**Agenda Item B-1**

# 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:** September 12, 2018

**TO:** MERA Executive Board

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

**SUBJECT:** AGENDA ITEM B-1**:** Report #45 on Next Gen System Project

Recommended Action: Review, discuss and accept report.

Background:

We are currently in Customer Design Review (CDR) with Motorola. MERA is represented in these discussions by our Federal Engineering Project Manager, David Mortimer, MERA Operations Officer Ernest Klock, Ethan Simpson and myself, supported by additional County and Federal Engineering staff, as needed. A few key issues:

1) Recent Project Meetings and Conference Calls:
   a. MERA Project Calls: 08/06/18, 08/20/18, 09/04/18
   b. Motorola Project Meetings: 07/18/18
   c. Regional Interoperability Interview of Marin: 08/07/18
   d. Site Visit – Martinelli Site: 09/05/18

2) Budget Update:
   a. On 08/30/18, Matthew Hymel and Tom Gaffney from the Finance Committee met with Executive Officer Maureen Cassingham, Operations Officer Ernest Klock and Deputy Executive Officer Dave Jeffries to review the MERA budget projections.

   b. As a result of this discussion, we identified corrected and updated estimates based on the current status of the project and looked at the potential impact from the pending Change Orders #5-#8. These projections were discussed with the Operational Issues Working Group on 09/05/18 and at the Joint Next Gen Project Oversight Committee/Finance Committee meeting on 09/12/18.

   See attachment #B for details.

3) Proposed Change Orders:
   a. Attached are four proposed Contract Change Orders that were presented to the Operations Issues Working Group on 09/05/18 and were also discussed at the Joint Next Generation Project Oversight Committee/Finance Committee meeting on 09/12/18.
   b. These change orders address a number of open issues that staff and Motorola have been working to address.

c. See attachments #C-#F for details.

4) CEQA:
   a. To be covered by Mr. Klock (Item #C-1)

Attachments:

A) Report #44 on the Next Gen System Project (Governing Board, 08/22/18)
B) NGPOC/FC Staff Report #C – Updated Budget Estimates
C) NGPOC/FC Staff Report #D – Motorola Change Order #5
D) NGPOC/FC Staff Report #E – Motorola Change Order #6
E) NGPOC/FC Staff Report #F – Contract Change Order #7 and Early Equipment Order
F) NGPOC/FC Staff Report #G – Motorola Change Order #8

**Agenda Item B-1**

# 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:** August 22, 2018

**TO:** MERA Governing Board

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

**SUBJECT:** AGENDA ITEM **B-1:** REPORT NO. 44 ON NEXT GEN SYSTEM PROJECT

Recommended Action: Review, discuss and accept report.

Background:

We are currently in Customer Design Review (CDR) with Motorola. MERA is represented in these discussions by our Federal Engineering Project Manager, David Mortimer, MERA Operations Officer Ernest Klock, and me, supported by additional County and Federal Engineering staff, as needed. A few key issues:

1) Recent Project Meetings and Conference Calls:
   a. MERA Project Calls: 07/09/18, 08/06/18, 08/20/18
   b. Motorola Project Meetings: 07/18/18
   c. Call with Marin County Fire on Microwave Needs: 07/05/18
   d. MERA Overhead Meeting: 07/12/18
   e. Sonoma County Site Discussion: 08/02/18
   f. Meeting with BayRICS Consultant on Interoperability Plan: 08/07/18

2) Dual Band Radio Order:
   a. Early Order #2 closed and placed with Motorola. All upgrades have been paid. Radios are scheduled to arrive before today's meeting.

3) Change Orders
   a. Developing proposals for MERA for consideration in September on a variety of contract and technical issues as well as timing of future radio orders.
   b. 09/05/18 – Proposals to be reviewed by the Operational Issues Working Group
   c. 09/12/18 – Proposals to be reviewed by a joint meeting of the Next Gen Project Oversight Committee and the Finance Committee
   d. 09/26/18 – Proposals to be considered at the Governing Board Meeting

4) CEQA:
   a. To be covered by Mr. Klock (Item #C-1)

ATTACHMENT:

B-1a Report No. 43 on Next Gen System Project (E.B. 7/11/18)

**Agenda Item C**

# 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:** September 12, 2018

**TO:** MERA Next Generation Project Oversight and Finance Committees

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

**SUBJECT:** AGENDA ITEM C**:** Updated Budget Estimates

**Recommended Action:** Review, discuss and accept report.

**Introduction:**

On 08/30/18, Matthew Hymel and Tom Gaffney from the Finance Committee met with Executive Officer Maureen Cassingham, Operations Officer Ernest Klock and Deputy Executive Officer Dave Jeffries to review the MERA budget projections.

As a result of this discussion, we identified corrected and updated estimates based on the current status of the project and looked at the potential impact from the pending Change Orders #5-#8.

The attachments resulted from that conversation and include:

Tab 1: Project Cost Estimate as of 08/31/18
Tab 2: Next Gen Project Revenues and Expenses FY 2015/16 through 2017/18
Tab 3: Capital Cash Flow
Tab 4: Capital Cash Flow With Change Orders #5-#8

The discussion and review of these updated figures will provide a foundation for the discussion of the pending change orders.

Attachments:
MERA Finance Committee Spreadsheet Aug 31 2018 (4 Tabs)

**Table 1** Version Aug. 31, 2018

**Marin Emergency Radio Authority**

**Next Gen Project**

**MERA Next Gen Project Cost**

| | Item | Amount | Notes | Source |
|---|---|---|---|---|
| 1 | vendor contract | $21,257,434 | Incl fire sta alert | Motorola |
| | Radios PS | 7,410,216 | | |
| | | 28,667,650 | | |
| 2 | Contingency | 2,200,000 | Motorola contract contingency GB approved 6/28/17 | Motorola |
| 3 | Fire Station Alert | | Incl | Motorola |
| 4 | Site Construction | | Incl | Motorola |
| 5 | Site Acqusition/constr | 5,300,000 | Estimate - Site Acquistion, environmentals, etc. | DPW |
| 6 | Federal Eng | 306,000 | Phase I Contract - Completed | DPW |
| 7 | Federal Eng | 1,492,603 | Phase II Contract | DPW |
| 8 | Marin DPW | 2,583,000 | County staff - Feasability, plannning, implementation agreement | MERA |
| 9 | Marin DPW | 25,000 | Non-staff expenses - Licensing, Permits, Frequency Coordination | DPW |
| 10 | RGS | 1,005,000 | MERA Staff - **thru 6/2019** | MERA |
| 11 | MERA Legal | 400,000 | Next Gen Project related Legal Expenses **thru 06/2021** | MERA |
| 12 | Fees | 3,200,000 | Administrative Fees, Audits, Parcel Tax Admin, Surety, etc **thru 06/2035** | MERA |
| 13 | Indie Politics | 397,000 | MERA Outreach and Public Education - Completed | MERA |
| 14 | Other Capital Cost | 30,000 | Dollar Hill (FY16/17) - Completed | MERA |
| - | Total | $45,606,253 | | |
| | | $8,940,804 | | |
| | | $54,547,057 | | |
| | **Future Expensess** | | | |
| 2 | Motorola | $8,940,804 | Year 4-15 Maintenance and SUA II costs **(Payable annually 1/12 per year)** | Motorola |
| | Interest | $9,971,000 | Years 2-20 | MERA |
| 16 | | | | |

| | | |
|---|---|---|
| Chg orders | | |
| | | 1,679,403 |
| SUA | | 1,533,635 |
| 5 Add Tib/MV | | 0 |
| 6 Sonoma Mtn | | 687,676 |
| 7 early radios | | 2,611,255 |
| 8 MPLS | | 1,934,835 |
| incl in 8 | $1,533,635 | SUA over 12 yrs |

**Version Date: 03/27/2018**

**Estimated Project Delay Costs (Assuming 08/31/2020 completion)**

| **Extent of Delay:** | **Per Month** | **x14 months** | **X 12 Months** |
|---|---|---|---|
| **RGS** | $15,000 | $210,000 | $180,000 |
| **FE** | $32,975 | $461,650 | $400,000 |
| **DPW** | $41,667 | $583,338 | $500,000 |
| **Legal** | $2,500 | $35,000 | $30,000 |
| **TOTALS:** | $92,142 | $1,289,988 | $1,110,000 |

Table 2
Marin Emergency Radio Authority
Next Gen Project Revenues and Expenses
FY 2015/16 through 2017/18

| | | FY 2015/16 Parcel Taxes Fund 70038 | FY 2016/17 Parcel Taxes Fund 70038 | FY 2016/17 2016 Bonds Fund 70039 | FY 2017/18 Parcel Taxes Fund 70038 | FY 2017/18 2016 Bonds Fund 70039 | Budget FY 2018/19 Parcel Taxes Fund 70038 | Budget FY 2018/19 2016 Bonds Fund 70039 |
|---|---|---|---|---|---|---|---|---|
| REVENUES | | | | | | | | |
| | Parcel Taxes | 3,588,000 | 3,583,000 | | 3,584,000 | | 3,565,000 | |
| | Interest | 6,000 | 13,000 | 394,000 | 25,000 | 450,000 | 25,000 | 400,000 |
| | Bond Proceeds | | | 33,000,000 | | | | |
| | Totals | 3,594,000 | 3,596,000 | 33,394,000 | 3,609,000 | 450,000 | 3,590,000 | 400,000 |
| EXPENSES | | | | | | | | |
| 1 | Motorola | | | 1,715,000 | | 200,000 | | 1,900,000 |
| 2 | Future cost included in later years | | | | | | | |
| 3 | Motorola Contingency | | | | | | | |
| 4 | Fire Station Alert | | | | | | | |
| 5 | Site Construction | | | | | | | 2,000,000 |
| 6 | Site Acqusition, CEQA | | | | | 250,000 | | 300,000 |
| 7 | Federal Eng - Ph 1 | 202,000 | | 104,000 | | | | |
| 8 | Federal Eng - Ph 2 | | | 132,000 | | 396,000 | | 396,000 |
| 9 | Marin DPW - Implementation | 86,000 | | 46,000 | | 210,000 | | 450,000 |
| 10 | Marin DPW expenses | | | | | | | |
| 11 | RGS | 107,000 | 147,000 | | 190,000 | | 200,000 | |
| 12 | MERA Legal | 19,000 | 25,000 | | 75,000 | | 100,000 | |
| 13 | Fees, parcel admin, collection | 115,000 | 178,000 | 4,000 | 130,000 | 4,000 | 138,000 | 4,000 |
| 14 | Indie Politics (paid earlier) | 397,000 | | | | | | |
| 15 | Other Capital Cost | | 30,000 | | | | | |
| | Totals | 926,000 | 380,000 | 2,001,000 | 395,000 | 1,060,000 | 438,000 | 5,050,000 |
| | Less: debt service 2016 Bonds | | | | 792,000 | | 2,417,000 | |
| | Estimated Balance FYE | | | | 4,560,000 | 32,335,000 | 5,294,000 | 24,835,000 |

**Table 3**
**Marin Emergency Radio Authority** 08/31/18
**Next Gen Project**
**Capital Cash Flow**

| | Budget 2018/19 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 | 2026/27 | 2026/28 | Future |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fund 70038 - Parcel Charges | 4,559,000 | | | | | | | | | | |
| Fund 70037 - 2016 Bonds | 32,335,000 | | | | | | | | | | |
| Beginning Capital Funds | $36,894,000 | $32,991,000 | $17,184,000 | $3,441,000 | $3,870,000 | $4,916,000 | $5,975,000 | $6,300,000 | $6,629,000 | $6,962,000 | |
| Revenues | | | | | | | | | | | |
| Note Project Financing | $225,000 | $225,000 | $225,000 | | | | | | | | |
| 2010 Bond Payments | 2,125,000 | 2,125,000 | | | | | | | | | |
| Extra capital charge | | | | | | | | | | | |
| Interest earnings - 1.19% | 425,000 | 393,000 | 204,000 | 41,000 | 46,000 | 59,000 | 71,000 | 75,000 | 79,000 | 83,000 | |
| New Funding | | | | | | | | | | | |
| Parcel Taxes | 3,565,000 | 3,565,000 | 3,565,000 | 3,565,000 | 3,565,000 | 3,565,000 | 3,565,000 | 3,565,000 | 3,565,000 | 3,565,000 | |
| Total Revenues | $6,340,000 | $6,308,000 | $3,994,000 | $3,606,000 | $3,611,000 | $3,624,000 | $3,636,000 | $3,640,000 | $3,644,000 | $3,648,000 | |
| Expenses | | | | | | | | | | | |
| 2007 Project Note | 210,000 | 210,000 | 210,000 | | | | | | | | |
| 2010 Refunding Bonds | 2,125,000 | 2,050,000 | | | | | | | | | |
| New Funding (5 years, 3.25%) | | | | | 0 | 0 | 0 | 0 | 0 | | |
| **2016 Revenue Bonds** | 2,420,000 | 2,420,000 | 2,420,000 | 2,420,000 | 2,420,000 | 2,420,000 | 2,420,000 | 2,420,000 | 2,420,000 | 2,420,000 | |
| Subtotal | $4,755,000 | $4,680,000 | $2,630,000 | $2,420,000 | $2,420,000 | $2,420,000 | $2,420,000 | $2,420,000 | $2,420,000 | $2,420,000 | |
| Balance available for Next Gen | $38,479,000 | $34,619,000 | $18,548,000 | $4,627,000 | $5,061,000 | $6,120,000 | $7,191,000 | $7,520,000 | $7,853,000 | $8,190,000 | |

| **MERA Next Gen Capital Cost Item** | **Amount** | Thru 8/2020 **Previous Expenditure** | **Current Budget** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Motorola | $28,668,000 | $1,915,000 | $1,900,000 | $12,500,000 | $12,353,000 | | | | | | | | $28,668,000 | Motorola |
| Contingency | 2,200,000 | | | 1,100,000 | 1,100,000 | | | | | | | | 2,200,000 | Contingency |
| Fire Station Alert | incl | | | | | | | | | | | | 0 | Fire Station Alert |
| Site Construction/acquir | 5,300,000 | 106,000 | 2,300,000 | 2,500,000 | 394,000 | | | | | | | | 5,300,000 | Site Construction |
| Federal Eng - completed | 306,000 | 306,000 | | | | | | | | | | | 306,000 | Federal Eng |
| Federal Eng | 1,493,000 | 528,000 | 396,000 | 290,000 | 279,000 | | | | | | | | 1,493,000 | Federal Eng |
| Marin DPW | 2,583,000 | 342,000 | 450,000 | 600,000 | 600,000 | 591,000 | | | | | | | 2,583,000 | Marin DPW |
| Marin DPW | 25,000 | | | 25,000 | | | | | | | | | 25,000 | Marin DPW |
| RGS | 1,005,000 | 444,000 | 200,000 | 200,000 | 161,000 | | | | | | | | 1,005,000 | RGS |
| MERA Legal | 400,000 | 119,000 | 100,000 | 80,000 | 80,000 | 21,000 | | | | | | | 400,000 | MERA Legal |
| Fees (20 years) | 3,200,000 | | | | | | | | | | | | 3,200,000 | Fees |
| Indie Politics - completed | 397,000 | 397,000 | | | | | | | | | | | 397,000 | Indie Politics |
| Other Capital Cost | 30,000 | 30,000 | | | | | | | | | | | 30,000 | Other Capital Cost |
| Annual delay cost ($1,200,000) | | | | | | | | | | | | | | Total |
| | 45,607,000 | | | | | | | | | | | | $45,607,000 | |
| Fees (20 years) | 3,200,000 | 431,000 | 142,000 | 140,000 | 140,000 | 145,000 | 145,000 | 145,000 | 145,000 | 145,000 | 145,000 | 145,000 | 1,332,000 | 3,200,000 | |
| SUA II and system updates (12 yrs) | 8,941,000 | | | | | | | 746,000 | 746,000 | 746,000 | 746,000 | 5,957,000 | 8,941,000 | |
| Total | 57,748,000 | | | | | | | | | | | | $57,748,000 | check |
| Chg order #6 Sonoma Mt | 688,000 | | | | | | | | | | | | | |
| Chg order #7 Early Radio delivery | 2,611,000 | | | | | | | | | | | | | |
| Chg order #8 MPLS -IP | 401,000 | | | | | | | | | | | | | |
| Chg order #8 MPLS -SUA (12 yrs) | | | | | | | | | | | | | | |
| **Next Gen Capital Cost** | $103,355,000 | $4,618,000 | $5,488,000 | $17,435,000 | $15,107,000 | $757,000 | $145,000 | $145,000 | $891,000 | $891,000 | $891,000 | $891,000 | | $46,368,000 | check |
| Ending Balance | | | $32,991,000 | $17,184,000 | $3,441,000 | $3,870,000 | $4,916,000 | $5,975,000 | $6,300,000 | $6,629,000 | $6,962,000 | $7,299,000 | | | |

| **Table 3** | WITH CHANGE ORDERS #'s 6,7,&8 | |
|---|---|---|
| **Marin Emergency Radio Authority** | 08/31/18 | |
| **Next Gen Project** | | |
| **Capital Cash Flow** | | Budget 2018/19 |
| Fund 70038 - Parcel Charges | | 4,559,000 |
| Fund 70037 - 2016 Bonds | | 32,335,000 |
| Beginning Capital Funds | | $36,894,000 |
| Revenues | | |
| Note Project Financing | | $225,000 |
| 2010 Bond Payments | | 2,125,000 |
| Extra capital charge | | |
| Interest earnings - I.19% | | 425,000 |
| New Funding | | |
| Parcel Taxes | | 3,565,000 |
| Total Revenues | | $6,340,000 |
| Expenses | | |
| 2007 Project Note | | 210,000 |
| 2010 Refunding Bonds | | 2,125,000 |
| New Funding (4 years, 3.25%) | | |
| **2016 Revenue Bonds** | | 2,420,000 |
| Subtotal | | $4,755,000 |
| Balance available for Next Gen | | $38,479,000 |

| | Thru 8/2020 | | |
|---|---|---|---|
| **MERA Next Gen Capital Cost Item** | **Amount** | **Previous Expenditure** | **Current Budget** |
| Motorola | $28,668,000 | $1,915,000 | $1,900,000 |
| Contingency | 2,200,000 | | |
| Fire Station Alert | incl | | |
| Site Construction/acquir | 5,300,000 | 106,000 | 2,300,000 |
| Federal Eng - completed | 306,000 | 306,000 | |
| Federal Eng | 1,493,000 | 528,000 | 396,000 |
| Marin DPW | 2,583,000 | 342,000 | 450,000 |
| Marin DPW | 25,000 | | |
| RGS | 1,005,000 | 444,000 | 200,000 |
| MERA Legal | 400,000 | 119,000 | 100,000 |
| Fees (20 years) | 3,200,000 | | |
| Indie Politics - completed | 397,000 | 397,000 | |
| Other Capital Cost | 30,000 | 30,000 | |
| Annual delay cost ($1,200,000) | | | |
| | 45,607,000 | | |
| Fees (20 years) | 3,200,000 | 431,000 | 142,000 |
| SUA II and system updates (12 yrs) | 8,941,000 | | |
| Total | 57,748,000 | | |
| Chg order #6 Sonoma Mt | 688,000 | | |
| Chg order #7 Early Radio delivery | 2,611,000 | | 1,311,000 |
| Chg order #8 MPLS -IP | 401,000 | | 201,000 |
| Chg order #8 MPLS -SUA (12 yrs) | 1,534,000 | | |
| **Next Gen Capital Cost** | $62,982,000 | $4,618,000 | $7,000,000 |
| Ending Balance | | | $31,479,000 |

| 2019/20 | 2020/21 | 2021/22 | 2022/23 | 2023/24 | 2024/25 |
|---|---|---|---|---|---|
| $31,479,000 | $13,810,000 | $683,000 | $809,000 | $1,549,000 | $2,297,000 |
| $225,000 | $225,000 | | | | |
| 2,125,000 | | | | | |
| 375,000 | 164,000 | 8,000 | 10,000 | 18,000 | 27,000 |
| | 1,000,000 | | | | |
| 3,565,000 | 3,565,000 | 3,565,000 | 3,565,000 | 3,565,000 | 3,565,000 |
| $6,290,000 | $4,954,000 | $3,573,000 | $3,575,000 | $3,583,000 | $3,592,000 |
| 210,000 | 210,000 | | | | |
| 2,050,000 | | | | | |
| | | 270,000 | 270,000 | 270,000 | 270,000 |
| 2,420,000 | 2,420,000 | 2,420,000 | 2,420,000 | 2,420,000 | 2,420,000 |
| $4,680,000 | $2,630,000 | $2,690,000 | $2,690,000 | $2,690,000 | $2,690,000 |
| $33,089,000 | $16,134,000 | $1,566,000 | $1,694,000 | $2,442,000 | $3,199,000 |
| $12,500,000 | $12,353,000 | | | | |
| 1,100,000 | 1,100,000 | | | | |
| 2,500,000 | 394,000 | | | | |
| 290,000 | 279,000 | | | | |
| 600,000 | 600,000 | 591,000 | | | |
| 25,000 | | | | | |
| 200,000 | 161,000 | | | | |
| 80,000 | 80,000 | 21,000 | | | |
| 140,000 | 140,000 | 145,000 | 145,000 | 145,000 | 145,000 |
| | | | | | 746,000 |
| 344,000 | 344,000 | | | | |
| 1,300,000 | | | | | |
| 200,000 | | | | | |
| | | | | | 128,000 |
| $19,279,000 | $15,451,000 | $757,000 | $145,000 | $145,000 | $1,019,000 |
| $13,810,000 | $683,000 | $809,000 | $1,549,000 | $2,297,000 | $2,180,000 |

| 2025/26 | 2026/27 | 2026/28 | Future |
|---|---|---|---|
| $2,180,000 | $2,332,000 | $2,486,000 | |
| 26,000 | 28,000 | 30,000 | |
| 3,565,000 | 3,565,000 | 3,565,000 | |
| $3,591,000 | $3,593,000 | $3,595,000 | |
| 2,420,000 | 2,420,000 | 2,420,000 | |
| $2,420,000 | $2,420,000 | $2,420,000 | |
| $3,351,000 | $3,505,000 | $3,661,000 | |

| | | | | | |
|---|---|---|---|---|---|
| | | | | $28,668,000 | Motorola |
| | | | | 2,200,000 | Contingency |
| | | | | 0 | Fire Station Alert |
| | | | | 5,300,000 | Site Construction |
| | | | | 306,000 | Federal Eng |
| | | | | 1,493,000 | Federal Eng |
| | | | | 2,583,000 | Marin DPW |
| | | | | 25,000 | Marin DPW |
| | | | | 1,005,000 | RGS |
| | | | | 400,000 | MERA Legal |
| | | | | 3,200,000 | Fees |
| | | | | 397,000 | Indie Politics |
| | | | | 30,000 | Other Capital Cost |
| | | | | | Total |
| | | | | $45,607,000 | |
| 145,000 | 145,000 | 145,000 | 1,332,000 | 3,200,000 | |
| 746,000 | 746,000 | 746,000 | 5,957,000 | 8,941,000 | |
| | | | | $57,748,000 | check |
| 128,000 | 128,000 | 128,000 | | | |
| $1,019,000 | $1,019,000 | $1,019,000 | | $50,452,000 | check |
| $2,332,000 | $2,486,000 | $2,642,000 | | | |

**Agenda Item D**

# 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:** September 12, 2018

**TO:** MERA Next Generation Project Oversight Committee

**FROM:** Ernest Klock, Operations Officer

**SUBJECT:** AGENDA ITEM D**:** NextGen Project Motorola Contract Change Order 5
Tiburon and Mill Valley Equipment, M3 Core, PA Functionality

This Contract Change Order number five (CCO#5) covers three items associated with the design of the Next Gen System and provides for a change in components not specified in the Motorola contract. The total cost for CCO#5 is $0, however, the value of this work is estimated to be $4,634,821.61. A detailed description of the services, equipment, and associated costs are included in the attached CCO#5 for the MERA Next Generation Radio System (Nextgen System). Attachments in CCO#5 provide supporting documentation including post-warranty services (System Upgrade Agreement II - SUAII) scope and cost. Decisions on these items should be made prior to completing the NextGen System design, or additional costs may be incurred. All of the foregoing items were 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.

***Item 1 – Tiburon and Mill Valley Additional Equipment and SUAII - $0***

Addition of equipment, design, and SUAII services is proposed at no cost for the Tiburon and Mill Valley sites. These sites were not contemplated in Motorola's proposal and the resultant contract, however, coverage requirements were specified in the request for proposals for the NextGen System. These two additional sites were found to be necessary to provide contract coverage during early system design leading up to FCC licensing Motorola provided a letter dated February 13, 2018 describing their commitment around this item and the scope of CCO#5 is commensurate with that commitment.

***Item 2 – Upgrade the Radio Core from M2 to M3 - $0***

Upgrade of the radio core from M2 to M3 is proposed with no loss in features or functionality and at no cost. The M3 core will provide future capability for connection to a backup Master Site without major hardware changes and will ensure the NextGen System radio core is consistent with surrounding Bay Area radio systems.

***Item 3 – Addition of PA Functionality to Woodacre and San Rafael Dispatch - $0***

Addition of PA functionality to the Woodacre and San Rafael dispatch centers is proposed at no cost. One Conventional Channel Gateway (CCGW) will be added at each dispatch center. Installation and configuration of the CCGWs are included in this CCO#5.

***Summary***

If approved, CCO#5 will provide added redundancy and security for the NextGen System as well as to ensure that the system coverage requirements are met. This CCO scope includes all equipment, services,

design, warranty and post-warranty services (SUAII) necessary to implement the items described for a total cost of $0 after discounts. Decision and/or addition of these items at a later date could expose MERA to additional costs as the design is approaching 50% and now is a good time to change directions.

Attachment 1 – February 13, 2018 Commitment Letter from Motorola
Attachment 2 – Motorola Contract Change Order #5

Motorola Solutions, Inc.
10680 Treena Street, #200
San Diego, CA 92131
U.S.A.

February 13, 2018

Ernest Klock
Assistant Director
Department of Public Works
County of Marin
3501 Civic Center Drive, Suite 304
San Rafael, Ca 94903

RE: Mill Valley & Tiburon Additional Sites

CC: Dave Jeffries

Dear Mr. Klock:

Motorola Solutions, Inc. ("Motorola") has agreed to include certain equipment and services at two additional sites (Mill Valley & Tiburon) to the System Design at no additional cost to MERA. This addition will be considered as part of the original contract and will allow MERA to conform to the RPC requirements while providing coverage consistent with the contract requirements.

The additional equipment and services will be fully described in a no cost Change Order that will be prepared and executed upon completion of the CDR. In addition, Motorola will agree that the additional equipment at the two additional sites will be covered by the proposed 15 year SUA II and maintenance services at no additional cost.

We thank you for the opportunity to do business with the County of Marin. Please contact your Project Manager, Kourosh Mostashari at 415-265-2155, or your Account Manager, Rodney Hughes at 805-390-7782 with any additional questions.

Sincerely,

MOTOROLA SOLUTIONS, INC.

Micah Applewhite
MSSSI Vice President

MOTOROLA SOLUTIONS

# CHANGE ORDER
[#005]

**Change Order No.** 005

**Date:** 08/13/18

**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 Tiburon and Mill Valley Water Tank sites, including all required radio and microwave hardware, engineering and installation services, and SUA II post-warranty services
2. Upgrade the radio system core to M3
3. Item #28 - Addition of PA functionality to Woodacre and San Rafael dispatch centers

**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 0 through 4 | $ 2,777,880.00 |
| This Change Order: | $ 0.00 |
| Existing Contract Credit: | $ 0.00 |
| Net Contract Impact of this Change Order: | $ 0.00 |
| New Contract Value: | $ 37,115,331.06 |

MOTOROLA SOLUTIONS

# CHANGE ORDER
[#005]

## 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

1. **Addition of Tiburon and Mill Valley Water Tank sites, including all required radio and microwave hardware and services**

   As per Motorola's commitment in November of 2017, two additional sites – namely Mill Valley Water Tank and Tiburon – will be considered as part of the original contract and will allow MERA to conform to the RPC requirements while providing coverage consistent with the contract requirements. For a detailed list of services, please refer to Section 5 of the Motorola's Next Generation Radio Contract for Marin County. For detailed list of post-warranty services, please refer to Section 12 of Motorola's Next Generation Radio Contract for Marin County

2. **Upgrade the Radio Core to M3**

   Although the next generation radio contract calls out for an M2 core and there is no difference in radio functionality between the M2 and M3 cores, in order to make the MERA radio core consistent with the surrounding bay area radio systems, Motorola will provide MERA with an M3 core for the next generation radio system at no cost. The M3 core will provide in the future capability to connect to a backup Master Site without major hardware changes. Motorola calls this function DSR (Dynamic System Resiliency). In addition, the M3 is capable of multi-zone which allows connecting to other zones in the future

3. **Item #28 - Addition of PA functionality to Woodacre and San Rafael dispatch centers**

   PA functionality will be added to the Woodacre and San Rafael dispatch by adding one CCGW at each dispatch center. Installation and configuration of the CCGWs are included in this Change Order

**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

MOTOROLA SOLUTIONS

# CHANGE ORDER
[#005]

| **Pricing Changes:** *(describe change or N/A)* |
|---|
| Please refer to the attached price summary sheet |

| **Customer Responsibilities:** *(describe change or N/A)* |
|---|
| As Mill Valley Water Tank and Tiburon sites are treated as part of the original contract, please refer to Section 5 of the Motorola's Next Generation Radio Contract for Marin County for the details of Marin County's responsibilities |

| **Payment Schedule for this Change Order:**<br>*(describe new payment terms applicable to this change order)* |
|---|
| N/A |

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: | | By: | |
| Printed Name: | KENT MARTIN | Printed Name: | |
| Title: | Regional Services Manager | Title: | |
| Date: | August 13, 2018 | Date: | |

Reviewed by: Kourosh Mostashari Date: August 13, 2018

Motorola Solutions Project Manager

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# Addition of Tiburon and Mill Valley Water Tank RF Sites - LMR Equipment

| Site Type | SUB SYS | BLOCK | APC | QTY | NOMENCLATURE | DESCRIPTION |
|---|---|---|---|---|---|---|
| Master Site | Tiburon | MASTER | 877 | 2 | UA00153AA | ADD: ASTRO 25 FDMA SITE LICENSE |
| Master Site | Tiburon | MASTER | 877 | 2 | UA00159AA | ADD: P25 PHASE 2 TDMA TRKNG OP SITE LIC |
| Master Site | Tiburon | MASTER | 877 | 2 | UA00160AA | ADD: PHASE 2 DYNAMIC TG ASGNMT SITE LIC |
| Master Site | Tiburon | MASTER | 877 | 26 | UA00161AA | ADD: P25 PHASE 2 TDMA SW BASE RADIO LIC |
| Master Site | Tiburon | MASTER | 877 | 12 | UA00162AA | ADD: PHASE 2 DYNAMIC CH BASE RADIO LIC |
| RF Site | Tiburon | GTR8000 | 112 | 1 | SQM01SUM7054 | GTR 8000 EXPANDABLE SITE SUBSYSTEM |
| RF Site | Tiburon | GTR8000 | 595 | 1 | CA00717AA | ADD: ASTRO SYSTEM RELEASE 7.17 |
| RF Site | Tiburon | GTR8000 | 112 | 1 | CA00855AA | ADD: 700/800 MHZ |
| RF Site | Tiburon | GTR8000 | 595 | 4 | CA01842AA | ADD: P25 TDMA SOFTWARE |
| RF Site | Tiburon | GTR8000 | 595 | 4 | CA01902AA | ADD: P25 DYNAMIC CHANNEL SOFTWARE |
| RF Site | Tiburon | GTR8000 | 112 | 1 | X305AC | ADD: QTY (5) GTR 8000 BASE RADIOS |
| RF Site | Tiburon | GTR8000 | 595 | 5 | CA01193AA | ADD: IP BASED MULTISITE BASE RADIO SOFTWARE |
| RF Site | Tiburon | GTR8000 | 147 | 2 | CA01706AA | ADD: ADD: GGM 8000 GATEWAY |
| RF Site | Tiburon | GTR8000 | 112 | 1 | CA00862AA | ADD: SITE & CABINET RMC W/CAPABILITY OF 7-24 BRS |
| RF Site | Tiburon | GTR8000 | 112 | 1 | CA01943AA | ADD:2ND BRANCH DIVERSITY |
| RF Site | Tiburon | GTR8000 | 112 | 1 | CA00879AA | ADD: PRIMARY 6 PORT CAVITY COMBINER |
| RF Site | Tiburon | GTR8000 | 112 | 1 | CA00882AA | ADD: 700 MHZ TX FILTER W/PMU |
| RF Site | Tiburon | GTR8000 | 112 | 2 | CA01536AA | ADD: GPB 8000 REFERENCE DISTRIBUTION MODULE |
| RF Site | Tiburon | GTR8000 | 595 | 2 | CA01537AA | ADD: REFERENCE DISTRIBUTION SOFTWARE |
| RF Site | Tiburon | GTR8000 | 112 | 1 | X882AH | ADD: 7.5 FT OPEN RACK, 48RU |
| RF Site | Tiburon | GTR8000 | 112 | 1 | CA02686AA | ADD: AC DC POWER DISTRIBUTION |
| RF Site | Tiburon | GTR8000 | 112 | 5 | CA01953AA | ADD:  POWER EFFICIENCY PACKAGE |
| RF Site | Tiburon | GTR8000 | 112 | 1 | CA03111AA | ADD: CEC COMPLIANCE |
| RF Site | Tiburon | GTR8000 | 906 | 2 | DS0900382702 | GPS TIMING ANTENNA/RECEIVER W/ ADDTL FILTERING |
| RF Site | Tiburon | GTR8000 | 906 | 2 | DS58534AAUB | MOUNTING KIT FOR 110033-03, GPS TIMING ANTENNA |
| RF Site | Tiburon | GTR8000 | 207 | 2 | DSIX2L1M1DC48IG | SPD, HPD GPS DATA LINE, 48VDC, HARD WIRE WITH ISOLATED GROUNDING |
| RF Site | Tiburon | GTR8000 | 351 | 2 | DS30C87465CO1 | 125FT OUTDOOR UV PROTECTED CABLE 6 PR, 22AWG DB15 CABLE |
| RF Site | Tiburon | GTR8000 | 112 | 1 | SQM01SUM7054 | GTR 8000 EXPANDABLE SITE SUBSYSTEM |
| RF Site | Tiburon | GTR8000 | 595 | 1 | CA00717AA | ADD: ASTRO SYSTEM RELEASE 7.17 |
| RF Site | Tiburon | GTR8000 | 112 | 1 | CA00855AA | ADD: 700/800 MHZ |
| RF Site | Tiburon | GTR8000 | 595 | 4 | CA01842AA | ADD: P25 TDMA SOFTWARE |
| RF Site | Tiburon | GTR8000 | 595 | 2 | CA01902AA | ADD: P25 DYNAMIC CHANNEL SOFTWARE |
| RF Site | Tiburon | GTR8000 | 112 | 1 | X304AE | ADD: QTY (4) GTR 8000 BASE RADIOS |
| RF Site | Tiburon | GTR8000 | 595 | 4 | CA01193AA | ADD: IP BASED MULTISITE BASE RADIO SOFTWARE |
| RF Site | Tiburon | GTR8000 | 112 | 1 | CA00877AA | ADD: CABINET RMC FOR EXPANSION RACK |
| RF Site | Tiburon | GTR8000 | 112 | 1 | CA00880AA | ADD: EXPANSION 6 PORT CAVITY COMBINER |
| RF Site | Tiburon | GTR8000 | 112 | 1 | CA01058AA | ADD: 700/800 PHASING HARNESS |
| RF Site | Tiburon | GTR8000 | 112 | 2 | CA00885AA | ADD: HIGH AVAILABILITY XHUB |
| RF Site | Tiburon | GTR8000 | 112 | 1 | X882AH | ADD: 7.5 FT OPEN RACK, 48RU |
| RF Site | Tiburon | GTR8000 | 112 | 1 | CA02686AA | ADD: AC DC POWER DISTRIBUTION |
| RF Site | Tiburon | GTR8000 | 112 | 4 | CA01953AA | ADD:  POWER EFFICIENCY PACKAGE |
| RF Site | Tiburon | GTR8000 | 112 | 1 | CA03111AA | ADD: CEC COMPLIANCE |
| RF Site | Tiburon | GTR8000 | 112 | 1 | SQM01SUM7054 | GTR 8000 EXPANDABLE SITE SUBSYSTEM |
| RF Site | Tiburon | GTR8000 | 595 | 1 | CA00717AA | ADD: ASTRO SYSTEM RELEASE 7.17 |
| RF Site | Tiburon | GTR8000 | 112 | 1 | CA00855AA | ADD: 700/800 MHZ |
| RF Site | Tiburon | GTR8000 | 595 | 4 | CA01842AA | ADD: P25 TDMA SOFTWARE |
| RF Site | Tiburon | GTR8000 | 112 | 1 | X304AE | ADD: QTY (4) GTR 8000 BASE RADIOS |
| RF Site | Tiburon | GTR8000 | 595 | 4 | CA01193AA | ADD: IP BASED MULTISITE BASE RADIO SOFTWARE |
| RF Site | Tiburon | GTR8000 | 112 | 1 | CA00877AA | ADD: CABINET RMC FOR EXPANSION RACK |
| RF Site | Tiburon | GTR8000 | 112 | 1 | CA00879AA | ADD: PRIMARY 6 PORT CAVITY COMBINER |
| RF Site | Tiburon | GTR8000 | 112 | 2 | CA00885AA | ADD: HIGH AVAILABILITY XHUB |
| RF Site | Tiburon | GTR8000 | 112 | 1 | X882AH | ADD: 7.5 FT OPEN RACK, 48RU |
| RF Site | Tiburon | GTR8000 | 112 | 1 | CA02686AA | ADD: AC DC POWER DISTRIBUTION |
| RF Site | Tiburon | GTR8000 | 112 | 4 | CA01953AA | ADD:  POWER EFFICIENCY PACKAGE |
| RF Site | Tiburon | GTR8000 | 112 | 1 | CA03111AA | ADD: CEC COMPLIANCE |
| RF Site | Tiburon | RACK | 509 | 1 | TRN7343 | SEVEN AND A HALF FOOT RACK |
| RF Site | Tiburon | CCGW | 147 | 1 | SQM01SUM0205 | GGM 8000 GATEWAY |
| RF Site | Tiburon | CCGW | 147 | 1 | CA01619AA | ADD: DC POWER |
| RF Site | Tiburon | CCGW | 147 | 1 | CA02086AA | ADD: HIGH DENSITY ENH CONV GATEWAY |
| RF Site | Tiburon | NFM | 469 | 1 | F4544 | SITE MANAGER ADVANCED |
| RF Site | Tiburon | NFM | 382 | 1 | F2463 | RTU_PER_DEVICE_SW_LICENSES |
| RF Site | Tiburon | NFM | 382 | 1 | V839 | RTU_SW_LIC_PER_NFM-RTU_I-O |
| RF Site | Tiburon | NFM | 382 | 13 | VA00312 | RTU_SW_LIC_PER_GTR8000_MS_BR |
| RF Site | Tiburon | NFM | 382 | 1 | VA00300 | RTU_SW_LIC_PER_RFDS |
| RF Site | Tiburon | RFDS | 351 | 1 | DS43783I01C48 | CONTROL MONITORING UNIT, 796-824MHZ,DUAL DIVERSITY,ETHERNET,48VDC |
| RF Site | Tiburon | RFDS | 351 | 1 | DS43783I01T | TTA, 796-824MHZ, SINGLE / DUAL NETWORK, TEST PORT |
| RF Site | Tiburon | TX ANTENNA 1 | 351 | 1 | DSSE414SWBPALDFD6 | ENCLOSED DIPOLE, 11.5 DBD, ADJ BEAMWID, LOW PIM, PIP, 6DT, 746-960 MHZ |
| RF Site | Tiburon | TX ANT TO SURGE 1 | 351 | 1 | DDN1078 | 78EZDM-M DIN MALE MOT CONNECTOR (MOTOROLA SPECIFIC) |
| RF Site | Tiburon | TX ANT TO SURGE 1 | 351 | 1 | DS245174 | 245174COLD SHRNK FOR USE WITH 7/8" TO 3/8" AND 1/2" N OR DIN TYPE CONN |
| RF Site | Tiburon | TX ANT TO SURGE 1 | 908 | 200 | DSAVA550 | AVA5-50,  COAXIAL CABLE, CORRUGATED COPPER,7/8 IN, BLACK PE JACKET |
| RF Site | Tiburon | TX ANT TO SURGE 1 | 351 | 5 | DSSG7806B2A | SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE |
| RF Site | Tiburon | TX ANT TO SURGE 1 | 351 | 1 | DSL5SGRIP | L5SGRIP 7/8" SUPPORT HOIST GRIP |
| RF Site | Tiburon | TX ANT TO SURGE 1 | 351 | 1 | DDN1077 | 7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC) |
| RF Site | Tiburon | SURGE 1 | 207 | 1 | DSTSXDFMBF | RF SPD, 698-2700MHZ DC BLOCK HIGH PWR, DIN FEM/MALE BI-DIR W/ BRACKET |
| RF Site | Tiburon | SURGE 1 | 207 | 1 | DSGSAKITD | GROUND STRAP KIT - DIN |
| RF Site | Tiburon | SURGE TO ESS 1 | 351 | 25 | L1705 | LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT |
| RF Site | Tiburon | SURGE TO ESS 1 | 351 | 2 | DDN1090 | L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN  CABLE |
| RF Site | Tiburon | TX ANTENNA 2 | 351 | 1 | DSSE414SWBPALDFD6 | ENCLOSED DIPOLE, 11.5 DBD, ADJ BEAMWID, LOW PIM, PIP, 6DT, 746-960 MHZ |
| RF Site | Tiburon | TX ANT TO SURGE 2 | 351 | 1 | DDN1078 | 78EZDM-M DIN MALE MOT CONNECTOR (MOTOROLA SPECIFIC) |
| RF Site | Tiburon | TX ANT TO SURGE 2 | 351 | 1 | DS245174 | 245174COLD SHRNK FOR USE WITH 7/8" TO 3/8" AND 1/2" N OR DIN TYPE CONN |
| RF Site | Tiburon | TX ANT TO SURGE 2 | 908 | 200 | DSAVA550 | AVA5-50,  COAXIAL CABLE, CORRUGATED COPPER,7/8 IN, BLACK PE JACKET |
| RF Site | Tiburon | TX ANT TO SURGE 2 | 351 | 5 | DSSG7806B2A | SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE |
| RF Site | Tiburon | TX ANT TO SURGE 2 | 351 | 1 | DSL5SGRIP | L5SGRIP 7/8" SUPPORT HOIST GRIP |
| RF Site | Tiburon | TX ANT TO SURGE 2 | 351 | 1 | DDN1077 | 7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC) |
| RF Site | Tiburon | SURGE 2 | 207 | 1 | DSTSXDFMBF | RF SPD, 698-2700MHZ DC BLOCK HIGH PWR, DIN FEM/MALE BI-DIR W/ BRACKET |
| RF Site | Tiburon | SURGE 2 | 207 | 1 | DSGSAKITD | GROUND STRAP KIT - DIN |
| RF Site | Tiburon | SURGE TO ESS 2 | 351 | 25 | L1705 | LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT |
| RF Site | Tiburon | SURGE TO ESS 2 | 351 | 2 | DDN1090 | L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN  CABLE |
| RF Site | Tiburon | RX ANTENNA 1 | 351 | 1 | DSCC80708T3 | OMNI CORPORATE COLLINEAR 8DBD 746-870MHZ 3 DEG DT PIM & 25KW PIP RATED |
| RF Site | Tiburon | ANT TO TTA 1 | 351 | 1 | DDN1090 | L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN  CABLE |
| RF Site | Tiburon | ANT TO TTA 1 | 351 | 1 | DS245174 | 245174COLD SHRNK FOR USE WITH 7/8" TO 3/8" AND 1/2" N OR DIN TYPE CONN |
| RF Site | Tiburon | ANT TO TTA 1 | 351 | 15 | L1705 | LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT |
| RF Site | Tiburon | ANT TO TTA 1 | 351 | 1 | DDN1088 | L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE |
| RF Site | Tiburon | ANT TO TTA 1 | 207 | 1 | DS245171 | COLD SHRINK KIT 7/8" TO 1/2" & 3/8" |
| RF Site | Tiburon | TTA TO SURGE 1 | 351 | 200 | L1705 | LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT |
| RF Site | Tiburon | TTA TO SURGE 1 | 351 | 1 | DDN1088 | L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE |

| | | | | | | |
|---|---|---|---|---|---|---|
| RF Site | Tiburon | TTA TO SURGE 1 | 207 | 1 | DS245171 | COLD SHRINK KIT 7/8" TO 1/2" & 3/8" |
| RF Site | Tiburon | TTA TO SURGE 1 | 351 | 1 | DDN1089 | L4TNF-PSA TYPE N FEMALE PS FOR 1/2 IN CABLE |
| RF Site | Tiburon | TTA TO SURGE 1 | 351 | 5 | DSSG1206B2A | SG12-06B2A 1/2IN SURE GROUND GROUNDING KIT |
| RF Site | Tiburon | TTA TO SURGE 1 | 351 | 1 | DSL4SGRIP | L4SGRIP SUPPORT HOIST GRIP 1/2" LDF |
| RF Site | Tiburon | TTA TO SURGE 1 | 207 | 1 | DS1090501WA | RF SPD, 700-1000MHZ BROADBAND 15 VDC PASS NM ANT, NF EQUIP PIP, ASIG |
| RF Site | Tiburon | SURGE TO BCU 1 | 351 | 25 | L1702 | FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT |
| RF Site | Tiburon | SURGE TO BCU 1 | 351 | 2 | DDN9682 | F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR |
| RF Site | Tiburon | RX ANTENNA 2 | 351 | 1 | DSCC80708T3 | OMNI CORPORATE COLLINEAR 8DBD 746-870MHZ 3 DEG DT PIM & 25KW PIP RATED |
| RF Site | Tiburon | ANT TO TTA 2 | 351 | 1 | DDN1090 | L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE |
| RF Site | Tiburon | ANT TO TTA 2 | 351 | 1 | DS245174 | 245174COLD SHRNK FOR USE WITH 7/8" TO 3/8" AND 1/2" N OR DIN TYPE CONN |
| RF Site | Tiburon | ANT TO TTA 2 | 351 | 15 | L1705 | LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT |
| RF Site | Tiburon | ANT TO TTA 2 | 351 | 1 | DDN1088 | L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE |
| RF Site | Tiburon | ANT TO TTA 2 | 207 | 1 | DS245171 | COLD SHRINK KIT 7/8" TO 1/2" & 3/8" |
| RF Site | Tiburon | TTA TO SURGE 2 | 351 | 200 | L1705 | LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT |
| RF Site | Tiburon | TTA TO SURGE 2 | 351 | 1 | DDN1088 | L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE |
| RF Site | Tiburon | TTA TO SURGE 2 | 207 | 1 | DS245171 | COLD SHRINK KIT 7/8" TO 1/2" & 3/8" |
| RF Site | Tiburon | TTA TO SURGE 2 | 351 | 1 | DDN1089 | L4TNF-PSA TYPE N FEMALE PS FOR 1/2 IN CABLE |
| RF Site | Tiburon | TTA TO SURGE 2 | 351 | 5 | DSSG1206B2A | SG12-06B2A 1/2IN SURE GROUND GROUNDING KIT |
| RF Site | Tiburon | TTA TO SURGE 2 | 351 | 1 | DSL4SGRIP | L4SGRIP SUPPORT HOIST GRIP 1/2" LDF |
| RF Site | Tiburon | SURGE | 207 | 1 | DS1090501WA | RF SPD, 700-1000MHZ BROADBAND 15 VDC PASS NM ANT, NF EQUIP PIP, ASIG |
| RF Site | Tiburon | SURGE TO BCU 2 | 351 | 25 | L1702 | FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT |
| RF Site | Tiburon | SURGE TO BCU 2 | 351 | 2 | DDN9682 | F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR |
| RF Site | Tiburon | TTA TEST TO SURGE | 351 | 200 | L1705 | LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT |
| RF Site | Tiburon | TTA TEST TO SURGE | 351 | 1 | DDN1088 | L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE |
| RF Site | Tiburon | TTA TEST TO SURGE | 207 | 1 | DS245171 | COLD SHRINK KIT 7/8" TO 1/2" & 3/8" |
| RF Site | Tiburon | TTA TEST TO SURGE | 351 | 1 | DDN1089 | L4TNF-PSA TYPE N FEMALE PS FOR 1/2 IN CABLE |
| RF Site | Tiburon | TTA TEST TO SURGE | 351 | 5 | DSSG1206B2A | SG12-06B2A 1/2IN SURE GROUND GROUNDING KIT |
| RF Site | Tiburon | TTA TEST TO SURGE | 351 | 1 | DSL4SGRIP | L4SGRIP SUPPORT HOIST GRIP 1/2" LDF |
| RF Site | Tiburon | SURGE | 207 | 1 | DS1090501WA | RF SPD, 700-1000MHZ BROADBAND 15 VDC PASS NM ANT, NF EQUIP PIP, ASIG |
| RF Site | Tiburon | SURGE TO BCU TEST | 351 | 25 | L1702 | FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT |
| RF Site | Tiburon | SURGE TO BCU TEST | 351 | 2 | DDN9682 | F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR |
| RF Site | Tiburon | DC POWER | 0 | 1 | DSTPS2084400002 | FP216 -48/500 3 DC32 R12 4T2 4BW7, SP2 TRILOGY WITH RELAY RACK AND BATT BREAKERS/CABLES |
| RF Site | Tiburon | DC POWER | 207 | 2 | DS241119105 | RECTIFIER, FLATPACK2 48/3000 HE |
| RF Site | Tiburon | DC POWER | 207 | 5 | DS236408 | BLIND PANEL FP2 HE BLACK G1 |
| RF Site | Tiburon | DC POWER | 207 | 1 | DS265504 | ESI SERIES INVERTER, 48VDC INPUT, 120VAC OUTPUT, 2KVA/1600W |
| RF Site | Tiburon | DC POWER | 207 | 1 | DS502660 | BREAKER 50A 1P AUX 5/16 BULLET |
| RF Site | Tiburon | DC POWER | 207 | 1 | DS298137 | SNMP CARD FOR DELTA INVERTERS |
| RF Site | Tiburon | DC POWER | 207 | 12 | DSNSB210FT | BATTERY, 12V, HT 210AH RED NORTHSTAR |
| RF Site | Tiburon | DC POWER | 0 | 4 | DS505056 | NYLON BATTERY STRAP 8 FT CAM BUCKLE FOR SEISMIC APPLICATIONS |
| RF Site | Tiburon | DC POWER | 207 | 2 | DS230700 | KIT: BATTERY MONITOR 10M G1, BATTERY MONITOR CAN BUS NODE |
| RF Site | Tiburon | DC POWER | 207 | 2 | DS083E27487500 | 3A BIRCUIT BREAKER, SINGLE POLE, ONE PANEL POSITION |
| RF Site | Tiburon | DC POWER | 207 | 1 | DS0831061408 | CIRCUIT BREAKER 5A SINGLE POLE |
| RF Site | Tiburon | DC POWER | 207 | 4 | DS0831061708 | CIRCUIT BREAKER 20A SINGLE POLE |
| RF Site | Tiburon | DC POWER | 207 | 6 | DS502660 | BREAKER 50A 1P AUX 5/16 BULLET |
| RF Site | Tiburon | DC POWER | 0 | 1 | DS321630 | BREAKER 125A Kit, 2P, E-TRIP, 5/16 BULLET |
| RF Site | Tiburon | APM | 351 | 1 | DSAPM7487K248 | ADVANCED POWER MONITOR, 740-870 MHZ, 36-60V DC (INC SINGLE COUPLER) |
| RF Site | Tiburon | APM | 351 | 1 | DSSP74964440DFF1RU | ANT LINE COUPLER 740-960MHZ 40DB 4-PORTS SUIT APM748 AND APM8796 |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | SQM01SUM7054 | GTR 8000 EXPANDABLE SITE SUBSYSTEM |
| RF Site | Mill Valley | GTR8000 | 595 | 1 | CA00717AA | ADD: ASTRO SYSTEM RELEASE 7.17 |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | CA00855AA | ADD: 700/800 MHZ |
| RF Site | Mill Valley | GTR8000 | 595 | 4 | CA01842AA | ADD: P25 TDMA SOFTWARE |
| RF Site | Mill Valley | GTR8000 | 595 | 4 | CA01902AA | ADD: P25 DYNAMIC CHANNEL SOFTWARE |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | X305AC | ADD: QTY (5) GTR 8000 BASE RADIOS |
| RF Site | Mill Valley | GTR8000 | 595 | 5 | CA01193AA | ADD: IP BASED MULTISITE BASE RADIO SOFTWARE |
| RF Site | Mill Valley | GTR8000 | 147 | 2 | CA01706AA | ADD: ADD: GGM 8000 GATEWAY |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | CA00862AA | ADD: SITE & CABINET RMC W/CAPABILITY OF 7-24 BRS |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | CA01943AA | ADD:2ND BRANCH DIVERSITY |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | CA00879AA | ADD: PRIMARY 6 PORT CAVITY COMBINER |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | CA00882AA | ADD: 700 MHZ TX FILTER W/PMU |
| RF Site | Mill Valley | GTR8000 | 112 | 2 | CA01536AA | ADD: GPB 8000 REFERENCE DISTRIBUTION MODULE |
| RF Site | Mill Valley | GTR8000 | 595 | 2 | CA01537AA | ADD: REFERENCE DISTRIBUTION SOFTWARE |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | X882AH | ADD: 7.5 FT OPEN RACK, 48RU |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | CA02686AA | ADD: AC DC POWER DISTRIBUTION |
| RF Site | Mill Valley | GTR8000 | 112 | 5 | CA01953AA | ADD: POWER EFFICIENCY PACKAGE |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | CA03111AA | ADD: CEC COMPLIANCE |
| RF Site | Mill Valley | GTR8000 | 906 | 2 | DS0900382702 | GPS TIMING ANTENNA/RECEIVER W/ ADDTL FILTERING |
| RF Site | Mill Valley | GTR8000 | 906 | 2 | DS58534AAUB | MOUNTING KIT FOR 110033-03, GPS TIMING ANTENNA |
| RF Site | Mill Valley | GTR8000 | 207 | 2 | DSIX2L1M1DC48IG | SPD, HPD GPS DATA LINE, 48VDC, HARD WIRE WITH ISOLATED GROUNDING |
| RF Site | Mill Valley | GTR8000 | 351 | 2 | DS30C87465CO1 | 125FT OUTDOOR UV PROTECTED CABLE 6 PR, 22AWG DB15 CABLE |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | SQM01SUM7054 | GTR 8000 EXPANDABLE SITE SUBSYSTEM |
| RF Site | Mill Valley | GTR8000 | 595 | 1 | CA00717AA | ADD: ASTRO SYSTEM RELEASE 7.17 |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | CA00855AA | ADD: 700/800 MHZ |
| RF Site | Mill Valley | GTR8000 | 595 | 4 | CA01842AA | ADD: P25 TDMA SOFTWARE |
| RF Site | Mill Valley | GTR8000 | 595 | 2 | CA01902AA | ADD: P25 DYNAMIC CHANNEL SOFTWARE |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | X304AE | ADD: QTY (4) GTR 8000 BASE RADIOS |
| RF Site | Mill Valley | GTR8000 | 595 | 4 | CA01193AA | ADD: IP BASED MULTISITE BASE RADIO SOFTWARE |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | CA00877AA | ADD: CABINET RMC FOR EXPANSION RACK |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | CA00880AA | ADD: EXPANSION 6 PORT CAVITY COMBINER |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | CA01058AA | ADD: 700/800 PHASING HARNESS |
| RF Site | Mill Valley | GTR8000 | 112 | 2 | CA00885AA | ADD: HIGH AVAILABILITY XHUB |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | X882AH | ADD: 7.5 FT OPEN RACK, 48RU |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | CA02686AA | ADD: AC DC POWER DISTRIBUTION |
| RF Site | Mill Valley | GTR8000 | 112 | 4 | CA01953AA | ADD: POWER EFFICIENCY PACKAGE |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | CA03111AA | ADD: CEC COMPLIANCE |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | SQM01SUM7054 | GTR 8000 EXPANDABLE SITE SUBSYSTEM |
| RF Site | Mill Valley | GTR8000 | 595 | 1 | CA00717AA | ADD: ASTRO SYSTEM RELEASE 7.17 |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | CA00855AA | ADD: 700/800 MHZ |
| RF Site | Mill Valley | GTR8000 | 595 | 4 | CA01842AA | ADD: P25 TDMA SOFTWARE |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | X304AE | ADD: QTY (4) GTR 8000 BASE RADIOS |
| RF Site | Mill Valley | GTR8000 | 595 | 4 | CA01193AA | ADD: IP BASED MULTISITE BASE RADIO SOFTWARE |

| | | | | | | |
|---|---|---|---|---|---|---|
| RF Site | Mill Valley | GTR8000 | 112 | 1 | CA00877AA | ADD: CABINET RMC FOR EXPANSION RACK |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | CA00879AA | ADD: PRIMARY 6 PORT CAVITY COMBINER |
| RF Site | Mill Valley | GTR8000 | 112 | 2 | CA00885AA | ADD: HIGH AVAILABILITY XHUB |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | X882AH | ADD: 7.5 FT OPEN RACK, 48RU |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | CA02686AA | ADD: AC DC POWER DISTRIBUTION |
| RF Site | Mill Valley | GTR8000 | 112 | 4 | CA01953AA | ADD:  POWER EFFICIENCY PACKAGE |
| RF Site | Mill Valley | GTR8000 | 112 | 1 | CA03111AA | ADD: CEC COMPLIANCE |
| RF Site | Mill Valley | RACK | 509 | 1 | TRN7343 | SEVEN AND A HALF FOOT RACK |
| RF Site | Mill Valley | CCGW | 147 | 1 | SQM01SUM0205 | GGM 8000 GATEWAY |
| RF Site | Mill Valley | CCGW | 147 | 1 | CA01619AA | ADD: DC POWER |
| RF Site | Mill Valley | CCGW | 147 | 1 | CA02086AA | ADD: HIGH DENSITY ENH CONV GATEWAY |
| RF Site | Mill Valley | NFM | 469 | 1 | F4544 | SITE MANAGER ADVANCED |
| RF Site | Mill Valley | NFM | 382 | 1 | F2463 | RTU_PER_DEVICE_SW_LICENSES |
| RF Site | Mill Valley | NFM | 382 | 1 | V839 | RTU_SW_LIC_PER_NFM-RTU_I-O |
| RF Site | Mill Valley | NFM | 382 | 13 | VA00312 | RTU_SW_LIC_PER_GTR8000_MS_BR |
| RF Site | Mill Valley | NFM | 382 | 1 | VA00300 | RTU_SW_LIC_PER_RFDS |
| RF Site | Mill Valley | RFDS | 351 | 1 | DS43783I01C48 | CONTROL MONITORING UNIT, 796-824MHZ,DUAL DIVERSITY,ETHERNET,48VDC |
| RF Site | Mill Valley | RFDS | 351 | 1 | DS43783I01T | TTA, 796-824MHZ, SINGLE / DUAL NETWORK, TEST PORT |
| RF Site | Mill Valley | TX ANTENNA 1 | 0 | 1 | DSSC476HF1LDFD10 | COLLINEAR OMNI ANTENNA, 6 DBD LOW PIM, 10 DEG DT, HD, 746-869 MHZ |
| RF Site | Mill Valley | TX ANT TO SURGE 1 | 351 | 1 | DDN1078 | 78EZDM-M DIN MALE MOT CONNECTOR (MOTOROLA SPECIFIC) |
| RF Site | Mill Valley | TX ANT TO SURGE 1 | 351 | 1 | DS245174 | 245174COLD SHRNK FOR USE WITH 7/8" TO 3/8" AND 1/2" N OR DIN TYPE CONN |
| RF Site | Mill Valley | TX ANT TO SURGE 1 | 908 | 200 | DSAVA550 | AVA5-50,  COAXIAL CABLE, CORRUGATED COPPER,7/8 IN, BLACK PE JACKET |
| RF Site | Mill Valley | TX ANT TO SURGE 1 | 351 | 5 | DSSG7806B2A | SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE |
| RF Site | Mill Valley | TX ANT TO SURGE 1 | 351 | 1 | DSL5SGRIP | L5SGRIP 7/8" SUPPORT HOIST GRIP |
| RF Site | Mill Valley | TX ANT TO SURGE 1 | 351 | 1 | DDN1077 | 7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC) |
| RF Site | Mill Valley | SURGE 1 | 207 | 1 | DSTSXDFMBF | RF SPD, 698-2700MHZ DC BLOCK HIGH PWR, DIN FEM/MALE BI-DIR W/ BRACKET |
| RF Site | Mill Valley | SURGE 1 | 207 | 1 | DSGSAKITD | GROUND STRAP KIT - DIN |
| RF Site | Mill Valley | SURGE TO ESS 1 | 351 | 25 | L1705 | LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT |
| RF Site | Mill Valley | SURGE TO ESS 1 | 351 | 2 | DDN1090 | L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN  CABLE |
| RF Site | Mill Valley | TX ANTENNA 2 | 0 | 1 | DSSC476HF1LDFD10 | COLLINEAR OMNI ANTENNA, 6 DBD LOW PIM, 10 DEG DT, HD, 746-869 MHZ |
| RF Site | Mill Valley | TX ANT TO SURGE 2 | 351 | 1 | DDN1078 | 78EZDM-M DIN MALE MOT CONNECTOR (MOTOROLA SPECIFIC) |
| RF Site | Mill Valley | TX ANT TO SURGE 2 | 351 | 1 | DS245174 | 245174COLD SHRNK FOR USE WITH 7/8" TO 3/8" AND 1/2" N OR DIN TYPE CONN |
| RF Site | Mill Valley | TX ANT TO SURGE 2 | 908 | 200 | DSAVA550 | AVA5-50,  COAXIAL CABLE, CORRUGATED COPPER,7/8 IN, BLACK PE JACKET |
| RF Site | Mill Valley | TX ANT TO SURGE 2 | 351 | 5 | DSSG7806B2A | SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE |
| RF Site | Mill Valley | TX ANT TO SURGE 2 | 351 | 1 | DSL5SGRIP | L5SGRIP 7/8" SUPPORT HOIST GRIP |
| RF Site | Mill Valley | TX ANT TO SURGE 2 | 351 | 1 | DDN1077 | 7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC) |
| RF Site | Mill Valley | SURGE 2 | 207 | 1 | DSTSXDFMBF | RF SPD, 698-2700MHZ DC BLOCK HIGH PWR, DIN FEM/MALE BI-DIR W/ BRACKET |
| RF Site | Mill Valley | SURGE 2 | 207 | 1 | DSGSAKITD | GROUND STRAP KIT - DIN |
| RF Site | Mill Valley | SURGE TO ESS 2 | 351 | 25 | L1705 | LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT |
| RF Site | Mill Valley | SURGE TO ESS 2 | 351 | 2 | DDN1090 | L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN  CABLE |
| RF Site | Mill Valley | RX ANTENNA 1 | 351 | 1 | DSCC80708T5 | OMNI, CORP COLLINEAR, 8 DBD, 746-870MHZ, 5DEG DT, PIM & 25KW PIP RATED |
| RF Site | Mill Valley | ANT TO TTA 1 | 351 | 1 | DDN1090 | L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN  CABLE |
| RF Site | Mill Valley | ANT TO TTA 1 | 351 | 1 | DS245174 | 245174COLD SHRNK FOR USE WITH 7/8" TO 3/8" AND 1/2" N OR DIN TYPE CONN |
| RF Site | Mill Valley | ANT TO TTA 1 | 351 | 15 | L1705 | LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT |
| RF Site | Mill Valley | ANT TO TTA 1 | 351 | 1 | DDN1088 | L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE |
| RF Site | Mill Valley | ANT TO TTA 1 | 207 | 1 | DS245171 | COLD SHRINK KIT 7/8" TO 1/2" & 3/8" |
| RF Site | Mill Valley | TTA TO SURGE 1 | 351 | 200 | L1705 | LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT |
| RF Site | Mill Valley | TTA TO SURGE 1 | 351 | 1 | DDN1088 | L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE |
| RF Site | Mill Valley | TTA TO SURGE 1 | 207 | 1 | DS245171 | COLD SHRINK KIT 7/8" TO 1/2" & 3/8" |
| RF Site | Mill Valley | TTA TO SURGE 1 | 351 | 1 | DDN1089 | L4TNF-PSA TYPE N FEMALE PS FOR 1/2 IN  CABLE |
| RF Site | Mill Valley | TTA TO SURGE 1 | 351 | 5 | DSSG1206B2A | SG12-06B2A 1/2IN SURE GROUND GROUNDING KIT |
| RF Site | Mill Valley | TTA TO SURGE 1 | 351 | 1 | DSL4SGRIP | L4SGRIP SUPPORT HOIST GRIP 1/2" LDF |
| RF Site | Mill Valley | TTA TO SURGE 1 | 207 | 1 | DS1090501WA | RF SPD, 700-1000MHZ BROADBAND 15 VDC PASS NM ANT, NF EQUIP PIP, ASIG |
| RF Site | Mill Valley | SURGE TO BCU 1 | 351 | 25 | L1702 | FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT |
| RF Site | Mill Valley | SURGE TO BCU 1 | 351 | 2 | DDN9682 | F4PNMV2-HC 1/2"  TYPE N MALE PLATED CONNECTOR |
| RF Site | Mill Valley | RX ANTENNA 2 | 351 | 1 | DSCC80708T5 | OMNI, CORP COLLINEAR, 8 DBD, 746-870MHZ, 5DEG DT, PIM & 25KW PIP RATED |
| RF Site | Mill Valley | ANT TO TTA 2 | 351 | 1 | DDN1090 | L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN  CABLE |
| RF Site | Mill Valley | ANT TO TTA 2 | 351 | 1 | DS245174 | 245174COLD SHRNK FOR USE WITH 7/8" TO 3/8" AND 1/2" N OR DIN TYPE CONN |
| RF Site | Mill Valley | ANT TO TTA 2 | 351 | 15 | L1705 | LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT |
| RF Site | Mill Valley | ANT TO TTA 2 | 351 | 1 | DDN1088 | L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE |
| RF Site | Mill Valley | ANT TO TTA 2 | 207 | 1 | DS245171 | COLD SHRINK KIT 7/8" TO 1/2" & 3/8" |
| RF Site | Mill Valley | TTA TO SURGE 2 | 351 | 200 | L1705 | LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT |
| RF Site | Mill Valley | TTA TO SURGE 2 | 351 | 1 | DDN1088 | L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE |
| RF Site | Mill Valley | TTA TO SURGE 2 | 207 | 1 | DS245171 | COLD SHRINK KIT 7/8" TO 1/2" & 3/8" |
| RF Site | Mill Valley | TTA TO SURGE 2 | 351 | 1 | DDN1089 | L4TNF-PSA TYPE N FEMALE PS FOR 1/2 IN  CABLE |
| RF Site | Mill Valley | TTA TO SURGE 2 | 351 | 5 | DSSG1206B2A | SG12-06B2A 1/2IN SURE GROUND GROUNDING KIT |
| RF Site | Mill Valley | TTA TO SURGE 2 | 351 | 1 | DSL4SGRIP | L4SGRIP SUPPORT HOIST GRIP 1/2" LDF |
| RF Site | Mill Valley | SURGE | 207 | 1 | DS1090501WA | RF SPD, 700-1000MHZ BROADBAND 15 VDC PASS NM ANT, NF EQUIP PIP, ASIG |
| RF Site | Mill Valley | SURGE TO BCU 2 | 351 | 25 | L1702 | FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT |
| RF Site | Mill Valley | SURGE TO BCU 2 | 351 | 2 | DDN9682 | F4PNMV2-HC 1/2"  TYPE N MALE PLATED CONNECTOR |
| RF Site | Mill Valley | TTA TEST TO SURGE | 351 | 200 | L1705 | LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT |
| RF Site | Mill Valley | TTA TEST TO SURGE | 351 | 1 | DDN1088 | L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE |
| RF Site | Mill Valley | TTA TEST TO SURGE | 207 | 1 | DS245171 | COLD SHRINK KIT 7/8" TO 1/2" & 3/8" |
| RF Site | Mill Valley | TTA TEST TO SURGE | 351 | 1 | DDN1089 | L4TNF-PSA TYPE N FEMALE PS FOR 1/2 IN  CABLE |
| RF Site | Mill Valley | TTA TEST TO SURGE | 351 | 5 | DSSG1206B2A | SG12-06B2A 1/2IN SURE GROUND GROUNDING KIT |
| RF Site | Mill Valley | TTA TEST TO SURGE | 351 | 1 | DSL4SGRIP | L4SGRIP SUPPORT HOIST GRIP 1/2" LDF |
| RF Site | Mill Valley | SURGE | 207 | 1 | DS1090501WA | RF SPD, 700-1000MHZ BROADBAND 15 VDC PASS NM ANT, NF EQUIP PIP, ASIG |
| RF Site | Mill Valley | SURGE TO BCU TEST | 351 | 25 | L1702 | FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT |
| RF Site | Mill Valley | SURGE TO BCU TEST | 351 | 2 | DDN9682 | F4PNMV2-HC 1/2"  TYPE N MALE PLATED CONNECTOR |
| RF Site | Mill Valley | DC POWER | 0 | 1 | DSTPS2084400002 | FP216 -48/500 3 DC32 R12 4T2 4BW7, SP2 TRILOGY WITH RELAY RACK AND BATT BREAKERS/CABLES |
| RF Site | Mill Valley | DC POWER | 207 | 2 | DS241119105 | RECTIFIER, FLATPACK2 48/3000 HE |
| RF Site | Mill Valley | DC POWER | 207 | 5 | DS236408 | BLIND PANEL FP2 HE BLACK G1 |
| RF Site | Mill Valley | DC POWER | 207 | 12 | DSNSB210FT | BATTERY, 12V, HT 210AH RED NORTHSTAR |
| RF Site | Mill Valley | DC POWER | 0 | 6 | DS505056 | NYLON BATTERY STRAP 8 FT CAM BUCKLE FOR SEISMIC APPLICATIONS |
| RF Site | Mill Valley | DC POWER | 207 | 3 | DS230700 | KIT: BATTERY MONITOR 10M G1, BATTERY MONITOR CAN BUS NODE |
| RF Site | Mill Valley | DC POWER | 207 | 2 | DS083E27487500 | 3A BIRCUIT BREAKER, SINGLE POLE, ONE PANEL POSITION |
| RF Site | Mill Valley | DC POWER | 207 | 2 | DS0831061708 | CIRCUIT BREAKER  20A SINGLE POLE |
| RF Site | Mill Valley | DC POWER | 207 | 6 | DS502660 | BREAKER 50A 1P AUX 5/16 BULLET |
| RF Site | Mill Valley | APM | 351 | 1 | DSAPM7487K248 | ADVANCED POWER MONITOR, 740-870 MHZ, 36-60V DC (INC SINGLE COUPLER) |
| RF Site | Mill Valley | APM | 351 | 1 | DSSP74964440DFF1RU | ANT LINE COUPLER 740-960MHZ 40DB 4-PORTS SUIT APM748 AND APM8796 |

# Addition of Tiburon and Mill Valley Water Tank RF Sites - Microwave Equipment

| Item | Part Number | Description | BIG ROCK | MILL VALLEY | TIBURON | SAN PEDRO | WOLFBACK RIDGE |
|---|---|---|---|---|---|---|---|
| 1.00 | | **9500 MPR Microwave Switching Shelf (MSS)** | | | | | |
| 1.01 | 3EM22715AH | 9500 MPR Shelf Kit w/Alarm FAN Evo-HSv3 | 1 | 1 | 1 | 1 | 1 |
| 1.02 | 3EM24105AA | Fan Alarm Cable - 25 foot | 1 | 1 | 1 | 1 | 1 |
| 1.03 | 3DB19017AB | Ethernet Access Module (v2) w/8 GbE port | 4 | 2 | 4 | 4 | 4 |
| 1.04 | 3DB18163AB | MSS Slot Cover - Blank Plate 1/2H | 2 | 4 | 2 | 2 | 2 |
| 1.05 | 3DB23386AEAB | 9500 MPR R8.0 uSD Card for CorEvo-10G ICS02 | 2 | 2 | 2 | 1 | 2 |
| 1.06 | 3DB18788BA | CorEvo-10G | 2 | 2 | 2 | 1 | 2 |
| 1.07 | 3DB18970BMBB | 9500 MPR R8.0 SW Electronic Delivery Kit ICS02 | 1 | 1 | 1 | 1 | 1 |
| 2 | | **9500 MPR Microwave Packet Transceiver (MPT)** | | | | | |
| 2.00 | 3EM24238AA | MPT-HL Shelf Kit Single T-R | 1 | | 2 | 1 | |
| 2.01 | 3EM24238AB | MPT-HL Shelf Kit Dual T-R | | 1 | | | |
| 2.02 | 3DB76050AA | MPT-HLC XCVR 11 GHz (10700 - 11700) | | 2 | | | 2 |
| 2.03 | 3DB76050EA | MPT-HLC XCVR 11 GHz HP TX HIGH (TX 11200 - 11700, RX 10700 - 11700) | 1 | | 2 | 1 | |
| 3 | | **9500 MPR RTUs - per ODU/RF Transceiver/ Upgrade** | | | | | |
| 3.00 | 3EM23068ADAA | RTU 160Mbps TRX Capacity | 1 | 2 | 2 | 1 | 2 |
| 3.01 | 3MU00086AAAA | 9500 MPR MSP Ring RTU | 1 | 1 | 1 | 1 | 1 |
| 4 | | **9500 MPR Microwave Packet Transceiver Accessories** | | | | | |
| 4.00 | 3EM23465AA | 6/11 GHz Hot Standby 1:10 Coupler Diplexer Bracket | | 1 | | | 1 |
| 4.01 | 3EM23465AC | 6/11 GHz 1+0 (Non-Standby) Diplexer Bracket | 1 | | 2 | 1 | |
| 4.02 | 3EM24188BA | 11 GHz Hot Standby 1:10 Coupler Diplexer Clamp and Isolator Kits | | 1 | | | 1 |
| 4.03 | 3EM24188BC | 11 GHz 1+0 (Non-Standby) Diplexer Clamp and Isolator Kits | 1 | | 2 | 1 | |
| 4.04 | 3EM24081AA | RF Diplexer Filter 10700-11700, 30 MHz | 1 | 1 | 2 | 1 | 1 |
| 4.05 | 1AB077940017 | Diplexer to Transition Cable Assy 304.8mm 12 Inch | 1 | 1 | 1 | 1 | 1 |
| 4.06 | 1AB077940018 | Diplexer to Transition Cable Assy 381mm 15 Inch | 1 | | 1 | 1 | |
| 4.07 | 3EM23511AF | Diplexer Transition Assy A2 (11 Ghz) Position Initial Kit | 1 | 1 | 1 | | 1 |
| 4.08 | 3EM23511AG | Diplexer Transition Assy A3 (11 Ghz) Position Add-On Kit | | | 1 | 1 | |
| 4.09 | 3DH04122HN | Flange Adapter CPR-90 1PORT, 11Ghz | 1 | 1 | 2 | 1 | 1 |
| 4.10 | 3EM23141AC | SFP Copper Cable, 1.5 M | 1 | | 1 | 1 | |
| 4.11 | 3EM23141AG | SFP Copper Cable, 2.0 M | 1 | 2 | 1 | 1 | 2 |
| 5 | | **Racks and Accessories** | | | | | |
| 5.00 | 3EM13317AB | Power Distribution Panel w/Fuse Alarm | 1 | 1 | 1 | 1 | 1 |
| 5.01 | 694-9000-006 | Standard Rack, 7 ft tall, 19 inch wide | 1 | 1 | 1 | 1 | 1 |
| **6.00** | | **Antenna/Waveguide** | | | | | |
| 6.00 | 10039985 | SC3-W100AC - 3ft Hi Perf, CPR90G, Single Pol Ant., Includes Radome, NO struts | 0 | 1 | 1 | 1 | 1 |
| 6.01 | 10045242 | SU4-107DC1S1T - 4' Hi Perf, CPR90G, Single Pol, Slim Line Ant., Includes Radome (Teflon), 1 strut | | | 1 | | |
| 6.02 | 409082880 | UHX6-107-P3A/K - 6' Hi Perf, CPR90G, Dual Pol Ant., Includes Radome (Teglar), 1 inboard strut | 1 | | | | |
| 6.03 | 1AF28451AAAA | Tieback Steel - Bulk Angle 4" X 4" X ¼" x 20' (ANG414) | 1 | 1 | 2 | 2 | 2 |
| 6.04 | 10031053 | Kit Sway Bar 8-12ft Refl (SMA-SK-60-3000A) | | | | | |
| 6.05 | 815487-001 | Standard Elliptical Waveguide E105 (10.0 - 11.7 GHz) | 66 | 138 | 233 | 45 | 57 |
| 6.06 | 399503-101 | Connector, Tunable (C90-105TG) | 1 | 1 | 2 | 1 | 1 |
| 6.07 | 399503-103 | Connector, Non-Tunable (top) (C90-105FG) | 1 | 1 | 2 | 1 | 1 |
| 6.08 | 916533-108 | Hoisting Grip (HOIST1-105L) - Lace-up (E105,E78) | 1 | 1 | 2 | 1 | 1 |
| 6.09 | 921234-108 | Grounding Kit - 60in wire, E105 (GKIT-60-105) | 3 | 3 | 6 | 3 | 3 |
| 6.10 | 920981-007 | Hanger Kit for E105, 7/8in coax (CLAMP-105) (10 pack, bolt-on) | 5 | 5 | 8 | 4 | 4 |
| 6.11 | ANGLE-CLPI) | Angle Member Adapter Kit, 3/8in Stainless Steel (ANGLE-CLPI) (10 pack) | 1 | 1 | 1 | 1 | 1 |
| 6.12 | CEIL12-5I | Ceiling Adapter Kit, 12in (CEIL12-5I, 514608-003) (5 pack) - waveguide only | 1 | 1 | 2 | 1 | 1 |
| 6.13 | 915006-W | Hardware Kit, HDWK3/8-16X1, 3/8" – 16 x 1" bolt (915006) - 10 each lock washers, hex nuts & fillister head screws | 5 | 5 | 8 | 4 | 4 |
| 6.14 | 400130 | Pressure Window (WPW-090EP) - mates to CPR90G | 1 | 1 | 2 | 1 | 1 |
| 6.15 | 400124 | 2ft Twistflex (TF090-CC1-024I) - CPR90G/CPR90G | 1 | 1 | 2 | 1 | 1 |
| 6.16 | 915665 | 4in Boot with 1 Hole for E105 (BOOT4-105) | 1 | 1 | 2 | 1 | 1 |
| 6.17 | 10042194 | APD20-D-35XH0R00S1 120v, 3-5psi, Lo psi alm, 10 day purge, < 7800' 6-12GHz | 1 | 1 | 1 | 1 | 1 |
| 6.18 | 20040835 | Dehydrator Wall Shelf for APD20 (20040835) | 1 | 1 | 1 | 1 | 1 |
| 6.19 | 920204-W | Gas Distribution Manifold, 4 Port, 0-15PSIG (920204) | 1 | 1 | 1 | 1 | 1 |
| 6.20 | 409081635 | UNIV ADJ LEG MT- UP TO 10 3/4 LEG (Ant. Pipe Mount) | 1 | 1 | 2 | 2 | 2 |
| **6.00** | | | | | | | |

## M3 Core Equipment List

| SHIP TO | SUB SYS | BLOCK | QTY | NOMENCLATURE | DESCRIPTION |
|---|---|---|---|---|---|
| Master Site | EOF | MASTER | 1 | SQM01SUM0273 | MASTER SITE CONFIGURATION |
| Master Site | EOF | MASTER | 1 | CA02832AB | ADD: M3 REDUNDANT ZONE (1-150 SITES)-1ST ZONE |
| Master Site | EOF | MASTER | 1 | CA03118AA | ADD: M3 - 1ST ZONE REDUNDANT HW |

# Addition of PA Functionality at Woodacre and San Rafael Dispatch

| System | Site | SysSeg | Item Num | Total Qty | Nomenclature | Description |
|---|---|---|---|---|---|---|
| PA FUNCTIONALITY | WOODACRE AND SAN RAFAEL DISPATCH | CCGW | 12a | 2 | CA01619AA CREDIT | ADD: DC POWER |
| PA FUNCTIONALITY | WOODACRE AND SAN RAFAEL DISPATCH | CCGW | 12b | 2 | CA02086AA CREDIT | ADD: HIGH DENSITY ENH CONV GATEWAY |

| | Equipment Total | Services | Warranty and Post-Warranty Services |
|---|---|---|---|
| 1. Addition of Mill Valley Water Tank and Tiburon Sites to the System Design | $ 2,367,875.50 | $ 1,181,849.50 | $ 944,311.50 |
| | | | |
| 2. Upgrade Radio System Core to M3 | $ 114,000.00 | $ - | $ - |
| | | | |
| 3. Item #28 - Addition of PA Functionality to Woodacre and San Rafael Dispatch Centers | $ 21,498.00 | $ 5,287.11 | $ - |
| | | | |
| **TOTAL** | $ 2,503,373.50 | $ 1,187,136.61 | $ 944,311.50 |

| | List Price | After Discount |
|---|---|---|
| **Equipment** | $ 2,503,373.50 | 0.00 |
| **Services** | $ 1,187,136.61 | 0.00 |
| **Warranty and Post-Warranty Services** | $ 944,311.50 | 0.00 |
| Total | $ 4,634,821.61 | 0.00 |
| **System Discount** | | N/A |
| Final Price | | 0.00 |

**Agenda Item E**

# 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:** September 12, 2018

**TO:** MERA Next Generation Project Oversight Committee

**FROM:** Ernest Klock, Operations Officer

**SUBJECT:** AGENDA ITEM E**:** NextGen Project Motorola Contract Change Order 6
Sonoma Mountain, Site Readiness, Equipment Spares

This Contract Change Order number six (CCO#6) covers nine items associated with the design of the Next Gen System and provides for spare components not specified in the Motorola contract. The cost of CCO#6 after discounts is $687,675.95, which does not include taxes on equipment at 9% for San Rafael estimated at $24,000 for a total cost of $711,675.95. A detailed description of the services, equipment, and associated costs are included in the attached CCO#6 for the MERA Next Generation Radio System (Nextgen System). Appendices A through C provide supporting documentation including post-warranty services (System Upgrade Agreement II - SUAII) scope and cost. Decisions on these items should be made prior to completing the NextGen System design, or additional costs may be incurred. All of the foregoing items were 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.

***Item 1 - Sonoma Mountain Site - $182,000***

Addition of equipment, design, and SUAII services is proposed for the Sonoma Mountain site such that Microwave connectivity may be provided for the NextGen System.

The NextGen System RFP provided an array of sites to consider for proposers. Motorola submitted a proposal for a microwave path from Tomales to OTA that was based on simulations as physical path surveys are not conducted for proposals unless required. Later, during detailed design, physical path surveys revealed that the OTA path was blocked by terrain and Sonoma Mountain is the most cost-effective solution. Additionally, the system network design has already been presented and approved through the Regional Planning Committee FCC licensing process which included the Sonoma Mountain link, and so time and expense would need to be spent to make a change from the Sonoma Mountain solution. Per Motorola contract section 5.14.4.1, final microwave design is contingent on physical path surveys and MERA is obligated to fund these items.

***Item 2 - UEM and Zone Watch licenses - $40,000***

Addition of one UEM and one Zone Watch license is proposed as only one UEM and one Zone Watch license was required by the RFP and included in the Motorola contract. The additional licenses will allow for monitoring of the NextGen System at two locations simultaneously, which will facilitate maintenance and this item is recommended.

***Item 3 - Site-Ready Services and Equipment - $406,000***

Addition of Site-Ready services and equipment is proposed in order to prepare for installation of NextGen System components in existing equipment enclosures.

During the RFP phase, preliminary site walks were conducted by County Staff and the Motorola proposal team. These site walks were not of sufficient length to determine the nature and extent of work to relocate T-band equipment and make room for NextGen equipment as this level of effort is not typical for a proposal. The RFP did not require detailed site studies for the proposal (such as preparation of floor plans in Appendix B) and so pricing was not included. While section 6 of the Motorola Contract does indicate generally that the existing T-band system will remain untouched while the NextGen System is installed, Table 5-15 of the Motorola Contract places "Site-Readiness" as a MERA responsibility and clearly delineates responsibility in several sections. County Radio Communication staff does not have the expertise to perform this work and so the scope of work in Appendix B for Site Readiness is recommended.

***Item 4- Redundant Voice Logging Equipment - $157,000***
Addition of redundant voice logging equipment (NICE) is proposed as only one voice logger with no backup was included in the Motorola contract. Voice logging is used to capture voice communications and often used to support emergency personnel in operations and after action reporting so redundancy provides backup. Due to the need for redundant voice logging to ensure data is available, this item is recommended.

***Item 5 - Jail BDA Backup Power - $10,000***
Addition of battery backup for the County Jail BDA system is proposed as no battery backup was either required in the RFP nor provided for in the Motorola Contract. The jail BDA system is supported by an emergency generator, but the battery backup maintains functionality of the BDA system in the event of generator failure. Due to the need for battery backup to ensure operation of the Jail BDA system, this item is recommended.

***Item 6 - Dispatch Console Speakers - $21,000***
Addition of two additional dispatch console speakers is proposed per the table on page 7 of CCO#6. The Motorola Contract included two speakers for each dispatch position, where existing dispatch positions may have as many as three or four. While two speakers may be sufficient, it is recommended to proceed with this item so that the various MERA agencies may choose additional speakers if needed.

***Item 7 - Upgrade Pagers to Time Division Multiple Access (TDMA) - $30,000***
The upgrade to TDMA mode of the 150 Unication pagers purchased as part of the contract is proposed to ease channel use of pager devices for the NextGen System. Frequency division multiple access (FDMA) was originally proposed as a replacement because TDMA for the specified pagers did not exist at the time of proposal. However, FDMA would occupy double the channels needed - leading to radio traffic concerns. This item is recommended because the channel use concern is remedied if TDMA is used.

***Item 8 - NAS Backup Server - $1,500***
Addition of one NAS Backup Server is proposed as no radio system backup capability was included in the original contract. While "This CCO does not capture the cost of turn up, configuring, and

installation of the spares", the scope of work for this item is anticipated to be a minor cost (1-2 hours of technician time) and so the addition of one NAS Backup Server is recommended.

***Item 9 - Spare VMS Server - $26,000***

Addition of one VMS Server is proposed to be used as a "pre-configured" spare in the event that the main VMS Server fails and a quick replacement is needed. Keeping this spare at hand will minimize downtime for the NextGen System in the event of failure of this component. While "This CCO does not capture the cost of turn up, configuring, and installation of the spares", the scope of work for this item is anticipated to be a minor cost (1-2 hours of technician time) and so the addition of one VMS Server is recommended.

***Summary***

If approved, CCO#6 will provide added redundancy and security for the NextGen System. This CCO scope includes all equipment, services, design, warranty and post-warranty services (SUAII) necessary to implement the items described for a total cost of $687,675.95 after discounts. Decision and/or addition of some of these items (Sonoma Mountain) at a later date could expose MERA to additional costs as the design is approaching 50% and now is a good time to change directions.

Attachment: Motorola Contract Change Order #6 with Appendices

MOTOROLA SOLUTIONS

# CHANGE ORDER
[#006]

**Change Order No.** 06

**Date:** 08/21/18

**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. Item #2 - Addition of Sonoma site, including all required hardware and design and implementation services, and warranty and post-warranty services
2. Item #8 - Addition of one extra UEM and Zone Watch license
3. Item #18 - Addition of "Site Readiness" to Motorola's Scope of Work
4. Item #20 and #21 - Addition of redundancy to the NICE radio logging recorder
5. Item #23 - Addition of 12-hour battery back-up to the jail BDA system
6. Item #26 - Addition of two MCC7500 dispatch console speakers (except EOF)
7. Item #29 - Addition of TDMA feature to 150 Unication G4 Pagers
8. Item #32 - Addition of NAS backup server for the radio system
9. Item #36 - Addition of a spare VMS server

**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 0 through 5 | $ 2,777,880.00 |
| This Change Order: | $ 687,675.95 |
| Existing Contract Credit: | $ 0.00 |
| Net Contract Impact of this Change Order: | $ 687,675.95 |
| New Contract Value: | $ 37,803,007.01 |

MOTOROLA SOLUTIONS

# CHANGE ORDER
[#006]

## 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<br>Please note that applicable CA taxes has not been applied to equipment pricing |

| **Customer Responsibilities:** *(describe change or N/A)* |
|---|
| Please refer to the attached Scope of Work (SOW) document |

| **Payment Schedule for this Change Order:**<br>*(describe new payment terms applicable to this change order)* |
|---|
| The Payment milestone plan for this Change Order is the following:<br><br>1. 25% of the Change Order Price upon change order execution<br><br>2. 65% of the Change Order Price upon shipment of equipment<br><br>3. 5% of the Change Order Price upon completion of installation (site by site)<br><br>4. 5% of the Change Order Price upon final system acceptance |

MOTOROLA SOLUTIONS

# CHANGE ORDER
[#006]

**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.

| **Motorola Solutions, Inc.** | | **Customer** | |
|---|---|---|---|
| By: | | By: | |
| Printed Name: | KENT MARTIN | Printed Name: | |
| Title: | Regional Services Manager | Title: | |
| Date: | August 21, 2018 | Date: | |

Reviewed by: Kourosh Mostashari Date: August 21, 2018

Motorola Solutions Project Manager

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# CHANGE ORDER #6 ATTACHMENT

AUGUST 21, 2018

MOTOROLA SOLUTIONS

# TABLE OF CONTENTS

# CHANGE ORDER #6 ATTACHMENT

The following changes have been captured in Change Order #6:

1. Item #2 - Addition of Sonoma site, including all required hardware and design and implementation services, and warranty and post-warranty services.
2. Item #8 - Addition of one extra UEM and Zone Watch license.
3. Item #18 - Addition of "Site Readiness" to Motorola's Scope of Work.
4. Item #20 and #21 - Addition of redundancy to the NICE radio logging recorder.
5. Item #23 - Addition of 12-hour battery back-up to the jail BDA system.
6. Item #26 – Addition of two MCC7500 dispatch console speakers (except EOF)
7. Item #29 - Addition of TDMA feature to 150 Unication G4 Pagers.
8. Item #32 - Addition of NAS backup server for the radio system.
9. Item #36 - Addition of a spare VMS server.

## 1. Item #2 - Addition of Sonoma site, including all required hardware and services

As per section 5.14.4.1 Finalize Backhaul System Design –Table 5-14 Responsibility Matrix of the contract, the final design of the microwave system is contingent upon the result of physical path surveys. The survey results revealed that the microwave path between Tomales and OTA suffered from terrain blockage as per the below image from the physical path survey performed by NOKIA. Therefore, an additional microwave node, namely Sonoma, is required to connect the two end points. Sonoma is currently included in the final microwave design as per the below network diagram. An additional benefit of adding Sonoma to the radio system design is to retain all the conventional resources at Sonoma, which includes the 700 MHz Mutual Aid simulcast conventional system.

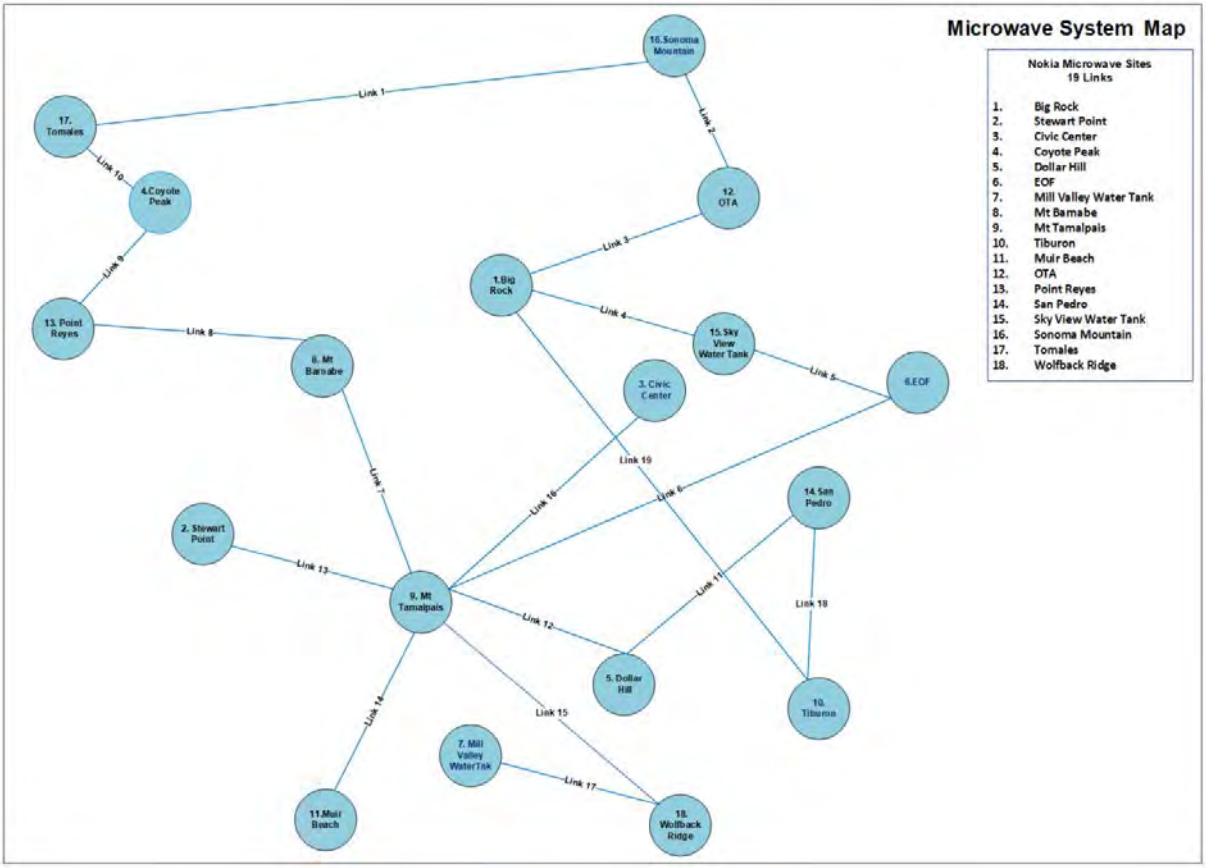
**TOMALES TO OTA BROADCASTING**
MILE 5.85 - CONTROLLING HILL

The detailed equipment list for Sonoma has been provided in Appendix B.

The revised microwave system map has been provided in next page.

Summary of services included for this item is similar to what's listed in section 5.14.6.1 of Motorola's Next Generation Radio Contract for Marin County.

Summary of post-warranty services for this item is similar to what's listed in section 12.5 of Motorola's Next Generation Radio Contract for Marin County.




## 2. Item #8 - Addition of one extra UEM and Zone Watch license

One additional UEM and Zone Watch license has been added to the equipment list – Appendix B. This will provide the functionality of monitoring the radio system at two locations simultaneously.

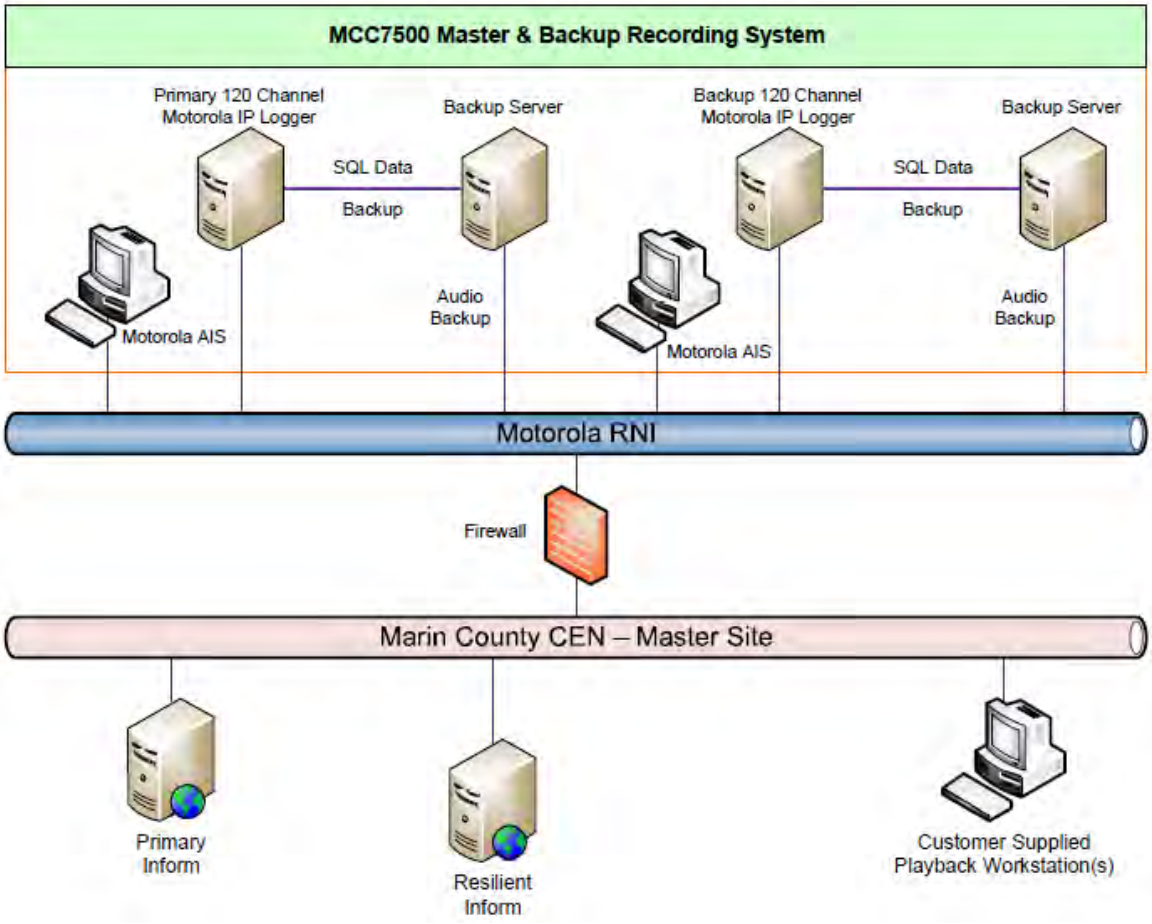
## 3. Item #18 - Addition of "Site Readiness" to Motorola's Scope of Work

Please refer to Appendix A for the Site Readiness Scope of Work (SOW) statement. Equipment list is provided in Appendix B.

## 4. Item #20 and #21 - Addition of redundancy to the NICE radio logging recorder

The NICE redundant radio logging solution was recommended as an option in Section 5.3-C of the contract. The following lists the components of a complete NICE redundant logging solution:

- Parallel 120 Channel Motorola IP Loggers for V7.17 (qty 2)
- Dual LBS (Logging Backup Servers-(qty2) ; note, Storage Center name was changed to LBS
- Audio Archive function
- SQL Database Backup function
- Dedicated Inform Server on the CEN
- Resilient Inform Server on the CEN




## 5. Item #23 - Addition of 12-hour battery back-up to the jail BDA system

A 12-hour battery backup, including installation services, will be added to the jail BDA system. Equipment list in provided in Appendix B.

## 6. Item #26 – Addition of two MCC7500 dispatch console speakers (except EOF)

Additional MCC7500 dispatch console speakers will be added to the dispatch positions as per the below table:

| Dispatch Sites | Speakers Added |
|---|---|
| Marin Backup Center (2 console positions) | 4 |
| Novato PD (3 console positions) | 6 |
| San Rafael PD (4 console positions) | 8 |
| County Fire - Woodacre (3 console positions) | 6 |
| Fairfax PD (1 console position) | 2 |
| County Jail (1 console position) | 2 |
| Radio Shop (1 console position) | 2 |
| EOF (16 console positions) | 16 |
| **TOTAL** | 46 |

### 7. Item #29 - Addition of TDMA feature to 150 Unication G4 Pagers

Quantity of 150 Unication G4 pagers will be upgraded with TDMA functionality.

### 8. Item #32 - Addition of NAS backup server for the radio system

A radio system NAS backup server has been added to the equipment list in Appendix B. This Change Order does not capture the cost of turn up, configuring, or installation of the spares.

### 9. Item #36 - Addition of a spare VMS server

A spare VMS server has been added to the equipment list in Appendix B. This Change Order does not capture the cost of turn up, configuring, or installation of the spares.

# APPENDIX A – SITE READINESS STATEMENT OF WORK

## INTRODUCTION

Motorola has performed detailed site audits in order to identify deficiencies at the existing sites. Motorola identified that installation of new equipment will not be feasible due to space constraints at 8 sites (Pt. Reyes, Stewart Pt., Mt. Barnabe, Big Rock, San Pedro, Dollar Hill, Tiburon, Sonoma). This document details the scope of work for preparing these sites for the installation of the new radio system equipment.

## SAN PEDRO

1. Marin radio shop perform baseline measurements with Motorola ST oversight: effective sensitivity on RMC, and forward and reflective power measurements on Transmit combiners.

   TBAND Impact: Up to 45 minutes site off the air.

2. Relocate legacy Transmit combiners to right against the wall. Short combiner would be located below the dehydrator. New Coax required from the Quantar to combiners new location.

   TBAND Impact: Up to 4 hours transmit antenna off the air, reduced outbound coverage.

3. Relocate Legacy Controller / RX Multicoupler rack (Row 1 Rack 3) 3” to the right to make room for the 25.5” width new DC plant.

   TBAND Impact: Equipment should be able to be moved short distance without powering down. No planned impact.

4. Install new DC plant in location of existing Microwave DC plant. Connect existing legacy equipment to new DC plant.

   TBAND Impact: Microwave can run on battery backup. Site off air for up to 1 hour when moving Quantars from old to new DC plant (when moving the 125A distribution circuit).

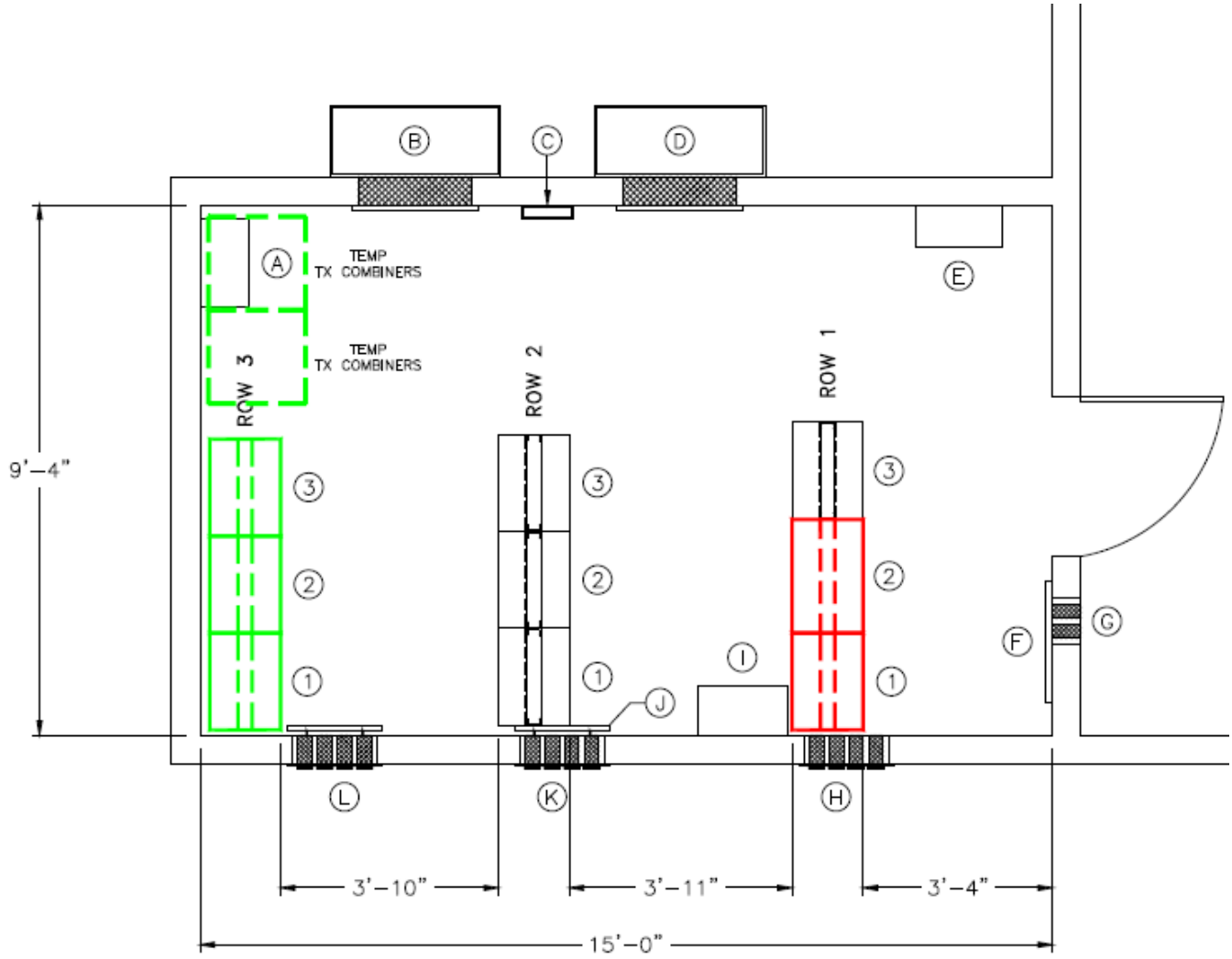
5. After T-Band equipment is moved, Marin radio shop re-perform measurements with Motorola ST oversight: effective sensitivity on RMC, and forward and reflective power measurements on Transmit combiners.

   TBAND Impact: Up to 45 minutes site off the air.

6. Remove legacy LMR DC plant.

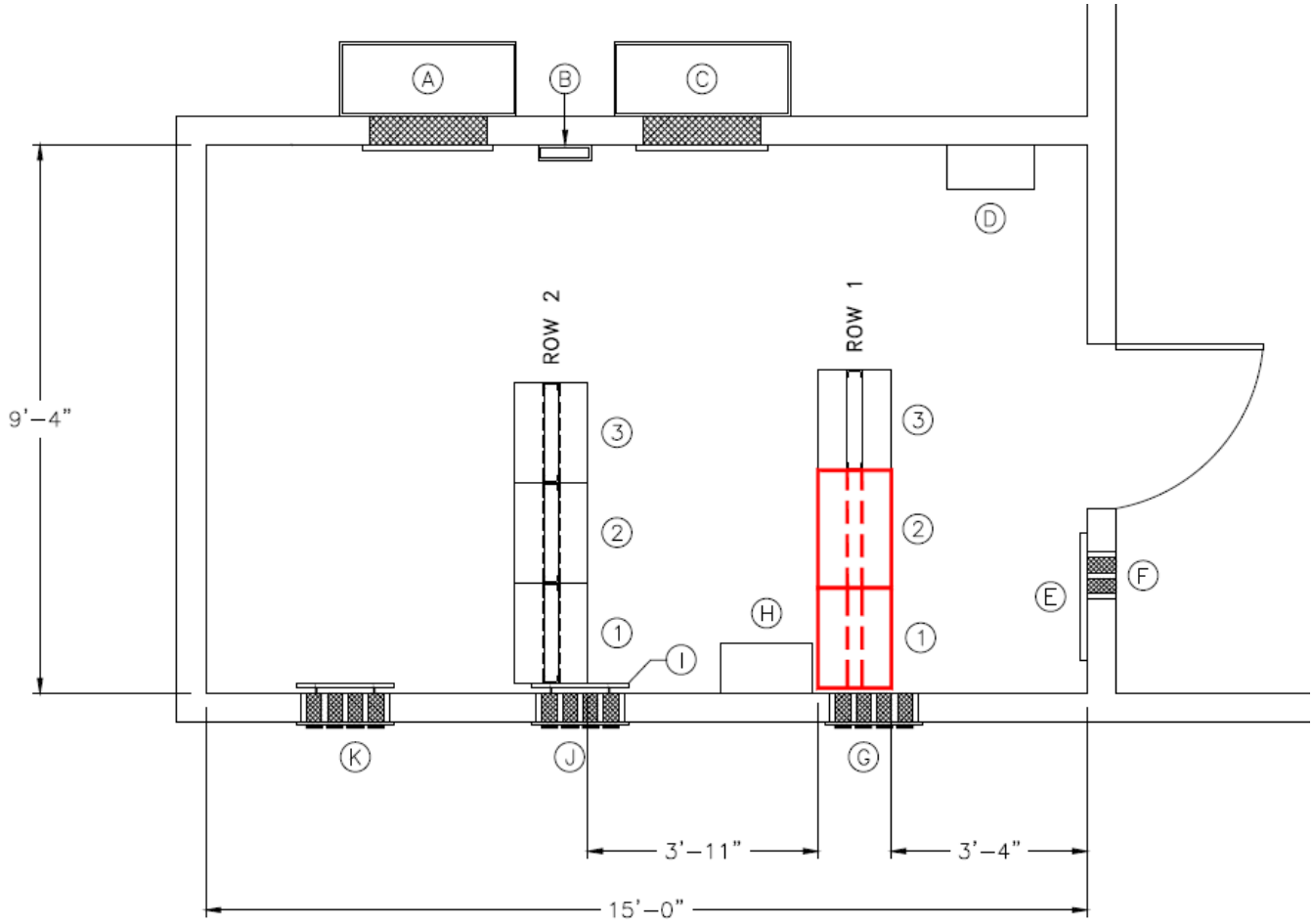
7. Install new Microwave Rack next to the new DC plant (where legacy LMR DC plant was located).
8. Relocate ½ rack of conventional equipment from Row 2 Rack 4 (VCALL San Pedro and Command Channel) into the bottom of the Microwave Rack. Remove this rack after equipment is relocated to allow for better clearance for ESS temp rack location.
9. Install ESS in temp location in row 3 against the wall. Note there would not be clearance to rear of rack during transition.
10. Relocate VFIRE21 MTR2000 conventional radio from Row 2 Rack 2 (Quantar rack) to bottom of Microwave Rack.
11. Remove legacy Quantar racks (Row 2 Rack 1, 2) and legacy Microwave (Row 2 Rack 3).
12. Relocate ESS racks into Row 2 Rack 1, 2, and 3.
13. Re optimize ESS equipment in its permanent location.

# Transition Floor Plan




| SPACE ASSIGNMENTS | | |
|---|---|---|
| ROW | RACK SPACE | DESCRIPTION |
| 1 | 1 | MICROWAVE/CONVENTIONAL (NEW) |
| | 2 | DC POWERPLANT (NEW) |
| | 3 | CONTROLLER/RX MULTICOUPLER |
| 2 | 1 | QUANTARS/MOSCAD |
| | 2 | CHANNEL BANK/QUANTARS |
| | 3 | MICROWAVE |
| 3 | 1 | ESS RACK 01 |
| | 2 | ESS RACK 02 |
| | 3 | ESS RACK 03 |

## Final Floor Plan




| SPACE ASSIGNMENTS | | |
|---|---|---|
| ROW | RACK SPACE | DESCRIPTION |
| 1 | 1 | MICROWAVE/CONVENTIONAL (NEW) |
| | 2 | DC POWERPLANT (NEW) |
| | 3 | CONTROLLER/RX MULTICOUPLER |
| 2 | 1 | ESS RACK 01 |
| | 2 | ESS RACK 02 |
| | 3 | ESS RACK 03 |

## Summary:

- Equipment Relocation – Transmit Combiners, Conventional equipment, Legacy Controller / RX Multicoupler rack , ESS
- ESS location – Temp location, then moved to final location
- Microwave – New rack, top of rack

## TIBURON

1. Marin radio shop perform baseline measurements with Motorola ST oversight: effective sensitivity on RMC, and forward and reflective power measurements on Transmit combiners.

   TBAND Impact: Up to 45 minutes site off the air.

2. Relocate legacy Controller to behind Quantar rack (Row 1 Rack 3). Either rotate 90° or 180° so that front of controller rack is readily accessible for serviceability.

   TBAND Impact: Should be able to move without powering down. Need to cut cable ties to give cables additional slack. No planned impact.

3. Move Quantar racks 3 and 4 in Row 1 3" up to allow room for new 25.5" width DC plant.

   TBAND Impact: Should be able to move without powering down. Need to cut cable ties to give cables additional slack. No planned impact.

4. Install new DC plant in location where legacy Controller was located (Row 1 Rack 2).

   TBAND Impact: Site off air for up to 1 hour when moving Quantars from old to new DC plant (when moving the 125A distribution circuit).

5. Remove legacy LMR DC plant and Microwave DC plant.

6. Install new Microwave where legacy Microwave DC plant was (Row 2 Rack 1).

7. Relocate short combiner behind tall combiner. It appears we can reuse the Coax cables but would need to re-route cable path across middle of cable tray.

8. After T-Band equipment is moved, Marin radio shop re-perform measurements with Motorola ST oversight: effective sensitivity on RMC, and forward and reflective power measurements on Transmit combiners.

   TBAND Impact: Up to 45 minutes site off the air.

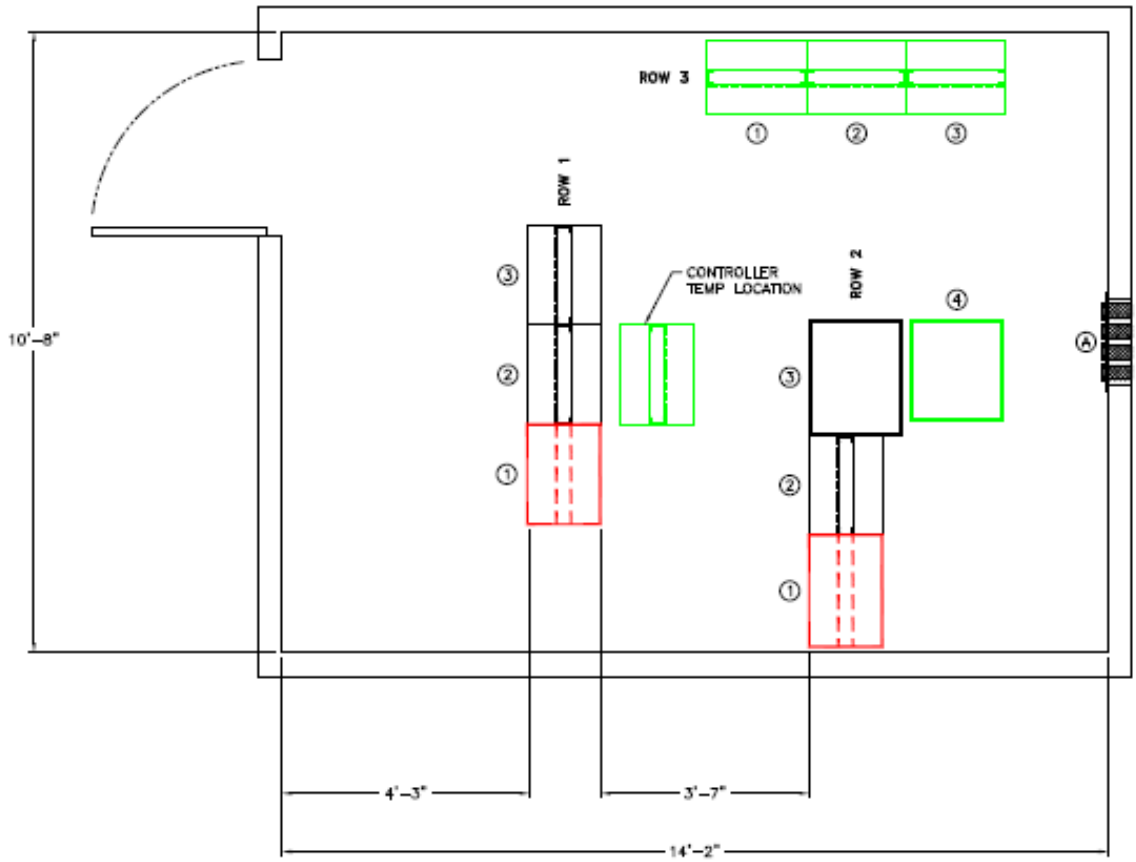
9. Install ESS in temp location against the wall perpendicular to Row 2.

10. Remove legacy combiners and legacy microwave.

11. Relocate ESS into permanent location in Row 2 (where combiners and microwave were located).

12. Re optimize ESS equipment in its permanent location.

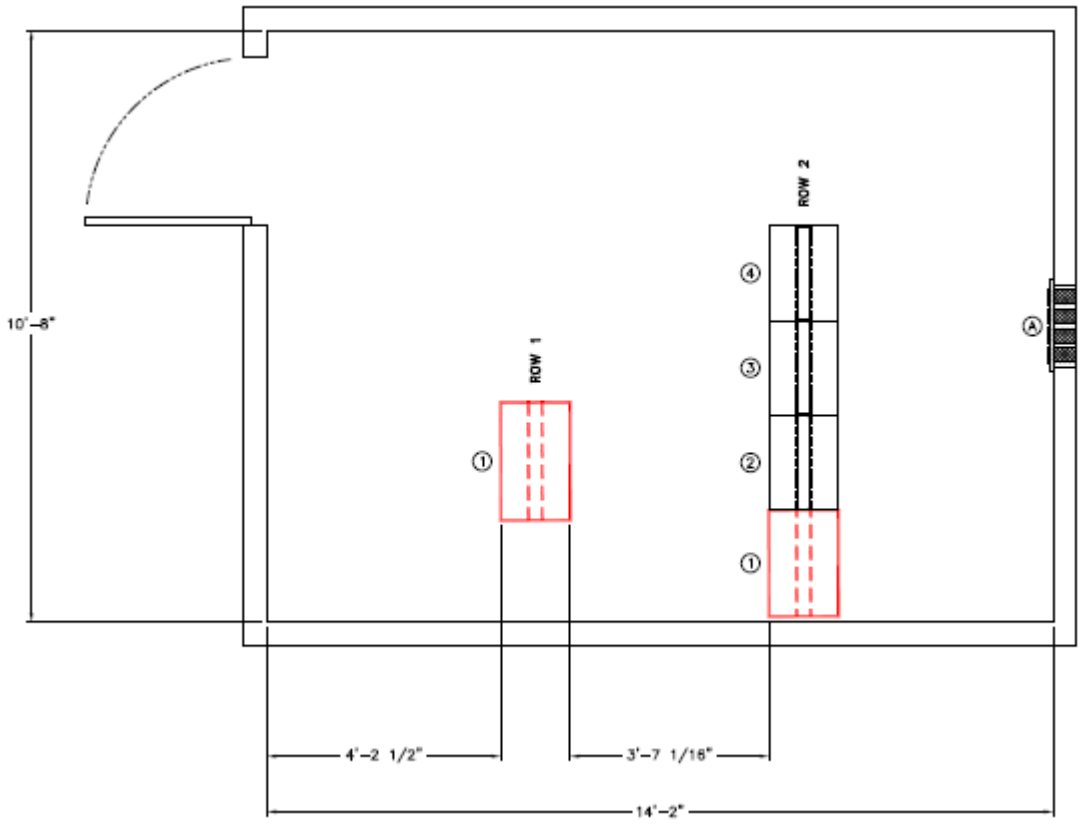
# Transition Floor Plan




## SPACE ASSIGNMENTS

| ROW | RACK SPACE | DESCRIPTION |
|---|---|---|
| 1 | 1 | DC POWERPLANT (NEW) |
| | 2 | QUANTAR |
| | 3 | QUANTAR |
| 2 | 1 | MICROWAVE (NEW) |
| | 2 | LEGACY MICROWAVE |
| | 3 | TX COMBINER |
| | 4 | TX COMBINER (TEMPORARY LOCATION) |
| 3 | 1 | ESS RACK 01 (TEMPORARY LOCATION) |
| | 2 | ESS RACK 02 (TEMPORARY LOCATION) |
| | 3 | ESS RACK 03 (TEMPORARY LOCATION) |

# Final Floor Plan




| SPACE ASSIGNMENTS | | |
|---|---|---|
| ROW | RACK SPACE | DESCRIPTION |
| 1 | 1 | DC PLANT (NEW) |
| 2 | 1 | MICROWAVE (NEW) |
| | 2 | ESS RACK 01 |
| | 3 | ESS RACK 02 |
| | 4 | ESS RACK 03 |

# Summary:

- Equipment Relocation – Legacy Controller, Quantar Racks (3”), Short Transmit combiner, ESS
- ESS location – Temp location, then moved to final location
- Microwave – New rack, top of rack

# DOLLAR HILL

1. Marin radio shop perform baseline measurements with Motorola ST oversight: effective sensitivity on RMC, and forward and reflective power measurements on Transmit combiners.

   TBAND Impact: Up to 45 minutes site off the air.

2. Slide Quantar and Legacy Controller rack 3" to the right to make room for the new DC plant (25.5" width). Reuse existing cabling. Need to cut cable ties, remove bend and cut corner across cable tray for Quantar to Combiners coax cabling.

3. Install new DC plant at Row 2 Rack 1 and power legacy equipment from the new DC plant.

   TBAND Impact: Site off air for up to 1 hour when moving Quantars from old to new DC plant (when moving the 125A distribution circuit).

4. After T-Band equipment is moved, Marin radio shop re-perform measurements with Motorola ST oversight: effective sensitivity on RMC, and forward and reflective power measurements on Transmit combiners.

   TBAND Impact: Up to 45 minutes site off the air.

5. Remove LMR legacy DC plant and MW DC plant.

6. Install Microwave into Row 1 Rack 1.

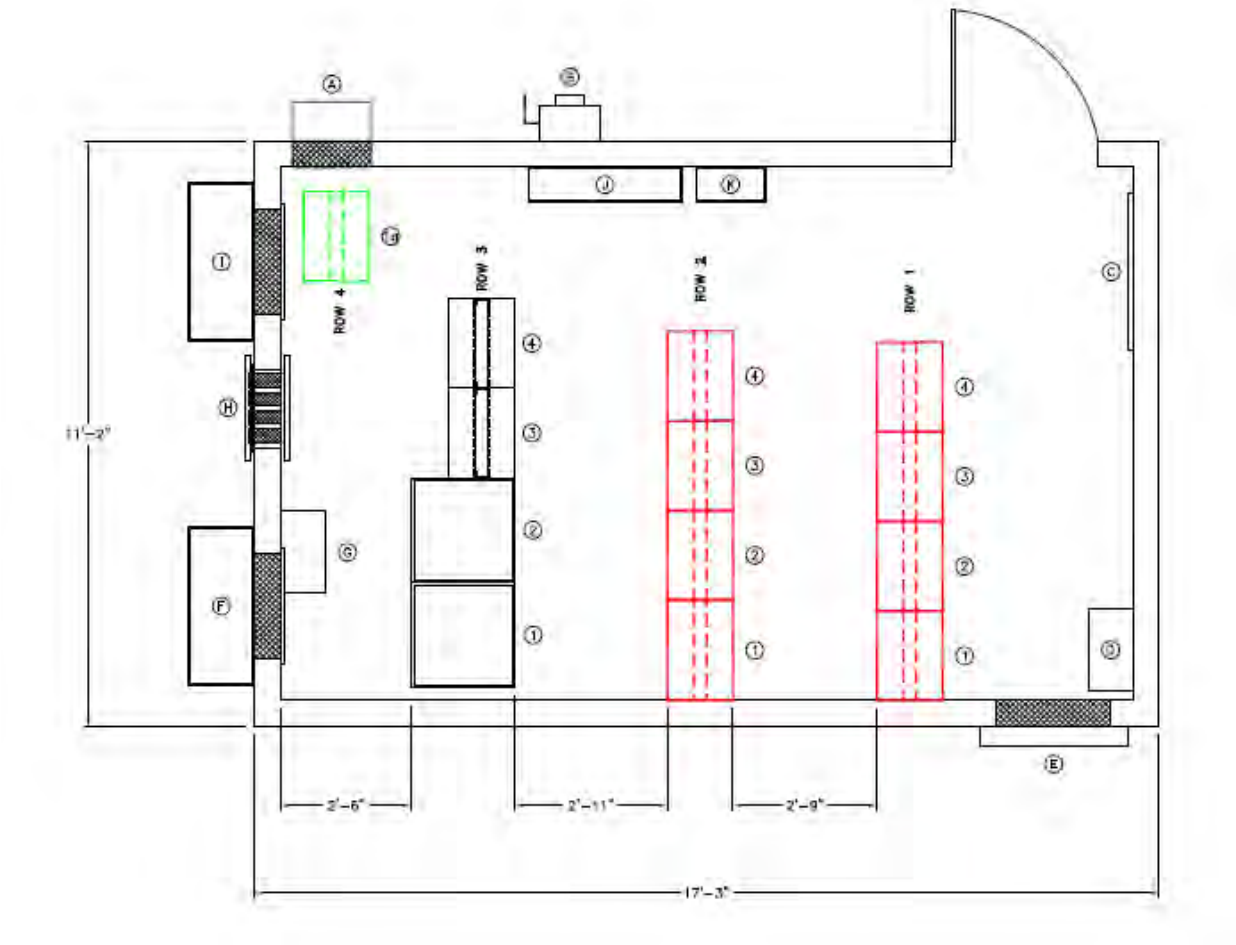
7. Relocate conventional rack to corner of room (where desk is presently located).

8. Install ESS into Row 1 Rack 2, 3, and 4 (permanent location).

9. Remove Quantar and Legacy Controller racks, Remove Transmit combiners.

10. Relocate conventional rack to Row 2 Rack 2 (next to the DC plant).

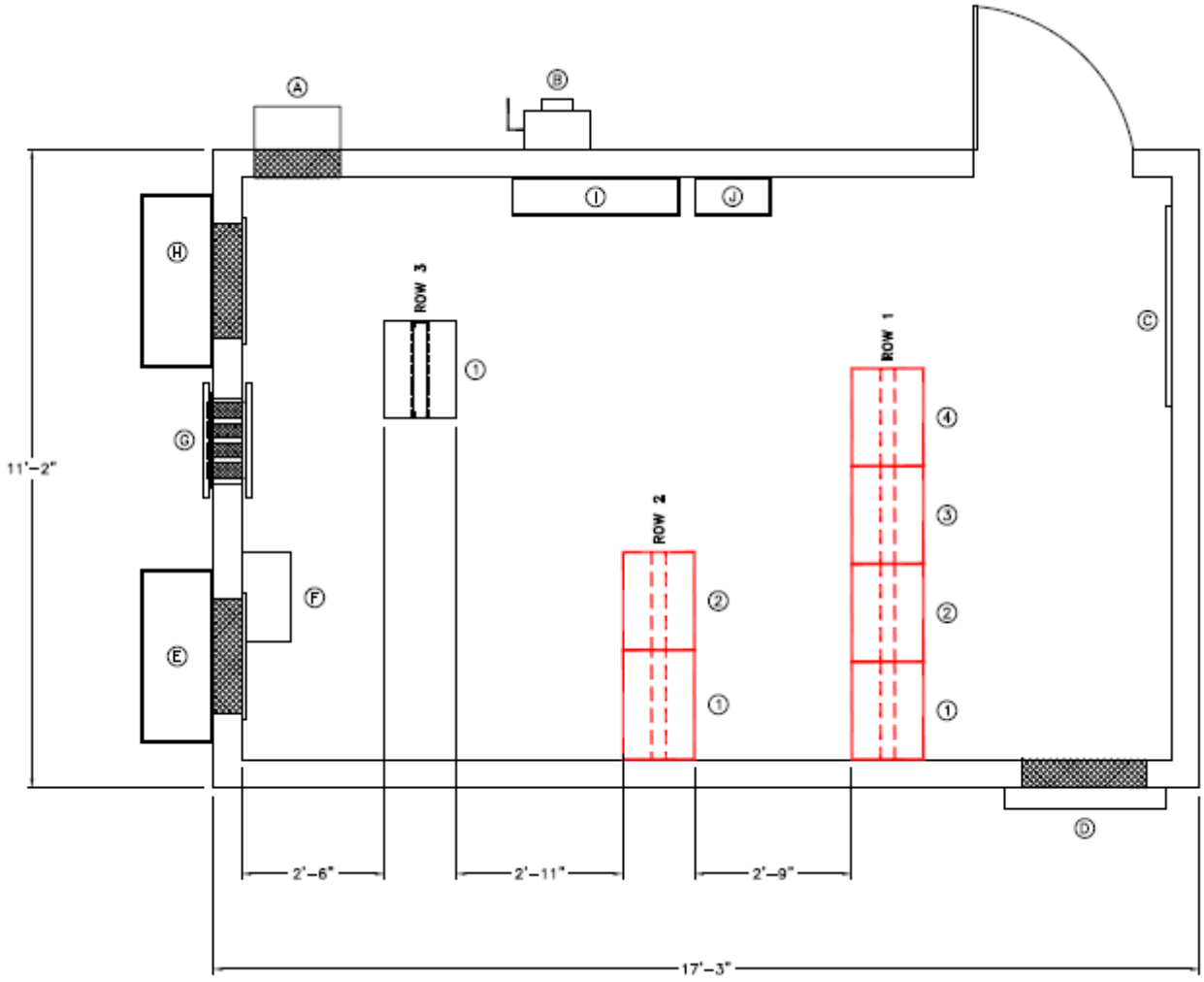
# Transition Floor Plan




## SPACE ASSIGNMENTS

| ROW | RACK SPACE | DESCRIPTION |
|---|---|---|
| 1 | 1 | MICROWAVE (NEW) |
| | 2 | ESS RACK 01 (NEW) |
| | 3 | ESS RACK 02 (NEW) |
| | 4 | ESS RACK 03 (NEW) |
| 2 | 1 | DC POWERPLANT (NEW) |
| | 2 | QUANTAR/CHANNEL BANK |
| | 3 | QUANTAR/MOSCAD |
| | 4 | REMOTE SITE CONTROLLER |
| 3 | 1 | TX COMBINER/5 CHANNEL |
| | 2 | TX COMBINER/4 CHANNEL |
| | 3 | RX MULTICOUPLER/FREQUENCY STANDARD |
| | 4 | MICROWAVE |
| 4 | 1 | CONVENTIONAL |

## Final Floor Plan




### SPACE ASSIGNMENTS

| ROW | RACK SPACE | DESCRIPTION |
|---|---|---|
| 1 | 1 | MICROWAVE (NEW) |
| | 2 | ESS RACK NO.1 (NEW) |
| | 3 | ESS RACK NO.2 (NEW) |
| | 4 | ESS RACK NO.3 (NEW) |
| 2 | 1 | DC POWERPLANT (NEW) |
| | 2 | CONVENTIONAL |
| 3 | 1 | CONVENTIONAL |

## Summary:

- Equipment Relocation – slide Quantar and Legacy Controller 3", Conventional Rack
- ESS location – final location
- Microwave – new rack, top of rack

# PT. REYES

1. Marin radio shop perform baseline measurements with Motorola ST oversight: effective sensitivity on RMC, and forward and reflective power measurements on Transmit combiners.

   TBAND Impact: Up to 45 minutes site off the air.

2. Install new DC plant at end of row next to conventional. Make sure to allow 36" from wall mounted AC panel. Connect legacy equipment to new DC plant.

   TBAND Impact: Site off air for up to 1 hour when moving Quantars from old to new DC plant (when moving the 125A distribution circuit).

3. Remove legacy DC plant.

4. Slide Legacy Controller to behind rack 3, 90 degrees, front to face towards rack 1. Appears to be enough slack in cables but will be tight. If required cut cable tray for slack (replace cable tray if this is done after legacy equipment is removed). Disconnect ground cable and run a new ground cable to the Legacy Controller.

5. After T-Band equipment is moved, Marin radio shop re-perform measurements with Motorola ST oversight: effective sensitivity on RMC, and forward and reflective power measurements on Transmit combiners.

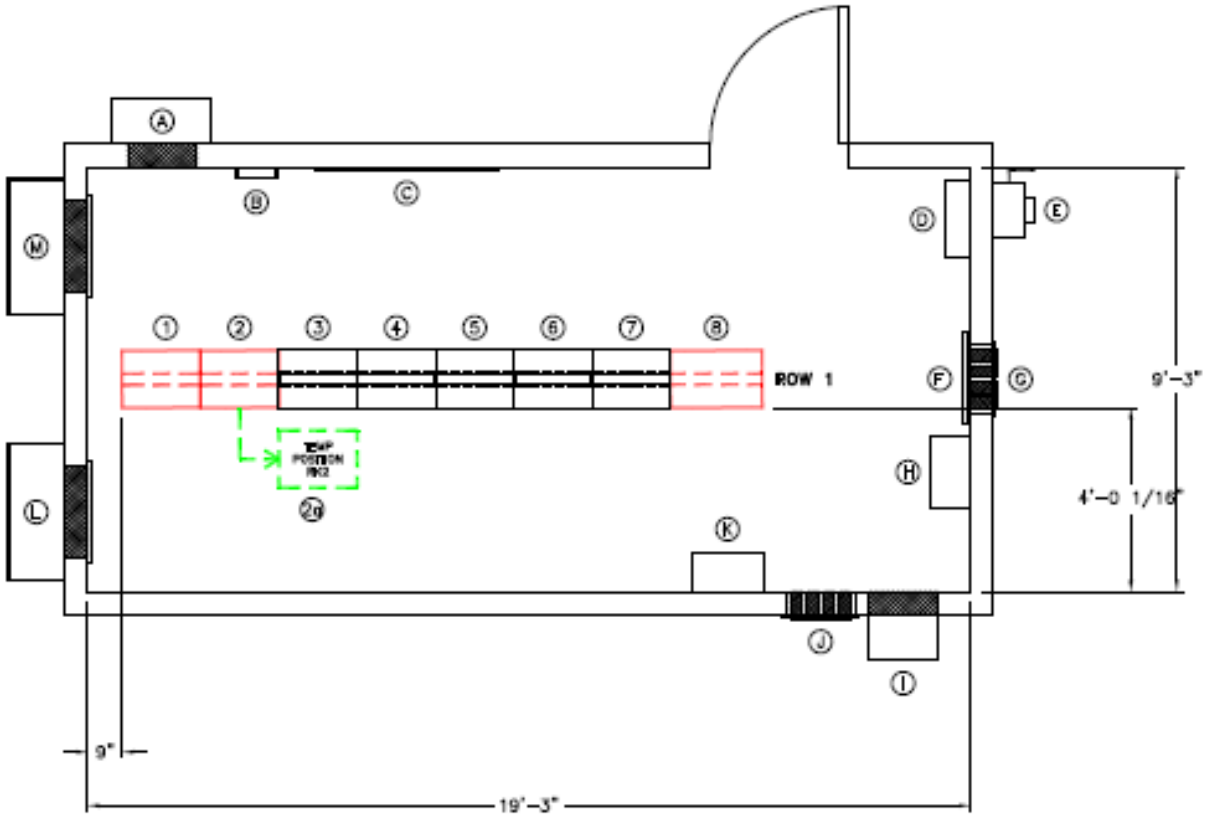
   TBAND Impact: Up to 45 minutes site off the air.

6. Install ESS in rack 1 and 2 (permanent location).

7. Install Microwave at top of conventional rack (Rack 7).

8. Remove Quantar and legacy microwave equipment.

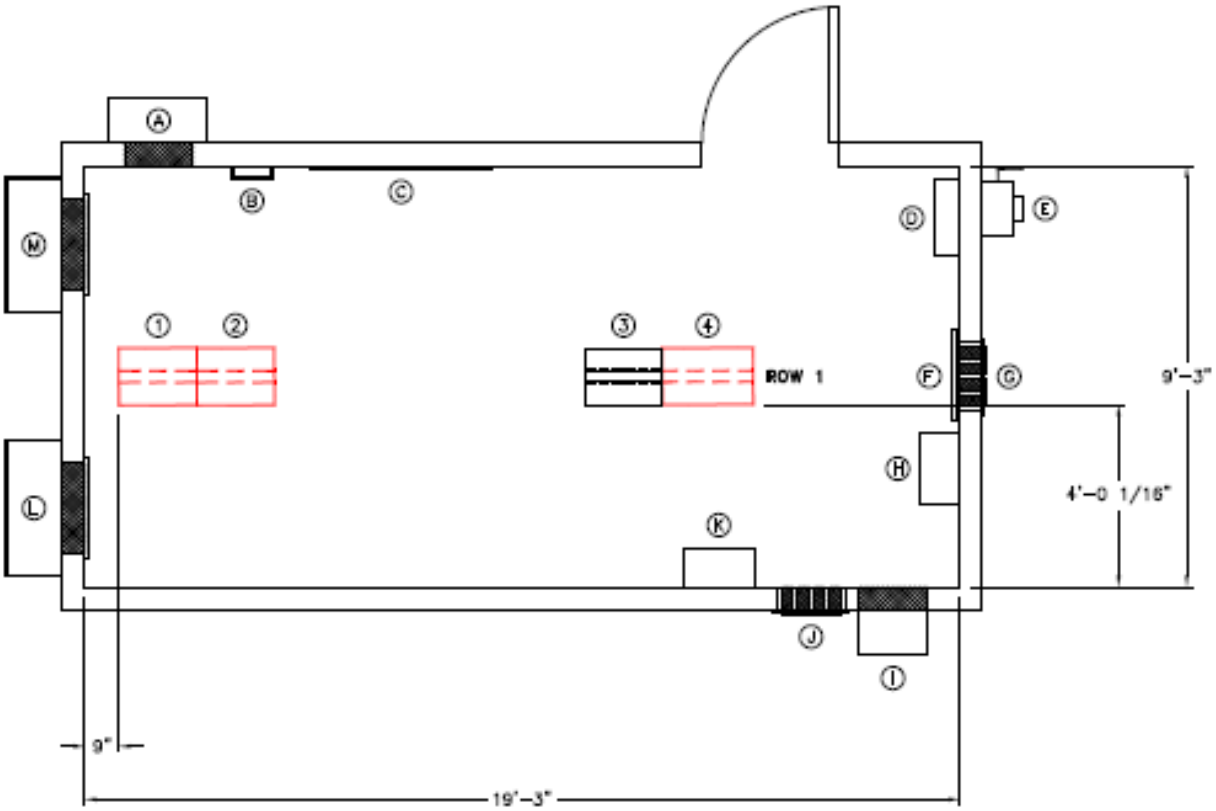
# Transition Floor Plan




## SPACE ASSIGNMENTS

| ROW | RACK SPACE | DESCRIPTION |
|---|---|---|
| 1 | 1 | ESS RACK 01 (NEW) |
| | 2 | ESS RACK 02 (NEW) |
| | 2a | CONTROLLER CABINET |
| | 3 | RX MULTICOUPLER/MOSCAD |
| | 4 | QUANTARS/CHANNEL BANK |
| | 5 | TX COMBINERS |
| | 6 | MICROWAVE |
| | 7 | GGM RADIOS & MICROWAVE (NEW) |
| | 8 | DC PLANT (NEW) |

## Final Floor Plan




| SPACE ASSIGNMENTS | | |
|---|---|---|
| ROW | RACK SPACE | DESCRIPTION |
| 1 | 1 | ESS RACK 01 (NEW) |
| | 2 | ESS RACK 02 (NEW) |
| | 3 | GGM RADIOS & MICROWAVE (NEW) |
| | 4 | DC POWERPLANT (NEW) |

## Summary:

- Equipment Relocation – Slide LEGACY CONTROLLER
- ESS location – Final location
- Microwave – Existing rack, top of rack

## STEWART POINT

1. Marin radio shop perform baseline measurements with Motorola ST oversight: effective sensitivity on RMC, and forward and reflective power measurements on Transmit combiners.

   TBAND Impact: Up to 45 minutes site off the air.

2. Relocate master ground bus.

3. Relocate combiner into corner. Will need to redo RF coax cabling.

   TBAND Impact: Up to 4 hours transmit antenna off the air, reduced outbound coverage.

4. Install new DC plant where combiner is (Rack 2) and connect legacy equipment to new plant.

   TBAND Impact: Site off air for up to 1 hour when moving Quantars from old to new DC plant (when moving the 125A distribution circuit).

5. After T-Band equipment is moved, Marin radio shop re-perform measurements with Motorola ST oversight: effective sensitivity on RMC, and forward and reflective power measurements on Transmit combiners.

   TBAND Impact: Up to 45 minutes site off the air.

6. Decommission and remove legacy DC plant (Rack 1).

7. Install new Microwave in Rack 1.

8. Install ESS in temp location against wall (behind Rack 1 and 2).

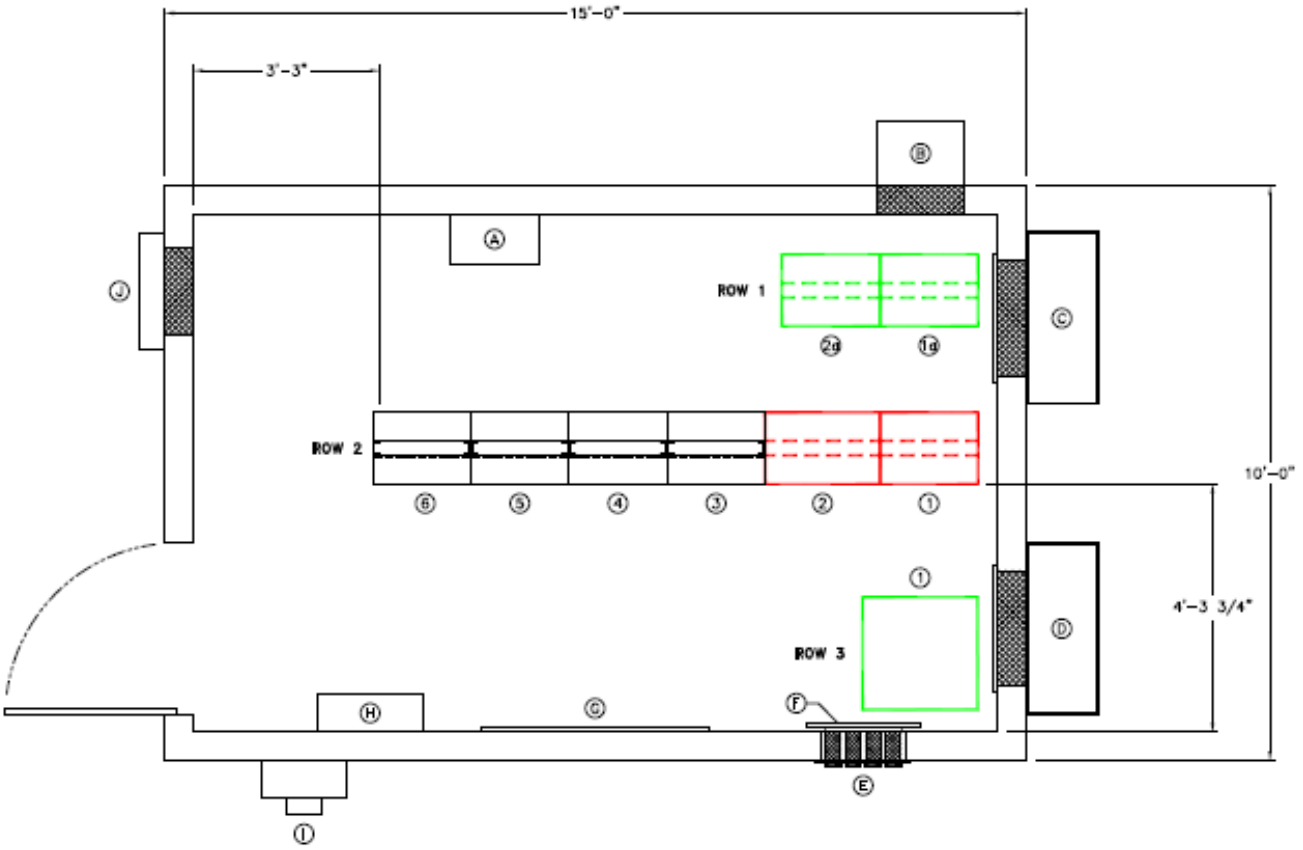
9. Relocate GTR Conventional into New Microwave Rack.

10. Decommission Quantar and MOSCAD racks (Rack 3 and 4) remove legacy Microwave (Rack 5).

11. Move ESS to final location (Rack 3 and 4).

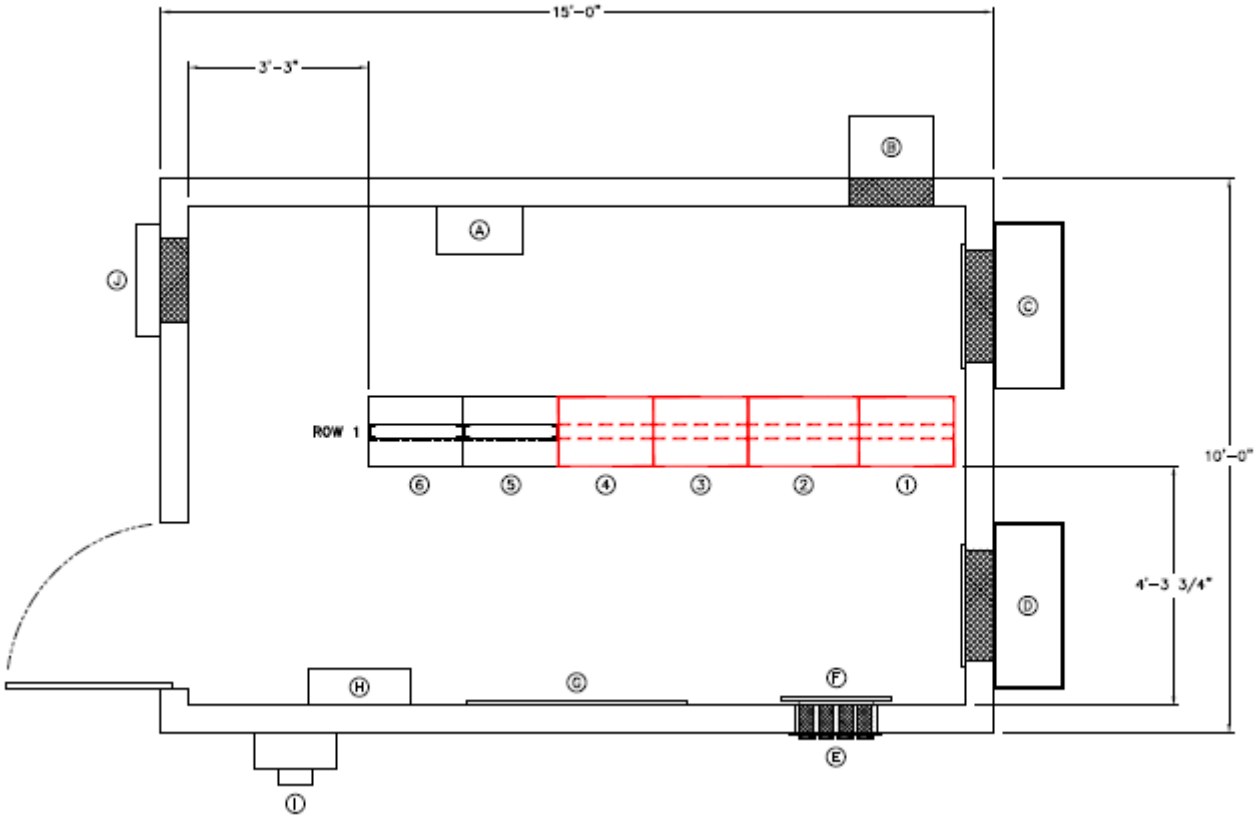
12. Re optimize ESS equipment in its permanent location.

# Transition Floor Plan




| SPACE ASSIGNMENTS | | |
|---|---|---|
| ROW | RACK SPACE | DESCRIPTION |
| 1 | 1a | ESS RACK 01 |
| | 2a | ESS RACK 02 |
| 2 | 1 | MICROWAVE/CONVENTIONAL (NEW) |
| | 2 | DC POWERPLANT (NEW) |
| | 3 | QUANTARS |
| | 4 | RX MULTICOUPLER/CHANNEL BANK/MOSCAD |
| | 5 | MICROWAVE |
| | 6 | PAGING |
| 3 | 1 | TX COMBINERS (RELOCATED) |

# Final Floor Plan




| SPACE ASSIGNMENTS | | |
|---|---|---|
| ROW | RACK SPACE | DESCRIPTION |
| 1 | 1 | MICROWAVE/CONVENTIONAL (NEW) |
| | 2 | DC POWERPLANT (NEW) |
| | 3 | ESS RACK 02 (NEW) |
| | 4 | ESS RACK 01 (NEW) |
| | 5 | EMPTY |
| | 6 | EMPTY |

## Summary:

- Equipment Relocation – Master ground bus, combiner, ESS
- ESS location – Temp location, final location
- Microwave – New Rack, top of rack

# MT. BARNABE

1. Marin radio shop perform baseline measurements with Motorola ST oversight: effective sensitivity on RMC, and forward and reflective power measurements on Transmit combiners.

   TBAND Impact: Up to 45 minutes site off the air.

2. Relocate legacy controller to make room for new DC rack.

   TBAND Impact: Should be able to move without powering down. Need to cut cable ties to give cables additional slack.  No planned impact.

3. Relocate conventional GTR and Cisco router to bottom of legacy microwave rack and remove this rack (Rack 5) to clear space for New DC Rack (25.5” Width).

4. Install new DC plant into Rack 4 and connect legacy equipment to new DC plant.

   TBAND Impact: Site off air for up to 1 hour when moving Quantars from old to new DC plant (when moving the 125A distribution circuit). Microwave hop to be transitioned one at a time, so should be no impact as long as no other issues in integrity of the ring.

5. After T-Band equipment is moved, Marin radio shop re-perform measurements with Motorola ST oversight: effective sensitivity on RMC, and forward and reflective power measurements on Transmit combiners.

   TBAND Impact: Up to 45 minutes site off the air.

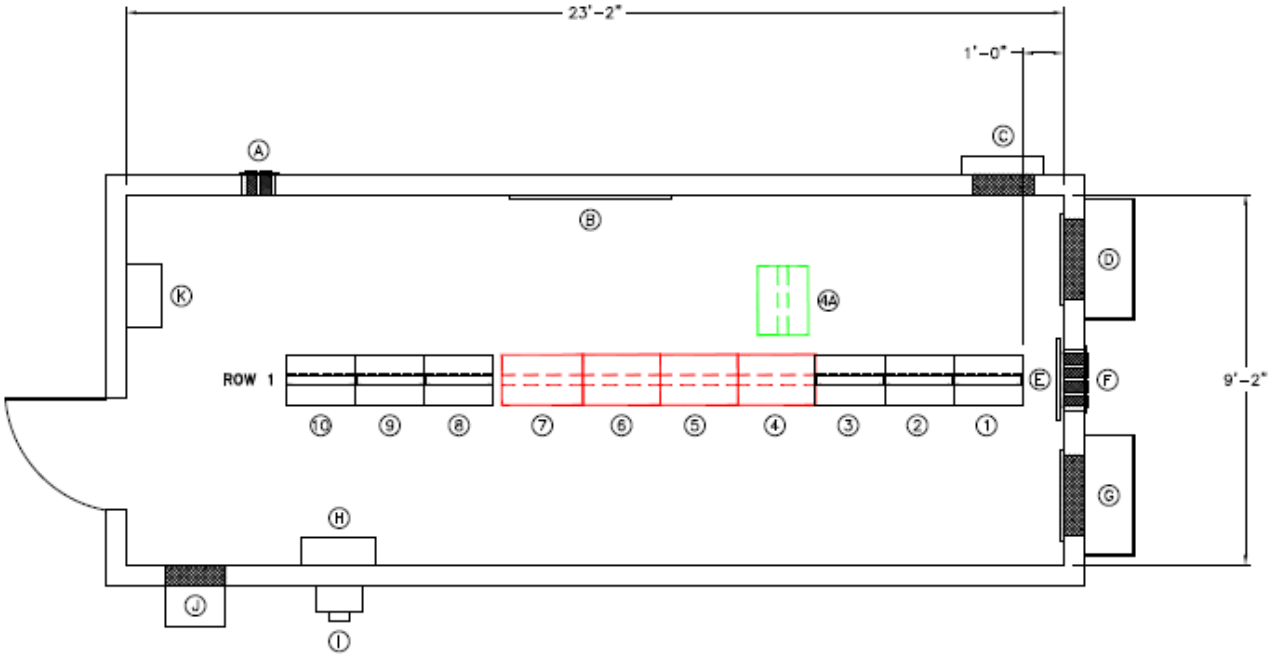
6. Decommission LMR and MW DC.

7. Install New Microwave in Rack 5.

8. Install ESS in Rack 6 and 7.

9. Decommission Quantar, MOSCAD, and legacy Microwave.

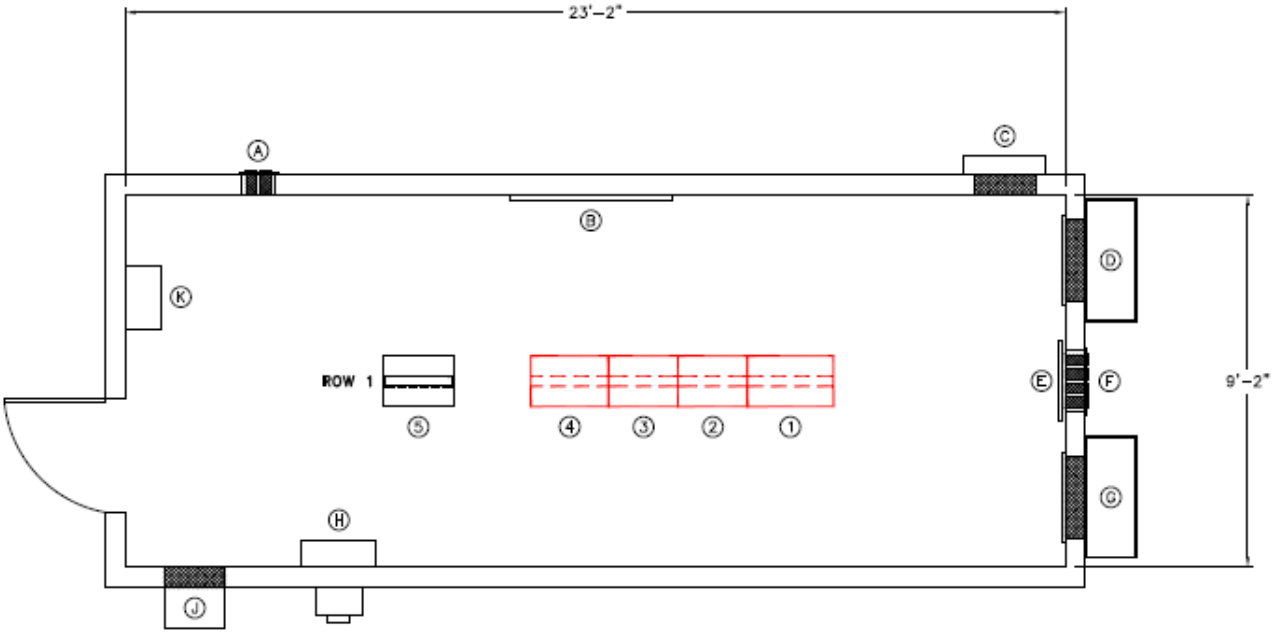
# Transition Floor Plan




## SPACE ASSIGNMENTS

| ROW | RACK SPACE | DESCRIPTION |
|---|---|---|
| 1 | 1 | TX COMBINERS |
| | 2 | QUANTAR/CHANNEL BANK |
| | 3 | RX MULTICOUPLER/MOSCAD |
| | 4 | DC POWERPLANT (NEW) |
| | 4A | CONTROLLER CABINET (NEW) |
| | 5 | MICROWAVE (NEW) |
| | 6 | ESS RACK 02 (NEW) |
| | 7 | ESS RACK 01 (NEW) |
| | 8 | MICROWAVE |
| | 9 | MICROWAVE/CONVENTIONAL |
| | 10 | MICROWAVE |

# Final Floor Plan




| SPACE ASSIGNMENTS | | |
|---|---|---|
| ROW | RACK SPACE | DESCRIPTION |
| 1 | 1 | DC POWERPLANT (NEW) |
| | 2 | MICROWAVE (NEW) |
| | 3 | ESS RACK 02 |
| | 4 | ESS RACK 01 |
| | 5 | MICROWAVE/CONVENTIONAL |

## Summary:

- Equipment Relocation – Legacy controller, conventional
- ESS location – Final location
- Microwave – New rack, top of rack

# BIG ROCK

1. Marin radio shop perform baseline measurements with Motorola ST oversight: effective sensitivity on RMC, and forward and reflective power measurements on Transmit combiners.

   TBAND Impact: Up to 45 minutes site off the air.

2. Relocate conventional rack next to Quantars. Note there would no longer be 36" in front of panel, but panel could still be opened.

3. Remove battery rack.

4. Install new DC next to wall (same location as prior conventional rack which has been relocated).

   TBAND Impact: Site off air for up to 1 hour when moving Quantars from old to new DC plant (when moving the 125A distribution circuit).

5. After T-Band equipment is moved, Marin radio shop re-perform measurements with Motorola ST oversight: effective sensitivity on RMC, and forward and reflective power measurements on Transmit combiners.

   TBAND Impact: Up to 45 minutes site off the air.

6. Decommission LMR and MW legacy DC.

7. Install new ESS racks to left of DC plant.

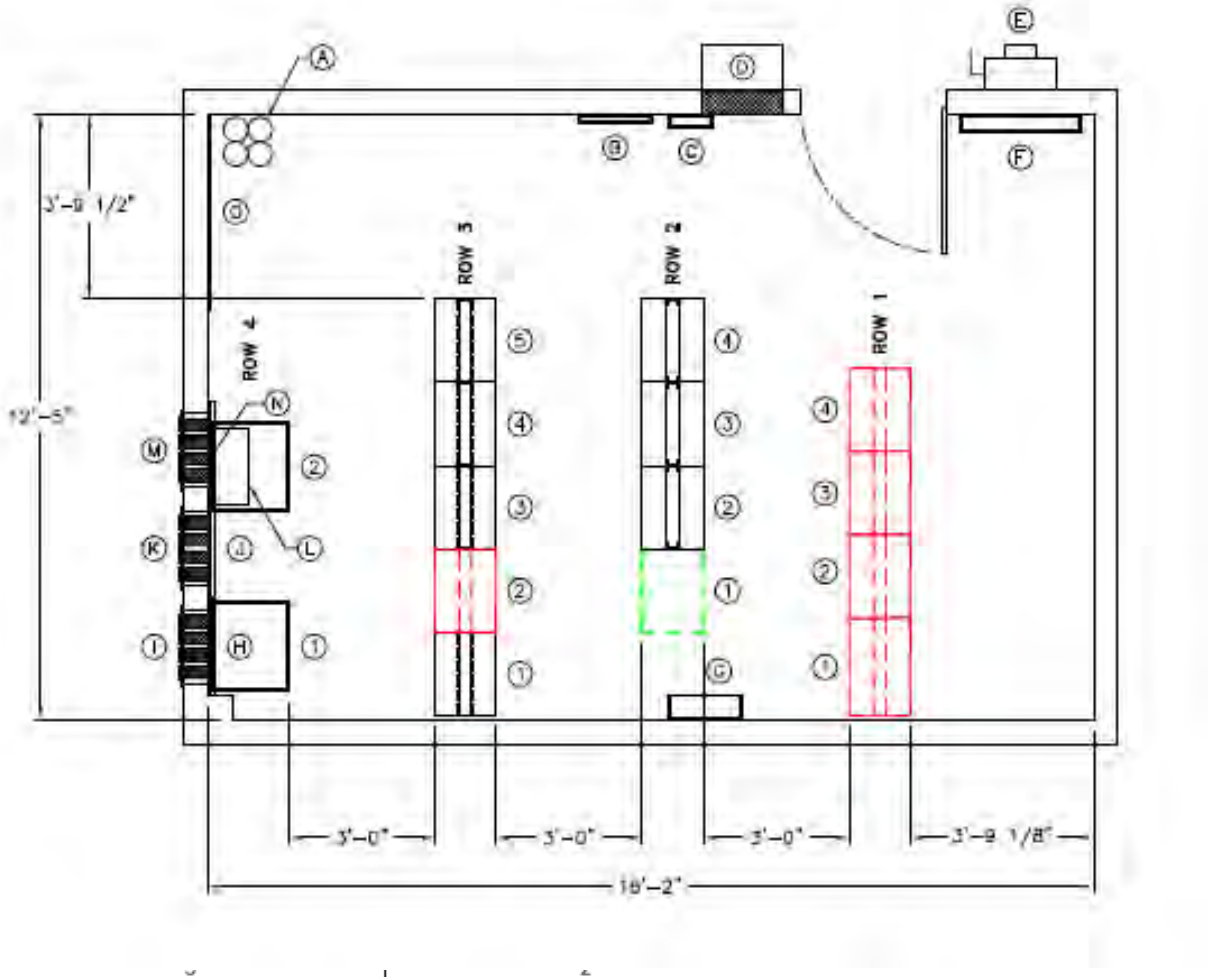
8. Remove unused Constellation radios (Big Rock to Civic Center) Row 3 Rack 2 to make room for new Nokia Microwave.

9. Install MW at top of rack in newly free rack space.

10. Decommission Quantars and legacy Microwave.

11. Slide conventional to right for final location, now there would be 36" clearance for the AC panel.

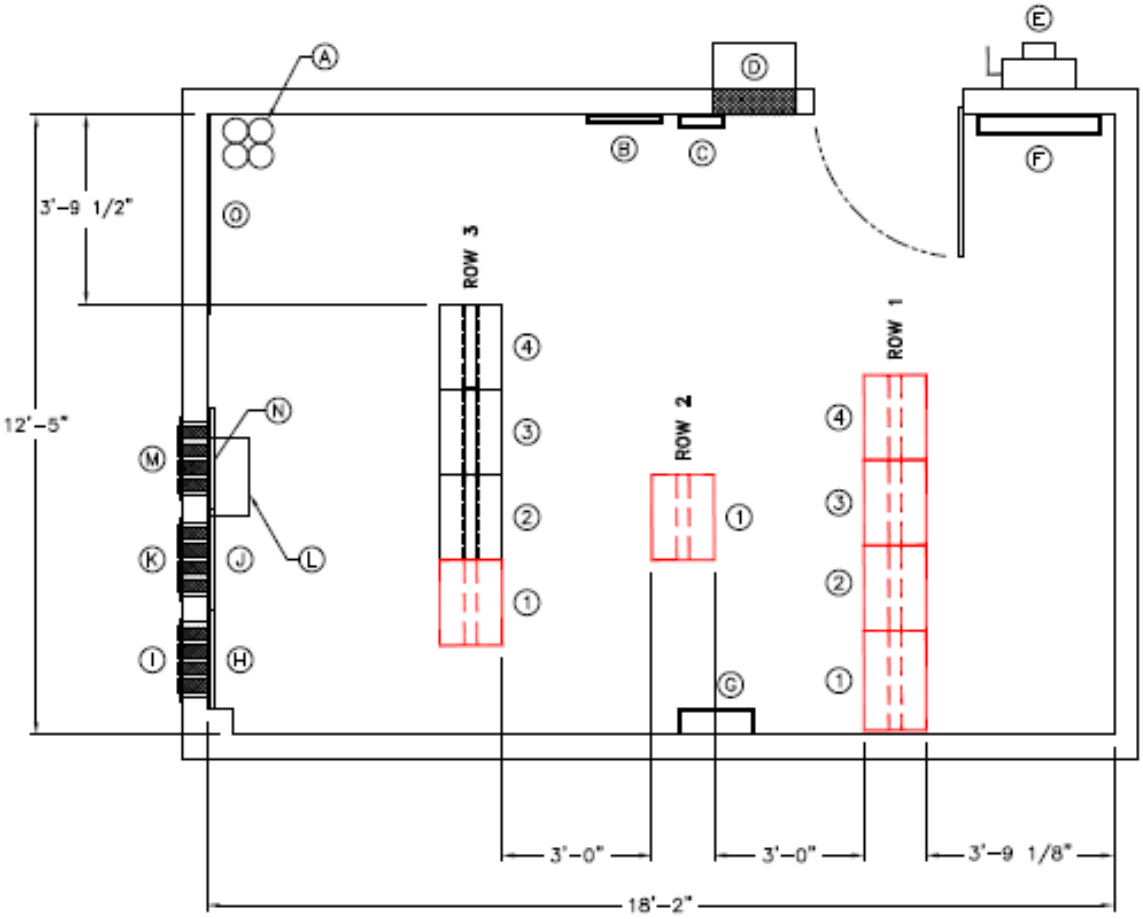
# Transition Floor Plan




## SPACE ASSIGNMENTS

| ROW | RACK SPACE | DESCRIPTION |
|---|---|---|
| 1 | 1 | DC POWERPLANT (NEW) |
| | 2 | ESS RACK 03 (NEW) |
| | 3 | ESS RACK 02 (NEW) |
| | 4 | ESS RACK 01 (NEW) |
| 2 | 1 | CONVENTIONAL (TEMPORARILY RELOCATED) |
| | 2 | QUANTARS |
| | 3 | RX MULTICOUPLER |
| | 4 | QUANTARS/CHANNEL BANK |
| 3 | 1 | MICROWAVE |
| | 2 | MICROWAVE/LEGACY MICROWAVE (NEW) |
| | 3 | MICROWAVE |
| | 4 | MICROWAVE |
| | 5 | UHF |
| 4 | 1 | TX COMBINERS |
| | 2 | TX COMBINERS |

# Final Floor Plan




## SPACE ASSIGNMENTS

| ROW | RACK SPACE | DESCRIPTION |
|---|---|---|
| 1 | 1 | DC POWERPLANT (NEW) |
| | 2 | ESS RACK 03 (NEW) |
| | 3 | ESS RACK 02 (NEW) |
| | 4 | ESS RACK 01 (NEW) |
| 2 | 1 | CONVENTIONAL (NEW) |
| 3 | 1 | MICROWAVE (NEW) |
| | 2 | MICROWAVE |
| | 3 | MICROWAVE |
| | 4 | UHF |

# Summary:

- Equipment Relocation – conventional rack
- ESS location – final location
- Microwave – existing rack, top of rack

## SONOMA

1. Relocate conventional equipment and Cisco switch from right most rack to Rack 2 (Rack next to combiners).
2. Install DC plant and Microwave in a single 19” rack in location where conventional was previously located. The DC plant will only power the new microwave and legacy equipment will not be connected to it.
3. Decommission Quantars and legacy Microwave.

# APPENDIX B – EQUIPMENT LIST

# Equipment List for Remaining Items

| System | Site | SysSeg | Item Num | Total Qty | Nomenclature | Description |
|---|---|---|---|---|---|---|
| MASTER SITE | EOF | LIC | 3 | 1 | SQM01SUM0273 | MASTER SITE CONFIGURATION |
| LICENSE | EOF | UEM | 3a | 1 | UA00146AA | ADD: UNIFIED EVENT MANAGER (UEM) |
| LICENSE | EOF | ZONEWATCH | 3b | 1 | UA00141AA | ADD: ZONEWATCH GRID & CTRL |
| IP LOGGER | EOF | AIS | 4 | 1 | B1933 | MOTOROLA VOICE PROCESSOR MODULE |
| IP LOGGER | EOF | AIS | 4a | 1 | CA00288AB | ADD: MCC 7500 ARCHIVING INTERFACE SERVER SOFTWARE LICENSE |
| IP LOGGER | EOF | AIS | 4b | 1 | CA00140AA | ADD: AC LINE CORD, NORTH AMERICAN |
| IP LOGGER | EOF | AIS | 4c | 1 | CA00147AF | ADD: MCC 7500 SECURE OPERATION |
| IP LOGGER | EOF | AIS | 4d | 1 | CA00182AB | ADD: AES ALGORITHM |
| IP LOGGER | EOF | AIS | 4e | 1 | CA00143AC | ADD: DES-OFB ALGORITHM |
| IP LOGGER | EOF | AIS | 5 | 1 | TT3225 | Z2 MINI WORKSTATION 258G 8G NON RET |
| IP LOGGER | EOF | AIS | 6 | 1 | T7885 | MCAFEE WINDOWS AV CLIENT |
| IP LOGGER | EOF | AIS | 7 | 1 | BLN1297 | VPM POWER SUPPLY MOUNTING KIT |
| IP LOGGER | EOF | AIS | 8 | 1 | T8126 | FORTINET FIREWALL APPLIANCE |
| IP LOGGER | EOF | AIS | 9 | 1 | SQM01SUM0205 | GGM 8000 GATEWAY |
| IP LOGGER | EOF | AIS | 9a | 1 | CA01616AA | ADD: AC POWER |
| IP LOGGER | EOF | AIS | 10 | 1 | CLN1856 | 2620-24 ETHERNET SWITCH |
| IP LOGGER | EOF | NICE | 11 | 1 | DQ NICE UPgrd | NICE  Logger UPgrade "Redundant |
| DSP SPKR | DISPATCH | MCC7500 | 12 | 46 | B1912 | MCC SERIES DESKTOP SPEAKER |
| TDMA PAGERS | PAGERS | TDMA | 14 | 150 | DQPAGERTDMAUPRD | TDMA PAGER UPGRADE |
| NAS SVR | EOF | NAS | 15 | 1 | DSQNAP4BAYW4HDDS | QNAP TS-453A 4-BAY WITH 4 SEAGATE 2TB NAS HDD |
| VMS SVR | EOF | SPARESCORE | 16 | 1 | DLN7009 | FRE: DL380 G9 900GB DISK WD2 |
| INVERTER | Multiple Sites | SITE READINESS | 17a | 7 | DS265503 | ESI SERIES INVERTER, 48VDC INPUT, 120VAC OUTPUT, 1KVA/800W |
| BATTERY BACKUP | JAIL BDA | BATTERY BACKUP | 18 | 1 | 6160-110-24-NR | BIRD 12 HOUR BATTERY BACKUP IN NEMA4 ENCLOSURE |

# Sonoma Link Equipment List

| Item | Part Number | Sonoma Link Description | OTA BROADCASTING | SONOMA MT | TOMALES |
|---|---|---|---|---|---|
| 1.00 | | **9500 MPR Microwave Switching Shelf (MSS)** | | | |
| 1.01 | 3EM22715AH | 9500 MPR Shelf Kit w/Alarm FAN Evo-HSv3 | 1 | 1 | 1 |
| 1.02 | 3EM24105AA | Fan Alarm Cable - 25 foot | 1 | 1 | 1 |
| 1.03 | 3DB19017AB | Ethernet Access Module (v2) w/8 GbE port | 4 | 4 | 4 |
| 1.04 | 3DB18163AB | MSS Slot Cover - Blank Plate 1/2H | 2 | 2 | 2 |
| 1.05 | 3DB23386AEAB | 9500 MPR R8.0 uSD Card for CorEvo-10G ICS02 | 2 | 2 | 2 |
| 1.06 | 3DB18788BA | CorEvo-10G | 2 | 2 | 2 |
| 1.07 | 3DB18970BMBB | 9500 MPR R8.0 SW Electronic Delivery Kit ICS02 | 1 | 1 | 1 |
| | | **9500 MPR Microwave Packet Transceiver (MPT)** | | | |
| 2.00 | 3EM24238AA | MPT-HL Shelf Kit Single T-R | 2 | 2 | 1 |
| 2.01 | 3DB19060AA | MPT-HLC XCVR L6 GHz (5720 - 6425) | 1 | 1 | |
| 2.02 | 3DB19060CA | MPT-HLC XCVR L6 GHz HP (5720 - 6425) | | 1 | 1 |
| | | **9500 MPR RTUs - per ODU/RF Transceiver/ Upgrade** | | | |
| 3.00 | 3EM23068ADAA | RTU 160Mbps TRX Capacity | 1 | 2 | 1 |
| 3.01 | 3MU00086AAAA | 9500 MPR MSP Ring RTU | 1 | 1 | 1 |
| | | **9500 MPR Microwave Packet Transceiver Accessories** | | | |
| 4.00 | 3EM23465AC | 6/11 GHz 1+0 (Non-Standby) Diplexer Bracket | 1 | 2 | 1 |
| 4.01 | 3EM23466AC | L6 GHz 1+0 (Non-Standby) Diplexer Clamp and Isolator Kits | 1 | 2 | 1 |
| 4.02 | 3EM24335AA | RF Diplexer Filter Xmt 5925-6425, Rcv 5925-6425, 30MHz | 1 | 2 | 1 |
| 4.03 | 3EM23511AA | Diplexer Transition Assy A2 (6Ghz) Position Initial Kit | 1 | 1 | |
| 4.04 | 3EM23511AB | Diplexer Transition Assy A3 (6Ghz) Position Add-On Kit | 1 | 1 | 1 |
| 4.05 | 1AB077940017 | Diplexer to Transition Cable Assy 304.8mm 12 Inch | 1 | 1 | 0 |
| 4.06 | 1AB077940018 | Diplexer to Transition Cable Assy 381mm 15 Inch | 1 | 1 | 0 |
| 4.07 | 3DH04122HA | Flange Adapter CPR-137 1PORT, 6Ghz | 2 | 2 | 1 |
| 4.08 | 3EM23141AC | SFP Copper Cable, 1.5 M | 1 | 1 | 0 |
| 4.09 | 3EM23141AG | SFP Copper Cable, 2.0 M | 1 | 1 | 1 |
| | | **Racks and Accessories** | | | |
| 4.00 | 3EM13317AB | Power Distribution Panel w/Fuse Alarm | 1 | 1 | 1 |
| 4.01 | 694-9000-006 | Standard Rack, 7 ft tall, 19 inch wide | 1 | 1 | 1 |
| | | **Antenna/Waveguide** | | | |
| 5.00 | 10036722 | PAD6-59BC7S1R - 6' Stnd, CPR137G, Single Pol Ant., Includes Radome (molded), 2 struts | | 3 | 2 |
| 5.01 | 409073210 | UHX6-59-P3A/L - 6' Hi Perf, CPR137G, Dual Pol Ant., Includes Radome (Teglar), 1 inboard strut | 1 | | |
| 5.02 | 1AF28451AAAA | Tieback Steel - Bulk Angle 4" X 4" X ¼" x 20' (ANG414) | 1 | 3 | 3 |
| 5.03 | 1AF06466AAAA | VSTRUT-P3KIT,Inner, 4'-6' antenna, 5' pipe | 1 | 0 | 0 |
| 5.04 | 810265-001 | Standard Elliptical Waveguide, E60 (5.6 - 6.425 GHz) | 189 | 131 | 50 |
| 5.05 | 399269-101 | Connector, Tunable / CPR137G (bottom) (C137-060TG) | 1 | 3 | 2 |
| 5.06 | 399269-103 | Connector, Non-Tunable / CPR137G (top) (C137-060FG) | 1 | 3 | 2 |
| 5.07 | 7 | Hoisting Grip (HOIST1-158L) - Lace-up (LCF158,HCA158,E60,EP60,EP65) | 1 | 3 | 2 |
| 5.08 | 921234-061 | Grounding Kit - 60" wire, E60 (GKIT-60-060) | 6 | 9 | 6 |
| 5.09 | 920981-003 | Hanger Kit for E60 (CLAMP-060) (10 pack, bolt-on) | 7 | 5 | 2 |
| 5.10 | ANGLE-CLPI) | Angle Member Adapter Kit, 3/8" Stainless Steel (ANGLE-CLPI) (10 pack) | 1 | 1 | 1 |
| 5.11 | CEIL12-5I | Ceiling Adapter Kit, 12" (CEIL12-5I, 514608-003) (5 pack) - waveguide only | 2 | 3 | 2 |
| 5.12 | 915006-W | Hardware Kit, HDWK3/8-16X1, 3/8" – 16 x 1" bolt (915006) | 7 | 5 | 2 |
| 5.13 | 400108 | Pressure Window (WPW-137EP) - mates to CPR137G | 1 | 3 | 2 |
| 5.14 | 400014 | 2' Twistflex (TF137-CC1-024I) - CPR137G/CPR137G | 1 | 3 | 2 |
| 5.15 | 915663 | 4" Boot with 1 Hole for E60 (BOOT4-060) | 1 | 3 | 2 |
| 5.16 | 10042194 | APD20-D-35XH0R00S1 120v, 3-5psi, Lo psi alm, 10 day purge, < 7800' 6-12GHz | 1 | 1 | 1 |
| 5.17 | 20040835 | Dehydrator Wall Shelf for APD20 (20040835) | 1 | 1 | 1 |
| 5.18 | 920204-W | Gas Distribution Manifold, 4 Port, 0-15PSIG (920204) | 1 | 1 | 1 |
| 5.19 | 409081635 | UNIV ADJ LEG MT- UP TO 10 3/4 LEG (Ant. Pipe Mount) | 1 | 3 | 3 |

# APPENDIX C – PRICING SUMMARY

| | Equipment Total | Services | Warranty and Post-Warranty Services |
|---|---|---|---|
| 1. Item #2 - Sonoma Links Cost | $ 114,000.00 | $ - | $ 67,797.00 |
| | | | |
| 2. Item #8 - Additional UEM and Zone Watch licenses (only one extra license) | | | |
| UEM License | $ 20,000.00 | $ - | $ - |
| ZoneWatch License | $ 20,000.00 | $ - | $ - |
| | | | |
| 3. Item #18 - Site Readiness | $ 19,915.00 | $ 386,380.00 | $ - |
| | | | |
| 4. Item #20 and 21 - Redundant NICE Radio Logging Recorder and NICE Storage Center | $ 104,829.00 | $ 52,143.00 | $ - |
| | | | |
| 5. Item #23 - 12-hour Battery Jail BDA Backup Power | $ 10,360.00 | $ - | $ - |
| | | | |
| 6. Item #26 - Two Additional MCC7500 Dispatch Console Speakers (Except EOF) | $ 20,700.00 | $ - | $ - |
| | | | |
| 7. Item #29 - Upgrade Pagers for TDMA | $ 30,000.00 | $ - | $ - |
| | | | |
| 8. Item #32 - NAS Backup Server for the Radio System | $ 1,518.00 | $ - | $ - |
| | | | |
| 9. Item #36 - Spare VMS Server | $ 26,166.00 | $ - | $ - |
| **TOTAL** | $ 367,488.00 | $ 438,523.00 | $ 67,797.00 |

| | List Price | After Discount |
|---|---|---|
| **Equipment** | $ 367,488.00 | $ 312,364.80 |
| **Services** | $ 438,523.00 | $ 438,523.00 |
| **Warranty and Post-Warranty Services** | $ 67,797.00 | $ 64,407.15 |
| Total | | $ 815,294.95 |
| | **System Discount** | $ 127,619.00 |
| | Final Price | $ 687,675.95 |

**Agenda Item F**

# 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:** September 12, 2018

**TO:** MERA Next Generation Project Oversight and Finance Committees

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

**SUBJECT:** AGENDA ITEM F**:** Contract Change Order #7 and Early Equipment Order

**Recommended Action:** Review, discuss and provide direction to staff and a recommendation to the Governing Board for approval of Contract Change Order #7 and authorization to order mobile radios early to be installed in time for cutover to the Next Gen System.

## 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.

## 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 tough 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, vet 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 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. The total cost for this Contract Change Order, after discounts, is $579,268.95.

**Early Order of Mobiles:**

Currently, we plan to begin installation of mobile radios at the time of cutover to the new Next Gen System. This process will take approximately 8 months, during which we need to maintain the current Gen I and new Next Gen Systems and maintain connectivity between users across both systems. Staff is proposing that we acquire the mobile radios early, with the intent that all the new mobiles be installed prior to cutover. This process, in conjunction with Radio Management/OTAP/Wi-Fi reduces the cutover period from eight months to a couple of weeks, shaving several months off the project. To do this, these mobile radios will need to be the APX8500 mobile radios with both UHF-T and 700/800 MHz bands installed. While Motorola had previously offered discounts to acquire the dual band radios, as of this writing, those discounts are no longer available.

At this time, the Cutover date has not yet been determined. Once we complete the CEQA process, Motorola will be providing MERA with an updated project schedule. If this plan is adopted by the Governing Board, we anticipate ordering radios so that installations can begin 8 months before the identified cutover date. MERA Staff has previously estimated that each month saved has a value to MERA of approximately $100,000.

We estimate the need to acquire approximately 1,100 mobile radios in this process. Portable radios are not included in this as they can be programmed and distributed as single band APX6000 radios as the time necessary for vehicle installations does not apply.

**Cost Issues:**

Mobile Radios/per unit:

| | |
|---|---|
| 1. Contract cost (APX6500) | $3,652.55 |
| 2. Contract cost with MERA recommended additions | $3,729.81 |
| 3. Early Order cost (APX8500 with dual band) | $5,499.81 |

Number of Mobile Radios Estimated: 1,100

Total Contract Costs:

| | |
|---|---|
| 1. Contract Cost | $4,017,805 (Install at Cutover) |
| 2. Early Order Cost | $6,049,791 (Install before Cutover) |
| **3. Additional Radio Funds Needed for Early Order** | **$2,031,986** |

**Change Order #7 Cost: $579,268**

**Total Cost for Change Order #7 and Early Order $2,611,254**

Attachments:

Motorola Contract Change Order #7, dated 08/13/2018

MOTOROLA SOLUTIONS

# CHANGE ORDER
[#007]

**Change Order No.** 007

**Date:** 08/13/18

**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 0 through 6 | $ 5,400,390.55 |
| This Change Order: | $ 579,268.95 |
| Existing Contract Credit: | $ 0.00 |
| Net Contract Impact of this Change Order: | $ 579,268.95 |
| New Contract Value: | $ 40,317,110.56 |

MOTOROLA SOLUTIONS

# CHANGE ORDER
[#007]

## 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 |
|---|
| This Change Order only captures the cost of AES/DES encryption modules for radios. Services required for applying these modules are not included.<br><br>Addition of 2920 Radio Management licenses to the radio core<br>Addition of WiFi capability to 1052 mobiles and 1560 portables<br>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<br>Please note that applicable CA taxes has not been applied to equipment pricing |

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

MOTOROLA SOLUTIONS

# CHANGE ORDER
[#007]

| **Payment Schedule for this Change Order:**<br>*(describe new payment terms applicable to this change order)* |
|---|
| Due 100% upon completion of the SOW |

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: | | By: | |
| Printed Name: | KENT MARTIN | Printed Name: | |
| Title: | Regional Services Manager | Title: | |
| Date: | August 13, 2018 | Date: | |

Reviewed by: Kourosh Mostashari Date: August 13, 2018

Motorola Solutions Project Manager

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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 | WIFII | | 1052 | GA09001 | ADD:  WI-FI CAPABILITY |
| RADIO MGT | Subscribers | WIFII | | 1052 | GA09007 | ADD:  OUT OF THE BOX WI-FI PROVISIONING |
| RADIO MGT | Subscribers | WIFII | | 1052 | GA00250 | ADD: WIFI/GNSS FLEXIBLE CABLE LMR195 |
| RADIO MGT | Subscribers | WIFII | | 1560 | GA09001 | ADD:  WI-FI CAPABILITY |
| RADIO MGT | Subscribers | WIFII | | 1560 | GA09007 | ADD:  OUT OF THE BOX WI-FI PROVISIONING |
| RADIO MGT | EOF | RM WIFII | 2 | 1 | SQM01SUM0273 | MASTER SITE CONFIGURATION |
| RADIO MGT | EOF | RM WIFII | 2a | 1 | CA02629AB | ADD: EXPAND 7.16 M CORE |
| RADIO MGT | EOF | RM WIFII | 2b | 2 | CA02838AA | ADD: NM/ZC RACK |
| RADIO MGT | EOF | RM WIFII | 3 | 1 | T7914 | RADIO MANAGEMENT ONLINE |
| RADIO MGT | EOF | RM WIFII | 3a | 2871 | UA00049AA | ADD: RADIO MANAGEMENT LICENSES ONLINE |
| RADIO MGT | EOF | RM WIFII | 4 | 1 | DSSUBSERVER3 | RACK MOUNT WINDOWS SERVER |
| RADIO MGT | EOF | RM WIFII | 5 | 24 | HKN6184C | CABLE CH, PROGRAMMING,USB |
| RADIO MGT | EOF | RM WIFII | 6 | 24 | PMKN4012B | PORTABLE PROGRAMMING CABLE |
| RADIO MGT | EOF | RM WIFII | 7 | 12 | PMKN4013C | PROGRAMMING, TEST & ALIGNMENT CABLE |
| RADIO MGT | EOF | RM WIFII | 8 | 1 | DSSUBSERVER1 | RACK MOUNT WINDOWS SERVER |
| RADIO MGT | EOF | RM WIFII | 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: MCAFEE 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 |

# MERA Change Order #7 Pricing Summary

| | Equipment Total | Services | Warranty and Post-Warranty Services |
|---|---|---|---|
| 1. Item #15 – AES and DES Encryption for Subscribers during migration | $ 159,800.00 | $ - | $ - |
| | | | |
| 2. Item #19 - Radio Management, including WiFi and OTAP | $ 1,231,667.00 | $ - | $ - |
| **TOTAL** | $ 1,391,467.00 | $ - | $ - |

| | List Price | After Discount |
|---|---|---|
| **Equipment** | $ 1,391,467.00 | $ 869,388.00 |
| **Services** | $ - | $ - |
| **Warranty and Post-Warranty Services** | $ - | $ - |
| Total | $ 1,391,467.00 | $ 869,388.00 |
| **System Discount** | | $ 290,119.05 |
| Final Price | | $ 579,268.95 |

**Agenda Item G**

# 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:** September 12, 2018

**TO:** MERA Next Generation Project Oversight Committee

**FROM:** Ernest Klock, Operations Officer

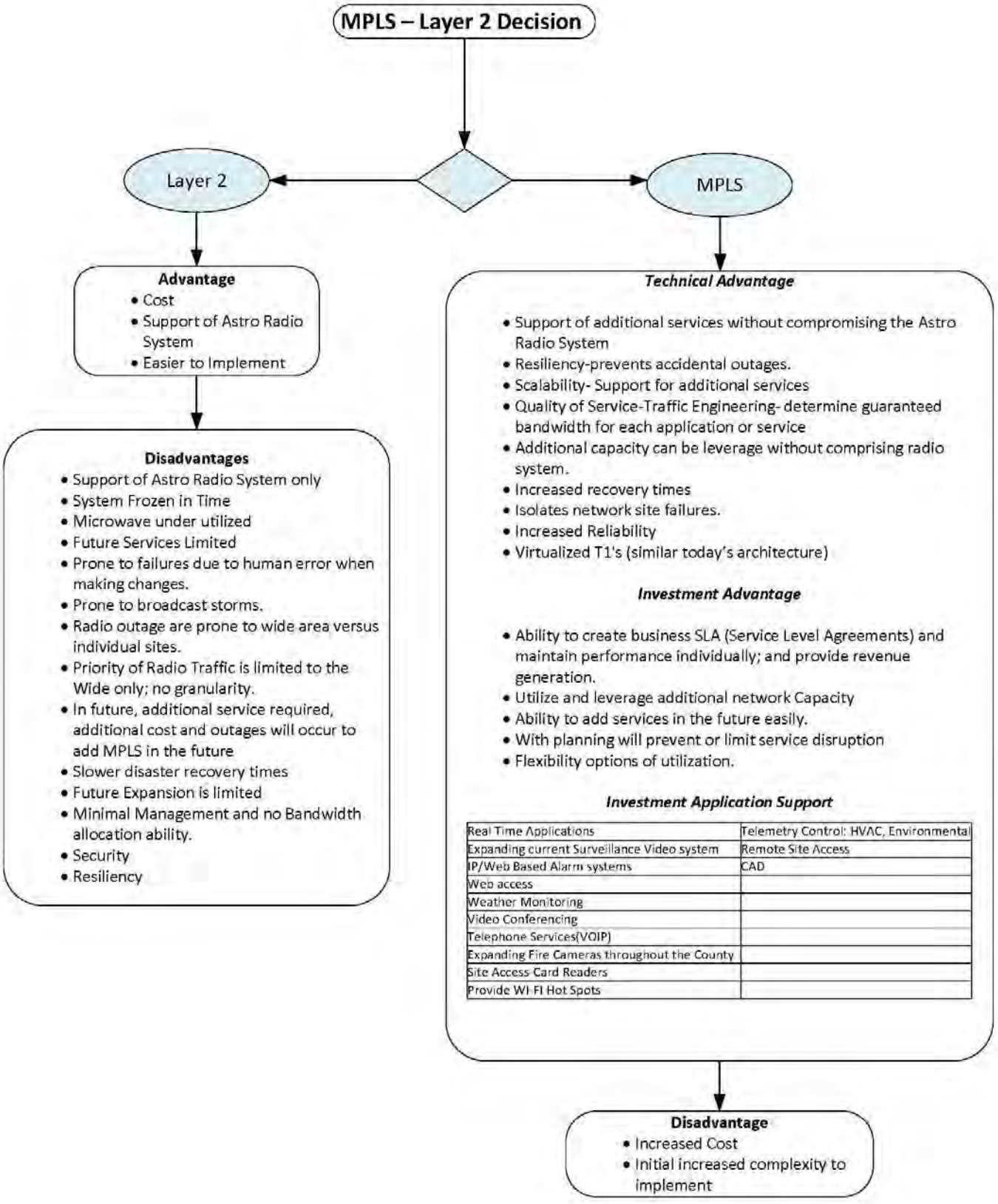
**SUBJECT:** AGENDA ITEM G**:** NextGen Project Motorola Contract Change Order #8 Multi-Protocol Label Switching (MPLS) for the Microwave Network

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 $1,934,834.60, which does not include taxes on equipment at 9% for San Rafael estimated at $29,797 for a total cost of $1,964,631.60. 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.

***Item 1 - Multi-Protocol Label Switching (MPLS) for the Microwave Network - $1,934,835***

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. 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 herein).

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 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 is a comparison between the two technologies.


MPLS – Layer 2 Decision
Layer 2
MPLS
Advantage
• Cost
• Support of Astro Radio System
• Easier to Implement
Disadvantages
• Support of Astro Radio System only
• System Frozen in Time
• Microwave under utilized
• Future Services Limited
• Prone to failures due to human error when making changes.
• Prone to broadcast storms.
• Radio outage are prone to wide area versus individual sites.
• Priority of Radio Traffic is limited to the Wide only; no granularity.
• In future, additional service required, additional cost and outages will occur to add MPLS in the future
• Slower disaster recovery times
• Future Expansion is limited
• Minimal Management and no Bandwidth allocation ability.
• Security
• Resiliency
Technical Advantage
• Support of additional services without compromising the Astro Radio System
• Resiliency-prevents accidental outages.
• Scalability- Support for additional services
• Quality of Service-Traffic Engineering- determine guaranteed bandwidth for each application or service
• Additional capacity can be leverage without comprising radio system.
• Increased recovery times
• Isolates network site failures.
• Increased Reliability
• Virtualized T1's (similar today's architecture)
Investment Advantage
• Ability to create business SLA (Service Level Agreements) and maintain performance individually; and provide revenue generation.
• Utilize and leverage additional network Capacity
• Ability to add services in the future easily.
• With planning will prevent or limit service disruption
• Flexibility options of utilization.
Investment Application Support
Real Time Applications
Telemetry Control: HVAC, Environmental
Expanding current Surveillance Video system
Remote Site Access
IP/Web Based Alarm systems
CAD
Web access
Weather Monitoring
Video Conferencing
Telephone Services(VOIP)
Expanding Fire Cameras throughout the County
Site Access Card Readers
Provide WI-FI Hot Spots
Disadvantage
• Increased Cost
• Initial increased complexity to implement

Layer 2 will function to carry voice radio traffic (small bursts of data) but cannot carry larger data packets such as non-LMR 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. If MERA is to continue supporting the non-LMR sources and wishes to add non-voice services on the microwave network, then MPLS is necessary. 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 (SUAII) necessary to implement the items described for a total cost of $1,934,834.60 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.

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**


**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.

MOTOROLA SOLUTIONS

# CHANGE ORDER
[#008]

**Change Order No.** 08

**Date:** 08/21/18

**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. 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 0 through 7 | $ 4,044,824.90 |
| This Change Order: | $ 1,934,834.60 |
| Existing Contract Credit: | $ 0.00 |
| Net Contract Impact of this Change Order: | $ 1,934,834.60 |
| New Contract Value: | $ 40,317,110.56 |

MOTOROLA SOLUTIONS

# CHANGE ORDER
[#008]

## 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<br>Please note that applicable CA taxes has not been applied to equipment pricing |

| **Customer Responsibilities:** *(describe change or N/A)* |
|---|
| Please refer to the attached Scope of Work (SOW) document |

| **Payment Schedule for this Change Order:**<br>*(describe new payment terms applicable to this change order)* |
|---|
| The Payment milestone plan for this Change Order is the following:<br><br>1. 25% of the Change Order Price upon change order execution<br><br>2. 65% of the Change Order Price upon shipment of equipment<br><br>3. 5% of the Change Order Price upon completion of installation (site by site)<br><br>4. 5% of the Change Order Price upon final system acceptance |

MOTOROLA SOLUTIONS

# CHANGE ORDER
[#008]

**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.

| **Motorola Solutions, Inc.** | | **Customer** | |
|---|---|---|---|
| By: | | By: | |
| Printed Name: | KENT MARTIN | Printed Name: | |
| Title: | Regional Services Manager | Title: | |
| Date: | August 21, 2018 | Date: | |

Reviewed by: Kourosh Mostashari Date: August 21, 2018

Motorola Solutions Project Manager

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# CHANGE ORDER #8 ATTACHMENT

AUGUST 21, 2018

# CHANGE ORDER #8 ATTACHMENT

The following changes have been captured in Change Order #6:

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, validtion 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 | COYOTE | 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 |
| 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 | | |
| CCGW 2 | | | VLAN BHS 2 | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| RECTIFIERS(Mngmt) | | 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(Mngmt) | | | | CEN 1 | CEN 1 | | CEN 1 | | CEN 1 | CEN 1 | | CEN 1 | | | CEN 1 | CEN 1 | | CEN 1 | |
| | | | | | | | | | | | | | | | | | | | |
| COUNTY USE(FD 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(WoodAcre** | 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 | | |
| CEN- Uwave -UEM-Mngmt | | 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-Wifi- | | 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 | | | | | | | | | | | | | | | | |
| SMARTX | | T1-2 | T1-2 | | | | | | | | | | | | | | | | |
| SMARTX | | T1-3 | T1-3 | | | | | | | | | | | | | | | | |
| SMARTX | | T1-4 | T1-4 | | | | | | | | | | | | | | | | |
| SMARTX | | T1-5 | T1-5 | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| Woodacre telephone/CAD | | T1-6 | T1-6 ? | | | | | | | | | T1-6(to Woodacre) | | | | | | | |
| FBI ckt(v.24) | | | RS232(12 port) | RS232(12 port) | | | | | | | | | | | | | | | |
| CHP Ckt | | | | | | | 4W(6 port) | | | | | 4W(6 port) | | | | | | | |

| | |
|---|---|
| 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 |

**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

# APPENDIX B – EQUIPMENT LIST

# MPLS Equipment List

| Item | Part Number | Description | BIG ROCK | CIVIC CENTER | COYOTE PEAK | DOLLAR HILL | EDF | MILL VALLEY WT 2 | MT BARNABE | MT TAMALPAIS | MT TIBURON | MUIR BEACH | OTA BROADCASTING | PT REYES | SAN PEDRO | SKYVIEW WT | SONOMA MT | STEWART PT | TOMALES | WOLFBACK RIDGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3.00 | | 7705-SAR-8 | | | | | | | | | | | | | | | | | | |
| 3.01 | 3HE06791AA | SAR-8 SHELF V2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3.02 | 3HE06792AA | Fan Module (SAR-8 Shelf V2) Ext Temp -48VDC | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3.03 | 3HE02774AB | CONTROL SWITCH MODULE V2 (CSMV2) | 2 | 2 | 2 | 2 | 4 | 2 | 2 | 4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 3.04 | 3HE02784KA | SAR RELEASE 8.0 BASIC OS LICENSE | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3.05 | 3HE02782AA | Packet Microwave Card (-48/+24 VDC) | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 6 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 3.06 | 3HE02776AB | 8 PORT GE/FE ETHERNET CARD V2 | | 1 | | | | | | | | | | | | | | | | |
| 3.06 | 3HE02775AB | 16 PORT T1/E1 ASAP CARD V2 (-48/+24 VDC) | | 1 | | | 1 | | 1 | | | | | | | | | | | |
| 3.09 | 3HE03391AB | 12P SERIAL DATA CARD V2 -48/+24VDC | 1 | 1 | | | | | | | | | | | | | | | | |
| 3.10 | 3HE03126AA | 6 port E&M Interface Card | | | | | | | 1 | 1 | | | | | | | | | | |
| 3.07 | 3HE03394AA | 32 PORT T1/E1 RJ45 PANEL | | 1 | | | 1 | | 1 | | | | | | | | | | | |
| 3.08 | 3HE03397AA | T1/E1 CABLE FOR DISTRIBUTION PANEL 1M | | 1 | | | 1 | | 1 | | | | | | | | | | | |
| 3.10 | 3HE04507AB | RS232 Cable - 2M | 2 | 2 | | | | | | | | | | | | | | | | |
| 3.11 | 3HE04511AA | 6 PORT RS232 DISTRIBUTION PANEL | 2 | 2 | | | | | | | | | | | | | | | | |
| 3.09 | 3HE03401AA | SYNCHRONIZATION Y- CABLE | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3.10 | 3HE00062CB | SFP - GIGE BASE-T RJ45 R6/6 DDM -40/85C | 8 | 10 | 8 | 8 | 8 | 8 | 8 | 24 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| 3.11 | 3HE00027CA | SFP - GIGE SX - LC ROHS 6/6 DDM -40/85C | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 12 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 3.50 | | 7705 Spares | | | | | | | | | | | | | | | | | | |
| 3.51 | 3HE06791AA | SAR-8 SHELF V2 | | | | | | | | | | | | | | | | | | |
| 3.52 | 3HE06792AA | Fan Module (SAR-8 Shelf V2) Ext Temp -48VDC | | | | | | | | | | | | | | | | | | |
| 3.53 | 3HE02774AB | CONTROL SWITCH MODULE V2 (CSMV2) | | | | | | | | | | | | | | | | | | |
| 3.54 | 3HE02782AA | Packet Microwave Card (-48/+24 VDC) | | | | | | | | | | | | | | | | | | |
| 3.55 | 3HE02776AB | 8 PORT GE/FE ETHERNET CARD V2 | | | | | | | | | | | | | | | | | | |
| 3.55 | 3HE02775AB | 16 PORT T1/E1 ASAP CARD V2 (-48/+24 VDC) | | | | | | | | | | | | | | | | | | |
| 3.56 | 3HE03391AB | 12P SERIAL DATA CARD V2 -48/+24VDC | | | | | | | | | | | | | | | | | | |
| 3.57 | 3HE03126AA | 6 port E&M Interface Card | | | | | | | | | | | | | | | | | | |
| 3.56 | 3HE00062CB | SFP - GIGE BASE-T RJ45 R6/6 DDM -40/85C | | | | | | | | | | | | | | | | | | |
| 3.57 | 3HE00027CA | SFP - GIGE SX - LC ROHS 6/6 DDM -40/85C | | | | | | | | | | | | | | | | | | |
| 4.00 | | NFM-P | | | | | | | | | | | | | | | | | | |
| 4.01 | 3HE11799DA | NSP 18: NFM-P STANDARD BASE | | | | | | | | | | | | | | | | | | |
| 4.02 | 3HE11801DA | NSP 18: NFM-P STANDARD LP | 23 | 33 | 18 | 18 | 31 | 18 | 28 | 51 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| 4.03 | 3HE11803DA | NSP 18: NFM-P HIGH AVAILABILITY LP | 23 | 33 | 18 | 18 | 31 | 18 | 28 | 51 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| 4.50 | | Software / OS Upgrades | | | | | | | | | | | | | | | | | | |
| 4.51 | 3HE02785XX | 7705 SAR RELEASE X.0 BASIC OS UPGRADE ( 2 OS level upgrades) | 2 | 2 | 2 | 2 | 4 | 2 | 2 | 4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 4.52 | 3HE10161AA | NFM SRS 2 years ( 2 NFM sw upgrades ) | | | | | | | | | | | | | | | | | | |

# APPENDIX C – PRICING SUMMARY

| | Equipment Total | Services | Warranty and Post-Warranty Services |
|---|---|---|---|
| 1. Item #3 and 4 - MPLS Design and non-LMR traffic | $ 417,011.40 | $ 411,891.00 | $ 1,457,970.00 |
| | | | |
| **TOTAL** | $ 417,011.40 | $ 411,891.00 | $ 1,457,970.00 |

| | 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 | | $ 1,934,834.60 |

| 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 |