

**MARIN EMERGENCY RADIO AUTHORITY**

c/o Novato Fire Protection District

95 Rowland Way, Novato, CA 94945

PHONE: (415) 878-2690 FAX: (415) 878-2660

[WWW.MERAONLINE.ORG](http://WWW.MERAONLINE.ORG)

**DATE:** November 14, 2018

**TO:** MERA Finance Committee

**FROM:** Dave Jeffries, Deputy Executive Officer for the Next Gen Project

**SUBJECT:** AGENDA ITEM C: Motorola Contract Change Order #7 – AES/DES Encryption, Radio Management, WiFi, OTAP

**Recommended Action:** Review, discuss, provide input and recommendation on Motorola Contract Change Order #7.

**Introduction:**

At the 03/19/18 meeting of the Project Oversight Committee, we discussed staff report #C that addressed the possibility of ordering mobile radios early in conjunction with Radio Management, Over the Air Programming and Wi-Fi programming. At that time, the committee recommended that MERA pass on delivery during the summer of 2018 and revisit the issue later. This was reported to the Governing Board at their meeting on 04/25/18 in Staff Report #B-1.

This revised proposal was discussed at a joint meeting of the Next Gen Project Oversight Committee and Finance Committee on 09/12/18, followed by a verbal report to the Executive Board later the same day. This matter was also discussed at the Governing Board Meeting on 09/26/18 as an information item for potential action on 10/24/18. At the 10/24/18 Governing Board Meeting, this item was continued for further consideration at the Governing Board's Meeting on 11/14/18.

**Change Order Details:**

Change Order #7 is focused on supporting the ability to manage and remotely reprogram field user radios. Currently, every reprogramming requires that the radio technicians travel to users and physically touch each radio needing updating or for those users to travel to the Radio Shop to have this service performed. With nearly 3,000 radio in our system, this can be a daunting and expensive task.

Radio Management is a database that tracks each radio in the MERA system, including software and code plug versions and can be used to push updates to all of the radios by using Wi-Fi connections and/or Over The Air Programming (OTAP). The Wi-Fi connection would utilize Wi-Fi hotspots at MERA agencies that will allow the MERA system to push program changes to the fleet of radios wirelessly. The OTAP connection uses a slower, yet existing MERA data backbone to push programming out to radio that will not have Wi-Fi access. Both methods eliminate the need for technicians to directly touch each radio needing updating, which has been estimated at \$75,000 to \$130,000 in communications technician time per round of reprogramming. This reduction in major reprogramming efforts in combination with minor reprogramming and increased staff efficiencies

provides a potential to reduce DPW technician costs to MERA under the System Maintenance Agreement. The Wi-Fi capability is available on all the portable radios expected for the Next Gen system as well as the dual band capable mobile radios. Wi-Fi connectivity is not available for the single band mobile radios.

The second part of this change order is for 200 instances of AES/DES encryption. Those MERA agencies using encryption in Gen I utilize an encryption technology called AES. In the Next Gen System, a newer technology, DES, will be used. These two technologies are not compatible. These instances of both AES and DES encryption are designated for those radios that currently use encryption to maintain their encryption capability while operating on the Gen I System and then continue to function after cutover on the Next Gen System.

**Relation to other Contract Change Orders:**

This Contract Change Order has an impact on Contract Change Order #11 – Early Order Mobiles in addition to its stand-alone value. If CCO#11 is approved with the intent of shortening the cutover period, the Radio Management/Wi-Fi/OTAP and encryption aspects of this Change Order will aid in shortening that process.

**Change Order Cost:**

The cost for this Contract Change Order, after discounts, is \$579,268.95. With estimated sales tax, the total cost is \$631,403.15

**Payment Schedule:**

Note – The following payment schedule is based on the current draft project schedule. This schedule will be reviewed and finalized following completion of the Subsequent EIR process as part of the Customer Design Review process. Dates are subject to change and therefore it is recommended that the payment schedules be reviewed in May/June 2019 and again in November 2019.

This Change Order is anticipated to be invoiced as a single item in Q2, 2022.

**ATTACHMENT:**

C-1 Motorola Contract Change Order #7, dated 09/17/2018

Change Order No. 007

Date: 09/17/18

Project Name: MERA Next Generation Radio System

Customer Name: Marin County

Customer Project Mgr: Ernest Klock

**The purpose of this Change Order is to:**

Capture the following changes:

1. Addition of 200 AES/DES encryption to subscriber radios
2. Addition of Radio Management, Wi-Fi, and OTAP feature

**Contract #** 31701399

**Contract Date:** 03/07/17

In accordance with the terms and conditions of the contract identified above between Marin County and Motorola Solutions, Inc., the following changes are approved:

**Contract Price Adjustments**

Original Contract Value:	\$ 34,337,451.06
Previous Change Order amounts for Change Order numbers <input type="text" value="0"/> through <input type="text" value="6"/>	\$ 3,279,495.50
This Change Order:	\$ 631,403.15
Existing Contract Credit:	\$ 0.00
Net Contract Impact of this Change Order:	\$ 631,403.15
New Contract Value:	\$ 38,248,349.71

**Completion Date Adjustments**

Original Completion Date:	3/27/2019
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Current Completion Date prior to this Change Order:	3/27/2019
New Completion Date:	3/27/2019

**Changes in Equipment:** *(additions, deletions or modifications)* **Include attachments if needed**

Please refer to the attached equipment list

**Changes in Services:** *(additions, deletions or modifications)* **Include attachments if needed**

This Change Order only captures the cost of AES/DES encryption modules for radios. Services required for applying these modules to radios are not included.

Addition of 2920 Radio Management licenses to the radio system core  
Addition of WiFi capability to 1052 APX8500 mobiles and 1560 APX8000 portables  
Addition of OTAP capability to 100 radios

**Schedule Changes:** *(describe change or N/A)*

The project schedule will be finalized upon CDR approvals and is contingent upon CEQA and site construction timelines

**Pricing Changes:** *(describe change or N/A)*

Please refer to the attached pricing summary sheet  
Please note that taxes are estimated at 9% but the final number will be determined based on where the equipment will be shipped

**Customer Responsibilities:** *(describe change or N/A)*

N/A

**Payment Schedule for this Change Order:**  
*(describe new payment terms applicable to this change order)*

The payment is 100% due upon the delivery of equipment



# CHANGE ORDER

[#007]

Unless amended above, all other terms and conditions of the Contract shall remain in full force. If there are any inconsistencies between the provisions of this Change Order and the provisions of the Contract, the provisions of this Change Order will prevail.

IN WITNESS WHEREOF the parties have executed this Change Order as of the last date signed below.

**Motorola Solutions,  
Inc.**

**Customer**

By: \_\_\_\_\_  
Printed Name: KENT MARTIN  
Title: Regional Services Manager  
Date: September 17, 2018

By: \_\_\_\_\_  
Printed Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Date: \_\_\_\_\_

Reviewed by: Kourosh Mostashari  
\_\_\_\_\_  
Motorola Solutions Project Manager

Date: September 17, 2018  
\_\_\_\_\_

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# MERA Change Order #7 Equipment List

System	Site	SysSeg	Item Num	Total Qty	Nomenclature	Description
ENCRYPTION	Subscribers	AES/DES		200	G851	ADD: AES/DES-XL/DES-OFB UCM ENCRYPTION
RADIO MGT	Subscribers	WIFI		1052	GA09001	ADD: WI-FI CAPABILITY
RADIO MGT	Subscribers	WIFI		1052	GA09007	ADD: OUT OF THE BOX WI-FI PROVISIONING
RADIO MGT	Subscribers	WIFI		1052	GA00250	ADD: WIFI/GNSS FLEXIBLE CABLE LMR195
RADIO MGT	Subscribers	WIFI		1560	GA09001	ADD: WI-FI CAPABILITY
RADIO MGT	Subscribers	WIFI		1560	GA09007	ADD: OUT OF THE BOX WI-FI PROVISIONING
RADIO MGT	EOF	RM WIFI	2	1	SQM01SUM0273	MASTER SITE CONFIGURATION
RADIO MGT	EOF	RM WIFI	2a	1	CA02629AB	ADD: EXPAND 7.16 M CORE
RADIO MGT	EOF	RM WIFI	2b	2	CA02838AA	ADD: NM/ZC RACK
RADIO MGT	EOF	RM WIFI	3	1	T7914	RADIO MANAGEMENT ONLINE
RADIO MGT	EOF	RM WIFI	3a	2871	UA00049AA	ADD: RADIO MANAGEMENT LICENSES ONLINE
RADIO MGT	EOF	RM WIFI	4	1	DSSUBSERVER3	RACK MOUNT WINDOWS SERVER
RADIO MGT	EOF	RM WIFI	5	24	HKN6184C	CABLE CH, PROGRAMMING,USB
RADIO MGT	EOF	RM WIFI	6	24	PMKN4012B	PORTABLE PROGRAMMING CABLE
RADIO MGT	EOF	RM WIFI	7	12	PMKN4013C	PROGRAMMING, TEST & ALIGNMENT CABLE
RADIO MGT	EOF	RM WIFI	8	1	DSSUBSERVER1	RACK MOUNT WINDOWS SERVER
RADIO MGT	EOF	RM WIFI	9	1	SQM01SUM0273	MASTER SITE CONFIGURATION
RADIO MGT	EOF	OTAP	9a	1	CA02629AB	ADD: EXPAND 7.16 M CORE
RADIO MGT	EOF	OTAP	9b	2	CA02838AA	ADD: NM/ZC RACK
RADIO MGT	EOF	OTAP	10	1	SQM01SUM0257	INTELLIGENT MIDDLEWARE
RADIO MGT	EOF	OTAP	10a	1	CA02384AE	ADD: UNIFIED NETWORK SERVICES SOFTWARE
RADIO MGT	EOF	OTAP	10b	1	CA02354AA	ADD: ASTRO NETWORK APPLICATION INTERFACE
RADIO MGT	EOF	OTAP	10c	1	CA02362AE	ADD: MCAFFEE STANDALONE ANTI VIRUS SOFTWARE
RADIO MGT	EOF	OTAP	10d	1	UA00054AA	ADD: 201-400 RESOURCES FOR PRESENCE
RADIO MGT	EOF	OTAP	10e	1	CA02053AE	ADD: SUPPLEMENTAL CD IA (IMW)
RADIO MGT	EOF	OTAP	11	1	T7562	DIGITAL SMARTZONE
RADIO MGT	EOF	OTAP	11a	32	G996AW	ENH: OVER THE AIR PROVISIONING
RADIO MGT	EOF	OTAP	12	1	T8012	9600 OR 3600 SINGLE SYSTEM DIGITAL TRUNKING
RADIO MGT	EOF	OTAP	12a	197	G996AW	ENH: OVER THE AIR PROVISIONING

	Equipment	MERA Equipment Discount	Services	Warranty and Post-Warranty Services	System Discount Applied
1. Item #15 – AES and DES Encryption for Subscribers during migration	\$ 159,800.00	\$ 59,957.03	\$ -	\$ -	\$ 20,007.95
2. Item #19 - Radio Management, including WiFi and OTAP	\$ 1,231,667.00	\$ 809,430.97	\$ -	\$ -	\$ 270,111.10
<b>TOTAL</b>	<b>\$ 1,391,467.00</b>	<b>\$ 869,388.00</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 290,119.05</b>

	List Price	After Discount
<b>Equipment</b>	\$ 1,391,467.00	\$ 869,388.00
<b>Services</b>	\$ -	\$ -
<b>Warranty and Maintenance</b>	\$ -	\$ -
Total	\$ 1,391,467.00	\$ 869,388.00
System Discount	\$ 290,119.05	
Final Price Without Taxes	\$ 579,268.95	
Estimated Equipment Taxes at 9%	\$ 52,134.21	
Final Price	\$ 631,403.15	



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**DATE:** November 14, 2018  
**TO:** MERA Governing Board  
**FROM:** Ernest Klock, Operations Officer  
**SUBJECT:** AGENDA ITEM D: NextGen Project Motorola Contract Change Order #8  
Multi-Protocol Label Switching (MPLS) for the Microwave Network –  
RECOMMENDED with Conditions

Recommended Action: Review, discuss, and provide feedback on acceptance of Motorola Contract Change Order 8 in the amount of \$1,967,943.09 for the inclusion of Multi-Protocol Label Switching for the Microwave Network into the MERA Next Gen System project.

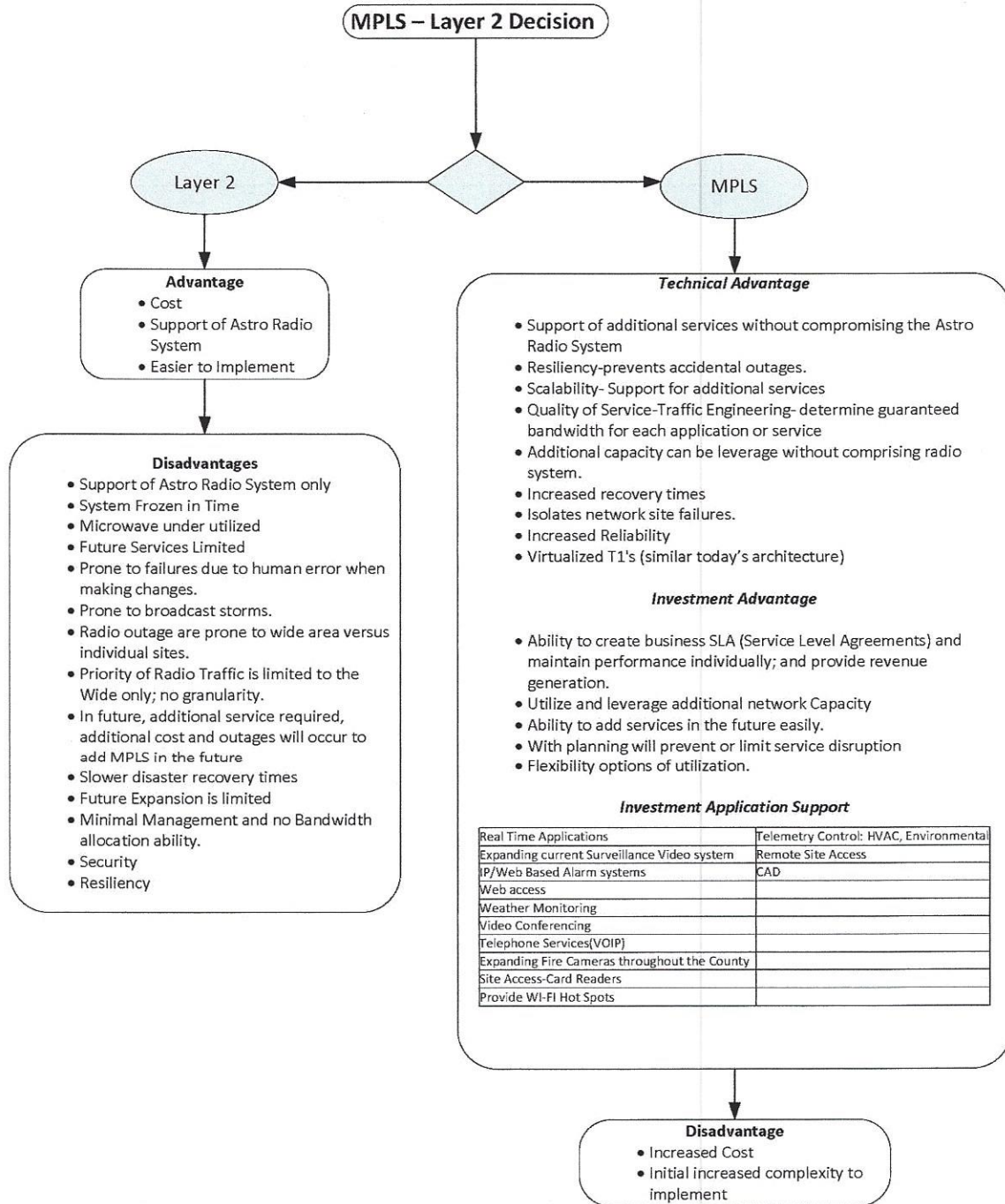
This Contract Change Order number eight (CCO#8) covers one item associated with the design of the microwave network for the MERA Next Generation Radio System (Nextgen System). The cost for CCO#8 is \$1,967,943.09, which includes taxes on equipment estimated at 9% for San Rafael. A detailed description of the services, equipment, and associated costs are included in the attached CCO#8. Appendices A through C provide supporting documentation including post-warranty services (System Upgrade Agreement II - SUAII) scope and cost. Decisions on this item should be made prior to completing the NextGen System design, or additional costs may be incurred. The MPLS item was presented to the Operations Working group at the September 5, 2018 meeting and the members present indicated support for the recommendation to proceed with the CCO. These items were also presented to the September 12, 2018 joint meeting of the Next Gen Project Oversight Committee and Finance Committee and a verbal report given to the subsequent Executive Board meeting. These items were further discussed at the September 26, 2018 and October 24, 2018 Governing Board meetings.

**Item 1 - Multi-Protocol Label Switching (MPLS) for the Microwave Network - \$1,967,943.09**

Replacement of the currently proposed Layer 2 network architecture with MPLS network architecture is proposed for the NextGen System microwave network to provide increased reliability, increased redundancy, and to ensure that non-LMR data services can continue to be provided for both MERA members and MERA non-member agencies (e.g, FBI & CHP Circuits, Cameras). A complete list of non-LMR connections carried over the existing microwave network is provided in Appendix A within CCO#8 (Attachment 2). This list has been created in conjunction with County Radio Communications staff, MERA staff, and Motorola. A deeper explanation of the differences in the technologies is provided by Federal Engineering in the attached letter dated September 5, 2018 (Attachment 1).

The NextGen System Request for Proposals (RFP) specified Layer 2 as a replacement for the existing MERA T-band system. Motorola submitted a Request for Information (RFI) prior to bidding the contract to ensure MERA wanted to implement Layer 2 as this was not consistent with their experience in building other Bay Area radio systems. The response was to stay with Layer 2 for the Motorola contract as it was believed to be an acceptable replacement for the MERA T-band system and the most

cost-effective approach. The presence of non-LMR traffic (e.g, FBI & CHP Circuits, Cameras) on the existing MERA microwave system was not clear during development of the NextGen System RFP and so accommodations for it were not considered. The following diagram compares the two technologies.



Layer 2 will function to carry voice radio traffic (small bursts of data) but cannot carry larger data packets such as video traffic without increased vulnerability - through feedback loops - to the NextGen System. Under the “feedback loop” scenario the NextGen System network could be overwhelmed by the data surge resulting in a widespread system outage. This item is listed as RECOMMENDED, because Layer 2 will function to carry the voice radio traffic only, but if MERA is to continue supporting the non-LMR sources and wishes to add non-voice services on the microwave network, then MPLS is REQUIRED. Due to the increases in redundancy, reliability, and future flexibility for the NextGen System added by MPLS, this item is recommended.

**Summary**

If approved, CCO#8 will provide added redundancy and security for the NextGen System. This CCO scope includes all equipment, services, design, warranty and post-warranty services (SUAI) necessary to implement the items described for a total cost of \$1,967,943.09 after discounts. Decision and/or addition of this item needs to be made prior to the completion of the system design (currently approaching 50%) as making this decision at a later date could expose MERA to additional costs.

The cost for the SUAI portion of this change order is \$1,397,944 which leaves a balance of \$569,999 for MPLS equipment and services to implement the microwave system changes and enable the features of the enhanced network architecture. Should MERA wish to proceed with MPLS and defer the SUAI costs, this change order may be changed to reflect that scenario and options for meeting the SUAI needs explored at a future date. The scope of the SUAI services under this CCO are detailed on pages 2 and 3 of the Motorola Change order attachment and include remote technical support, repair and exchange services, and software subscription plan, among others. The cost to implement MPLS after the NextGen System go live is estimated to be roughly double the MPLS equipment and services portion of this CCO#8, or \$1.14M.

Attachment 1 – Federal Engineering Layer 2 vs. MPLS Letter dated September 5, 2018

Attachment 2 – Motorola Contract Change Order #8



# Next Generation Radio System Implementation

## Microwave Network Data Transfer

September 5, 2018

Prepared by



*"Unleashing the Power of Technology"*

Federal  
Engineering®

**Federal Engineering, Inc.**  
10600 Arrowhead Dr., Suite 160  
Fairfax, VA 22030  
703-359-8200



## Background

The Marin County Emergency Authority (MERA) is currently implementing a 700 MHz Project 25 (P25) Phase 2 compliant trunked radio system to support mission critical communications within Marin County.

As with all advanced trunked radio systems, the various tower sites will be connected to the central controller using an Internet Protocol (IP)-based digital network (the “backbone” or “backhaul”) that will transport LMR traffic between locations using Ethernet frames. The medium used to transport the LMR traffic (known in network terminology as the Physical Layer or Layer 1) can take various forms such as copper cables, optical fibers, or radio links. In the new MERA radio system, the Physical Layer will be a digital microwave radio system supplied by Motorola/Nokia.

In the conceptual model of digital networks, the next level above the Physical Layer is the Data Link Layer (Layer 2), which defines how the Layer 1 devices (the microwave radios, in this case) establish connections and transfer data. Ethernet is the Layer 2 technology used for public-safety backhaul networks. Internet Protocol (IP) is a Layer 3 network protocol used on the vast majority of data networks. Multiprotocol Label Switching (MPLS) falls between Ethernet and IP (Layer 2.5) and along with Ethernet, are the two most common technologies used for public-safety microwave backhaul networks.

In the current MERA project, various discussions have taken place over the past two years regarding the technology to be used in the new microwave backhaul network. The conversations center around whether the new microwave backhaul network should use Layer 2 or MPLS.

At the request of MERA, this document describes the differences between Layer 2 and MPLS and the use cases where each approach can be most effectively used for carrying data for LMR and other applications on the MERA microwave network.

## Layer 2

As explained above, Ethernet is a Layer 2 protocol used in microwave backhaul networks. Layer 2 is best suited to cases where a single type of traffic, for example land mobile radio traffic, is being transported over the network. This is because, although it can prioritize traffic, it is not as easy to configure and manage as MPLS.

## Multiprotocol Label Switching (MPLS)

MPLS is commonly used for high performance telecommunications networks, designed to carry various traffic types simultaneously such as both radio and video traffic. MPLS provides the efficiencies and features needed by complex networks, particularly those that provide a variety of services to different user organizations.





## MERA Use Cases

In considering what data-carrying technique should be used on the new MERA microwave network, two use cases should be examined:

### Use Case #1 – Radio system traffic only

In this scenario, the new microwave network will only transport data associated with the voice radio network, which includes conventional, interoperability, and 700 MHz trunked voice channels, along with data used for system management. Layer 2 is sufficient to robustly and reliably support the traffic in this configuration.

This was the only case that was considered during the preparation of the project's Request for Proposals, in initial discussions with Motorola, and during contract negotiation. At that time, MERA did not express interest in transporting additional services such as fire video on the microwave network, and Federal Engineering was not made aware that any non-radio services were possibly using the existing microwave network

### Use Case #2 – Radio system traffic plus other services

In this scenario, the new microwave network will transport not only the data associated with the voice radio network, but other data services as well. Additional data services might include video from fire detection cameras and security cameras at tower sites.

Because of the multiple services being carried by this network, the MPLS solution might be a better fit with its management capabilities and ease of use.

## Conclusion

As shown above, Layer 2 Ethernet and MPLS are two methods used to transfer data over a telecommunications network. Although these methods are more than a couple of decades old, each is satisfactory and reliable when employed for the appropriate use case, and MERA must decide the appropriate case for the new microwave network.

If MERA decides that only voice radio system traffic will be carried by the network, then Layer 2 Ethernet will be adequate. This is the solution described in Motorola's project proposal, and they have committed to making it work. In this case, the cost of upgrading to MPLS is probably not be justified.

If, however, MERA decides now or in the long term to include other data services on the new microwave network (similar to those listed above), then MPLS might be a better fit.



Change Order No. 08

Date: 09/17/18

Project Name: MERA Next Generation Radio System

Customer Name: Marin County

Customer Project Mgr: Ernest Klock

**The purpose of this Change Order is to:**

Capture the following changes:

- Item #3 and #4 - Addition of MPLS hardware, design and implementation services - including the provisioning of non-LMR traffic, and warranty and post-warranty services

Contract # 31701399

Contract Date: 03/07/17

In accordance with the terms and conditions of the contract identified above between Marin County and Motorola Solutions, Inc., the following changes are approved:

**Contract Price Adjustments**

Original Contract Value:	\$ 34,337,451.06
Previous Change Order amounts for Change Order numbers <input type="text" value="0"/> through <input type="text" value="7"/>	\$ 3,910,898.65
This Change Order:	\$ 1,967,943.09
Existing Contract Credit:	\$ 0.00
Net Contract Impact of this Change Order:	\$ 1,967,943.09
New Contract Value:	\$ 40,216,292.80

**Completion Date Adjustments**

Original Completion Date:	3/27/2019
Current Completion Date prior to this Change Order:	3/27/2019
New Completion Date:	3/27/2019

**Changes in Equipment:** *(additions, deletions or modifications)* **Include attachments if needed**

Please refer to the attached equipment list

**Changes in Services:** *(additions, deletions or modifications)* **Include attachments if needed**

Please refer to the attached Scope of Work (SOW) document

**Schedule Changes:** *(describe change or N/A)*

The project schedule will be finalized upon CDR approvals and is contingent upon CEQA and site construction timelines

**Pricing Changes:** *(describe change or N/A)*

Please refer to the attached pricing summary sheet  
 Please note that taxes are estimated at 9% but the final number will be determined based on where the equipment will be shipped

**Customer Responsibilities:** *(describe change or N/A)*

Please refer to the attached Scope of Work (SOW) document

**Payment Schedule for this Change Order:**  
*(describe new payment terms applicable to this change order)*

The Payment milestone plan for this Change Order is the following:

1. 20% of the Change Order Price upon completion of project's Customer Design Review (CDR)
2. 45% of the Change Order Price upon shipment of equipment
3. 25% of the Change Order Price upon completion of installation (site by site)
4. 10% of the Change Order Price upon final system acceptance



**If Subscribers are purchased, 100% of the Subscriber Contract Price will be invoiced upon shipment (as shipped).**

Motorola may make partial shipments of Equipment and will request payment upon shipment of such Equipment. In addition, Motorola will invoice for installations completed on a site-by-site basis or when professional services are completed, when applicable. The value of the Equipment shipped/services performed will be determined by the value of the shipped/services performed as a percentage of the total milestone value. Unless otherwise specified, contract discounts are based upon all items proposed and overall System package. For invoicing purposes only, discounts will be applied proportionately to the FNE and Subscriber Equipment values to total Contract Price. Overdue invoices will bear simple interest at the maximum allowable rate.

**For Lifecycle Support Plan and Subscription Based Services:**  
**Motorola will invoice Customer annually in advance of each year of the plan. The annual warranty and post-warranty services costs quoted in this Change Order (Appendix D of the attachment) is in addition to the original contract's annual costs of tech support and infrastructure replacement, SUA II, and Nokia's Maintenance and Upgrade Program for the MPR 9500 system.**

Unless amended above, all other terms and conditions of the Contract shall remain in full force. If there are any inconsistencies between the provisions of this Change Order and the provisions of the Contract, the provisions of this Change Order will prevail.

IN WITNESS WHEREOF the parties have executed this Change Order as of the last date signed below.

<b>Motorola Solutions, Inc.</b>		<b>Customer</b>	
By:	_____	By:	_____
Printed Name:	KENT MARTIN	Printed Name:	_____
Title:	Regional Services Manager	Title:	_____
Date:	September 17, 2018	Date:	_____
Reviewed by:	Kourosh Mostashari	Date:	September 17, 2018
	_____ Motorola Solutions Project Manager		_____

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# CHANGE ORDER #8 ATTACHMENT

SEPTEMBER 17, 2018

# CHANGE ORDER #8 ATTACHMENT

The following changes have been captured in Change Order #8:

1. Item #3 and #4 - Addition of MPLS hardware, design and implementation services - including the provisioning of non-LMR traffic, and warranty and post-warranty services.

Summary of services included for this item is the following:

- Establish the system architecture and logically identify which networks/sites need to communicate within the system
- Define and build the bandwidth requirements document (TNDT report) for each site
- Define the QoS values for ASTRO and other applications
- Determine demarcation points at each site for non-ASTRO traffic
- Review and validate all the requirements identified in Appendix A
- Define and build the WAN Transport IP Plan for ASTRO application based on the logical design
- Gather, validate and input TNCT parameter for config generation, validation and configuration file generation
- Build and deploy MPLS Configuration files. This includes the Network Management Subsystem
- Ensure all MPLS equipment is installed and connected as specified in the rack drawings
- Ensure physical connectivity has been tested and validated before validating service/logical connectivity
- Each service logical path will be tested using the Y.1564 testing method to validate the design specifications
- Provide As-Built Documentation for provided equipment; this will include a network drawing and final IP plan
- Provide all router configuration files and audit of each device

All MPLS equipment come with a one-year standard repair warranty.

Summary of the 15-year post-warranty services are the following:

- **RTS Gold** – Remote Technical Support, Gold. The NOKIA Technical Support (TS) Service provides the customer remote access to NOKIA engineers in support of product-related questions, troubleshooting assistance, diagnostic procedures, Patch Releases and Maintenance Releases, as may be made available, to restore service and/or functionality and resolve problems for Maintained Products. Customer access is provided via phone or email to the Welcome Center or, if available, via web-based Online Customer Support 24 hours a day, 365 days a year, to open a ticket or ‘Assistance Request’ (“AR”).
- **RES-AES-NBD** – Repair & Exchange Services, Advanced Exchange Service, Next Business Day The NOKIA Repair & Exchange Services (RES) provides repair or exchange of defective, customer-owned hardware (Parts). Upon receipt and acceptance

of a 'Part Request' from the Customer, NOKIA will provide a functioning part from the list of RES Entitled Parts (based on existing customer configuration). The functioning part is delivered within the next business day (NBD) in advance of the Defective Return from the Customer except for RES Entitled Parts that require customer configuration before dispatch, require SW installation before dispatch or exceed 60 lbs. (27 kg). Upon receiving the replacement Part, Customer will ship or return the reported defective Part to Seller within five (5) Calendar Days.

- **SSP** – Software Subscription Plan for nodal equipment. **SRS** – Software Release Service for NFM-P network management systems. The NOKIA SSP or SRS makes available all Feature Releases of software for network/node elements and management systems for specific network elements or families of network elements, and other network-related applications available for download from a NOKIA web site. Professional Services to provide Installation or application of such software upgrades, is not included in SSP or SRS.

Please note that the warranty and post-warranty pricing for this item in the Change Order captures one MPLS network refresh only. The MPLS network refresh as quoted replaces the original 7705-SAR hardware with the same functionality, but with the exception of the T1 cards. It is assumed that the T1 functionality will be replaced with ethernet in the future by the time of refresh. Also, the 7705 OS is not included in the refresh price since OS upgrades would already have been covered by the Software Subscription Service (SSP) for the 7705's.

In collaboration with MERA, Motorola has identified the non-LMR traffic (such as IP cameras) that will be provisioned on the MPLS network as per Appendix A.

The detailed MPLS equipment list has been provided in Appendix B.

# APPENDIX A – NON-LMR TRAFFIC

**MPLS NETWORK/Non LMR CONNECTIONS**

Services	PORT #	EOF	CIVIC CENTER 2ND DECK	BIG ROCK	DOLLAR	MILL VALLEY	MT TAM	OTA	SAN PEDRO	TIBURON	WOLFBACK	BARNABE	COVOTE	MUIR WT	REYES	STEWART	TOMALES	SONOMA	SKYVIEW
GATEWAY 1		VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1
CCGW 1		VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1	VLAN BHS 1
GATEWAY 2		VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2
CCGW 2		VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2	VLAN BHS 2
RECTIFIERS(Mgmt)		CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1
INVERTERS(Mgmt)		CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1	CEN 1
COUNTY USE (IP Camera)		VLAN MC 1	VLAN MC 1	VLAN MC 1	VLAN MC 1	VLAN MC 1	VLAN MC 1	VLAN MC 1	VLAN MC 1	VLAN MC 1	VLAN MC 1	VLAN MC 1	VLAN MC 1	VLAN MC 1	VLAN MC 1	VLAN MC 1	VLAN MC 1	VLAN MC 1	VLAN MC 1
COUNTY USE (Security Camera)		VLAN MC 2	VLAN MC 2	VLAN MC 2	VLAN MC 2	VLAN MC 2	VLAN MC 2	VLAN MC 2	VLAN MC 2	VLAN MC 2	VLAN MC 2	VLAN MC 2	VLAN MC 2	VLAN MC 2	VLAN MC 2	VLAN MC 2	VLAN MC 2	VLAN MC 2	VLAN MC 2
CEN-Images-JEM-Mgmt		VLAN MC 3	VLAN MC 3	VLAN MC 3	VLAN MC 3	VLAN MC 3	VLAN MC 3	VLAN MC 3	VLAN MC 3	VLAN MC 3	VLAN MC 3	VLAN MC 3	VLAN MC 3	VLAN MC 3	VLAN MC 3	VLAN MC 3	VLAN MC 3	VLAN MC 3	VLAN MC 3
Web-Mgmt		VLAN MC 4	VLAN MC 4	VLAN MC 4	VLAN MC 4	VLAN MC 4	VLAN MC 4	VLAN MC 4	VLAN MC 4	VLAN MC 4	VLAN MC 4	VLAN MC 4	VLAN MC 4	VLAN MC 4	VLAN MC 4	VLAN MC 4	VLAN MC 4	VLAN MC 4	VLAN MC 4
VOIP IP Phone		VLAN MC 5	VLAN MC 5	VLAN MC 5	VLAN MC 5	VLAN MC 5	VLAN MC 5	VLAN MC 5	VLAN MC 5	VLAN MC 5	VLAN MC 5	VLAN MC 5	VLAN MC 5	VLAN MC 5	VLAN MC 5	VLAN MC 5	VLAN MC 5	VLAN MC 5	VLAN MC 5
Future		VLAN MC 6	VLAN MC 6	VLAN MC 6	VLAN MC 6	VLAN MC 6	VLAN MC 6	VLAN MC 6	VLAN MC 6	VLAN MC 6	VLAN MC 6	VLAN MC 6	VLAN MC 6	VLAN MC 6	VLAN MC 6	VLAN MC 6	VLAN MC 6	VLAN MC 6	VLAN MC 6
SMARTX		T1-1	T1-1	T1-1	T1-1	T1-1	T1-1	T1-1	T1-1	T1-1	T1-1	T1-1	T1-1	T1-1	T1-1	T1-1	T1-1	T1-1	T1-1
SMARTX		T1-2	T1-2	T1-2	T1-2	T1-2	T1-2	T1-2	T1-2	T1-2	T1-2	T1-2	T1-2	T1-2	T1-2	T1-2	T1-2	T1-2	T1-2
SMARTX		T1-3	T1-3	T1-3	T1-3	T1-3	T1-3	T1-3	T1-3	T1-3	T1-3	T1-3	T1-3	T1-3	T1-3	T1-3	T1-3	T1-3	T1-3
SMARTX		T1-4	T1-4	T1-4	T1-4	T1-4	T1-4	T1-4	T1-4	T1-4	T1-4	T1-4	T1-4	T1-4	T1-4	T1-4	T1-4	T1-4	T1-4
SMARTX		T1-5	T1-5	T1-5	T1-5	T1-5	T1-5	T1-5	T1-5	T1-5	T1-5	T1-5	T1-5	T1-5	T1-5	T1-5	T1-5	T1-5	T1-5
Woodbarre Telephone/CAD		T1-6	T1-6	T1-6	T1-6	T1-6	T1-6	T1-6	T1-6	T1-6	T1-6	T1-6	T1-6	T1-6	T1-6	T1-6	T1-6	T1-6	T1-6
FBI dkt(w/24)		R5232(12 port)	R5232(12 port)	R5232(12 port)	R5232(12 port)	R5232(12 port)	R5232(12 port)	R5232(12 port)	R5232(12 port)	R5232(12 port)	R5232(12 port)	R5232(12 port)	R5232(12 port)	R5232(12 port)	R5232(12 port)	R5232(12 port)	R5232(12 port)	R5232(12 port)	R5232(12 port)
CRP Opt																			

**Notes:**  
 1. Custom Tones: Review Gold Elite Admin  
 2. Test Radio on Mt. TAM will be Connected to CCGW  
 3. Intercom System Connected to CCGW  
 4. Refer Conventional Interface Drawing

RNI NETWORK IP BACKHAUL	Primary Use
CNI IP BACKHAUL	Secondary Use
COUNTY USE IP BACKHAUL	Secondary Use
SMARTX T1 BACKHAUL	Primary Use
NON IP BACKHAUL	Primary Use

# APPENDIX B – EQUIPMENT LIST



# MPLS Equipment List

Item	Part Number	Description	BIG ROCK	CINC CNTR	COVOTE PEAK	DOLLAR HILL	EOF	MILL VALLEY WT 2	MT BARNABE	MT TAVALPAIS	MT TSBURON	MUIR BEACH	OTA BROADCASTING	PT REYES	SAN PEDRO	SKYVIEW WT	SONOMA MT	STEWART PT	TOWALES	WOLFBACK RIDGE
3.01	3H00000000	7005-8000																		
3.02	3H00000000	7005-8000																		
3.03	3H00000000	7005-8000																		
3.04	3H00000000	7005-8000																		
3.05	3H00000000	7005-8000																		
3.06	3H00000000	7005-8000																		
3.07	3H00000000	7005-8000																		
3.08	3H00000000	7005-8000																		
3.09	3H00000000	7005-8000																		
3.10	3H00000000	7005-8000																		
3.11	3H00000000	7005-8000																		
3.12	3H00000000	7005-8000																		
3.13	3H00000000	7005-8000																		
3.14	3H00000000	7005-8000																		
3.15	3H00000000	7005-8000																		
3.16	3H00000000	7005-8000																		
3.17	3H00000000	7005-8000																		
3.18	3H00000000	7005-8000																		
3.19	3H00000000	7005-8000																		
3.20	3H00000000	7005-8000																		
3.21	3H00000000	7005-8000																		
3.22	3H00000000	7005-8000																		
3.23	3H00000000	7005-8000																		
3.24	3H00000000	7005-8000																		
3.25	3H00000000	7005-8000																		
3.26	3H00000000	7005-8000																		
3.27	3H00000000	7005-8000																		
3.28	3H00000000	7005-8000																		
3.29	3H00000000	7005-8000																		
3.30	3H00000000	7005-8000																		
3.31	3H00000000	7005-8000																		
3.32	3H00000000	7005-8000																		
3.33	3H00000000	7005-8000																		
3.34	3H00000000	7005-8000																		
3.35	3H00000000	7005-8000																		
3.36	3H00000000	7005-8000																		
3.37	3H00000000	7005-8000																		
3.38	3H00000000	7005-8000																		
3.39	3H00000000	7005-8000																		
3.40	3H00000000	7005-8000																		
3.41	3H00000000	7005-8000																		
3.42	3H00000000	7005-8000																		
3.43	3H00000000	7005-8000																		
3.44	3H00000000	7005-8000																		
3.45	3H00000000	7005-8000																		
3.46	3H00000000	7005-8000																		
3.47	3H00000000	7005-8000																		
3.48	3H00000000	7005-8000																		
3.49	3H00000000	7005-8000																		
3.50	3H00000000	7005-8000																		
3.51	3H00000000	7005-8000																		
3.52	3H00000000	7005-8000																		
3.53	3H00000000	7005-8000																		
3.54	3H00000000	7005-8000																		
3.55	3H00000000	7005-8000																		
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3.57	3H00000000	7005-8000																		
3.58	3H00000000	7005-8000																		
3.59	3H00000000	7005-8000																		
3.60	3H00000000	7005-8000																		
3.61	3H00000000	7005-8000																		
3.62	3H00000000	7005-8000																		
3.63	3H00000000	7005-8000																		
3.64	3H00000000	7005-8000																		
3.65	3H00000000	7005-8000																		
3.66	3H00000000	7005-8000																		
3.67	3H00000000	7005-8000																		
3.68	3H00000000	7005-8000																		
3.69	3H00000000	7005-8000																		
3.70	3H00000000	7005-8000																		
3.71	3H00000000	7005-8000																		
3.72	3H00000000	7005-8000																		

# APPENDIX C – PRICING SUMMARY

Marin County Next Generation Radio Project

	Equipment	MERA Equipment Discount	Services	Warranty and Post-Warranty Services	System Discount Applied
1. Item #3 and 4 - MPLS Design and non-LMR traffic	\$ 417,011.40	\$ 49,139.30	\$ 411,891.00	\$ 1,457,970.00	\$ 230,000.00
<b>TOTAL</b>	\$ 417,011.40	\$ 367,872.10	\$ 411,891.00	\$ 1,457,970.00	\$ 230,000.00

	List Price	After Discount
Equipment	\$ 417,011.40	\$ 367,872.10
Services	\$ 411,891.00	\$ 411,891.00
Warranty and Post-Warranty Services	\$ 1,457,970.00	\$ 1,385,071.50
Total		\$ 2,164,834.60
System Discount		\$ 230,000.00
Final Price Without Taxes		\$ 1,934,834.60
Estimated Equipment Taxes at 9%		\$ 33,108.49
Final Price		\$ 1,967,943.09

Warranty and Post Warranty Services Annual Cost Breakdown														
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
\$55,315	\$63,530	\$63,530	\$63,532	\$63,532	\$419,114	\$71,284	\$71,284	\$71,284	\$71,284	\$76,851	\$76,851	\$76,851	\$76,851	\$76,851

**MARIN EMERGENCY RADIO AUTHORITY**

c/o Novato Fire Protection District

95 Rowland Way, Novato, CA 94945

PHONE: (415) 878-2690 FAX: (415) 878-2660

[WWW.MERAONLINE.ORG](http://WWW.MERAONLINE.ORG)

**DATE:** November 14, 2018

**TO:** MERA Finance Committee

**FROM:** Dave Jeffries, Deputy Executive Officer for the Next Gen Project

**SUBJECT:** AGENDA ITEM E: Motorola Contract Change Order #10, Radio Accessories and Portable Chargers

**Recommended Action:** Review, discuss, provide input and recommendation on Motorola Contract Change Order #10.

**Introduction:**

This Contract Change Order addresses three related issues:

- 1) Radio Accessories to be ordered – In the initial contract, the radios equipment packages were quoted with minimal equipment and lower capability batteries. In addition, portable radio chargers were listed as an option and therefore not included in the contract cost. The differences between the contracted equipment and recommended equipment was addressed by the Governing Board on 06/28/17, Agenda item B-2.
- 2) Additional Radios – The original radio equipment estimates have been updated and now reflect 28 additional mobile radios and 242 additional portable radios.
- 3) Radio accessories ordered in early order #1 and early order #2.

This Contract Change Order involves required items.

**Change Order Details:**

- 1) Radio accessories to be ordered:
  - a. Portables – This includes ruggedized upgrades for fire radios, shoulder microphones, upgraded batteries, carrying cases and chargers. (1394 Portables)
  - b. Mobiles – This includes upgrading all mobiles to the APX6500 series radios as we found limitations with the SPX4500 radios. This also includes the Direct Entry Key pads (DEK) that we currently use, upgraded speakers and where needed, the dual head radios. (1014 Mobiles)
- 2) Additional Radios: Includes the additional estimated radios and needed accessories.
- 3) Radio accessories ordered during Early Order #1 and #2: This includes accessories as included in Radio Accessories above and radio upgrades paid by local agencies. All of those local agency upgrade costs have been paid and received.
- 4) Following input from the Finance Committee and Executive Board, Motorola will prepare a formal, written change order for Governing Board consideration at their 11/28/18 meeting.

**Relation to other Contract Change Orders:**

None directly – however the items included are considered required for the base use of the system.

**Change Order Cost:**

Cost Summary:

- 1) Radio Accessories: \$2,741,590 (Includes taxes of \$226,369.22)
- 2) Additional Radios: \$1,233,106.95 (Includes taxes of \$92,947.68)
- 3) Early Order #1 and #2: \$200,763.22 (Includes taxes of \$16,576.78)

The cost for this Contract Change Order, after discounts, is \$3,839,566.49. With estimated sales tax, the total cost is \$4,175,460.17.

**Payment Schedule:**

Note – The following payment schedule is based on the current draft project schedule. This schedule will be reviewed and finalized following completion of the Subsequent EIR process as part of the Customer Design Review process. Dates are subject to change and therefore it is recommended that the payment schedules be reviewed in May/June 2019 and again in November 2019.

This Change Order is anticipated to be invoiced as a single item in Q3, 2021 assuming CCO#11 (Early Order Mobiles) is approved, otherwise it is Q2, 2022.

**MARIN EMERGENCY RADIO AUTHORITY**

c/o Novato Fire Protection District

95 Rowland Way, Novato, CA 94945

PHONE: (415) 878-2690 FAX: (415) 878-2660

[WWW.MERAONLINE.ORG](http://WWW.MERAONLINE.ORG)

**DATE:** November 14, 2018

**TO:** MERA Finance Committee

**FROM:** Dave Jeffries, Deputy Executive Officer for the Next Gen Project

**SUBJECT:** AGENDA ITEM F: Motorola Contract Change Order #11, Early Order Mobile Radios

**Recommended Action:** Review, discuss, provide input and recommendation on Motorola Contract Change Order #11.

**Introduction:**

This Contract Change Order addresses the scenario in which we acquire dual band mobile radios early to allow early installation of the mobile radios and shorten the time required after cutover to the new system to move all MERA users to the new system.

Essentially, this Change Order assumes that we would receive the remainder of the mobile radios ten (10) months prior to cutover. After programming, these dual band radios would be installed allowing users to continue to operate on the current UHF-T band Gen I System. When we are ready to start using the new Next Gen System, these radios will only require re-programming, saving potentially eight months on the project.

This Contract Change Order involves recommended items.

**Change Order Details:**

- 1) The Mobile Radios described in Contract Change Order #10 will be upgraded from APX6500 single band radios to APX8500 dual band radios.
- 2) Motorola has offered an increased discount if we commit to this upgrade by 12/15/2018.
- 3) Following input from the Finance Committee and Executive Board, Motorola will prepare a formal, written change order for Governing Board consideration at their 11/28/18 meeting.

**Relation to other Contract Change Orders:**

- 1) Contract Change Order #7 – Radio Management/Wi-Fi/OTAP: This proposal will benefit from CCO #7 in that the reprogramming required at cutover can be addressed thru Radio Management/Wi-Fi and OTAP.
- 2) Contract Change Order #10 – This change order builds on and assumes CCO#10 is approved. If CCO#10 is not approved, this proposal's costs will need to be reassessed and will increase significantly.

**Change Order Cost:**

The cost for this Contract Change Order, after discounts, is \$389,173.84. With estimated sales tax, the total cost is \$424,198.83.

**Payment Schedule:**

Note – The following payment schedule is based on the current draft project schedule. This schedule will be reviewed and finalized following completion of the Subsequent EIR process as part of the Customer Design Review process. Dates are subject to change and therefore it is recommended that the payment schedules be reviewed in May/June 2019 and again in November 2019.

This Change Order is anticipated to be invoiced as a single item in Q3, 2021.

**MARIN EMERGENCY RADIO AUTHORITY**

c/o Novato Fire Protection District

95 Rowland Way, Novato, CA 94945

PHONE: (415) 878-2690 FAX: (415) 878-2660

WWW.MERAONLINE.ORG

**DATE:** November 14, 2018  
**TO:** MERA Finance Committee  
**FROM:** Dave Jeffries, Deputy Executive Officer for the Next Gen Project  
**SUBJECT:** AGENDA ITEM G: Update of Next Gen System Project Budget

**Recommended Action:** Review, discuss impacts of Contract Change Orders on Next Gen Project budget.

**Introduction:**

On 09/26/18, the MERA Governing Board approved an updated project budget (attached). At the Governing Board meeting on 10/24/18, the Governing Board approved Contract Change Orders # XXX and postponed consideration of Contract Change Orders #7 (Radio Management/Wi-Fi/OTAP) and #8 (MPLS). Since that meeting, we have received quotes for Change Order #10 (Radio Accessories) and #11 (Early Mobile Radio Order). CCO #7 #8, #10 and #11 were discussed in prior agenda items for this Finance Committee meeting.

In addition, MERA Staff has worked with Motorola to develop draft payment schedules for these change orders for the Finance Committee's consideration.

**Considerations:**

1) Governing Board Meeting (10/24/18) – Contract Change Orders Approved

a. CCO #5 – Mill Valley and Tiburon Sites –	Equipment Costs	\$0.00
Estimated Construction Costs (Included in Site Acquisition Costs)-		\$400-\$700k
b. CCO #6 - Site-Ready Services and Equipment -	Equipment Costs	\$501,616.00
c. CCO #9 – Equipment Spares -	Equipment Costs	\$214,174.70

2) Pending Change Orders

a. CCO #7 – Radio Management/Wi-Fi/OTAP	Equipment Costs	\$631,403.15
b. CCO #8 – MPLS Microwave	Equipment Costs	\$1,967,943.09
c. CCO#10 – Radio Accessories/Chargers	Equipment Costs	\$4,175,460.17
d. CCO #11 – Early Order Mobile Radios	Equipment Costs	\$424,198.83

Payment Schedule:

Note – The following payment schedule is based on the current draft project schedule. This schedule will be reviewed and finalized following completion of the Subsequent EIR process as part of



Agenda Item G – Update of Next Gen System Project Budget

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the Customer Design Review process. Dates are subject to change and therefore it is recommended that the payment schedule be reviewed in May/June 2019 and again in November 2019.

<u>Change Order</u>	<u>Milestone</u>	<u>Amount</u>	<u>Invoice Date</u>
CCO #5 – Tib/MV	N/A	\$0.00	N/A
CCO #6 – Site Ready and Sonoma Mountain (Sites Prorated)			
	Complete Customer Design 20%	\$100,323.10	2019 Q3
	Ship Equipment 45%	\$225,726.98	2021 Q1
	Big Rock 25%	\$13,933.76	2021 Q2
	Dollar Hill 25%	\$13,933.76	2021 Q1
	Mt Barnabe 25%	\$13,933.76	2021 Q1
	Point Reyes 25%	\$13,933.76	2021 Q1
	San Pedro 25%	\$13,933.76	2021 Q2
	Sonoma Mountain 25%	\$13,933.76	2021 Q2
	Stewart Point 25%	\$13,933.76	2021 Q1
	Tiburon 25%	\$13,933.76	2021 Q2
	Sonoma Mt – Complete Microwave 25%	\$13,933.76	2021 Q2
	Final System Acceptance 10%	\$50,161.55	2023 Q2
CCO #7 – Radio Management/Wi-Fi/OTAP			
	Equipment Delivery 100%	\$631,403.15	2022 Q3
CCO #8 – MPLS Microwave (Sites Prorated)			
	Complete Customer Design 20%	\$146,005.34	2019 Q3
	Ship Equipment 45%	\$328,512.01	2021 Q1
	M/W install – Big Rock 25%	\$10,139.26	2021 Q2
	M/W Install – Civic Center 25%	\$10,139.26	2021 Q1
	M/W Install – Coyote Peak 25%	\$10,139.26	2021 Q2
	M/W Install – Dollar Hill 25%	\$10,139.26	2021 Q2
	M/W Install – EOF 25%	\$10,139.26	2021 Q1
	M/W Install – Mill Valley 25%	\$10,139.26	2021 Q2
	M/W Install – Mt Barnabe 25%	\$10,139.26	2021 Q1
	M/W Install – Mt. Tamalpais 25%	\$10,139.26	2021 Q2
	M/W Install – Muir Beach 25%	\$10,139.26	2021 Q2
	M/W Install – OTA 25%	\$10,139.26	2021 Q2
	M/W Install – Point Reyes 25%	\$10,139.26	2021 Q2
	M/W Install – San Pedro 25%	\$10,139.26	2021 Q2
	M/W Install – Skyview Ter 25%	\$10,139.26	2021 Q2
	M/W Install – Sonoma Mt 25%	\$10,139.26	2021 Q2
	M/W Install – Stewart Point 25%	\$10,139.26	2021 Q1
	M/W Install – Tiburon 25%	\$10,139.26	2021 Q2
	M/W Install – Tomales 25%	\$10,139.26	2021 Q2
	M/W Install – Wolfback 25%	\$10,139.26	2021 Q1
	Final System Acceptance 10%	\$73,002.67	2023 Q2
	Warranty and Post Warranty– Year 1	\$48,982.90	2023 Q2

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Warranty and Post Warranty– Year 2		\$56,257.50	2024 Q2
Warranty and Post Warranty– Year 3		\$56,257.50	2025 Q2
Warranty and Post Warranty– Year 4		\$56,259.27	2026 Q2
Warranty and Post Warranty– Year 5		\$56,259.27	2027 Q2
Warranty and Post Warranty– Year 6		\$371,136.54	2028 Q2
Warranty and Post Warranty– Year 7		\$63,123.87	2029 Q2
Warranty and Post Warranty– Year 8		\$63,123.87	2030 Q2
Warranty and Post Warranty– Year 9		\$63,123.87	2031 Q2
Warranty and Post Warranty– Year 10		\$63,123.87	2032 Q2
Warranty and Post Warranty– Year 11		\$68,053.59	2033 Q2
Warranty and Post Warranty– Year 12		\$68,053.59	2034 Q2
Warranty and Post Warranty– Year 13		\$68,053.59	2035 Q2
Warranty and Post Warranty– Year 14		\$68,053.59	2036 Q2
Warranty and Post Warranty– Year 15		\$68,053.59	2037 Q2

CCO #9 – Equipment Spares (Installs Pro Rated)

Complete Customer Design	20%	\$42,834.94	2019 Q3
Ship Equipment	45%	\$96,378.62	2022 Q1
NICE Logging Redundancy	25%	\$17,847.89	2022 Q1
Jail BDA Battery Backup	25%	\$17,847.89	2022 Q1
Console Speakers	25%	\$17,847.89	2022 Q1
Final System Acceptance	10%	\$21,417.47	2023 Q3

CCO #10 – Accessories and Chargers

Equipment Delivery	100%	\$4,175,460.17	2021 Q3
			Note – If CCO #11 not approved, then 2022 Q2

CCO #11 – Early Order of Mobiles

Equipment Delivery	100%	\$424,198.83	2021 Q3
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ATTACHMENT:

G-1 MERA Next Gen Project Budget (Over 20 years) – Revision Date 09/26/2018

Description	Approved Project Budget	Revised 09/26/2018 Project Budget	Variance Increase/(Savings)	Comments
Vendor Contract (w/o radios)	21,257,434	21,257,434	-	
Vendor Radios	7,410,216	7,410,216	-	
Site Acquisition/Construction	10,000,000	5,300,000	(4,700,000)	Revised DPW estimate
Project implementation staffing (DPW)	2,000,000	2,000,000	-	
FE Construction/Proj Mgmt	1,344,000	1,798,603	454,603	extended timeline
RGS MERA staffing	795,000	1,005,000	210,000	extended timeline
Marin DPW	25,000	25,000	-	
Other Capital costs	30,000	30,000	-	
MERA legal	225,000	400,000	175,000	extended timeline
Public Outreach	397,000	397,000	-	
Admin Fees	560,000	3,200,000	2,640,000	for all 20 years
Financing Costs	9,971,000	9,971,000	-	
SUA	8,940,804	8,940,804	-	
<b>Project budget</b>	<b>62,955,454</b>	<b>61,735,057</b>	<b>(1,220,397)</b>	
Budgeted Vendor Contingency	2,200,000	2,200,000		
Unappropriated Project Reserve	6,844,546	8,064,943		

**Project Funding Sources:**

Source	Annual	20 Years
Parcel Tax	3,550,000	71,000,000
MERA (Non-Public Safety Radios)		1,000,000
<b>Total:</b>		<b>72,000,000</b>