE FROM DEPT

Weston Fire Department Mobile and Portable Radios / NO RESPONSE FROM DEPT					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit <small>(Mobiles)</small>	Unit <small>(Portables)</small>	Extended
Project 25 700/800MHz Mobile Radio <i>(provide radio series and model here)</i>			\$	\$	\$
Trunk Mount			\$	\$	\$
Dual Control Head			\$	\$	\$
External Speaker			\$	\$	\$
“Consolette” Style Control Station			\$	\$	\$
“Mobile Radio” Style Control Station			\$	\$	\$
Control Station Antenna System, Grounding			\$	\$	\$
Project 25 700/800MHz Portable Radio <i>(provide radio series and model here)</i>			\$	\$	\$
P25 Phase 2 Operation			\$	\$	\$
Dual Band (700/800, VHF)			\$	\$	\$
500 Modes Minimum			\$	\$	\$
Full Color LCD Alphanumeric Side Display			\$	\$	\$
Full Keypad			\$	\$	\$
Partial Keypad			\$	\$	\$
Dual Mic Noise Cancelling			\$	\$	\$
High Noise Reduction			\$	\$	\$
Submersible to IP67 (1m for 30 min)			\$	\$	\$
Man Down Sensor			\$	\$	\$
Color (Standard)			\$	\$	\$
Color (Hi Visibility Yellow)			\$	\$	\$
Intrinsically Safe			\$	\$	\$
PTT-ID			\$	\$	\$
Emergency Alert			\$	\$	\$
Priority Scan			\$	\$	\$

Weston Fire Department Mobile and Portable Radios / NO RESPONSE FROM DEPT					
Description <small>(add text to make more descriptive of models and options)</small>	Mobiles	Portables	Unit (Mobiles)	Unit (Portables)	Extended
Individual Call and Call Alert			\$	\$	\$
GPS Location			\$	\$	\$
Text Messaging			\$	\$	\$
Bluetooth Capability			\$	\$	\$
Radio Authentication			\$	\$	\$
AES Single-key Voice Encryption			\$	\$	\$
AES Multikey Voice Encryption			\$	\$	\$
AES Over The Air Rekeying (OTAR)			\$	\$	\$
Over The Air Programming (OTAP)			\$	\$	\$
Battery Type (prefer Lithium Polymer)			\$	\$	\$
Battery Life 10 Hours			\$	\$	\$
Single Unit Charger (1-Hour)			\$	\$	\$
Vehicular Charger			\$	\$	\$
Multi-Unit Charger			\$	\$	\$
Battery Conditioner			\$	\$	\$
Speaker Microphone (no antenna)			\$	\$	\$
Spare battery			\$	\$	\$
Belt Clip			\$	\$	\$
Swivel Belt Clip			\$	\$	\$
Leather Carrying Case			\$	\$	\$
Services: Installation, Programming, and other Services Related to Radios	Lot		\$	\$	\$
Total Weston Fire Department Mobile and Portable Radios and Related Services					\$