Supplement Request Form

Approved at October 30, 2019 EPAC

Link to Meeting Minutes

Date Prepared: 10/28/2019	**Project Title: Connecticut Voice Radio System**
Company/Companies: Eversource CT	**Project ID Number: VOCSYS1D, VOCSYS1T, VOCSYS4D, VOCSYS4T, VOCSYS71**
Organization: Telecommunications Engineering	**Plant Class/ (F.P. Type): General Plant**
Project Initiator: [redacted]	**Project Type: Specific**
Project Manager: [redacted] **(IT PMO)**	**Capital Investment Part of Original Operating Plan? Y**
Project Sponsor: [redacted]	**O&M Expenses Part of the Original Operating Plan? Y**
Current Authorized Amount: $19,135,862	**Estimated in service date(s): December 2021**
Supplement Request: $20,703,773	**Other:**
Total Request: $39,839,635	

Supplement Justification

[redacted] In 2016, Eversource approved a PAF of $19.1M (which included $6.5M for the purchase of [redacted] The project requests supplemental funding based on the results of initial engineering and solution development. Additionally, the funding request is not related to a cost overrun as investment to date is $6.5M of $19.1M authorized; with $12.6M of initial authorized funds remaining. This supplement is seeking an additional $20.7M to implement a [redacted] The total request is $39.8M.

Description Project Funding	Total	Distribution	Transmission (PTF)[1]	Transmission (Non-PTF)[1]	Gas	Distribution	Transmission
		VOCSYS1D	VOCSYS1T		VOCSYS71	VOCSYS4D	VOCSYS4T
Total Project Capital Funding	$ 39,248,510	$ 29,043,898	$ 4,890,364	$ 604,427	$ 4,709,821	$ -	$ -
Total Project Expense Funding	$ 591,125	$ 405,062	$ 67,230	$ 8,309	$ 66,781	$ 40,681	$ 3,062
Total Project Funding	**$ 39,839,635**	**$ 29,448,960**	**$4,957,594**	**$ 612,736**	**$4,776,602**	**$ 40,681**	**$ 3,062**

[1] **Transmission PTF vs Non-PTF Cost Distribution:** Transmission costs have been further categorized as either Pool Transmission Resource (PTF) or Non-PTF costs. CT Voice Radio System Project Transmission costs are distributed based upon the ratio of the total length of Connecticut's PTF Transmission line versus Non-PTF Transmission line; the distribution ratio is as follows: Transmission PTF 89% and Transmission Non-PTF 11%. (*Source: Eversource Transmission Planning*)

Project Scope (Original)

[redacted] The project was to be implemented in four (4) phases during a scheduled timeframe from 3/1/2016 – 12/31/2019. The project costs were distributed between CT Distribution, Transmission & Gas and WMA Distribution & Transmission.

Breakdown of Capital Project[2] Investment Summary (Distributed by Operating Company): (Original Authorization (2016), Current Investment to Date, Supplemental PAF Request (2019) & Total Project Capital Cost)

Description of Capital Investment	Total	CT				WMA[3]	
		Distribution	Transmission (PTF)	Transmission (Non-PTF)	Gas	Distribution	Transmission
		VOCSYS1D	VOCSYS1T		VOCSYS71	VOCSYS4D	VOCSYS4T
Current Investment to Date	$6,591,773	$6,045,577	$221,946	$-	$195,725	$119,528	$8,997
[redacted] Refund Adjustment	($1,730,419)	($1,184,223)	($221,946)	$-	($195,725)	($119,528)	($8,997)
Current Investment to Date (Spectrum Adjusted)[4]	**$4,861,354**	**$4,861,354**	**$-**	**$-**	**$-**	**$-**	**$-**
Original Authorization (2016)	$19,135,862	$13,469,104	$2,082,790	$-	$2,411,162	$1,070,871	$101,935
Adjusted Supplemental PAF request (2019)	$20,112,648	$15,574,794	$2,807,574	$604,427	$2,298,659	$(1,070,871)	$(101,935)

[2] **Breakdown of Capital Project Investment Summary-** Table only reflects Project Capital Funding of $39,248,510 only and does not reflect Project Expense Funding of $591,125 [redacted] Termination Fee

[3] **WMA**: Regarding WMA cost, the 2016 DMR Solution included project cost for WMA usage of the [redacted]. A DMR Project for WMA is within the 5-year plan for ES Telecom which will be presented and funded separately at a future date.

[4] **Current Investment to Date (Spectrum Adjusted):** The current spend to date has been adjusted for the refund of the frequency deposit (see **Footnote 6** for details)

Total Capital Project Funding	**$39,248,510**	**$29,043,898**	**$4,890,364**	**$604,427**	**$4,709,821**	**$-**	**$-**

Total Project Cashflow Summary

(Note: Dollar values are in thousands)[5]

CT Voice Radio Estimated Total Cashflow						
Year	**Prior to 2019**	**2019**	**2020**	**2021**	**2022**	**Total**
Capital	$2,622	$3,849	$16,463	$11,810	$2,936	$37,680
Loaders	$140	$165	$852	$798	$204	$2,159
Total	**$2,762**	**$4,014**	**$17,315**	**$12,608**	**$3,140**	**$39,839**

Project Capital Current Investment to Date Summary

Description	Investment
Engineering Design Phase 1.0 (Complete)	$3,500,000
Engineering Design Phase 1.5 (In Progress)	$300,000
Frequency Purchase Deposit[6]	$1,730,419
FCC Legal	$100,000
ES Internal Labor	$691,000
Loaders	$270,314
Total	**$6,591,773**

Project (One-Time) O&M Expense Summary

Expense Description	Project Cost	CT			WMA	
		Distribution	Transmission	Gas	Distribution	Transmission
450MHz Termination Fee	$591,125	$405,062	$75,539	$66,781	$40,681	$3,062
O&M Operations Budget	Telecom Engineering O&M CCC: 13N					

Project (Long Term) O&M Expense Summary [7]

	Connecticut Operating Company Split

[5] **Total Project Cashflow Summary:** Provides end-to-end cashflow of CT Voice Radio Project from inception to completion.

[6] **Project Capital Current Investment to Date Summary (Frequency Purchase Deposit) & Project (One-Time) O&M Expense Summary:** In support of the projects original scope, a deposit of $1.73M (included within Project Investment to Date) was placed on the procurement of [redacted] (total spectrum costs were to be $6.5M); this purchase agreement contract allowed for the cancellation of the agreement with a termination fee. Upon CT Voice Radio Project determining that the [redacted]. A one-time termination fee of $591K will need to be expensed to the project in January of 2020, upon executing the [redacted].

[7] **Project (Long Term) O&M Expense Summary** The yearly expense increase is not a part of the project cost. Instead, it is a forecast which will impact the ES Real Estate Yearly O&M budget. ES Real Estate is aware of this future cost.

Yearly Lease Expense (increase)	CL&P Distribution	CL&P Transmission	CT Gas
	74%	14%	12%
$114,600.00	$84,804.000	$11,702.952	$1,427.760

Telecom Tower Lease Fee (Annual):

[redacted]

Project Scope (Revised)

[redacted]

[redacted]

- **Eversource awarded EPC** project to 3rd Party Systems Integrator BV

- **Upon completion of BV Preliminary Design,** CT Voice Radio understood that vendors **could not deliver** our requested coverage within the $19M budget, as budgeting was based upon only a **Conceptual Design.**
    - **Initial BV cost estimates were $70M+;** bringing Total Project Cost to $84M+ which is $64.5M greater than the 2016 Approved PAF of $19.1M

- **Current EPC estimated project costs are $39.8M** ($20M+ greater than current budget)
    - **Current project spend to date is $6.5M of $19.1M budgeted** (remaining available project funding is $12M+
    - At the request of Eversource management, the CT DMR project commissioned BV on June 5, 2019 to perform an [redacted]. The assessment was completed on September 6th, 2019; the outcome demonstrated that [redacted] at a lower overall cost. This guided the CT DMR project to [redacted] during Phase 1.5 & 2 of the project due to its advantages

over the [redacted]. A summary of the project phases is provided below.

A summary of the spend to date, project budget authorizations and supplement request is provided below. To date, the CT Voice Radio DMR project has spent $6.5M of an approved $19.1M

Project Funding Request:

Based upon Preliminary Engineering & Technology Evaluation, [redacted] To obtain the requested funding, CT Voice Radio pursues Supplemental PAF approval from the Subsidiary Board. The project costs would now be distributed between CT Distribution, Transmission & Gas (Note: [redacted]

Current Project Scope:

Eversource CT Voice Radio has initiated a planned Multi-Phase DMR EPC Project with 3rd Party System Integrator, BV, to provide 95% [redacted]

Phase 1.0 - Aug 2018 – April 2019: (COMPLETE)

Assessment and Preliminary Design performed by Eversource 3rd Party System Integrator (BV)

- Assessment included, Site Assessment, Drive Testing, Drone Survey, Software-based modeling of strategic telecom sites (including some CSP Sites) in support of Eversource requirements.
- Design aided by Assessment to meet Eversource requirements and estimation of Phase 2.0 costs.

Phase 1.5- Sept 2019 – Sept 2020: (IN PROGRESS)

Phase 1.5 is a subset of Phase 2 and is performed in parallel with [redacted]

- Completion of detailed engineering and issue for construction (IFC) tasks in preparation for Phase 2.0
- Readiness tasks for siting and leasing
- Procurement and implementation of a five-site pilot, to be used a validation of detailed engineering design

  Procurement of proceeding five post-pilot sites to be implemented during Phase 2.0

Phase 2- Sept 2020 – Dec 2021: (ON HOLD- Pending EPAC, Supplemental PAF & Subsidiary Board approvals)

The planned Build and Implementation of the Designed DMR Solution

- Based upon the Assessment in Phase 1.0 and readiness tasks in Phase 1.5, Eversource requests approval to initiate the implementation of the [redacted]

- Implementation will include, construction and remaining procurement for each of the remaining [redacted].
- **Decommission** of legacy LMR radio solution post successful implementation of DMR Solution.

(***Note**: A more detailed breakdown of project scope and completed tasks per phase is provided below in the **"Alternates Considered: Current Project Details"** section of this document).*

Project Contingency Enterprise Risk Management Assessment Results

Based on an assessment performed by the CT Voice Radio project and Eversource Enterprise Risk Management, the total Project Contingency is $3.14M.

Enterprise Risk Management Assessment Results

Risk Description	Risk Horizon	Impact	Risk Mitigation
Severe weather delays construction resulting in increasing costs	**2020-2021**	**$0.4M**	The Project schedule has been adjusted such that construction tasks with the most dependency on weather are performed outside of the winter weather months. Additionally, a "float" buffer is incorporated into individual site's project schedules to absorb minimal delays.
Challenges in securing 220MHz frequency	**2019-2020**	**$0.4M**	**220MHz Frequency procurement** must occur by 12/31/2019 (in advance of 3/31/2020 450MHz Spectrum purchase deadline). Failure to procure the 220MHz Spectrum by 3/31/2020, would force the project to return to the 450MHz DMR Solution and increase estimated project cost by nearly $7M (220MHz $39.8M vs, 450MHz $46.6M). CT Voice Radio has engaged ES Legal to obtain the frequency (which is in receivership) from Select Spectrum; currently, contracts are being reviewed; with a court hearing scheduled during week of Nov. 17, 2019 to review spectrum purchase contract. Spectrum contract execution is expected by 12/31/2019.
Field verification requires additional channels and tower locations resulting in schedule delays and increased costs	**2021**	**$0.2M**	The Project has pivoted frequency solutions from 450MHz to 220MHz which significantly increases channel availability from 12 to 40 channels; providing much greater channel planning flexibility. A third-party system integrator has been contracted to engineer and construct a voice radio system with a 95% coverage performance guarantee. The coverage model currently predicts that all districts will have greater than 97% coverage. A system drive test will be performed of the first sites built to validate and tune coverage model predictions
Encounter unexpected conditions (rock/ledge, poor soil, UG obstructions) during	**2020-2021**	**$0.2M**	The Project's construction scope is now limited to the installation of three wooden utility poles within existing Eversource substation locations. These locations have minimal risk of unexpected conditions during construction. Additionally, other construction related ground disturbances are limited to a depth of two (2) feet.

Risk Description	Risk Horizon	Impact	Risk Mitigation
construction result in increases costs			
Inability to secure tower sites (siting/leasing) results in schedule delays and increased costs	**2019-2020**	**$0.2M**	The Project utilizes 45 Tower Sites, of which seven (7) are commercial lease sites. For the seven (7) leased sites, applications have been submitted and approved by the tower owner for our proposed ground and tower lease space. Additionally, the Project has minimized the use of "Green-Field" [8] tower sites; which present the highest risk of not receiving siting approval. Currently there are three (3) "Greenfields" tower sites, all of which are at Eversource transmission substations, with the scope of construction work being limited to the installation of wooden utility poles. Lastly, the Project has presented to and is aligned with Eversource siting and the Connecticut Siting Council (CSC) on the scope of all 45 Tower Sites; this alignment decreases the risk of obtaining siting approval.
Testing, including system performance and user acceptance is abbreviated to meet schedule	**2021**	**$0.2M**	The Project has made testing a major dependency of the overall project schedule. System testing occurs from May to October 2021 to decrease the impact of foliage on testing results. Testing will occur in districts with the highest density of foliage first as that is where there is greater impact. Should project testing fail or not be complete by October 2021, the Project team will be reduced to include only key personnel from BV and Eversource utilizing project contingency.
Various other risks (e.g. permit delays, holes in coverage, singular vendor, etc.)	**2019-2021**	**$1.54M**	The Project Team recognizes additional risks & required mitigation strategies. Regarding permitting delays, the Project Team has met and aligned with the CSC regarding permitting requirements. Regarding holes in coverage, extensive coverage modelling occurs with a 95% coverage guarantee. Regarding singular vendor, the project has met and aligned with the hardware vendor, Tait, and obtained a hardware warranty and optional last time buy, 18 months in advance of hardware being deemed End-Of-Life.
Total Risks Identified:	**2019-2021**	**$3.14M**	**Total Risk Impact:** As identified by Eversource Enterprise Risk Management and the Project Team is $3.14M

[8] ***Greenfield*** *is an area of agricultural or forest land, or some other undeveloped* ***site*** *earmarked for commercial development, industrial projects or other construction projects.*

Alternatives Considered

In 2016, at the Initiation phase of the CT Voice Radio DMR Project, [redacted]. In 2019, during the project's Planning & Preliminary Design phase, projected costs for the [redacted] were $46.6M prompting the commission of a [redacted] to consider potential alternatives. Upon completion of the [redacted] the assessment was presented to senior leadership for consideration. Thereafter, it was determined, due to decreased cost and increased performance, that the [redacted]

Description	2019 Black & Veatch with Eversource [redacted] Preliminary Design Implementation (Pending Approval)	2019 Black & Veatch with Eversource [redacted] Preliminary Design Implementation (Pending Approval)
Tower Site Builds	$ 12.845 M	$ 9.001 M
Central Systems and Services	$ 11.114 M	$ 13.243 M
Preliminary Design	$ 4.383 M	$ 4.383 M
Additional Eversource Costs	$ 14.728 M	$ 10.073 M
Subtotal	**$ 43.070 M**	**$ 36.700 M**
Total Contingency	$ 3.600 M	$ 3.140 M
Grand Total	**$ 46.670 M**	**$ 39.840 M**

Alternative Considered Solution Comparison Table

The following is a summary of the solution comparison performed between the original [redacted]

The summary is driven by how well each DMR Solution adheres to the project's Guiding Principles which align directly with Eversource's Field Area Network (FAN) Strategy.

450MHz and 220MHz Solution Comparison									
Guiding Principle	Weighting	Description	[redacted]						
Interoperability & Standardization	20%	CT Users Interoperability	Meets Expectations	3.00	2.20	Meets Expectations	3.00	2.80
		WMA Interoperability	Meets Expectations	3.00		Meets Expectations	3.00	
		EMA Interoperability	Meets Expectations	3.00		Improvement Needed	2.00	
		NH Interoperability (Future)	Unsatisfactory	1.00		Meets Expectations	3.00	
		Firstnet Interoperability (Future)	Unsatisfactory	1.00		Meets Expectations	3.00	
Cybersecurity & Saftey	10%	Situational Awareness	Meets Expectations	3	3	Meets Expectations	3	3
Reliable & Resilient	25%	Number of Channels	12	3.00	2.75	40	5.00	4.00
		Number of Sites	60	3.00		45	4.00	
		Voice Capacity	Meets Expectations	3.00		Exceeds Expectations	4.00	
		Data Capacity	Improvement Needed	2.00		Meets Expectations	3.00	
Cost Effective & Feasible	20%	Project Cost (with Contingency)	$46.6M	2.57	2.42	$39.8M	3.00	3.50
		Leased Site O&M Cost Increase	$420,000	1.10		$115,200.00	4.00	
		CT Estimated Go-live Timeframe	3Q-21	3.00		3Q-21	3.00	
		WMA Estimated Go-live Timeframe	1Q-24	3.00		2Q-23	4.00	
Technology Obsolescence & Risk Mitigation	25%	Base Station Availability (Manufacturers)	4	3.00	3.00	1	2.00	2.00
Combined	100%	Scoring	2.66			3.06		

Scale of Performance Rating Scoring

5: Exceptional; 4: Exceeds Expectations; 3: Meets Expectations; 2: Improvement Needed; 1: Unsatisfactory

Overall 2016 vs 2019 Scope & Cost Change Summary:

There are material differences when comparing the 2016 Project Scope & Cost based on the Conceptual Design (estimated to cost $19M) to the 2019 Project Scope and Cost based upon the 220MHz Preliminary Design (estimated to cost $39M). This $20M variance is related to (6) key cost categories (Tower Sites; Central Systems and Services; Preliminary Design; Additional ES Costs; Contingency; and Ongoing Lease O&M Costs).

Overall, the change of scope from (2016) Eversource self-performing the implementation with best-effort/ non-guaranteed radio coverage to (2018) Eversource contracting a third-party System Integrator for the engineering, procurement and construction of the CT Voice Radio system to [redacted] per each of the 12 CT Electric Districts & CT Gas District) provides ES with a reliable telecom system at a firm-fixed-price from the System Integrator..

Furthermore, changes related to DMR frequency purchase and required tower sites; radio units & warranty; leasing, siting and permitting; preliminary design validated by system testing; ES interoperability with MA & NH; taxes, insurance and bonding fees; and legacy radio system decommissioning all impacted cost and scope 2016 to 2019.

The following tables provide cost and scope change details for (6) key cost categories:

- Tower Sites
- Central Systems and Services
- Preliminary Design
- Additional ES Costs
- Ongoing Lease O&M Costs
- Contingency

2016 vs 2019 Cost Comparison – Tower Sites

	2016 Eversource Telecom [redacted] Conceptual Design Implementation (PAF Approved)	2019 Black & Veatch with Eversource [redacted] Preliminary Design Implementation (Pending Approval)	Variance
Tower Site Builds	**$ 9,307,980**	**$ 9,000,912**	**($307,068)**
Tower Site IFC	**$ 554,500**	**$ 1,944,381**	**$ 1,389,881**
IFC - Engineering	$ 522,000	$ 1,086,791	$ 564,791
IFC - Land Services (Leasing, Siting, Zoning, Permitting)	$ 32,500	$ 857,590	$ 825,090
Tower Site Construction	**$ 8,753,480**	**$ 7,056,531**	**($1,696,949)**
Site Materials	$ 6,376,800	$ 4,647,433	($1,729,367)
Site Construction Labor (Outside Resources)	$ 2,376,680	$ 2,409,097	$ 32,417

Tower Site Scope changes 2016 vs 2019; whereas 2019 includes:

- Issue For Construction (IFC) – The following documentation is now part of the IFC package for each radio site
  - Construction Drawings (CD) for [redacted]
  - Attachments
  - [redacted]
- IFC Land Services – The following is now included as part of the scope
  - Connecticut Siting Council packages for each of the radio sites proposed for the system. Land Services tasks include the publication and submittal of CSC packages on behalf of Eversource by preferred contractor "All Points Technologies". CSC package to include the following details:
    - FCC NEPA; Environmental Site Assessment; FAA Air Safety Analysis; FCC Antenna Structure Registration; SHPO Consultation; Hazardous Material Investigation; Visibility Analysis; Balloon/Crane Testing; RF Emission Studies; Photo-simulations and Local Permitting and Zoning as required
- Site Materials costs have reduced due to the removal of eight sites (45 vs 53 sites)
- Site Construction Labor now performed by 3rd Party with a 5% surcharge

Central Systems and Services

	2016 Eversource Telecom [redacted] Conceptual Design Implementation (PAF Approved)	2019 Black & Veatch with Eversource [redacted] Preliminary Design Implementation (Pending Approval)	Variance
Central Systems and Services	**$ 1,253,113**	**$ 13,242,792**	**$ 11,989,679**
Third Party PMO	$ 67,034	$ 3,101,586	$ 3,034,552
Subscriber Units (Mobiles + Portables)	$ 891,200	$ 5,138,962	$ 4,247,762
Central System Integration	$ 198,472	$ 2,406,563	$ 2,208,091
System Testing, Commissioning, Decommissioning	$ 84,757	$ 956,258	$ 871,501
Warranty	$ 11,650	$ 1,639,423	$ 1,627,773

Central Systems and Services Scope changes 2016 vs 2019; where 2019 includes:

- **Third Party Project Management Office (PMO)** including Weekly & Monthly Meetings; Project Schedule & Scope Development and Refinement. The following resources have been identified for phase two PMO
  - Project Manager
  - Project Manager Admin
  - Project Controls Analyst
  - Project Controls Cost and Scheduler Analyst
  - Engineering Manager
  - Construction Manager
  - Construction Admin
  - Safety Manager
  - Procurement Rep

- **Subscriber Units (Mobiles + Portables)** installation costs for Substation control stations and fleet are incorporated into project costs. In 2016, only the procurement of hardware was included.
  - Approximately 1577 vehicles have been identified as requiring a changeout of mobile radios.
    - Cellular backup is now an included feature for the most critical users
    - Over the air programming is now included to allow for remote reconfiguration by radio technicians
  - Approximately 458 substations have been identified as requiring a dedicated control station to be installed in Connecticut.
  - Provisions for 604 handheld portable radios is now included

- [redacted]

- Central Systems Integration now includes
  - [redacted]
  - Hardware Vendor technical services
  - Technical Training
  - End user Training

- Site/System Acceptance Testing now costs now includes
  - Land Mobile Radio (LMR) Site Acceptance Test
  - Dispatch Console Commissioning Procedure
  - LMR DMR Roaming Test Procedure
  - LMR Bit Error Rate (BER) and Data Audio Quality (DAQ) Coverage Test Procedure
  - LMR Functionality Commissioning Procedure
  - New Microwave Link Verification Test Procedure
  - New Third-party Terrestrial Link Verification Test Procedure
  - Backhaul Commissioning Test Procedure

- Decommissioning of legacy radio system now included
  - Decommissioning includes removal of legacy voice radio system antennas
  - Removal of legacy voice radio system base stations
  - Safe Disposal of Electronics

- Hardware Warranty to provide replacement of key radio components for ten years; software updates; technical support

Preliminary Design

	2016 Eversource Telecom [redacted] Conceptual Design Implementation (PAF Approved)	2019 Black & Veatch with Eversource [redacted] Preliminary Design Implementation (Pending Approval)	Variance
Phase 1 – Preliminary Design	**$ 150,000**	**$ 4,383,321**	**$ 4,233,321**
Preliminary Design	$ -	$ 3,500,000	$ 3,500,000
Other Costs Incurred to Date	$ 150,000	$ 883,321	$ 733,321

Preliminary Design Scope changes 2016 vs 2019; where 2019 includes:

- **Preliminary Design** in addition to a Conceptual and Detailed Design. Phase 1.0 of the CT Voice Radio project was to produce the preliminary design. Preliminary design deliverables include:
  - Project Management Services including Weekly & Monthly Meetings; Project Schedule & Scope Development and Refinement.
  - Site Survey Services performing a three (3) Team/ 6-week survey of 116 Potential DMR Sites; Post-Survey services included, creation of Survey reports (per site) and Assessment Matrix, which serves as the basis of go-forward project planning.
  - Radio Frequency (RF) Design Services provided for 71 of116 DMR Sites, most likely to be incorporated into final DMR Solution.
    - RF Design Documentation Deliverables detailed in Current Project Status Phase 1.0 tasks.
    - RF Design Drone Surveys- Performed Drone based surveys of 36 sites most likely to be incorporated into DMR System; and published comprehensive reports for each site.
    - RF Design Drive Testing- Performed a 1,800mile drive test in CT gathering samples of three (3) terrain types (Urban, Coastal & Forest) used in the fine tuning of propagation coverage maps
    - RF Design Coverage Design KMZ Files- Published coverage plots for each of the 12 Eversource Operational Districts. The publication requires a resource intensive iterative process in support of frequency channel planning, per site.
    - Civil Design- Structural Analysis (SA)- Performed SA per each of the 71 Sites
    - RF Design DMR Radio Hardware Assessment- Published Mobile & Portable Radio Plan which included a hardware assessment, on-site workshops, and a detailed hardware selection process

  - Permitting Services in support of Permitting & Zoning; Perform assessment of Permitting & Zoning requirements for 71 Sites; Deliverables detailed in Current Project Status Phase 1.0 tasks
  - Cost Estimation Services
- ***Note***: ***Preliminary Design*** *costs have been incurred and are broken out for reference*

- **Other Costs incurred to date** Include Eversource labor costs to date associated with providing the following project support
  - Eversource Project Management Services
  - Eversource Telecom Engineering Services
  - Eversource Real Estate Service
  - Eversource Facilities Services
  - Eversource Siting Service
  - Eversource Substation Engineering Services
  - Eversource Enterprise Risk Management
  - Eversource Legal Service
  - Eversource Field Communications

Additional ES Costs

	2016 Eversource Telecom [redacted] Conceptual Design Implementation (PAF Approved)	2019 Black & Veatch with Eversource [redacted] Preliminary Design Implementation (Pending Approval)	Variance
Additional Eversource Costs	**$ 8,231,303**	**$ 10,101,486**	**$ 1,870,183**
Site Leases - First Month's Rent	$ 108,000	$ 75,000	($ 33,000)
Frequency Purchase	$ 6,500,000	$ 1,540,000	($ 4,960,000)
ES Existing WAN Retrofit	$ -	$ 400,000	$ 400,000
ES Substation Work	$ -	$ 295,000	$ 295,000
ES Site Fiber Rollout	$ -	$ 100,000	$ 100,000
External (Non-ES) Interoperability	$ -	$ 1,250,000	$ 1,250,000
Vehicles (Mileage)	$ -	$ 27,000	$ 27,000
Real Estate Lease Execution	$ -	$ 250,000	$ 250,000
Eversource Internal Labor	$ -	$ 2,407,509	$ 2,407,509
Eversource Contractor Labor	$ 736,303	$ 1,437,071	$ 700,768
Warehousing - Eagle Trailers and Windsor CT	$ -	$ 30,000	$ 30,000
Taxes, Insurance, Bonds	$ -	$ 1,009,031	$ 1,009,031
Overhead/Loaders	$ 887,000	$ 1,280,875	$ 393,875

Additional ES Costs Scope changes 2016 vs 2019; whereas 2019 includes:

- Frequency purchase no longer includes the purchase of [redacted] at the cost of $6.5M; Instead, [redacted] is being purchased to augment Eversource's existing [redacted]
- Taxes, Insurance, Bonds costs have now been accounted for
- Eversource CT Interoperability includes the procurement of hand-held portable radios for radio access in storm events
- Eversource business unit internal & contractor Labor now captured*
  - (Note: Eversource Internal Labor and Eversource Contractor Labor costs are pre-loaded and are not included in the Overhead/Loaders line item above)

Contingency

Contingency	2016 Eversource Telecom [redacted] Conceptual Design Implementation (PAF Approved)	2019 Black & Veatch with Eversource [redacted] Preliminary Design Implementation (Pending Approval)
Total	$ 970,000	$ 3,140,000

Contingency Scope changes 2016 vs 2019; whereas 2019 includes:

- Project Contingency- 2016 Contingency was $970K, with 2019 being $3.14M
- Based upon the results of the Eversource Enterprise risk management- Project Risk Assessment; $3.14M in contingency costs have been recommended.

Ongoing Lease O&M Costs

Frequency	Total Sites		Project Phase	
	No Cost	Leased	During Construction (Yearly)	Post Construction (Yearly)
[redacted]	[redacted]	[redacted]	$ 138,600.00	$ 114,600.00

Ongoing Lease O&M Cost Scope changes 2016 vs 2019; whereas 2019 includes:

- In 2016, ongoing O&M Lease costs were not captured
- Leased costs will decrease after construction when the antennas supporting the legacy voice radio system have been removed from associated leased radio sites.

Current Project Status

To date, the project has completed Phase 1.0, is currently in progress with Phase 1.5 and has suspended the remainder of Phase 2.0, pending approval of remaining project funding.

Phase 1.0 Tasks (Complete)

Black & Veatch Phase 1.0 Deliverables

- Project Management Services including Weekly & Monthly Meetings; Project Schedule & Scope Development and Refinement.
- Site Survey Services performing a three (3) Team/ 6-week survey of 116 Potential DMR Sites; Post-Survey services included, creation of Survey reports (per site) and Assessment Matrix, which serves as the basis of go-forward project planning.
- Radio Frequency (RF) Design Services provided for 71 of116 DMR Sites, most likely to be incorporated into final DMR Solution.
    - RF Design Documentation Deliverables included:
        - Site Documents: Includes drawings for General Design, Site Specific Design, Shelter Equipment Space & Site Grounding Reports
        - Passive Intermodulation (PIM) Reports: Performed a Site RF interference study
        - Backhaul Assessment: Assessed requirements to produce serviceable backhaul for CT Voice System
        - Interoperability Report: Performed a study to assess and provide potential interoperability for (1) CT Voice users working outside of CT & (2) Non-CT Voice users working inside of CT (Not for 71 Sites)
        - LTE Viability Report- In support of Interoperability, determined availability of Radio Hardware which supports DMR & LTE
        - [redacted]
        - [redacted]
        - Cutover Assessment Report: Assessed methodology of implementing legacy users onto the proposed CT Voice Radio system with minimal interruption
        - Portable self-contained tactical repeaters: Determined needs and requirements for a portable tactical repeater for use within the proposed CT Voice Radio System
        - Phase 2.0 Construction Plan- Published an End-to-End Construction Plan for Phase 2.0.
        - Design Process Report- Published methodology and logic regarding the proposed DMR Solution
        - Equipment Requirements- Published related requirements for Receiver Multi-coupler; Transmitter Combiner Requirements; Antenna and Transmission Line; GPS timing Requirements and Backhaul System.

- Test Plan Requirements - Performed Assessment of Testing requirements to be executing during Phase 2.0, post construction DMR System Testing
- Safety and Quality Requirements - Performed Assessment of Safety & Quality requirements in support of implementation of the DMR System
- Construction Execution Plan and Schedule- Published construction plan and final schedule to be used in support of the implementation of the DMR System
- Equipment Spec Sheet - Published manufactured supplied spec-sheets for DMR System equipment
- System Configuration Requirements - Published required in support of the configuration of the DMR System.

  - RF Design Drone Surveys- Performed Drone based surveys of 36 sites most likely to be incorporated into DMR System; and published comprehensive reports for each site.
  - RF Design Drive Testing- Performed a 1,800mile drive test in CT gathering samples of three (3) terrain types (Urban, Coastal & Forest) used in the fine tuning of propagation coverage maps
  - RF Design Coverage Design KMZ Files- Published coverage plots for each of the 12 Eversource Operational Districts. The publication requires a resource intensive iterative process in support of frequency channel planning, per site.
  - Civil Design- Structural Analysis (SA)- Performed SA per each of the 71 Sites
  - RF Design DMR Radio Hardware Assessment- Published Mobile & Portable Radio Plan which included a hardware assessment, on-site workshops, and a detailed hardware selection process

- Permitting Services in support of Permitting & Zoning; Performed assessment of Permitting & Zoning requirements for 71 Sites; Produce a Site Candidate Report for Commercial Lease Sites. Commercial Leasing support- Generation of Draft Lease Requirements for 19 Commercial Sites, Submittal of Initial & Updated Lease Applications for 19 Commercial Sites, Procurement of Structural Analysis for each of the 19 Commercial Sites and development and updating/publishing of Lease Tracking Matrix & Documentation; and Siting Council Services- publication of 10 sample Connecticut Siting Council Submittals

- Cost Estimation Services- development and publication of 30% Not to Exceed (NTX) Rough Order of Magnitude (ROM) Cost Estimate (450MHz), 70% Cost Estimate (450MHz), 100% Firm Fixed Price (450MHz) and updated Cost Estimate (220MHz)

Eversource Phase 1.0 Deliverables

- [redacted]

- Provided the following project Support
  - Eversource Project Management Services
  - Eversource Telecom Engineering Services
  - Eversource Real Estate Service
  - Eversource Facilities Services
  - Eversource Siting Service
  - Eversource Substation Engineering Services
  - Eversource Enterprise Risk Management
  - Eversource Legal Service

- Eversource Field Communications

Phase 1.5 (In Progress- To be completed Sept-2020)

Black & Veatch Phase 1.5 Deliverables

- Project Management Services including Weekly Meetings; Project Schedule & Scope Development and Refinement.

- Radio Frequency (RF) Design Services provided in support of DMR Solution
  - [redacted]
  - Performed Drone Surveys of additional sites to be incorporated into DMR System

- Detailed Design Services in support of [redacted]
  - RF Design Deliverables include the following documentation deliverables:
    - Construction Drawings (CD) for LMR Antenna System Tower Attachments; Grounding System Additions; Finalized Cabinet Elevation Drawings and Microwave Tower Attachments
    - Microwave (MW) Design Services for MW Path Coordination Notification; MW Schematic Drawings.
    - Television Channel 13 Interference Studies
    - Execution of System Test Procedures for the following test types:
      - Land Mobile Radio (LMR) Factory Acceptance Testing; LMR Site Acceptance Test (Inspection); LMR Site Acceptance Test (DMR Power Up); LMR DMR Roaming Test Procedure; LMR BER and DAQ Coverage Test Procedure; LMR Subscriber Installation Inspection Checklist and LMR Functionality Commissioning Test procedures
      - New Microwave Link Verification & New Third-party Terrestrial Link Verification Test Procedure
      - Backhaul Commissioning Test Procedure
      - Dispatch Console Commissioning Procedure
  - Civil Design Deliverables include the following documentation deliverables:
    - Construction Drawings (CD) for Shelter Installation; Ice Bridge Cable Installation; Fencing Modifications; Building Mast Installation; Site Plans Drawings and Finalized PE Stamped Structural Analysis (Tower Modification Drawings)
  - Network Design Deliverables include the following documentation deliverables:
    - Site Backhaul IP Addressing & Requirements to produce serviceable backhaul for CT Voice System
    - Site Router & Switch Configurations
  - Central Systems and Integration Services
    - Integration with existing Avtec Dispatch system utilized by SOC and EOC
    - Gateway

        - Integration with Kodiak Motorola LTE Push to talk over Cellular Gateway for all three service regions
    - Land Services tasks include the publication and submittal of CSC packages on behalf of Eversource by preferred contractor "All Points Technologies". CSC package to include the following details:
        - FCC NEPA; Environmental Site Assessment; FAA Air Safety Analysis; FCC Antenna Structure Registration; SHPO Consultation; Hazardous Material Investigation; Visibility Analysis; Balloon/Crane Testing; RF Emission Studies; Photo-simulations and Local Permitting and Zoning as required

- Permitting Services in support of Issue For Construction (IFC) Tasks for DMR System; including preparation, rework and submittal of Eversource Siting applications and Connecticut Siting Council forms for all required Telecom Sites. Leasing Services also provided, which include preparation, rework and submittal of Commercial Site Leasing Applications for all Telecom Sites.

- Cost Estimation Services- development and publication refined Cost Estimate for [redacted]

Eversource Phase 1.5 Deliverables

- Provided the following project Support
    - Eversource Project Management Service
    - Eversource Telecom Engineering Service
    - Eversource Real Estate Service
    - Eversource Facilities Services
    - Eversource Siting Service
    - Eversource Substation Engineering Service
    - Eversource Scheduling Service
    - Eversource Legal Service
    - Eversource Field Communications

(Proposed) Phase 2.0 Tasks (Pending approval of remaining project funding)

Black & Veatch Phase 2.0 Proposed Deliverables

- Project Management Services including Weekly & Monthly Meetings; Project Schedule & Scope Development and Refinement.

- Procurement Services include the procurement of the following:
    - Site RF Antenna and Cabling; Site Base Stations and Filters; Site Routers and Switches; Core Routers and Switches; Microwave Radio components; Mobile, Portable, and Control Station Subscriber units; DMR Core Servers and Gateways and, Avtec VP-Gate Server Hardware and Licensing

- Construction Services included in support of [redacted]
    - Implementation of Design Services described and detailed above

- Testing/Commissioning Services included in support of [redacted]
    - Implementation of Testing/Commissioning Services described and detailed above

- Decommission Services in support of legacy low band radio solution.

Eversource Phase 2.0 Proposed Deliverables

- Provide the following project Support Services
    - Eversource Project Management Services
    - Eversource Telecom Engineering Services
    - Eversource Real Estate Service
    - Eversource Facilities Services
    - Eversource Siting Service
    - Eversource Substation Engineering Services
    - Eversource Enterprise Risk Management
    - Eversource Legal Service
    - Eversource Field Communications

- Eversource Additional Deliverables include
    - Documentation Deliverables to include Shelter Layout Drawings and Electrical Design Package
    - Backhaul Implementation – Configuration of existing Eversource owned backhaul per Phase 2.0 design
    - Real Estate - Finalize Site Lease Agreements provided by BV under Phase 1.0
    - Siting and Permitting - Submission and Approval of BV Provided CSC Forms
    - Substation Design Modifications & Implementations for non-RF components.
    - Warehousing

Project Schedule

The Project Plan and Schedule is comprised of the following phases:

Project Phase	Description	Start Date	End Date
Phase 1.0	Conceptual & Preliminary Design; Including Feasibility Study & Initial Cost Estimates	**Aug-18**	**Apr-19**
	[redacted] Assessment (Change Order)	**Jun-19**	**Sep-19**
Phase 1.5	Issue For Construction (IFC) & Siting Tasks for all [redacted]	**Nov-19**	**Jul-20**
	Detailed Engineering for all [redacted]	**Sep-19**	**Jul-20**
	Procurement of Hardware for Pilot Sites (1-5 of 45)	**Jan-20**	**May-20**
	Implementation of Pilot Sites (1-5 of 45)	**Jul-20**	**Sep-20**
	Testing of Pilot Sites	**Aug-20**	**Sep-20**
	Procurement of Hardware for Sites (6-10 of 45)	**Apr-20**	**Sep-20**
Phase 2.0	Procurement of Hardware for Sites (11-45 of 45)	**Sep-20**	**Mar-21**
	Implementation of Sites (6 -45 of 45)	**Sep-20**	**Apr-21**
	Testing of DMR System	**May-21**	**Aug-21**
	Go-Live	**21-Jul**	**Oct-21**
	Decommission of Legacy LMR Solution	**Oct-21**	**Nov-21**
In Service Date	[redacted]	**Oct-21**	

Design Updates

[redacted]

Note: Raw Land coverage contractually guaranteed to provide [redacted]

Operational District	Coverage Type						
	Raw Land	100' Buffer All ES	100' Buffer	100' Buffer	Distribution	Electric	Substations
[redacted]							

Note: [redacted]

Supplement Cost Summary

Total - Supplement Cost Summary

Note: Dollar values are in thousands:

	Prior Authorized	Supplement Request	Total
Capital Additions - Direct	$ 18,283	$ 18,801	$ 37,084
Less Customer Contribution	-	-	-
Removals net of Salvage ____%	-	-	-
Total Direct Spending	$ 18,283	$ 18,801	$ 37,084
Capital Additions - Indirect	463	230	693
AFUDC	389	1,081	1,470
Total Capital Request	$ 19,135	$ 20,112	$ 39,247
O&M	-	591	591
Total Request	**$ 19,135**	**$ 20,703**	**$ 39,838**

PTF - Supplement Cost Summary

Note: Dollar values are in thousands:

	Prior Authorized	Supplement Request	Total
Capital Additions - Direct	$ 1,990	$ 2,624	$ 4,614
Less Customer Contribution	-	-	-
Removals net of Salvage ____%	-	-	-
Total Direct Spending	$ 1,990	$ 2,624	$ 4,614
Capital Additions - Indirect	50	32	83
AFUDC	42	151	193
Total Capital Request	$ 2,082	$ 2,807	$ 4,889
O&M	-	67	67
Total Request	**$ 2,082**	**$ 2,874**	**$ 4,957**

Non-PTF - Supplement Cost Summary

Note: Dollar values are in thousands:

	Prior Authorized	Supplement Request	Total
Capital Additions - Direct	$ -	$ 573	$ 573
Less Customer Contribution	-	-	-
Removals net of Salvage ____%	-	-	-
Total Direct Spending	$ -	$ 573	$ 573
Capital Additions - Indirect	-	7	7
AFUDC	-	31	31
Total Capital Request	$ -	$ 611	$ 611
O&M	-	9	9
Total Request	**$ -**	**$ 620**	**$ 620**

Total Supplement Request Cash Flow

Note: Dollar values are in thousands:

Total - Supplement Request by year view

*(**Note:** No additional dollars are requested in year 2019)*

	Year 2020	Year 2021	Year 2022	Total
Capital Additions - Direct	$ 4,055	$ 11,810	$ 2,936	$ 18,801
Less Customer Contribution	$ -	$ -	$ -	$ -
Removals net of Salvage __%	$ -	$ -	$ -	$ -
Total Direct Spending	$ 4,055	$ 11,810	$ 2,936	$ 18,801
Capital Additions - Indirect	$ 61	$ 135	$ 34	$ 230
AFUDC	$ 248	$ 663	$ 170	$ 1,081
Total Capital Request	$ 4,364	$ 12,608	$ 3,140	$ 20,112
O&M	$ 591	$ -		$ 591
Total Request	**$ 4,955**	**$ 12,608**	**$ 3,140**	**$ 20,703**

Note: Dollar values are in thousands:

PTF - Supplement Request by Year

*(**Note:** No additional dollars are requested in year 2019)*

	Year 2020	Year 2021	Year 2022	Total
Capital Additions - Direct	$ 564	$ 1,650	$ 410	$ 2,624
Less Customer Contribution	$ -	$ -	$ -	$ -
Removals net of Salvage __%	$ -	$ -	$ -	$ -
Total Direct Spending	$ 564	$ 1,650	$ 410	$ 2,624
Capital Additions - Indirect	$ 8	$ 19	$ 5	$ 32
AFUDC	$ 35	$ 92	$ 24	$ 151
Total Capital Request	$ 607	$ 1,761	$ 439	$ 2,807
O&M	$ 67	$ -	$ -	$ 67
Total Request	**$ 674**	**$ 1,761**	**$ 439**	**$ 2,874**

Note: Dollar values are in thousands:

Non PTF - Supplement Request by Year

	Year 2020	Year 2021	Year 2022	Total
Capital Additions - Direct	$ 137	$ 349	$ 87	$ 573
Less Customer Contribution	-	-	-	-
Removals net of Salvage ____%	-	-	-	-
Total Direct Spending	$ 137	$ 349	$ 87	$ 573
Capital Additions - Indirect	2	4	1	7
AFUDC	7	20	4	31
Total Capital Request	$ 146	$ 373	$ 92	$ 611
O&M	9	-		9
Total Request	**$ 155**	**$ 373**	**$ 92**	**$ 620**

Superseded Project Summary & Previous Estimates

Technical Authorization Form

Date Prepared: 06/14/16	Project Title: CL&P Voice Radio System
Company/ies: Eversource CT (T&D, Gas)	Project ID Number: VOCSYS1D
Organization: Telecommunications	Class(es) of Plant: General
Project Initiator: [redacted]	Project Category: Basic Business - ED
Project Owner/Manager: [redacted]	Project Type: Specific
Project Sponsor: [redacted]	Project Purpose: part of regulatory tracked program? No
Estimated in service date: 2016-2019	If Transmission Project: NA

Project Need Statement

[redacted]

Project Objectives

- Secure spectrum
- Construct a radio network that will meet the current and future needs of the Eversource in CT (Electric T&D and gas)
- Enhance the safety of workers
- Improve reliability of voice communications
- Establish priority among talk groups
- Provide lowest life cycle costs
- Ensure sufficient voice radio call capacity throughout Transmission, Distribution, Gas, during blue sky and storms
- Operate with minimal interference
- Offer interoperability throughout Eastern MA and CT (with the potential to include WMA)

Project Scope

[redacted]

Background / Justification

[redacted]

[redacted]

[redacted]

[redacted]

Business Process and / or Technical Improvements:

[redacted]

1) Interoperability (today and into the future) across service territory
2) Increased flexibility and capacity by allowing users to share a pool of talk paths within the four (4) simulcast sectors, rather than one single dedicated channel for a particular function
3) Reliability increased via new modern equipment creating a system that is easier to maintain
4) Greatly improved audio quality for mobile-to-mobile, portable and group wide communications across districts due to digital technology
5) [redacted]
6) Increased operational efficiency, allowing for separate group conversations and priority assignments for critical business functions
7) Increased safety, improved man down provided by emergency ruthless preemption mode ensuring use of a channel when necessary
8) Eliminating a separate Gas Company system, saving maintenance costs, providing interoperability with CT and MA electric companies and standardizing voice radio systems within CT

Cost Estimate and Assumptions

The total project cost is estimated at $19.9M, inclusive of loaders. The cost estimates for years 2017-2019 assume similar costs for 2016 equipment and labor, without inflation rates. This assumes:

- Frequency negotiations (for six channels) $6,500,000
- 53 Total Radio Sites (composed of a combination of super and normal sites) per unit cost varies depending upon size
- 209 base stations at $12,000.00 per unit
- Structural reinforcements (7)
- Shelter installations (8) $400,000
- Generator installations (7) $130,000
- Battery/charger expansions (35) $610,000
- Mobile (1724) and portable (480) per unit costs of approximately $420.00 each
- Emergency spare equipment costs of approximately $85,000.00

- Zoning drawing modifications, structural analyses and power density studies for each radio site $377,625
- Selex/Avtec interface for dispatch consoles
- Networking equipment costs $795,000
- Labor, project management, training, siting and leasing costs

Alternatives Considered with Cost Estimates

Status Quo - [redacted]

Cellular – [redacted]

(220 MHz) – Eversource owns 220MHz spectrum in CT and Western MA, and is currently making [redacted]

[redacted]

Project Schedule

Milestone/Phase Name	Estimated Start Date	Estimated Completion Date
Phase 1 - Design	03/01/16	09/01/16
Phase 1 – Rollout (Cheshire District – 8 Sites)	09/01/16	12/31/16
Phase 2 – Rollout (2017 Newtown, Norwalk, Stamford Districts – 15 Sites)	01/01/17	12/31/17

Milestone/Phase Name	Estimated Start Date	Estimated Completion Date
Phase 3 – Rollout (2018 Hartford, Falls Village, Tolland, Torrington Districts – 15 Sites)	01/01/18	12/31/18
Phase 4 – Rollout (2019 Danielson, Madison, New London, East Hampton Districts – 15 Sites)	01/01/19	12/31/19

Regulatory Approvals

Cost Allocation:

Distribution – 73%
Transmission – 14%
Eversource CT Gas - 13%
This distribution was determined by the number of users split by functional responsibilities.

Risks and Risk Mitigation Plans

1) Frequency Availability and Cost - The key to building this system is frequency obtainability. Eversource has decided to purchase [redacted], the current owner. The need for specific frequencies has been established and negotiations are about to begin. If the two parties are unable to come to an agreed upon, negotiated cost, the project will be adversely impacted. It is imperative that the frequencies be secured first before investing any significant funds for other project needs.

2) Locations (Siting & Leasing) - Develop backup plan to enable alternate leasing options.

3) Construction (Weather, Unanticipated Tower Loading) - Establish timeline to accommodate potential delays; using proven analysis to identify and indicate tower loading early in the process. Budget anticipates some degree of loading mitigation.

4) Holes in coverage - Plan includes provisions for fill in sites as needed.

[redacted]

References

PAF VOCSYS1D CLP Voice Radio Sys R3 FINAL.xls
Telecom Strategy CT Voice 160204.pptx
Budget per Site.xls

One-Line Diagrams, Attachments, and Images

Predicted State-Wide 450 MHz Coverage 2016.pdf (attached and below)

Project Authorization Form

Date Prepared: 06/14/16	Project Title: CL&P Voice Radio System
Company/ies: Eversource CT (T&D, Gas)	Project ID Number: VOCSYS1D
Organization: Telecommunications	Class(es) of Plant: General
Project Initiator: [redacted]	Project Category: Basic Business – ED
Project Owner/Manager: [redacted]	Project Type: *Specific*
Project Sponsor: [redacted]	Project Purpose: part of regulatory tracked program? No
Estimated in service date: 2016-2019	If Transmission Project: NA
Supplement to Existing Authorization? No	Capital Investment Part of Original Operating Plan? Yes
Eng./Constr. Resources Budgeted? Yes	O&M Expenses Part of the Original Operating Plan? Yes

Project Authorization

Project authorization must be in accordance with the approval levels included in the Delegation of Authority Policy (DOA).

If Chief Executive Officer or subsidiary board approval is required, document the review by Enterprise Risk Management (ERM) and Financial Planning and Analysis (FP&A)

ERM: _____

FP&A: _____

Executive Summary

[redacted]

[redacted]

[redacted]

[redacted]

_____

[redacted]

[redacted]

Project Costs Summary

Note: Dollar values are in thousands

	Prior Authorized*	2016	2017	2018+	Totals
Capital Additions - Direct		$ 8,918	$ 3,443	$ 6,666	$ 19,027
Less Customer Contribution		$ -	$ -	$ -	$ -
Removals net of Salvage					$ -
Total - Direct Spending	$ -	$ 8,918	$ 3,443	$ 6,666	$ 19,027
Capital Additions - Indirect		$ 77	$ 137	$ 268	
Subtotal Request	$ -	$ 8,995	$ 3,580	$ 6,934	$ 19,509
AFUDC		$ 121	$ 97	$ 187	
Total Request	$ -	$ 9,116	$ 3,677	$ 7,121	$ 19,914

** to be completed if supplemental authorization is required*

Financial Evaluation

Provide the following financial information (attach additional detail if summarized items are significant or additional information is needed). Note: Dollar values are in thousands

Direct Capital Costs	Year 1	Year 2	Year 3+	Total
Straight Time Labor	83	149	290	522
Overtime Labor	0	0	0	0
Outside Services	890	838	1782	3510
Materials	1238	2101	3929	7268
450MHZ Frequencies	6500			6500
Other, including contingency amounts (describe)	207	355	665	1227
Total	8914	3443	6666	19027

Indirect Capital Costs	Year 1	Year 2	Year 3+	Total
Indirects/Overheads (including benefits)	77	137	268	482
Capitalized interest or AFUDC, if any	121	97	187	405
Total				887

Total Capital Costs				19914
Less Total Customer Contribution				
Total Capital Project Costs				19914
Total O&M Project Costs				