



TRWC Board of Directors Meeting

September 12, 2019 - 9:00 a.m.

Phoenix-Mesa Gateway Airport (PMGA)

Administration Building, Board Room

5835 S. Sossaman Road

Mesa, AZ 85212

Video Conference: <https://global.gotomeeting.com/join/515309917>

Audio Bridge: 1-872240-3412, Access Code 515-309-917

Members of the public may address the Board on any item. Please complete a "Request to Speak Card", located at the entry of the room and promptly turn it in to the Executive Director or designee prior to the beginning of the meeting. There is a time limit of three minutes for comments.

Agenda

1) Call to Order and Opening Comments

- a. Materials and sign-in sheet
- b. Speaker cards
- c. Audio and video recording
- d. Board representative roll-call
- e. Staffing Changes
 - Jared Hansen departed for new opportunity in Maricopa County
 - Angie Huckaby joins TRWC handling budget and finance
 - Cheryl Noll depart for new opportunity in Mesa Contracting Office
 - Gina Ross joins the TRWC handling administrative support

2) Public Comment

Members of the public may address the Board on items not on the printed agenda. Please complete a "Request to Speak Card", located at the entry of the room and promptly turn it in to the Executive Director or designee prior to the beginning of the meeting. There is a time limit of three minutes for comments.

3) Discussion and Action on Board Meeting Minutes

- a. Instruction overview on locating the Minutes on the TRWC Website – Gina Ross
- b. February 21, 2019 Board Meeting Minutes

4) Discussion and Action on Chairman and Vice-Chairman Elections – Dale Shaw

5) Discussion and Possible Action on System Coverage Study – Dave Brunk, Denis Murphy and Rajit Jhaver

6) Presentation, Discussion and Possible Action on FY 20/21 Preliminary Budget - Dale Shaw

- a. Protocol and Super-Majority procedures – Bill Anger
- b. Preliminary Budget Review – Angie Huckaby

- 7) Discussion and Action on Communications System Strategic Alliance & Task Orders – Dale Shaw
 - a. Task order 1 – Motorola Support Services Contracts
 - b. Task order 2 – Subscriber Supply and Support Contracts
 - c. Task order 3 – Software Licensing
 - d. PRCC Update

- 8) Discussion and Possible Action on DOJ US Marshall Service Interoperability Request – Dale Shaw and Darin Douglass

- 9) Discussion on Communications Boilerplate Legal Language - Dale Shaw and Bill Anger

- 10) Discussion and Possible Action on Network Administrator Updates
 - a. Finance Update – Angie Huckaby
 - b. Network Updates and Performance Overview – Randy Thompson

- 11) Comments from the Board
 An opportunity will be provided for Board members to present a brief summary of current events. The Board is not allowed to propose, discuss, deliberate or take action at the meeting on any matter in the summary, unless the specific matter is properly noticed for legal action.

- 13) Next TRWC Board Meetings:
 December 12, 2019 – Budget Adoption

All meetings are currently scheduled from 9:00 a.m. to 11:00 a.m. at PMGA.

- 14) Future Board of Directors Schedule

Date	Upcoming Agenda Items
12/12/19	Budget Adoption
3/12/20	
5/14/20	
9/10/20	Prelim Budget Review
12/10/20	Budget Adoption

- 15) Adjournment



#3

Discussion and Action on Board Meeting Minutes

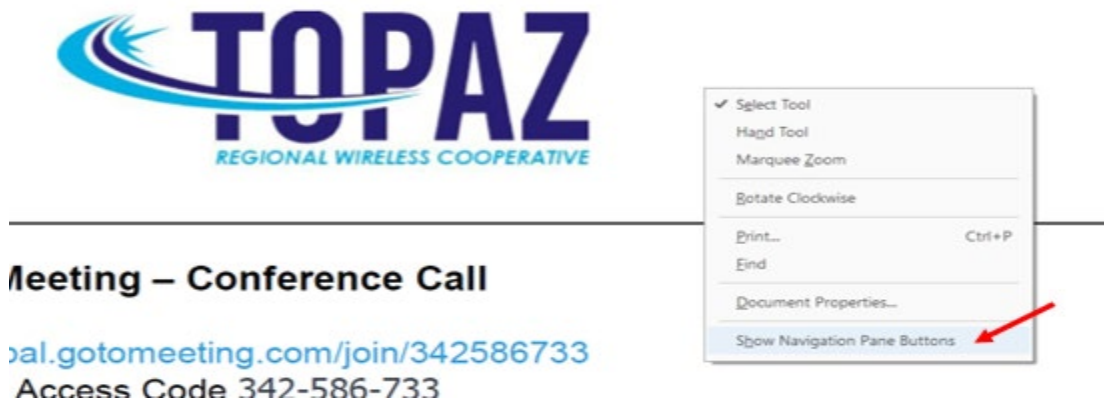
a. Instruction Overview on Locating Materials

INTERNET EXPLORER BROWSER

1. Choose the meeting material you are interested in by clicking on the PDF icon.

Meeting Date	Document Title	Meeting Type	Document Type	
2/21/2019	TRWC Board Meeting Attachments 2.21.19	Board of Directors	Attachment	
9/6/2018	TRWC Board Meeting Attachments 09.06.18	Board of Directors	Attachment	

2. Right click and choose Show Navigation Pane Buttons



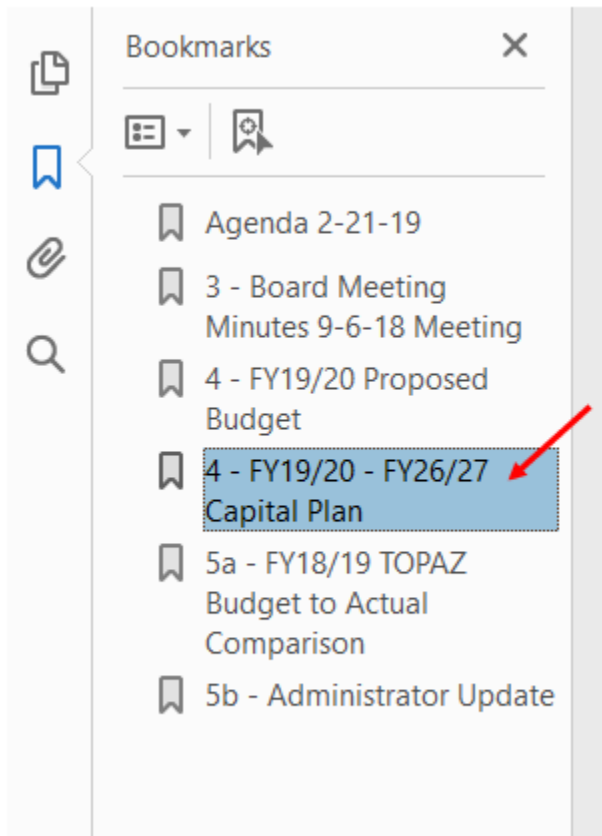
The screenshot shows the TOPAZ Regional Wireless Cooperative logo at the top. Below it, the text reads "Meeting – Conference Call" followed by the URL "gotomeeting.com/join/342586733" and "Access Code 342-586-733". A right-click context menu is open over the page, listing options such as "Select Tool", "Print...", and "Show Navigation Pane Buttons". A red arrow points to the "Show Navigation Pane Buttons" option.

3. Choose the Bookmark icon

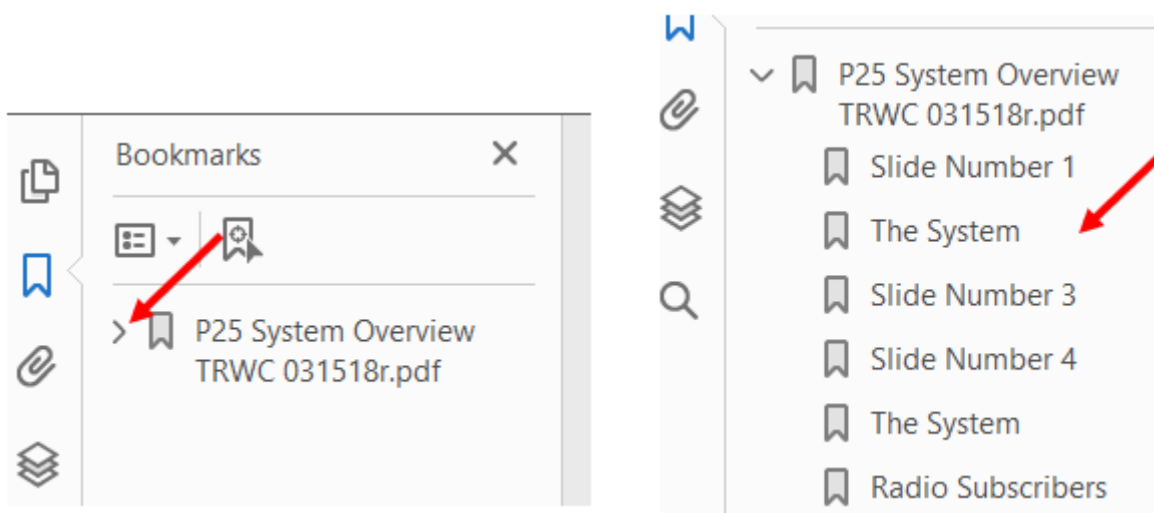


The screenshot shows the top of an Internet Explorer browser window. The address bar contains "Convert" and "S". Below the address bar is a vertical toolbar with icons for Copy, Paste, Print, and Search. A red arrow points to the bookmark icon (a ribbon shape) in the toolbar.

4. Select or click the document you are looking for.



5. If an arrow appears, click for more options

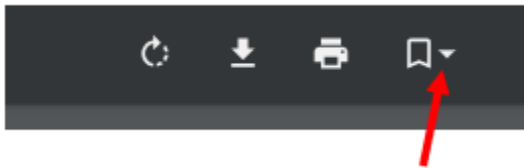


CHROME BROWSER

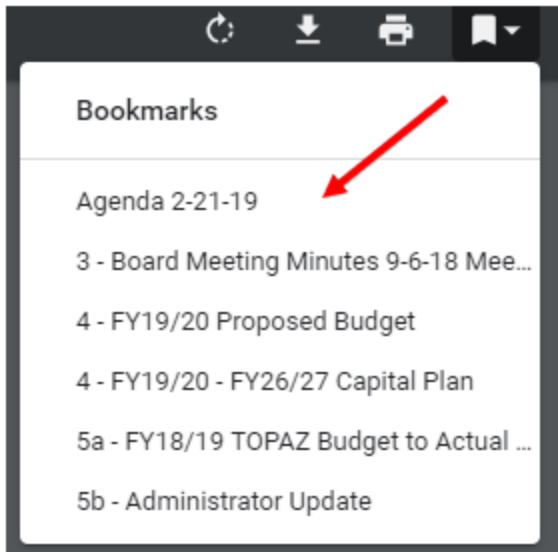
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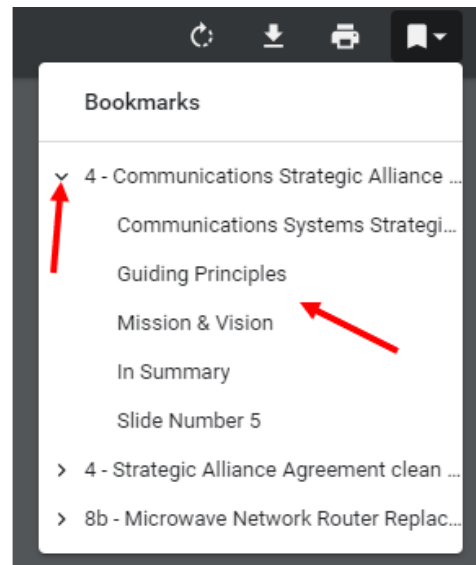
2. Click on the Bookmark arrow in the upper left corner of the page



3. Choose the document you are interested in



4. Click the down arrow for more options





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b. February 21, 2019 Board Meeting Minutes



TRWC Board of Director's Meeting Minutes

February 21, 2019 - 1:00 p.m.

Conference Call

Public Access: Queen Creek Municipal Services Building

Saguaro Conference Room

22358 S. Ellsworth Road

Queen Creek, AZ 85142

Video Conference: <https://global.gotomeeting.com/join/342586733>

Audio Bridge: 872-240-3212, Access Code 342-586-133

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Agenda

1) Call to Order and Opening Comments

- a. Materials and sign-in sheet (public attendance access only)
- b. Speaker cards (public attendance access only)
- c. Audio and video recording
- d. Board representative roll-call
- e. Announcement of other teleconference participants
- f. Teleconference protocol and Super-Majority procedures (Bill Anger)

Chairman Kross called the meeting to order with a quorum of four and welcomed the attendees, provided instruction on the process for public comment and reminded the participants the meeting is audio recorded.

The materials and the sign in sheet are located at the Queen Creek Municipal Services Building.

Dale Shaw and the Board members welcomed Gina Ross as the new supporting admin for the TWRC Board members. Gina Ross conducted the roll-call. There are 4 board members in attendance to constitute the quorum.

Bill Anger reviewed the highlights of the open meeting law, conference call protocol and the Super-Majority procedure. The Super-Majority Vote can be found in the Second Amendment to Amended and Restated Intergovernmental Agreement 2.2.11

2) Public Comment

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No public comment requests were received.

3) Discussion and Action on Board Meeting Minutes

September 6, 2018 Board Meeting Minutes

Chief Openshaw motioned to approve the 9/6/2018 TRWC Board Meeting Minutes and John Pombier seconded the motion. All Board members who were in favor signaled by saying aye; there was no opposition, the motion passed unanimously.

4) Discussion and Possible Action on FY 19/20 Proposed Budget – Jared Hansen, Dale Shaw

Dale Shaw reviewed the Fiscal Year 2019/2020 Budget memo provided in the meeting materials. The total budget has been reviewed by the executive committee and has received their approval and endorsement. The Executive Committee co-chairs, Bob Badgett and Darin Douglass, are present for comments regarding the proposed budget. Bob thanked Jared Hansen and Randy Thompson for putting the budget together. The committee has asked for changes in the next budget layout with a greater breakdown of the projects and the cost inside of each individual project so that all members have a better understanding of the budget. Darin Douglass agreed with Bob and feels comfortable moving the budget forward.

Jared Hansen presented an overview of the TRWC FY 2019/2020 proposed budget as provided in the meeting materials

Jared replied to a question from Leah Hubbard Rhineheimer regarding a breakdown in the labor numbers. Jared stated that the breakdown in the regular budget, in terms of total labor, the difference between the general and administrative is that the general number represents the actual staff that works for the City of Mesa. The other administrative numbers are the temporary employees that do not work for the City of Mesa.

Randy Thompson replied to Chairman Kross regarding a timeline conflict in the forecast on the Southeast Queen Creek Topaz expansion site. Randy explained that the timing listed in the discretion is no longer correct, and it is not reflected on the current material. The timing on the spreadsheet, the later timing, is the correct timing.

Randy also responded to Chairman Kross regarding project timing from start to finish. Typically, when a new project is forecasted, we allow a year for the acquisition of land and then the actual project itself is forecasted for another year. Therefore, a start to finish duration is about two years.

While no other questions were asked Chairman Kross took a moment to thank and appreciate the co-chairs and the Executive Committee, including Dale Shaw, on the hard work that went into the proposed budget.

Leah Hubbard Rhineheimer motioned to approve the FY 2019/2020 budget. Chief Openshaw second the motion. All Board members who were in favor signaled by saying aye; there was no opposition, the motion passed unanimously.

5) Discussion and possible Action on Network Administrator Updates

a. Finance Update – Jared Hasen

Jared Hasen gave an update on the budget for the year, as of January 31, 2019 as provided in the meeting materials.

b. Network Updates and Performance Overview – Randy Thompson

Randy Thompson gave a summary review of the Capital Projects and Operations Summary Staff Report as provided in the meeting materials.

Randy responded to a question from Chairman Kross regarding why Motorola was unable to service the dispatch? Randy stated that the problem originated from Motorola's network operation where they were monitoring the alarms. Randy is unsure if it is due to personnel or that they are using more automation of their monitoring systems. After repeated attempts to have them correct the issue it became clear that they would not be able to meet our expectations. Randy made note

that the local Motorola personnel has been responsive and are not part of the problem.

6) Comments from the Board

Before comments from the Board Dale Shaw introduced a new RWC Executive Director, John Imig. John has taken David Felix's position at RWC. John Imig stated that he is looking forward to working with TRWC and that together we will improve our service to our First Responders, our Government users and our Citizens. John Kross thanked John Imig for joining the meeting and stated that TRWC is looking forward to working with him.

An opportunity will be provided for Board members to present a brief summary of current events. The Board is not allowed to propose, discuss, deliberate or take action at the meeting on any matter in the summary, unless the specific matter is properly noticed for legal action.

7) Next TRWC Board Meetings:

All meetings are currently scheduled from 9:00 a.m. to 11:00 a.m. at PMGA.

2019 Schedule

Date	Upcoming Agenda Items
05/09/19	
09/12/19	- Chairman & Vice-Chairman Elections - FY20/21 Preliminary Budget Review
12/12/19	- FY20/21 Budget Adoption

8) Adjournment



5

Discussion and Possible Action
on System Coverage Study

TRWC Radio Coverage Evaluation Project

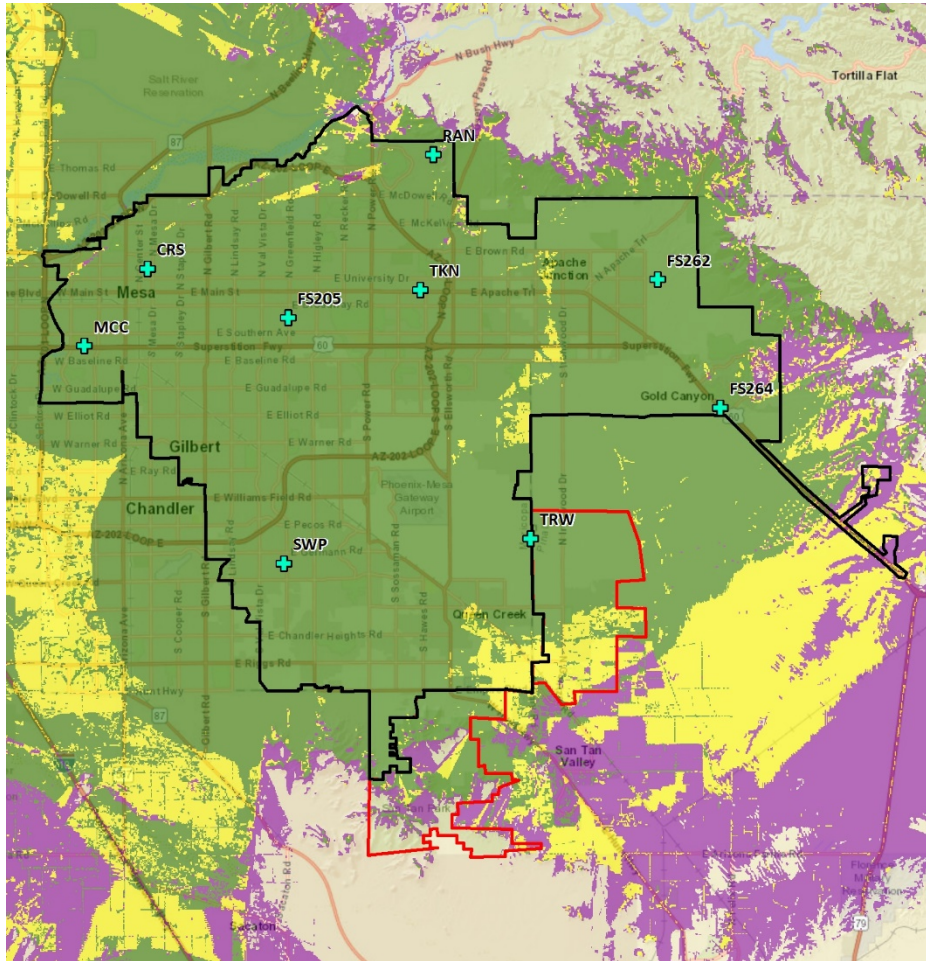








TRWC Board of Directors

September 12, 2019

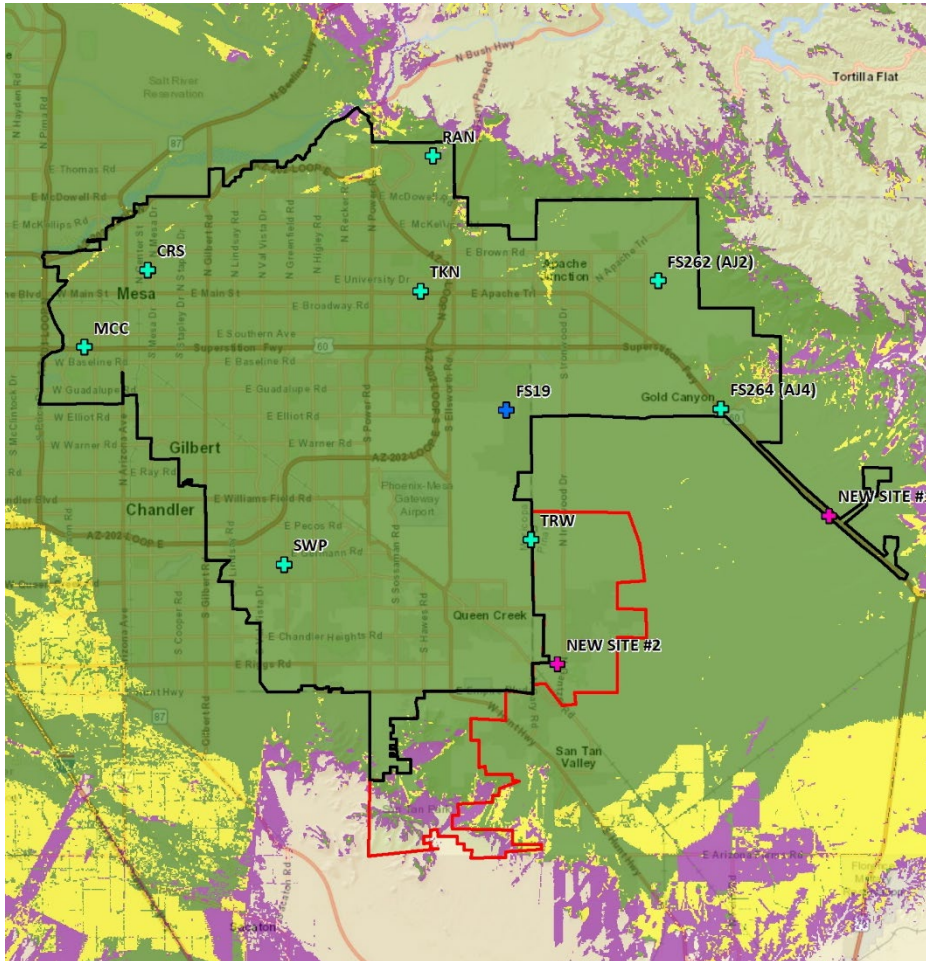
- Evaluate existing 800 MHz and VHF system radio coverage
- Analyze alternatives and make recommendations to cover existing gap areas and provide coverage for expansion of TRWC boundaries

Existing 800 MHz Coverage



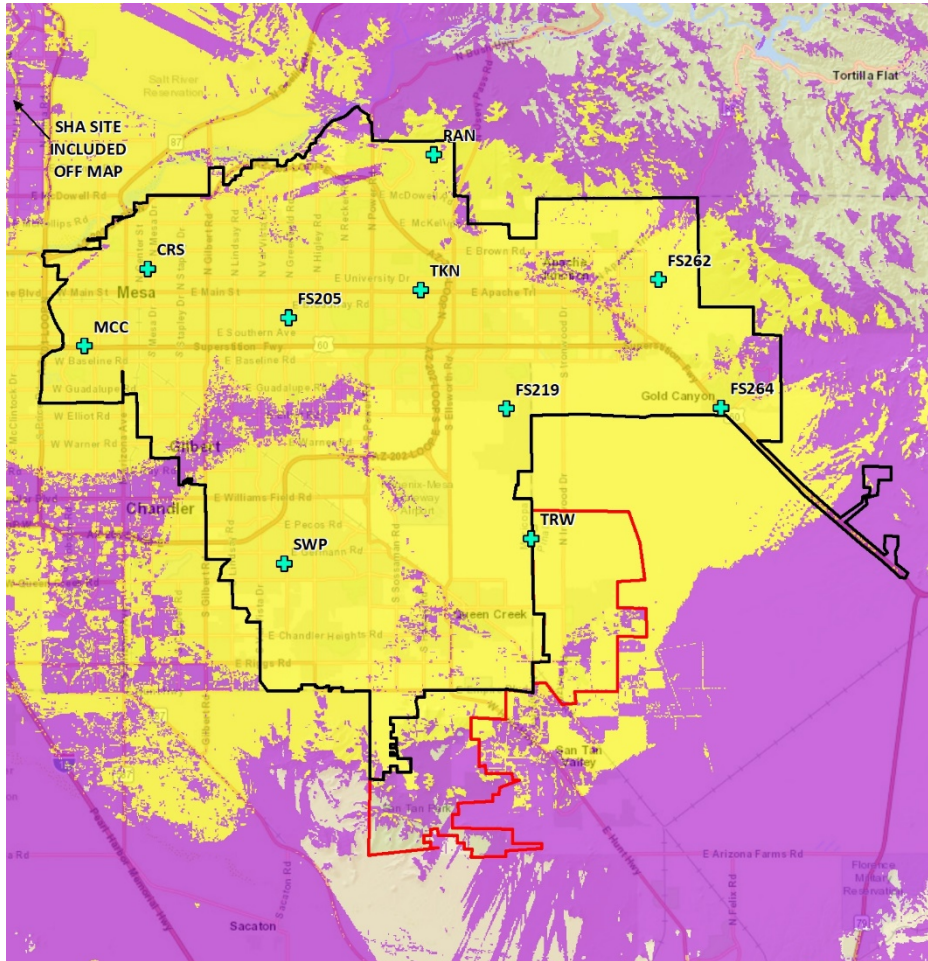
-  Existing 800 MHz P25 Receive Site
-  TRWC Coverage Boundary
-  Queen Creek Planning / Water Service Areas
-  Mobile Coverage
-  Portable On-Street Coverage
-  Portable In-Building Coverage






Potential 800 MHz Coverage



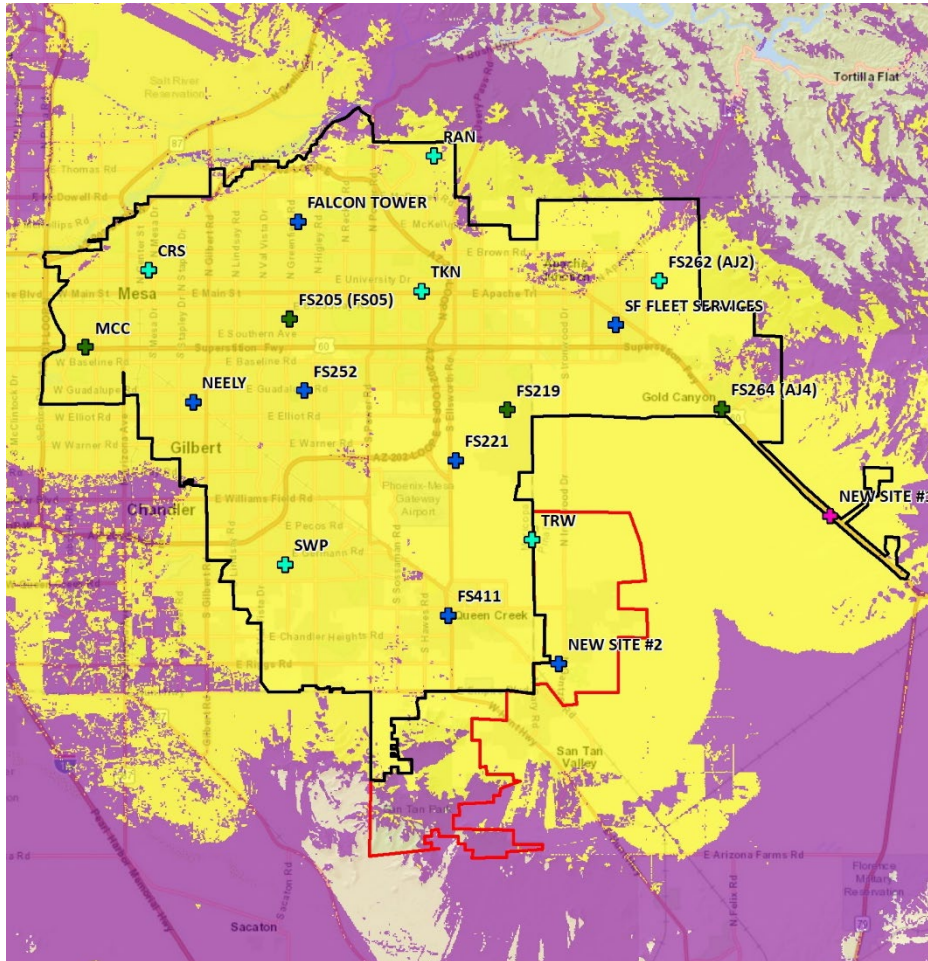
- Existing TX/RX Site
- Candidate TX/RX Site
- Candidate RX-Only Site
- TRWC Coverage Boundary
- Queen Creek Planning / Water Service Areas
- Mobile Coverage
- Portable On-Street Coverage
- Portable In-Building Coverage

Existing VHF Coverage



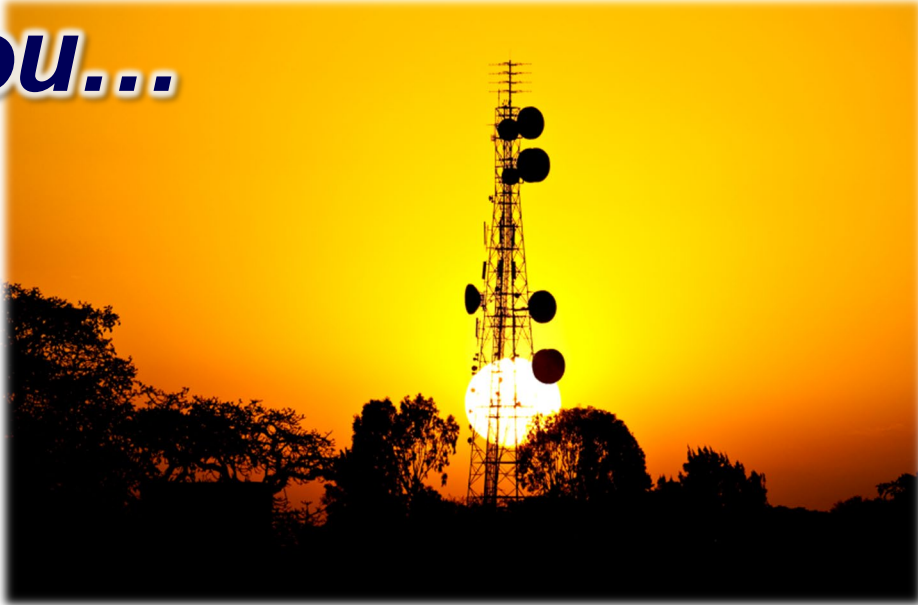
-  Existing Analog VHF Receive Site
-  TRWC Coverage Boundary
-  Queen Creek Planning / Water Service Areas
-  Mobile Coverage
-  Portable On-Street Coverage

Potential VHF Coverage



- + Existing TX/RX Site
- + Existing RX-Only Site
- + Candidate TX/RX Site
- + Candidate RX-Only Site
- TRWC Coverage Boundary
- Queen Creek Planning / Water Service Areas
- Mobile Coverage
- Portable On-Street Coverage

Thank you...





6

Presentation and Discussion on FY 20/21 Preliminary Budget

- a. Protocol and Super-Majority Procedures *(no materials)*
- b. Preliminary Budget Review



Date: September 12, 2019
To: Topaz Regional Wireless Cooperative (TRWC) Board of Directors
From: Dale Shaw, TRWC Executive Director
Bob Badgett, TRWC Executive Committee Co-chairman
Darin Douglass, TRWC Executive Committee Co-chairman
Subject: Fiscal Year 2020/2021 Budget

Recommendation

The TRWC Executive Director and Executive Committee submit the Preliminary TRWC Budget (attached) in the amount of \$4,585,553 for Fiscal Year 2020/2021 to the TRWC Board of Directors.

Background & Discussion

The attached Preliminary Budget for Fiscal Year 2020/2021 has been under review and endorsed by the TRWC Executive Committee. When compared to the current 2019/2020 Fiscal Year Budget, the proposed Operating & Maintenance expenses will decrease by \$22,616 and Capital will increase by \$571,877 (primarily due to site expansion, potential capacity increases, and planned upgrades) - with a net overall Budget increase of \$549,261.

Fiscal Impact

The Proposed Budget represents the total planned contribution by all member agencies for the ongoing operation, maintenance, and improvement of the TRWC radio network. Each member agency will be invoiced as actual expenditures occur on a monthly basis using the cost allocation methodology outlined in the Proposed Budget.

**TRWC Operating & Maintenance Budget
Summary of Labor and Non-labor**

	FY 19/20 ENDORSED BUDGET	FY 20/21 PROPOSED BUDGET	CHANGE FY19/20 to FY20/21
ESCALATION FACTOR			0.00%
Salaries and Wages	\$ 398,266	\$ 398,266	\$ -
Total Labor	\$ 398,266	\$ 398,266	\$ -
ESCALATION FACTOR			0.00%
GENERAL & ADMINISTRATIVE - OTHER SERVICES			
Temp Services	\$ 6,114	\$ 6,114	\$ -
Prof Services - TRWC Executive Director	90,182	91,986	1,804
Prof Services - Legal	37,703	37,703	-
Prof Services - Consulting & Other	15,285	75,285	60,000
Ins. Premiums - Agencies	8,662	8,662	-
Utilities	70,000	70,000	-
Telephone	3,465	3,465	-
Repairs & Maint	31,587	31,589	2
Equipment Usage (Vehicles)	20,380	20,380	-
Shaw Butte & Florence Gardens	25,781	25,781	-
Training	10,000	10,000	-
Travel	-	10,000	10,000
System-of-Systems Networking Subscription Costs	-	63,000	63,000
All Other Services	-	-	-
TOTAL OTHER SERVICES	\$ 319,159	\$ 453,965	\$ 134,806
GENERAL & ADMINISTRATIVE - COMMODITIES			
Non Cap Assets	\$ 25,474	25,474	\$ -
Contract - Motorola (Preventative & Security Monitoring)	1,012,200	874,214	(137,986)
Software Maint-Mainsaver, Juniper	22,928	-	(22,928)
Materials & Repair Parts	20,849	25,000	4,151
All Other Commodities	-	-	-
TOTAL COMMODITIES	\$ 1,081,451	\$ 924,688	\$(156,763)
OTHER BUDGET ITEMS			
PROPOSED CONTINGENCY - 3%	\$ 53,966	\$ 53,308	\$ (659)
VHF OPERATIONS (special assessment)	123,813	123,813	-
VHF Equipment Staff Time (special assessment)	28,023	28,023	-
TOTAL OTHER BUDGET ITEMS	\$ 205,802	\$ 205,144	\$ (659)
Total Operating & Maintenance	\$ 2,004,678	\$ 1,982,062	\$ (22,616)
O&M - AIRTIME PERCENTAGE (1)			
Mesa	68.54%	68.54%	0.00%
Gilbert	17.79%	17.79%	0.00%
Apache Junction	9.00%	9.00%	0.00%
Ft McDowell	2.11%	2.11%	0.00%
Superstition Fire & Medical	1.06%	1.06%	0.00%
Queen Creek	0.41%	0.41%	0.00%
Rio Verde	0.03%	0.03%	0.00%
Southwest Ambulance	0.87%	0.87%	0.00%
American Medical Response	0.19%	0.19%	0.00%
Total	100.00%	100.00%	0.00%
VHF SPECIAL ASSESSMENT (2,3)			
Mesa Fire & Medical	68.68%	68.68%	0.00%
Gilbert Fire	17.16%	17.16%	0.00%
Superstition Fire & Medical	10.01%	10.01%	0.00%
Queen Creek Fire	3.22%	3.22%	0.00%
Rio Verde Fire	0.93%	0.93%	0.00%
Total	100.00%	100.00%	0.00%
ANNUAL ESTIMATED REVENUE: OPERATING & MAINTENANCE			
Mesa	1,374,219	1,358,718	(15,501)
Gilbert	355,676	351,652	(4,023)
Apache Junction	166,756	164,720	(2,035)
Ft McDowell	39,095	38,618	(477)
Superstition Fire & Medical	34,839	34,599	(240)
Queen Creek	12,486	12,393	(93)
Rio Verde	1,968	1,961	(7)
Southwest Ambulance	16,120	15,923	(197)
American Medical Response	3,520	3,477	(43)
Total	\$ 2,004,678	\$ 1,982,062	\$ (22,616)

(1) Normal partner assessments are allocated based on July, 2019 6-month rolling average airtime and will change based on actual monthly data.

(2) For FY 19/20 Endorsed Budget, agency cost distribution for the Fire Hazard Zone Communication (VHF) Special Assessment is based on 12 months average Airtime as of March 31, 2015.

(3) For FY 20/21 Proposed Budget, agency cost distribution for the Fire Hazard Zone Communication (VHF) Special Assessment is based on Call Volume July 1, 2018 - June 30, 2019.

**TRWC Operating & Maintenance Budget
Summary of Labor and Non-labor**

	FY 19/20	FY 20/21 PROPOSED BUDGET	FORECAST				
	ENDORSED BUDGET CORRECTED		FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26
ESCALATION FACTOR		1.90%	1.90%	2.30%	3.00%	3.00%	3.00%
Salaries and Wages	\$ 398,266	\$ 398,266	\$ 405,833	\$ 415,167	\$ 427,622	\$ 440,451	\$ 453,664
Total Labor	\$ 398,266	\$ 398,266	\$ 405,833	\$ 415,167	\$ 427,622	\$ 440,451	\$ 453,664
ESCALATION FACTOR		1.90%	1.90%	1.90%	1.90%	1.90%	1.90%
GENERAL & ADMINISTRATIVE - OTHER SERVICES							
Temp Services	\$ 6,114	\$ 6,114	\$ 6,230	\$ 6,349	\$ 6,469	\$ 6,592	\$ 6,717
Prof Services - TRWC Executive Director	90,182	91,986	93,734	95,515	97,330	99,179	101,064
Prof Services - Legal	37,703	37,703	38,419	39,149	39,893	40,651	41,424
Prof Services - Consulting & Other	15,285	75,285	76,715	78,173	79,658	81,172	82,714
Ins. Premiums - Agencies	8,662	8,662	8,827	8,994	9,165	9,339	9,517
Utilities	70,000	70,000	71,330	72,685	74,066	75,474	76,908
Telephone	3,465	3,465	3,531	3,598	3,666	3,736	3,807
Repairs & Maint	31,587	31,589	32,189	32,801	33,424	34,059	34,706
Equipment Usage (Vehicles)	20,380	20,380	20,767	21,162	21,564	21,974	22,391
Shaw Butte & Florence Gardens	25,781	25,781	26,271	26,770	27,279	27,797	28,325
Training	10,000	10,000	10,190	10,384	10,581	10,782	10,987
Travel	-	10,000	10,190	10,384	10,581	10,782	10,987
System-of-Systems Networking Subscription Costs	-	63,000	64,197	65,417	66,660	67,926	69,217
All Other Services	-	-	-	-	-	-	-
TOTAL OTHER SERVICES	\$ 319,159	\$ 453,965	\$ 462,591	\$ 471,380	\$ 480,336	\$ 489,463	\$ 498,762
GENERAL & ADMINISTRATIVE - COMMODITIES							
Non Cap Assets	\$ 25,475	25,475	\$ 25,959	\$ 26,452	\$ 26,955	\$ 27,467	\$ 27,989
Contract - Motorola (Preventative & Security Monitoring)	1,012,200	874,214	1,136,531	1,156,761	1,177,351	1,189,125	1,201,016
Software Maint-Mainsaver,Juniper	22,927	-	-	-	-	-	-
Materials & Repair Parts	20,849	25,000	25,475	25,959	26,452	26,955	27,467
All Other Commodities	-	-	-	-	-	-	-
TOTAL COMMODITIES	\$ 1,081,451	\$ 924,689	\$ 1,187,965	\$ 1,209,172	\$ 1,230,758	\$ 1,243,546	\$ 1,256,472
OTHER BUDGET ITEMS							
PROPOSED CONTINGENCY - 3%	\$ 53,966	\$ 53,307	\$ 61,692	\$ 62,872	\$ 64,162	\$ 65,204	\$ 66,267
VHF OPERATIONS (special assessment)	123,813	123,813	127,567	131,404	135,326	139,386	143,567
VHF Equipment Staff Time (special assessment)	28,023	28,023	28,555	29,098	29,651	30,214	30,788
TOTAL OTHER BUDGET ITEMS	\$ 205,802	\$ 205,143	\$ 217,814	\$ 223,374	\$ 229,138	\$ 234,804	\$ 240,623
Total Operating & Maintenance	\$ 2,004,678	\$ 1,982,063	\$ 2,274,203	\$ 2,319,093	\$ 2,367,855	\$ 2,408,264	\$ 2,449,521
O&M - AIRTIME PERCENTAGE (1)							
Mesa	68.54%	68.54%	68.54%	68.54%	68.54%	68.54%	68.54%
Gilbert	17.79%	17.79%	17.79%	17.79%	17.79%	17.79%	17.79%
Apache Junction	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
Ft McDowell	2.11%	2.11%	2.11%	2.11%	2.11%	2.11%	2.11%
Superstition Fire & Medical	1.06%	1.06%	1.06%	1.06%	1.06%	1.06%	1.06%
Queen Creek	0.41%	0.41%	0.41%	0.41%	0.41%	0.41%	0.41%
Rio Verde	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%
Southwest Ambulance	0.87%	0.87%	0.87%	0.87%	0.87%	0.87%	0.87%
American Medical Response	0.19%	0.19%	0.19%	0.19%	0.19%	0.19%	0.19%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
VHF SPECIAL ASSESSMENT (2)							
Mesa Fire & Medical	68.68%	68.68%	68.68%	68.68%	68.68%	68.68%	68.68%
Gilbert Fire	17.16%	17.16%	17.16%	17.16%	17.16%	17.16%	17.16%
Superstition Fire & Medical	10.01%	10.01%	10.01%	10.01%	10.01%	10.01%	10.01%
Queen Creek Fire	3.22%	3.22%	3.22%	3.22%	3.22%	3.22%	3.22%
Rio Verde Fire	0.93%	0.93%	0.93%	0.93%	0.93%	0.93%	0.93%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
ANNUAL ESTIMATED REVENUE: OPERATING & MAINTENANCE							
Mesa	\$ 1,374,219	\$ 1,358,719	\$ 1,558,957	\$ 1,589,731	\$ 1,623,159	\$ 1,650,861	\$ 1,679,146
Gilbert	355,676	351,652	403,597	411,556	420,202	427,362	434,671
Apache Junction	166,756	164,720	190,627	194,273	198,259	201,480	204,765
Ft McDowell	39,095	38,618	44,692	45,546	46,481	47,236	48,006
Superstition Fire & Medical	34,839	34,599	38,080	38,947	39,865	40,707	41,570
Queen Creek	12,486	12,393	13,711	14,018	14,344	14,640	14,942
Rio Verde	1,968	1,961	2,087	2,140	2,195	2,249	2,304
Southwest Ambulance	16,120	15,923	18,427	18,780	19,165	19,476	19,794
American Medical Response	3,520	3,477	4,024	4,101	4,185	4,253	4,323
TOTAL	\$ 2,004,678	\$ 1,982,063	\$ 2,274,203	\$ 2,319,093	\$ 2,367,855	\$ 2,408,264	\$ 2,449,521

(1) Normal partner assessments are allocated based on the July 2019 6-month rolling average airtime and will change based on actual monthly data.

(2) For the FY19/20 Endorsed Budget, agency cost distribution for the Fire Hazard Zone Communication (VHF) Special Assessment is based on 12 months average Airtime as of March 31, 2015.

(3) For the FY20/21 Proposed Budget, agency cost distribution for the Fire Hazard Zone Communication (VHF) Special Assessment is based on Call Volume from July 1, 2018 - June 30, 2019.

TRWC Capital Budget Plan

	PROJECT ID	ENDORSED	PROPOSED	Forecasted						TOTAL	Project	Personnel	Overhead	
		FY19/20	FY20/21	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28				9 Years
TOPAZ Voice Radio Network Upgrade	CN0022	\$ 433,828	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 433,828	-	-	-
Site Expansion #1	CP0091	-	574,063	988,024	-	-	-	-	-	-	1,562,087	463,328	83,399	27,336
Site Expansion #2	CP0754	-	-	590,276	1,013,847	-	-	-	-	-	1,604,123	-	-	-
Site Expansion #3	CP0779	-	-	-	605,703	1,040,515	-	-	-	-	1,646,218	-	-	-
System-of-Systems Networking Expansion	CP0905	396,480	247,800	247,800	247,800	-	-	-	-	-	1,139,880	200,000	36,000	11,800
Upgrade Shaw Butte and Florence Gardens to P25 Phase II (TDMA)	CP0906	287,406	287,406	-	-	-	-	-	-	-	574,812	231,966	41,754	13,686
Radio Sites Emergency Power Upgrade	LF0226	106,200	106,200	106,200	106,200	106,200	-	-	-	-	531,000	85,714	15,429	5,057
Communications Building UPS Battery Replacement	LF0228	-	-	-	17,700	-	-	-	17,700	-	35,400	-	-	-
Radio & Core Sites Battery Backup Lifecycle Upgrade	LF0266	-	-	31,910	-	-	71,433	71,433	89,292	-	264,068	-	-	-
Radio & Core Sites DC Power Plant Lifecycle Upgrade	LF0267	-	-	-	-	-	-	-	451,068	-	451,068	-	-	-
Antenna & Transmission Lines Lifecycle Upgrade	LF0282	236,000	236,000	-	-	-	-	-	-	-	472,000	190,476	34,286	11,238
TOPAZ P25 Voice Radio Network Lifecycle Upgrade (FY31)	New	-	-	-	-	-	-	-	-	-	-	-	-	-
Wireless Backhaul (Microwave) Network Lifecycle Upgrade	New	-	-	-	167,265	167,265	167,265	-	-	-	501,795	-	-	-
Simulcast Capacity Upgrade	New	-	681,450	123,900	123,900	123,900	-	-	-	-	1,053,150	550,000	99,000	32,450
Consulting Services for VHF & 7/800 MHz Coverage Expansion		200,000	-	-	-	-	-	-	-	-	200,000	-	-	-
Sub-total		1,659,914	2,132,919	2,088,110	2,282,415	1,437,880	238,698	71,433	558,060	-	10,469,429			
Fire Hazard Zone System Coverge Improvement and Expansion	CP0907	371,700	371,700	371,700	371,700	371,700	371,700	371,700	371,700	371,700	3,345,300	300,000	54,000	17,700
Fire Hazard Zone System Lifecycle Upgrade	New	-	-	-	-	-	-	-	-	-	-	-	-	-
Fire Hazard Zone System Simulcast Timing Reference Lifecycle Upgrade	New	-	98,872	115,351	-	-	-	-	-	-	214,223	79,800	14,364	4,708
Sub-total VHF Special Assessment Projects		371,700	470,572	487,051	371,700	371,700	371,700	371,700	371,700	371,700	3,559,523			
Total Capital & Fire Special Assessment Projects		\$2,031,614	\$2,603,491	\$2,575,161	\$2,654,115	\$1,809,580	\$610,398	\$443,133	\$ 929,760	\$ 371,700	\$14,028,952			
Capital Assessment to Members														
Mesa	69.52%	1,149,988	1,482,804	1,451,653	1,586,735	999,614	165,943	49,660	387,962	-	7,274,359			
Gilbert	17.36%	298,453	370,275	362,496	396,227	249,616	41,438	12,401	96,879	-	1,827,785			
Apache Junction	9.68%	150,886	206,467	202,129	220,938	139,187	23,106	6,915	54,020	-	1,003,648			
Ft McDowell	2.14%	35,356	45,644	44,686	48,844	30,771	5,108	1,529	11,942	-	223,880			
Superstition Fire & Medical	0.78%	17,761	16,637	16,287	17,803	11,215	1,862	557	4,353	-	86,475			
Queen Creek	0.50%	6,972	10,665	10,441	11,412	7,189	1,193	357	2,790	-	51,019			
Rio Verde	0.02%	498	427	418	456	288	48	14	112	-	2,261			
Sub-total	100.00%	1,659,914	2,132,919	2,088,110	2,282,415	1,437,880	238,698	71,433	558,058	-	10,469,427			
VHF Special Assessment														
Mesa Fire & Medical	68.68%	255,283	323,189	334,506	255,283	255,283	255,283	255,283	255,283	255,283	2,444,676			
Gilbert Fire	17.16%	63,784	80,750	83,578	63,784	63,784	63,784	63,784	63,784	63,784	610,816			
Superstition Fire & Medical	10.01%	37,207	47,104	48,754	37,207	37,207	37,207	37,207	37,207	37,207	356,307			
Queen Creek Fire	3.22%	11,969	15,152	15,683	11,969	11,969	11,969	11,969	11,969	11,969	114,618			
Rio Verde Fire	0.93%	3,457	4,376	4,530	3,457	3,457	3,457	3,457	3,457	3,457	33,105			
Sub-total	100.00%	371,700	470,571	487,051	371,700	371,700	371,700	371,700	371,700	371,700	3,559,522			
Total Capital + Fire Special Assessment														
Mesa		1,405,271	1,805,993	1,786,159	1,842,018	1,254,897	421,226	304,943	643,245	255,283	9,719,035			
Gilbert		362,237	451,025	446,074	460,011	313,400	105,222	76,185	160,663	63,784	2,438,601			
Apache Junction		150,886	206,467	202,129	220,938	139,187	23,106	6,915	54,020	-	1,003,648			
Ft McDowell		35,356	45,644	44,686	48,844	30,771	5,108	1,529	11,942	-	223,880			
Superstition Fire & Medical		54,968	63,741	65,041	55,010	48,422	39,069	37,764	41,560	37,207	442,782			
Queen Creek		18,941	25,817	26,124	23,381	19,158	13,162	12,326	14,759	11,969	165,637			
Rio Verde		3,955	4,803	4,948	3,913	3,745	3,505	3,471	3,569	3,457	35,366			
Total		2,031,614	2,603,490	2,575,161	2,654,115	1,809,580	610,398	443,133	929,758	371,700	14,028,949			



Capital & Lifecycle Plan

This document provides a narrative of the capital and lifecycle projects forecast for the TOPAZ Regional Wireless Cooperative for the fiscal years of 2020/2021 (FY21) through 2027/2028 (FY28). All projects are dependent on the appropriation of funds for the timeframes indicated.

Proposed Projects for FY 2020/2021 (FY21)

Expansion Site Number One

Project No. CP0091

\$1,562,087

Timeframe: July 1, 2019 to June 30, 2021

As population growth in the east valley continues, demand for Public Safety services will grow as well. This project is a placeholder for an additional TOPAZ radio site to ensure reliable in-building TOPAZ radio coverage (both 800 MHz and VHF). This may require the development of a radio site, including a radio tower, equipment shelter, emergency generator, radio and network equipment, and services, including land. Note: we will look at colocation at an existing radio site or on an existing radio tower, or sharing existing facilities or systems if possible, to avoid duplication (overbuilding) and constructing facilities if they are not necessary. The need for and proposed location of this site will be validated by a consultant study prior to commencement of the project. The anticipated cost of this project in FY21 is \$574,063 for site acquisition and development.

System-of-Systems Networking Expansion

Project No. CP0905

\$1,139,880

Timeframe: July 1, 2019 to June 30, 2023

This is the ongoing expansion of the System-of-Systems Networking Project (CP0438) for the cost of licensing and hardware to connect to other systems, both adjacent P25 systems (such as the Arizona Department of Public Safety, Maricopa or Pinal Counties, or the (Phoenix) Regional Wireless Cooperative) and broadband (cellular) networks such as Verizon (the connection to FirstNet built by AT&T has already been made). These connections may use the Integrated Services Gateway (ISGW) or services such as Motorola Solutions “Critical Connect” (which requires an additional hardware device called the Wave Radio Gateway (WRG)). The anticipated cost of this project in FY21 is \$247,800.

TDMA Channel Conversion for Shaw Butte & Florence Gardens

Project No. CP0906

\$574,812

Timeframe: July 1, 2019 to June 30, 2021

Two of the three TOPAZ wide-area sites, Shaw Butte and Florence Gardens, have 6 physical radio channels, which limits their voice channels to 5 simultaneous transmissions. The third TOPAZ wide-area site, Thompson Peak, has 11 physical radio channels, which allows a maximum of 10 simultaneous voice transmissions. There have been occasions when users have received busies due to a lack of voice channel capacity on Shaw Butte or Florence Gardens. To remedy this situation, 5 of the 6 physical voice channels at Shaw Butte and Florence Gardens will be upgraded to Time Division Multiple Access (TDMA, also known as P25 Phase II; currently the sites all use Frequency Division Multiple Access (FDMA), also known as P25 Phase I) to enable two simultaneous voice transmissions on each physical radio channel. This will enable 10 simultaneous voice transmissions on all three wide-area sites. This upgrade will also include the addition of receiver diversity, which improves the reception range (“talk in”) of the site and provides some reliability improvement to the receiver subsystem. The anticipated cost of this project in FY21 is \$287,406.



Capital & Lifecycle Plan

oscillators are no longer available, so a lifecycle upgrade is required to ensure reliable operation. The anticipated cost of this project in FY21 is \$98,872.

Future Capital Improvement Projects

Expansion Site Number Two **Project No. CP0754** **\$1,604,123**
Timeframe: July 1, 2021 to June 30, 2023

As population growth in the east valley continues, demand for Public Safety services will grow as well. This project is a placeholder for an additional TOPAZ radio site to ensure reliable in-building TOPAZ radio coverage (both 800 MHz and VHF). This will require the development of a radio site, including a radio tower, equipment shelter, emergency generator, radio and network equipment, and services, including land. Note: we will look at colocation at an existing radio site or on an existing radio tower, or sharing existing facilities or systems if possible, to avoid duplication (overbuilding) and constructing facilities if they are not necessary. The need for and proposed location of this site will be validated by a consultant study prior to commencement of the project.

Expansion Site Number Three **Project No. CP0779** **\$1,646,218**
Timeframe: July 1, 2022 to June 30, 2024

As population growth in the east valley continues, demand for Public Safety services will grow as well. This will require an additional TOPAZ radio site in the far northeast area of Mesa to ensure reliable in-building TOPAZ radio coverage (both 800 MHz and VHF). This may require the development of a radio site, including a radio tower, equipment shelter, emergency generator, radio and network equipment, and services, including land. Note: we will look at colocation at an existing radio site or on an existing radio tower, or sharing existing facilities or systems if possible, to avoid duplication (overbuilding) and constructing facilities if they are not necessary. The need for this site will be validated by a consultant study prior to commencement of the project.

Future Lifecycle Upgrade Capital Projects

Communications Building UPS Battery Lifecycle Replacement **Project No. LF0228** **\$35,400**
Timeframe: July 1, 2023 to June 30, 2024, depending on the availability of funds

The City of Mesa Communications Building includes an Uninterruptible Power Supply (UPS) that keeps critical equipment operational during a power failure while the building emergency generators are starting. This UPS relies on batteries to store the energy required to keep the critical electronic systems functioning without interruption. These batteries require replacement every four years; the TRWC pays one-half the cost of these replacement batteries.

Radio & Core Sites Battery Backup Next Lifecycle Upgrade **Project No. LF0266** **\$264,068**
Timeframe: July 1, 2024 to June 30, 2028

These batteries back up the TOPAZ voice radio network and other equipment at the radio sites, the core site at City of Mesa Communications Building, and the backup core site at Mesa Fire Station 219. These batteries have a service life of ten years. Normally, these batteries only power the equipment at a site for less than a minute while the emergency generator starts and picks up the load to power the site equipment. However, these batteries are sized to power the site for a minimum of 4 hours in the event



Capital & Lifecycle Plan

the emergency generator does not start, so there is time to take a portable generator to the site to provide emergency power.

Radio & Core Sites DC Power Plant Lifecycle Upgrade **Project No. LF0267** **\$451,068**
Timeframe: July 1, 2026 to June 30, 2027

The equipment at the radio sites is powered by a Direct Current (DC) power plant that allows backup of the site equipment with battery banks as described above. This arrangement also isolates the equipment from disturbances on the incoming Alternating Current (AC) power lines, which keeps the equipment operating during reductions or disruptions (outages) in the AC power supply. This equipment has a typical service life of 15 years. The equipment was last replaced in August 2011.

Wireless Backhaul (Microwave) Network Lifecycle Upgrade **Project No. NEW** **\$501,795**
Timeframe: July 1, 2022 to June 30, 2025

The wireless backhaul or point-to-point microwave radio network connects the radio sites used by the TRWC into a network. The radio signals received from the radio sites are transported to a central location for processing and then transported back to each radio site for transmission to field units. This equipment has a serviceable life of 10 years. This project will replace 15 sets of equipment installed beginning in 2012.

TOPAZ Voice Radio Network Next Lifecycle Upgrade **Project No. NEW** **\$7,500,000**
Timeframe: July 1, 2030 to June 30, 2031

The TOPAZ voice radio network infrastructure was upgraded in August-September 2015, with new equipment at the nine simulcast cell radio sites, and the addition of the backup Master Site (DSR) and geo-redundant simulcast Prime Site. The typical service life for this equipment is 15 years, so it is prudent to plan for the next lifecycle upgrade.

Fire Hazard Zone (VHF) Lifecycle Upgrade **Project No. NEW** **\$2,500,000**
Timeframe: July 1, 2032 to June 20, 2033

The Fire Hazard Zone (VHF) Communications System provides radio infrastructure to communicate with firefighters when working in areas deemed hazard or hot zones. The communications in the hazard or hot zones will be on the Very High Frequency (VHF) radio band (150-174 MHz). Firefighters and on-scene command personnel will communicate direct from radio-to-radio without any infrastructure. The infrastructure utilized by the Fire Hazard Zone Communications System enables the tele-communicators and command personnel in the fire alarm room (dispatch) to monitor the fire ground communications and communicate with on-scene personnel. This infrastructure will also receive and allow response to transmissions initiated when the “emergency” button on the handheld or vehicle-mounted radio is activated. This system provides operational consistency with the fire departments dispatched by the Phoenix Fire Department. The original infrastructure for the Fire Hazard Zone Communications System was commissioned for operation on December 1, 2017 and has an anticipated serviceable life of 15 years.

Completed Projects

TOPAZ Voice Radio Network Lifecycle Upgrade **Project No. CN0022** **\$7,169,138**
Timeframe: Completed September, 2015



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This project provided a lifecycle upgrade to the TOPAZ 800 MHz voice radio network infrastructure, re-banded the radio frequencies utilized by the TRWC to comply with Federal Communications Commission rules, and added the backup capability for the Master Site (Dynamic Site Resiliency, DSR) and the geo-redundant Prime Site for the simulcast cell. This project is complete but appears on the TRWC Capital Plan because it was funded through a lease-purchase arrangement. The final lease payment was made June 24, 2019.

Wireless Backhaul (Microwave) Network Lifecycle Upgrade **Project No. CP0093** **\$306,350**
Timeframe: Original Project Complete October 9, 2019

The wireless backhaul or point-to-point microwave radio network connects the radio sites used by the TRWC into a network. The radio signals received from the radio sites are transported to a central location for processing and then transported back to each radio site for transmission to field units. The former equipment in this network was obsolete and on best-effort support by the manufacturer and utilized technology that was obsolete and inefficient in transporting the data to and from the radio sites. The new wireless backhaul equipment will transport the signals with technology that matches the other network components, improving efficiency. The total project cost was \$612,700, with the cost shared equally between the TRWC members (including the City of Mesa) and the City of Mesa (Mesa pays about 87.5% of the total project cost). This purchase was approved for the TRWC Administrative Manager by the Mesa City Council at their May 8, 2017, meeting. A Change Order was executed to add a microwave path between Thompson Peak and Rio Verde Fire Station 441. This was done because the Cox Communications connection used for connecting Fire Station Alerting and for the Fire Hazard Zone Communications (VHF) network was unreliable. This Change Order was completed April 25, 2019, when the Thompson Peak to Rio Verde Fire Station 441 microwave path was placed in service.

System-of-Systems Networking **Project No. CP0438** **\$619,500**
Timeframe: July 1, 2018 to June 30, 2019

System-of-systems networking is a method for radio networks such as the TRWC to connect with other similar radio networks to allow handheld and vehicle-mounted radios to “roam” from system to system and utilize the resources in the other system to communicate with users in both the home and visited systems. Possible applications of this type of networking would be for the TRWC to network with the (Phoenix) Regional Wireless Cooperative, Maricopa or Pinal Counties, or the Arizona Department of Public Safety, for example. This would allow TRWC users to roam into those systems and talk back to units in the TRWC service area and the other system’s service area, and units from the other system to roam into the TRWC service area to utilize resources on the TRWC network to talk back to their system as well as users in radio coverage of the TRWC network. In addition, the system-of-systems networking will enable direct connection to push-to-talk services offered by cellular carriers such as Verizon Wireless and the First Responder Network Authority (FirstNet) through AT&T. The connection to the cellular network(s) will enable nationwide roaming capabilities. Not all system talkgroups (channels) would have this capability. The current technology for system-of-systems networking (Motorola Solutions Inter Sub-Site Interface (ISSI) 8000) allows users to move from one system to the other automatically, without user action. This purchase was approved for the TRWC Administrative Manager by the Mesa City Council at their June 18, 2018, meeting.



Capital & Lifecycle Plan

In addition to the initial purchase of the software and licensing already approved, there will be ongoing licensing costs as we connect to other Public Safety voice networks. These costs are forecast in future years. These costs are listed under CP0905 System-of-Systems Networking Expansion.

Internet Protocol Network Routers & Switches Lifecycle Upgrade Project No. LF0248 \$415,000

Timeframe: Complete

Internet Protocol (IP) network routers and switches direct the communications between the radio sites and the TOPAZ infrastructure. They also redirect those communications if there is a failure in the network that connects the TOPAZ radio sites and infrastructure together. This equipment is currently eight years old and is on best-effort support status with the manufacturer. To ensure continued reliable operation of this network, this equipment requires upgrading. The TRWC pays one-half of the \$830,000 total cost of this upgrade. The acceleration of this lifecycle upgrade project was approved by the TRWC Board of Directors at their September 14, 2017, meeting. This purchase was approved for the TRWC Administrative Manager by the Mesa City Council at their October 2, 2017, meeting.

Internet Protocol Routers & Switches Expansion

Project No. CP0755 \$464,625

Timeframe: Complete

Internet Protocol (IP) network routers and switches direct the communications between the TOPAZ radio sites and the TOPAZ infrastructure. They also redirect those communications if there is a failure in the network that connects the TOPAZ radio sites and infrastructure together. When the TOPAZ Lifecycle Upgrade was implemented, there were some sites that did not have routers to direct/redirect the radio traffic. In those cases, other network components were configured to provide some of the direction/redirection of the radio traffic, but this is not the best way to implement these capabilities, and it has resulted in some unexpected network behavior and unscheduled impairments to the TOPAZ network. To mitigate these unscheduled impairments to the TOPAZ network, the proper equipment will be installed at all TOPAZ sites to provide full network direction/redirection capabilities for the TOPAZ radio sites. This project came in under budget at \$243,636.

Florence Gardens TOPAZ ISR Site Lifecycle Upgrade

Project No. LF0224 \$354,000

Timeframe: Completed November 27, 2018

The Florence Gardens Intelligent Site Repeater (ISR) provides TOPAZ wide-area service to the area around Florence for the City of Mesa Gas Utility Magma Gas Service Area, and the Apache Junction Police Department for communications when transporting prisoners to the Pinal County Jail. The Florence Gardens ISR was put in service in October 2016, with equipment that was removed from the Thompson Peak site that is over 15 years old. This equipment is obsolete and will require upgrading to maintain compatibility with the TOPAZ network infrastructure software. This purchase was approved for the TRWC Administrative Manager by the Mesa City Council at their June 18, 2018, meeting. This project came in under budget at \$196,491.

Communications Building UPS Battery Lifecycle Replacement

Project No. LF0228 \$35,400

Timeframe: Completed June 24, 2019

The City of Mesa Communications Building includes an Uninterruptible Power Supply (UPS) that keeps critical equipment operational during a power failure while the building emergency generators are starting. This UPS relies on batteries to store the energy required to keep the critical electronic systems functioning without interruption. These batteries require replacement every four years, with the cost



Capital & Lifecycle Plan

shared equally between the TRWC members (including the City of Mesa) and the City of Mesa (Mesa pays about 87.5% of the total project cost).

Fire Hazard Zone Communications System (VHF)

Project No. CP0305

\$1,181,168

Timeframe: Completed December 1, 2017

This project provides radio infrastructure to communicate with firefighters when working in areas deemed hazard or hot zones. The communications in the hazard or hot zones will be on the Very High Frequency (VHF) radio band (150-174 MHz). Firefighters and on-scene command personnel will communicate direct from radio-to-radio without any infrastructure. The infrastructure implemented by this project will enable the tele-communicators and command personnel in the fire alarm room (dispatch) to monitor the fire ground communications and communicate with on-scene personnel. This infrastructure will also receive and allow response to transmissions initiated when the “emergency” button on the handheld or vehicle-mounted radio is activated. This system will provide operational consistency with the fire departments dispatched by the Phoenix Fire Department.



Capital & Lifecycle Plan

Appendix – Project Details

Wireless Backhaul (Microwave) Network Lifecycle Upgrade **Project No. CP0093**

	Path	In Service	Notes
Communications Building	Mesa Community College	✓	
Communications Building	Fire Station 219	✓	
Communications Building	Twin Knolls	✓	
Central Radio Site	Falcon Field Airport	✓	
Falcon Field Airport	South (Greenfield) Water Plant	✓	New path. Replaced Mesa Community College to South Water Plant path.
Falcon Field Airport	East Mesa Service Center	✓	
East Mesa Service Center	Twin Knolls	✓	
Twin Knolls	Fire Station 205	✓	
Twin Knolls	Fire Station 219	✓	
Twin Knolls	Apache Junction Police Department	✓	
Twin Knolls	Fire Station 262	✓	
Fire Station 262	Apache Junction Police Department	✓	
Fire Station 219	TRW	✓	
TRW	Mesa Community College	✓	
TRW	South Water Plant (Greenfield)	✓	
Thompson Peak	Fire Station 441 (Rio Verde)	✓	New path. Cox Communications cable link inadequate for VHF network.

Internet Protocol Network Routers & Switches Lifecycle Upgrade **Project No. LF0248**
Internet Protocol Routers & Switches Expansion **Project No. CP0755**

Location	MX104 Router	Number of EX3400 Switches	Notes
Twin Knolls (TKN-01)	✓	1	Installed
Communications Building (COM-01)	✓	1	Installed
Thompson Peak (THO-01)	✓	1	Installed May 30, 2018
Range Rider (RAN-01)	✓	1	Installed May 30, 2018
Shaw Butte (SHA-01)	✓	1	Installed May 30, 2018
Mesa Community College (MCC-01)	✓	1	Installed July 11, 2018
TRW (TRW-01)	✓	1	Installed August 15, 2018
South (Greenfield) Water Plant (SWP-01)	✓	1	Installed
Fire Station 219 (FS219-01)	✓	1	Installed
Communications Building (COM-02)	✓	1	Installed
Central Radio Site (CRS-01)	✓	1	Installed
Falcon Field Airport (FAL-01)	✓	1	Installed
East Mesa Service Center (EMC-01)	✓	1	Installed
Fire Station 205 (FS205-01)	✓	1	Installed
Fire Station 262 (FS262-01)	✓	1	Installed
Fire Station 264 (FS264-01)	✓	1	Installed
Florence Gardens	✓	1	Installed
DC Spare	✓	✓	
AC Spare	✓	✓	



Capital & Lifecycle Plan

Fire Hazard Zone Communications System (VHF)

Project No. CP0305

Location	Site Capability		CH1	CH2	CH3	CH4	CH5
			156.2400 MHz	151.1675 MHz	154.8000 MHz	154.2800 MHz	155.6175 MHz
Central Radio Site	Transmit	Receive	X	X	X	X	X
Mesa Community College		Receive	X	X	X	X	X
Fire Station 205		Receive	X	X	X		X
Twin Knolls	Transmit	Receive	X	X	X		X
Range Rider	Transmit	Receive	X	X	X		X
TRW	Transmit	Receive	X	X	X	X	X
Fire Station 262	Transmit	Receive	X	X	X		X
Fire Station 264		Receive	X	X	X		X
South (Greenfield) Water Plant	Transmit	Receive	X	X	X		X
Fire Station 219		Receive	X	X	X	X	X
Shaw Butte	Transmit	Receive	X				
Fire Station 441 (Rio Verde)	Transmit	Receive	X	X			



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Discussion and Action on Communications System Strategic Alliance & Task Orders

- a. Task order 1 - Motorola Support Services Contracts
- b. Task order 2 - Subscriber Supply and Support Contracts
- c. Task order 3 - Software Licensing
- d. PRCC Update



Date: September 12, 2019
To: Topaz Regional Wireless Cooperative (TRWC) Board of Directors
From: Dale Shaw, TRWC Executive Director
Bob Badgett, TRWC Executive Committee Co-chairman
Darin Douglass, TRWC Executive Committee Co-chairman
Subject: CSSA Task Orders #1-3 Approval

Recommendation

The TRWC Executive Director and Executive Committee recommend the approval of the attached Communication Systems Strategic Alliance (CSSA) Task Orders #1-3 (with non-substantive changes prior to execution by the Executive Director).

Background & Discussion

The attached Task Orders were produced as part of the ongoing collaboration between the TRWC and RWC under the direction of the CSSA Coordinating Council. Each Task Order establishes an agreement between the Systems to participate together in procurement and subsequent contracting efforts pertaining to the following:

- **Motorola Support Services Contracts (Task Order #1)**
The objective of this Task Order is to cooperatively procure and enter into purchasing contract(s) with Motorola for system support services.
- **Subscriber Supply and Support Contracts (Task Order #2)**
The objective of this Task Order is to cooperatively procure and enter into purchasing contract(s) with suppliers for subscribers and associated support services.
- **Software Licensing (Task Order #3)**
The objective of this Task Order is to cooperatively procure and enter into purchasing contract(s) with suppliers for software licensing.

Fiscal Impact

Known and anticipated fiscal considerations have been outlined in each Task Order. Any subsequent future fiscal impact will be further defined and approved by the

TRWC Board of Directors as part of the normal approval process, to include any Task Order amendments pertaining to further financial obligations if necessary.



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a. Task order 1 - Motorola Support Services Contracts

TASK ORDER

Motorola Support Services Contracts

October 1, 2019

Task Order #1

THIS TASK ORDER (“Task Order”) is made and entered into as of October 1, 2019, (“Effective Date”) by and between the City of Mesa on behalf of the Topaz Regional Wireless Cooperative (“TRWC”), and the City of Phoenix on behalf of the Regional Wireless Cooperative (“RWC”) (collectively “Parties”), pursuant to the Intergovernmental Agreement for Communications Systems Strategic Alliance, dated March 5, 2018 and recorded with the Maricopa County Recorder’s Office on May 31, 2018 at document number 20180419526 (“Agreement”) as such Agreement may be amended. The City of Mesa and the City of Phoenix shall be referred to individually as a “Party” and collectively as the “Parties.” Capitalized terms not otherwise defined in this Task Order shall have the meanings ascribed to them in the Agreement. In accordance with the terms and conditions of the Agreement, this Task Order authorizes the collaboration on acquisition and use of System Resources as described below.

Objective

The objective of this Task Order is to cooperatively procure and enter into purchasing contract(s) with Motorola for system support services to achieve improved service, cost savings, and improved efficiencies.

Scope

The scope of this Task Order is the development, solicitation, and review of an RFP/B, and subsequent contracting for any of the following services.

- Preventative maintenance
- Technical support
- Security monitoring
- System monitoring
- Trouble response
- Advance replacement
- Hardware repair
- Hardware upgrades
- Software upgrades
- Console support
- Logging recorder maintenance

Any contracted services are not intended to and do not supersede, replace or amend any existing agreements unless explicitly agreed to by each Participating Party (as defined in Section 3.1 of the Agreement) to such existing agreement. The Agreement supersedes and controls over any conflicting provisions of this Task Order.

Roles

The City of Mesa (or incumbent administrative manager or assignee) will act as the lead agency for the purposes of preparation and publishing of formal procurement documents and subsequent contract preparation. The Parties will each assign no less than two (2), and no more than five (5) representatives to participate throughout the review and contracting process. The Parties will ensure that their respective procurement and legal departments review and endorse any final documents, and that their respective governing bodies' approval is obtained. Each administrative manager will select a person to co-lead the effort associated with this Task Order and will ensure systems officials (including the Executive Directors and governing boards of the TRWC, RWC or any other applicable networks) are kept informed on progress.

Duration and Termination

This Task Order will remain in effect so long as the Parties cooperatively and continually procure and exercise associated contracts for any services within the Scope of this Task Order and do not explicitly terminate the Task Order through any governing body action by any of the Parties. This Task Order may be terminated under the same terms and conditions as set forth in Sections 2.2 and 2.3 of the Agreement. Each Task Order is subject to Sections 4.1 through 4.4 of the Agreement.

Budget and Financial Considerations

Each Participating Party will ensure that required budgets are reviewed, approved, and established through their respective governing bodies prior to the execution and commencement of any cooperative contracts associated with this Task Order.

Each Participating Party will be responsible for their portion of fees due for any services rendered in accordance with final service contract(s) terms, and/or an executed amendment to this Task Order.

Conflict of Interest

This Task Order shall be subject to cancellation for conflict of interest pursuant to A.R.S. § 38-511.

Authority to Execute; Counterparts

The individuals executing this Task Order on behalf of the Parties hereto represent that they have authority to execute this Task Order on behalf of such Parties, and represent that upon execution, this Task Order shall be binding and no further action is or shall be necessary to make this Task Order enforceable in its entirety. This Task Order

may be signed in counterparts and the original signatures of all authorized representatives and of their attorneys may appear on separate signature pages.



7

b. Task order 2 - Subscriber Supply and Support Contracts

TASK ORDER

Subscriber Supply & Support Contracts

October 1, 2019

Task Order #2

THIS TASK ORDER (“Task Order”) is made and entered into as of October 1, 2019, (“Effective Date”) by and between the City of Mesa on behalf of the Topaz Regional Wireless Cooperative (“TRWC”), and the City of Phoenix on behalf of the Regional Wireless Cooperative (“RWC”) (collectively “Parties”), pursuant to the Intergovernmental Agreement for Communications Systems Strategic Alliance, dated March 5, 2018 and recorded with the Maricopa County Recorder’s Office on May 31, 2018 at document number 20180419526 (“Agreement”) as such Agreement may be amended. The City of Mesa and the City of Phoenix shall be referred to individually as a “Party” and collectively as the “Parties.” Capitalized terms not otherwise defined in this Task Order shall have the meanings ascribed to them in the Agreement. In accordance with the terms and conditions of the Agreement, this Task Order authorizes the collaboration on acquisition and use of System Resources as described below.

Objective

The objective of this Task Order is to cooperatively procure and enter into purchasing contract(s) with suppliers for subscribers and associated support services to achieve improved service, cost savings, and improved efficiencies.

Scope

The scope of this Task Order is the development, solicitation, and review of RFP/B(s), and subsequent contracting related to mobile, portable, and console subscriber equipment for any of the following.

- Device Procurement
- Service & support

Any contracted procurement or services are not intended to and do not supersede, replace or amend any existing agreements unless explicitly agreed to by each Participating Party (as defined in Section 3.1 of the Agreement) to such existing agreement. The Agreement supersedes and controls over any conflicting provisions of this Task Order.

Roles

The City of Mesa (or incumbent administrative manager or assignee) will act as the lead agency for the purposes of preparation and publishing of formal procurement documents and subsequent contract preparation. The Parties will each assign no less than two (2), and no more than five (5) representatives to participate throughout the review and contracting process. The Parties will ensure that their respective procurement and legal departments review and endorse any final documents, and that their respective governing bodies’ approval is obtained. Each administrative manager will select a person to co-lead the effort associated with this Task Order and will ensure systems

officials (including the Executive Directors and governing boards of the TRWC, RWC or any other applicable networks) are kept informed on progress.

Duration and Termination

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Budget and Financial Considerations

Each Participating Party will ensure that required budgets are reviewed, approved, and established through their respective governing bodies prior to the execution and commencement of any cooperative contracts associated with this Task Order.

Each Participating Party will be responsible for their portion of fees due for any services rendered in accordance with final service contract(s) terms, and/or an executed amendment to this Task Order.

Conflict of Interest

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Authority to Execute; Counterparts

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7

c. Task order 3 - Software Licensing

TASK ORDER

Software Licensing

October 1, 2019

Task Order #3

THIS TASK ORDER (“Task Order”) is made and entered into as of October 1, 2019, (“Effective Date”) by and between the City of Mesa on behalf of the Topaz Regional Wireless Cooperative (“TRWC”), and the City of Phoenix on behalf of the Regional Wireless Cooperative (“RWC”) (collectively “Parties”), pursuant to the Intergovernmental Agreement for Communications Systems Strategic Alliance, dated March 5, 2018 and recorded with the Maricopa County Recorder’s Office on May 31, 2018 at document number 20180419526 (“Agreement”) as such Agreement may be amended. The City of Mesa and the City of Phoenix shall be referred to individually as a “Party” and collectively as the “Parties.” Capitalized terms not otherwise defined in this Task Order shall have the meanings ascribed to them in the Agreement. In accordance with the terms and conditions of the Agreement, this Task Order authorizes the collaboration on acquisition and use of System Resources as described below.

Objective

The objective of this Task Order is to cooperatively procure and enter into purchasing contract(s) with suppliers for software licensing to achieve improved service, cost savings, and improved efficiencies.

Scope

The scope of this Task Order is the development, solicitation, and review of an RFP/B, and subsequent contracting related to licensing for any of the following.

- Motorola ISSI
- Network management
- Logger interface
- Radio Manager
- Other software as identified

Any contracted procurement or services are not intended to and do not supersede, replace or amend any existing agreements unless explicitly agreed to by each Participating Party (as defined in Section 3.1 of the Agreement) to such existing agreement. The Agreement supersedes and controls over any conflicting provisions of this Task Order.

Roles

The City of Mesa (or incumbent administrative manager or assignee) will act as the lead agency for the purposes of preparation and publishing of formal procurement documents and subsequent contract preparation. The Parties will each assign no less than two (2), and no more than five (5) representatives to participate throughout the review and contracting process. The Parties will ensure that their respective procurement and legal departments review

and endorse any final documents, and that their respective governing bodies' approval is obtained. Each administrative manager will select a person to co-lead the effort associated with this Task Order and will ensure systems officials (including the Executive Directors and governing boards of the TRWC, RWC or any other applicable networks) are kept informed on progress.

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Budget and Financial Considerations

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Each Participating Party will be responsible for their portion of fees due for any services rendered in accordance with final service contract(s) terms, and/or an executed amendment to this Task Order.

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The individuals executing this Task Order on behalf of the Parties hereto represent that they have authority to execute this Task Order on behalf of such Parties, and represent that upon execution, this Task Order shall be binding and no further action is or shall be necessary to make this Task Order enforceable in its entirety. This Task Order may be signed in counterparts and the original signatures of all authorized representatives and of their attorneys may appear on separate signature pages.



8

Discussion and Possible Action on DOJ US
Marshall Service Interoperability Request



Date: September 12, 2019
To: Topaz Regional Wireless Cooperative (TRWC) Board of Directors
From: Dale Shaw, TRWC Executive Director
Bob Badgett, TRWC Executive Committee Co-chairman
Darin Douglass, TRWC Executive Committee Co-chairman
Subject: DOJ U.S. Marshals Service Interoperability Request

Recommendation

The TRWC Executive Director and Executive Committee recommends the TRWC Board of Director's authorization of the Executive Director (or appropriate delegate) to develop and execute an interoperability agreement with the U.S. Department of Justice (DOJ) for network access by the U.S. Marshals Service (and other DOJ agencies as required).

Background & Discussion

As requested in the attached letter dated June 11, 2019, the U.S. Department of Justice U.S. Marshals Service has requested interoperability access to the TRWC Network to support radio interoperability with TRWC public safety agencies. Should the Board of Directors elect to approve this request, the Executive Director will work with DOJ officials to execute the current standard interoperability agreement, with minor modification where appropriate, in a form that will provide for the requested access by the U.S. Marshals Service, and to include interoperability access by other DOJ agencies as required.

Fiscal Impact

No fiscal impact is anticipated beyond normal forecasted expenditures.



U.S. Department of Justice

United States Marshals Service

District of Arizona

June 11, 2019

Dale Shaw
Executive Director
Topaz Regional Wireless Cooperative (TRWC)

Dear Mr. Shaw:

The US Marshals Service – District of Arizona (D/AZ) is requesting authorization for use of frequencies under control by the Topaz Regional Wireless Cooperative. The D/AZ is requesting access in order to allow coordination among emergency response agencies and related resources. The coordination may occur during interagency operations, en-route travel, and/or on-incident communications.

The D/AZ would only operate (transmit) on another agency's interoperability frequencies (B-Deck and C-Deck) when authorized to do so by that agency, or per agreed upon operational procedures. The D/AZ would manage employees' usage by ensuring they comply with federal, state, local laws, ordinances and rules.

Sincerely,

David Gonzales
US Marshal
District of Arizona



9

Discussion on Communications
Boilerplate Legal Language



Memorandum

To: TOPAZ Regional Wireless Cooperative (“TRWC”) Board of Directors

Through: Dale Shaw, TRWC Executive Director

From: William H. Anger

Date: September 12, 2019

Re: Suggested language for communication agreements related to the TRWC Network between a TRWC Member and a non-TRWC Member.

TRWC Members may from time to time enter into communication agreements related to the TRWC Network with a non-TRWC Member. Attached as Exhibit A to this memorandum is suggested language that could be used in such third party agreements. This is only suggested language and a TRWC Member may desire or need to use alternative language based on the type and nature of such communication agreement.

EXHIBIT A

This Agreement shall be null and void unless [name of Third Party Interoperability Participant] enters into a separate Interoperability Agreement [in a form approved by the Topaz Regional Wireless Cooperative Network's ("TRWC") Board of Directors] with the Administrative Manager of the TRWC, for the use and access of the TRWC Network ("TRWC Interoperability Agreement"). Notwithstanding anything to the contrary in this Agreement, the TRWC Interoperability Agreement (as may be amended) at all times supersedes and controls over any conflicting provision of this Agreement.



10

Discussion and Possible Action on Network Administrator Updates

a. Finance Update

TOPAZ
Detail of Operating and Maintenance
Fiscal Year 2018 / 2019

Year to Date Through June 30, 2019

Description	Budget	Updated Forecast	YTD Forecast*	YTD Actual	\$ Var	% Var
					From YTD Forecast	Incr/(Decr)
Personnel Services	\$ 418,340	\$ 370,334	\$ 370,334	\$ 370,334	\$ -	0%
Insurance Premiums	8,500	8,500	8,500	-	(8,500)	-100%
Legal Services	37,000	37,000	37,000	19,140	(17,860)	-48%
Temp Services	6,000	6,000	6,000	2,395	(3,605)	-60%
Leases and Rents - Land	25,300	25,300	25,300	15,649	(9,651)	-38%
Professional Services - Consulting	88,500	88,500	88,500	142,283	53,783	61%
Professional Services - Other	15,000	15,000	15,000	1,054	(13,946)	-93%
Utilities	60,000	60,000	60,000	49,492	(10,508)	-18%
Telephone	3,400	3,400	3,400	2,139	(1,261)	-37%
Repairs & Maintenance	31,000	31,000	31,000	-	(31,000)	-100%
Equipment Usage (Vehicles)	20,000	20,000	20,000	13,314	(6,686)	-33%
All Other Services	-	-	-	14,951	14,951	0%
Sub-total Services	294,700	294,700	294,700	260,417	(34,283)	-12%
Motorola Contract	957,200	957,200	957,200	869,166	(88,034)	-9%
Juniper Software	22,500	22,500	22,500	-	(22,500)	-100%
Materials & Parts	20,460	20,460	20,460	24,082	3,622	18%
Non Cap Assets	25,000	25,000	25,000	3,896	(21,104)	-84%
All Other Commodities	-	-	-	-	-	0%
Sub-total Commodities	1,025,160	1,025,160	1,025,160	897,144	(128,016)	-12%
Subtotal O&M	1,738,200	1,690,194	1,690,194	1,527,895	(162,299)	-10%
Contingency - 5% of total O&M	51,321	51,321	51,321	-	(51,321)	-100%
VHF Operations	120,138	120,138	120,138	-	(120,138)	-100%
Total	\$ 1,909,659	\$ 1,861,653	\$ 1,861,653	\$ 1,527,895	\$ (333,758)	-18%

*YTD Forecast represents 12 months of operational costs plus any contractual expenses already incurred (i.e. one time payments such as Insurance Premiums, Land Rental and Motorola Contract).

TOPAZ
Detail of Operating and Maintenance
Fiscal Year 2019 / 2020

Year to Date Through August 31,2019

Description	Budget	Updated Forecast	YTD Forecast*	YTD Actual	\$ Var	% Var
					From YTD Forecast	Incr/(Decr)
Personnel Services	\$ 418,340	\$ 388,671	\$ 59,796	\$ 59,796	\$ (0)	0%
Insurance Premiums	8,500	8,500	8,500	-	(8,500)	-100%
Legal Services	37,000	37,000	37,000	-	(37,000)	-100%
Temp Services	6,000	6,000	6,000	-	(6,000)	-100%
Leases and Rents - Land	25,300	25,300	25,300	8,400	(16,900)	-67%
Professional Services - Consulting	88,500	88,500	88,500	18,233	(70,267)	-79%
Professional Services - Other	15,000	15,000	15,000	(29,027)	(44,027)	-294%
Utilities	60,000	60,000	60,000	7,977	(52,023)	-87%
Telephone	3,400	3,400	3,400	195	(3,205)	-94%
Repairs & Maintenance	31,000	31,000	31,000	-	(31,000)	-100%
Equipment Usage (Vehicles)	20,000	20,000	20,000	1,400	(18,600)	-93%
All Other Services	-	-	-	-	-	0%
Sub-total Services	294,700	294,700	294,700	7,178	(287,522)	-98%
Motorola Contract	957,200	957,200	957,200	869,166	(88,034)	-9%
Juniper Software	22,500	22,500	22,500	-	(22,500)	-100%
Materials & Parts	20,460	20,460	20,460	1,022	(19,438)	-95%
Non Cap Assets	25,000	25,000	25,000	-	(25,000)	-100%
All Other Commodities	-	-	-	-	-	0%
Sub-total Commodities	1,025,160	1,025,160	1,025,160	870,188	(154,972)	-15%
Subtotal O&M	1,738,200	1,708,531	1,379,656	937,162	(442,494)	-32%
Contingency - 5% of total O&M	51,321	51,321	51,321	-	(51,321)	-100%
VHF Operations	120,138	120,138	120,138	-	(120,138)	-100%
Total	\$ 1,909,659	\$ 1,879,990	\$ 1,551,115	\$ 937,162	\$ (613,953)	-40%

*YTD Forecast represents 12 months of operational costs plus any contractual expenses already incurred (i.e. one time payments such as Insurance Premiums, Land Rental and Motorola Contract).



10

b. Network Updates and Performance Overview

Date: September 12, 2019

To: TOPAZ Regional Wireless Cooperative (TRWC) Board of Directors

Through: Dale Shaw, TRWC Executive Director

From: Randy Thompson

Subject: Administrator Update

Capital Projects

1) Fiscal Year 2020 Capital Projects (approved in Fiscal Year 2019-2020 TRWC Capital Budget)

- a. System-of-Systems Networking Expansion.** This project will enable the expansion of the networking of the TRWC to other Project 25 radio networks, the First Responder Network Authority (FirstNet built by AT&T), or other push-to-talk providers to enable “roaming” between systems to expand radio coverage without building additional radio sites.

The connection required for system-of-systems networking with FirstNet built by AT&T was established on June 27, 2019. Since that time, we have been performing testing to ensure the link is stable and that we understand the features and limitations of the system-of-systems networking connection to FirstNet/AT&T. The next planned step is a controlled rollout of the integrated FirstNet and TOPAZ networks with the Mesa Police Department and the Mesa Fire & Medical Department.

The testing with FirstNet built by AT&T has been slow and deliberate because we want to ensure the Public Safety end-user experience meets expectations. We have also become aware there are alternatives to the current FirstNet broadband push-to-talk offering under development, and do not want to commit to a path if a standards-based FirstNet broadband push-to-talk offering becomes available in the near future.

We will not be expending the budgeted funds for this project until the appropriate agreements are in place with other P25 networks or cellular carriers.

- b. Radio Sites Emergency Power Upgrade.** This is a five-year plan to replace the emergency generators at the TOPAZ radio sites. This is a planned lifecycle upgrade. We have difficulty getting parts for the older generators, so we want to replace rather than wait for failure. A bid award has been made, and the project is being started; the plan is to replace two generators this fiscal year.
- c. Antenna & Transmission Lines Lifecycle Upgrade.** The antennas and the transmission lines that connect the antennas to the base stations at the TOPAZ radio sites are over 15 years old, so we need to replace them before they fail. This a two-year plan. This

TRWC Administrator Update, September 12, 2019

project is on hold pending the outcome of the TOPAZ Network Engineering Study described below.

- d. **Capacity Expansion for Shaw Butte and Florence Gardens.** The channels (talkgroups) made available at the Shaw Butte and Florence Gardens sites have been limited due to concerns about capacity. Rather than add physical radio channels, the Shaw Butte and Florence Gardens sites will be converted to Project 25 Phase II, which doubles the voice carrying capacity of the site without adding physical radio channels.
- e. **TOPAZ Network Engineering Study.** This is a new project for Fiscal Year 2020 and will be funded by the TRWC Operations & Maintenance budget. This engineering study will evaluate the current TOPAZ networks (7/800 MHz P25 and the Fire Hazard Zone Communications System (VHF)) to determine the following:
 - i. Are current site locations optimal for the current radio coverage area criteria
 - ii. Are the current antennas appropriate to meet the system radio coverage objectives (this is related to item “d” above).
 - iii. An ordered list of areas requiring new sites to provide or improve radio coverage in the future (this is related to the TRWC Capital Budget Plan)
 Federal Engineering was awarded a \$69,508 contract for this work which began July 15, 2019 and is scheduled to be complete by September 25, 2019.

Operations Summary

Unscheduled Impairments – Please see the unscheduled impairments graph on page 4. Since the last Administrator update on February 21, 2019, the unimpaired system availability has been as follows:

Period	Unimpaired System Availability	Comments
February, 2019	99.613%	2/6/19: Twin Knolls out of service 2:35:53 due to equipment failure (LNA).
March, 2019	100%	
April, 2019	100%	
May, 2019	100%	
June, 2019	100%	
July, 2019	100%	
August, 2019	99.666%	8/29/19: Twin Knolls out of service 2:29:07 due to equipment failure (LNA).
Fiscal Year 2019	99.859	Goal 99.999%
Calendar Year 2019	99.913	Goal 99.999%
Fiscal Year 2020	99.833	Goal 99.999%

The cause of the Low Noise Amplifier (LNA) failures at the Twin Knolls site is unknown and will be investigated by a consultant with expertise in radio site grounding and lightning protection.

TRWC Administrator Update, September 12, 2019

Airtime and Radio Counts – the following charts are included:

- 1) Six month rolling average airtime usage by member for calendar year 2019 through July.
- 2) Average number of radios enabled by member for calendar year 2019 through July.
- 3) Six month rolling average airtime usage by service type for calendar year 2019 through July.
- 4) Average number of radios enabled by service type for calendar year 2019 through July.

Peak Channel Usage – the following charts are included:

- 1) Peak channel usage for each site for February through August, 2019 is shown on the graphs at the end of this report. The following table is a summary of the number of days with an all channels in use event:

Period	Simulcast Cell	Florence Gardens	Shaw Butte	Thompson Peak
February, 2019	14	0	3	7
March, 2019	14	0	3	8
April, 2019	13	0	3	8
May, 2019	13	1	3	7
June, 2019	15	1	3	6
July, 2019	15	1	3	7
August, 2019	15	0	4	7

- a. Although all channels were in use on several occasions as shown above, no system busies have been reported by users.
- b. The events all channels in use on the simulcast cell in June, July, and August were due to testing with FirstNet through the system-of-systems networking. The cause of all channels in use has been determined, and a workaround put in place to prevent the recurrence of the cause.

Other Operational Events:

- 1) Nothing to report.

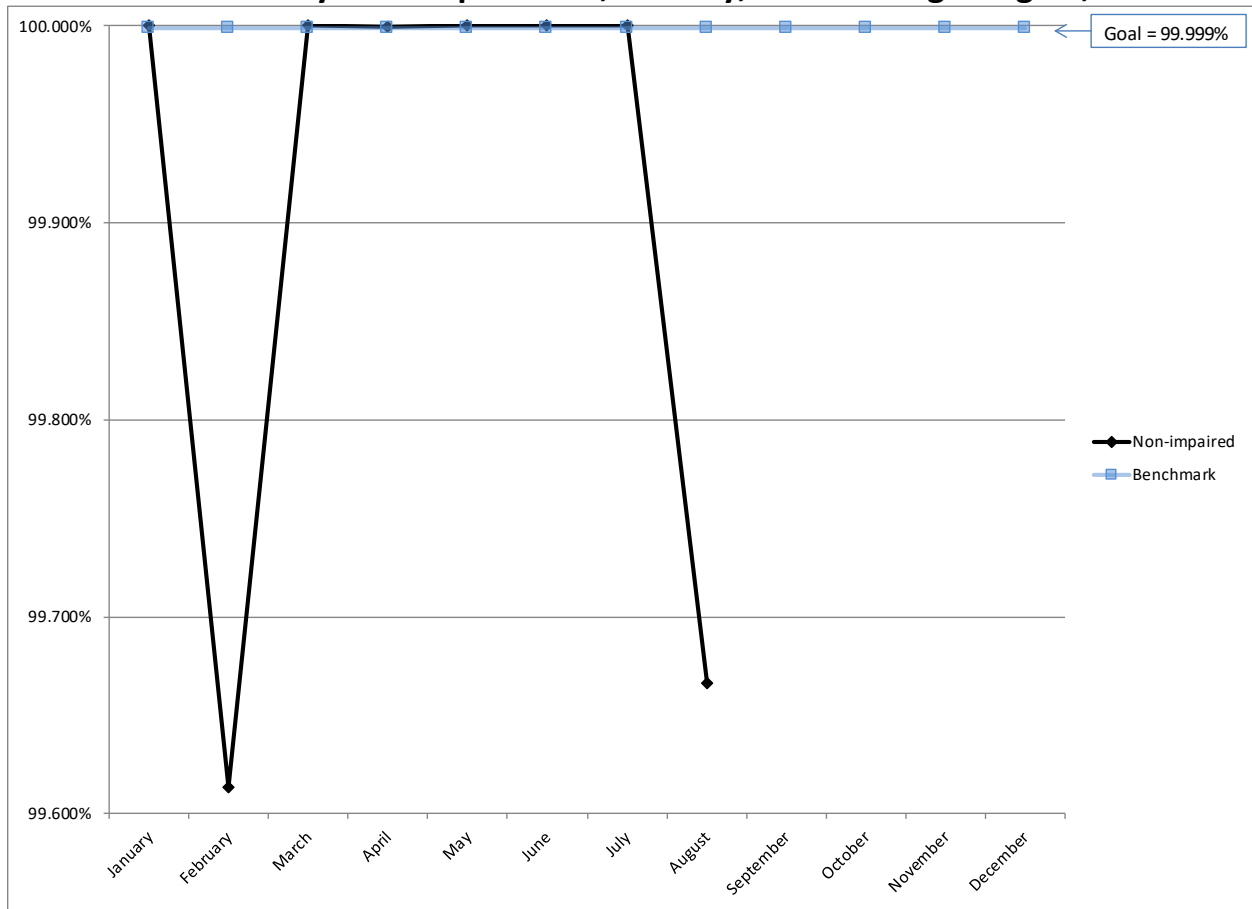
Upcoming Events:

- 1) The upgrade of the TOPAZ 7/800 MHz network from the current 7.16 system release to the 7.18 system release is scheduled for September 30 – October 10, 2019.

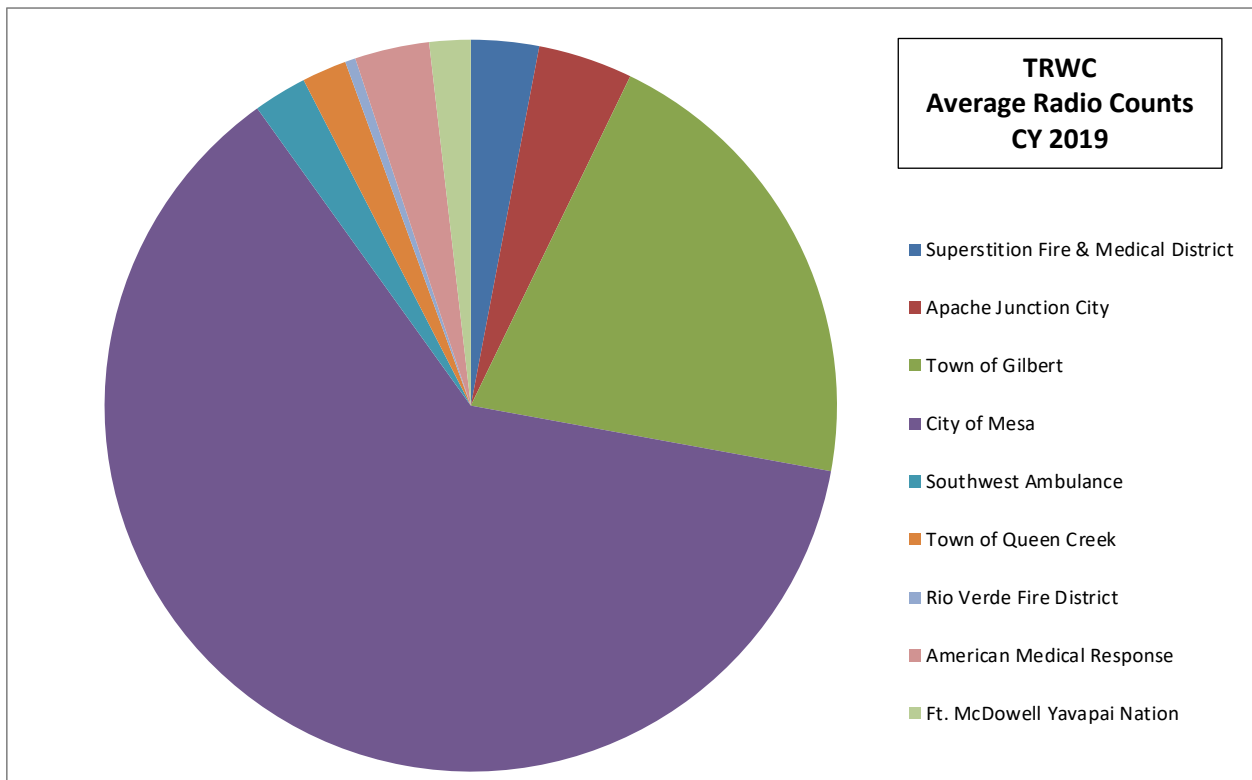
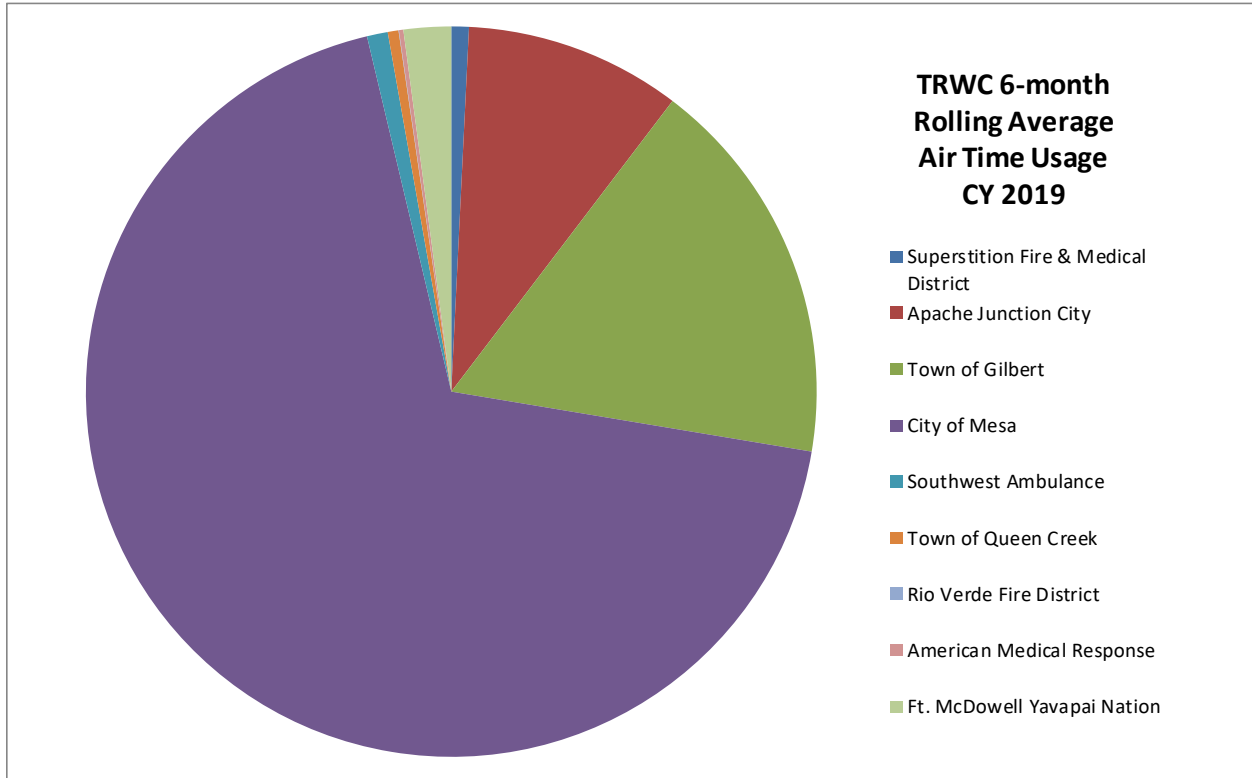
Other News:

- 1) Nothing to report.

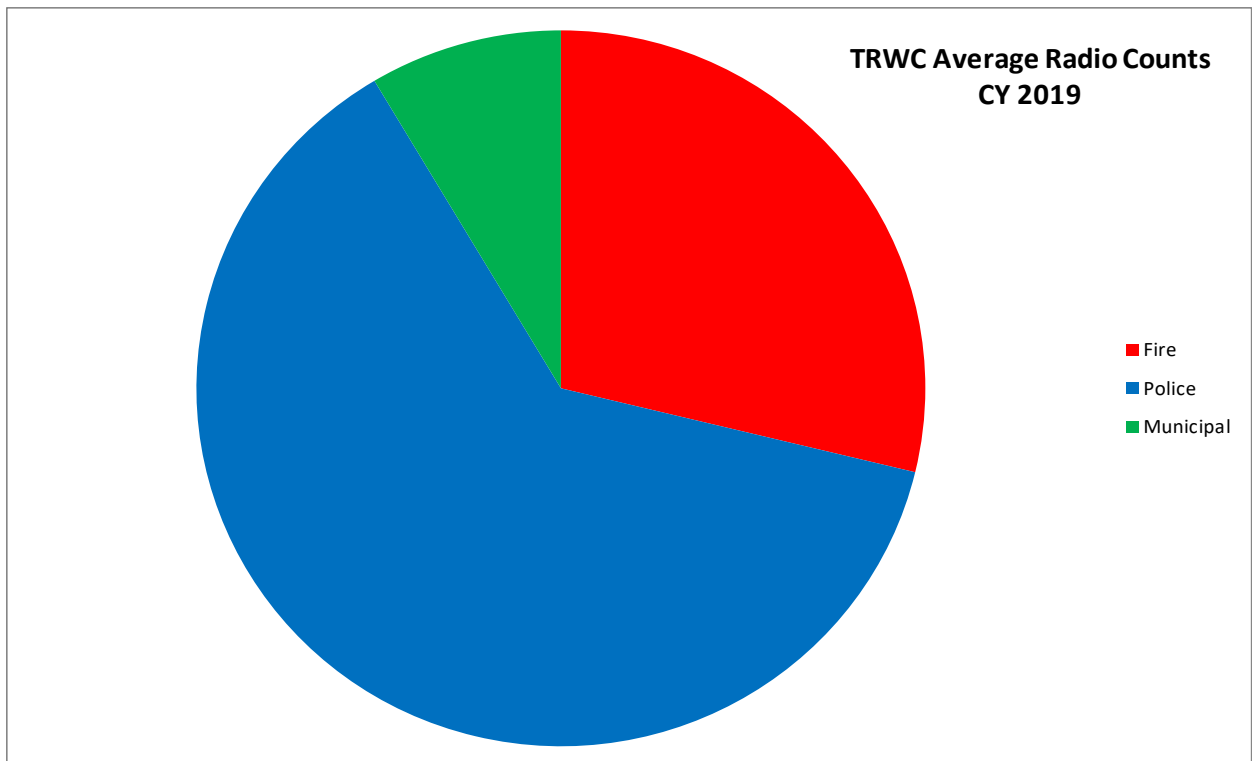
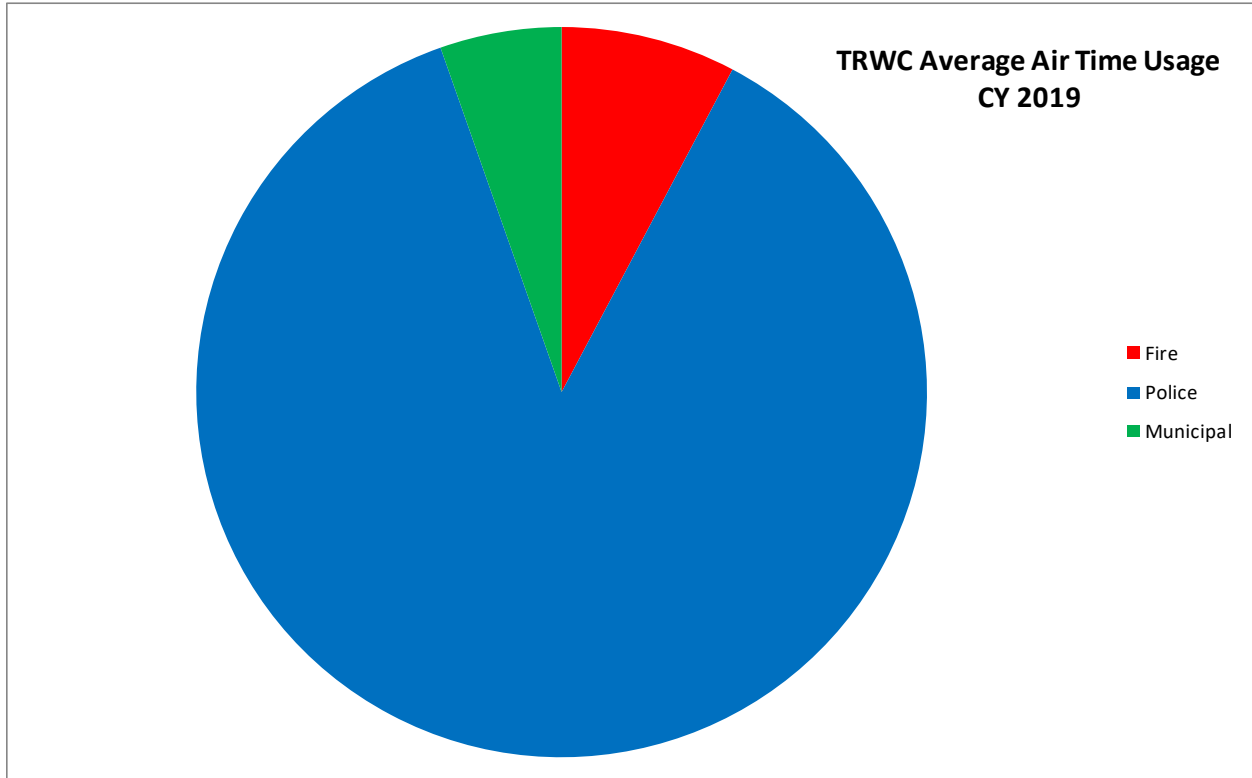
Unscheduled System Impairment, January, 2019 through August, 2019



TRWC Administrator Update, September 12, 2019

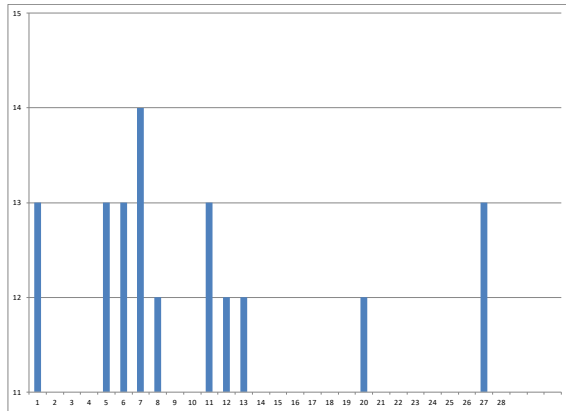


TRWC Administrator Update, September 12, 2019

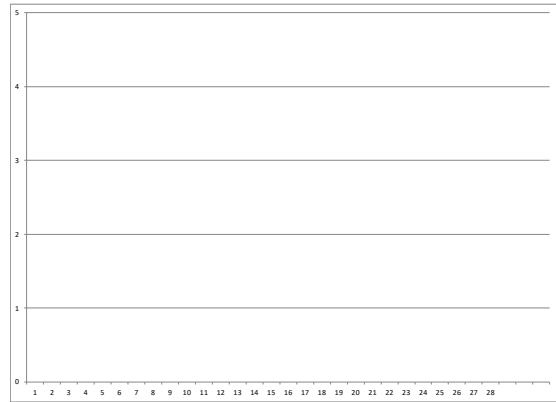


TRWC Administrator Update, September 12, 2019

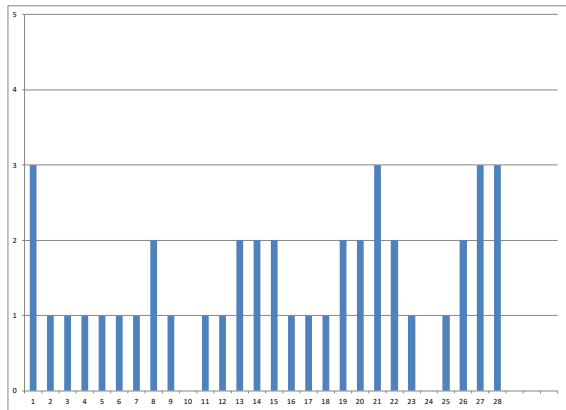
TOPAZ Peak Channel Usage, February, 2019



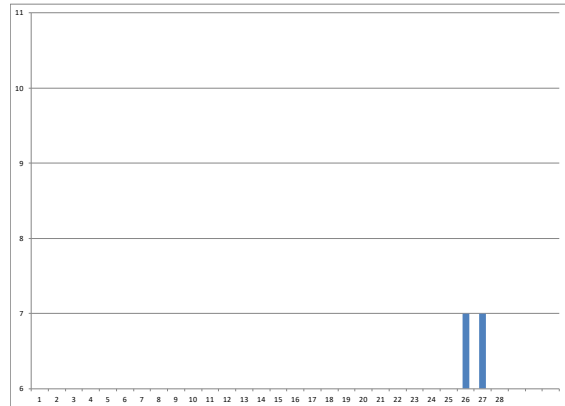
Simulcast Cell



Florence Gardens



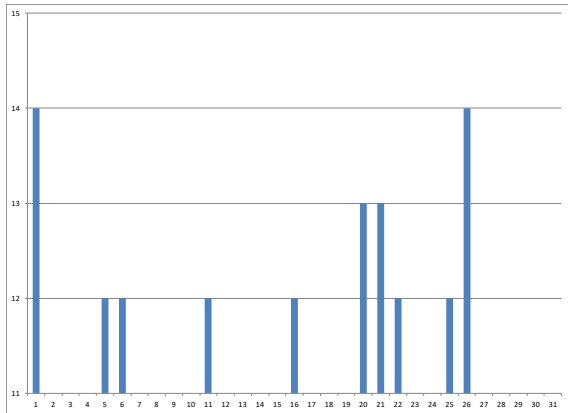
Shaw Butte



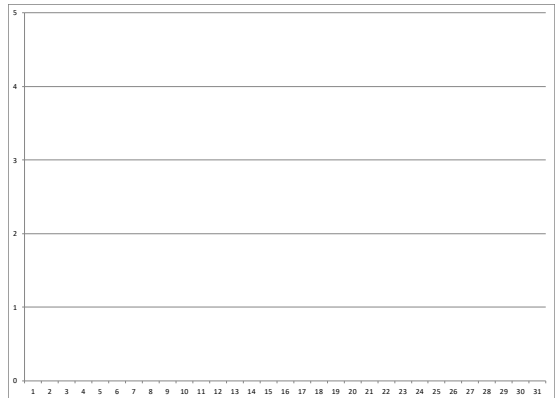
Thompson Peak

TRWC Administrator Update, September 12, 2019

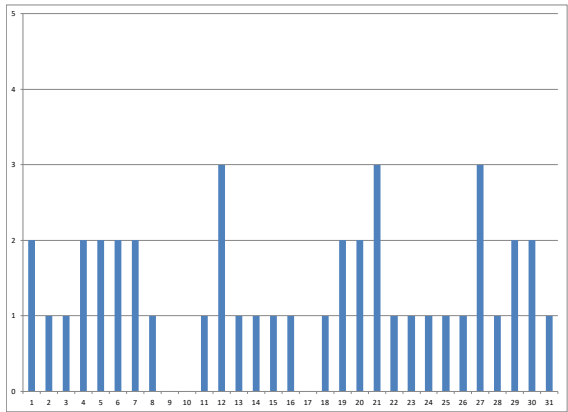
TOPAZ Peak Channel Usage, March, 2019



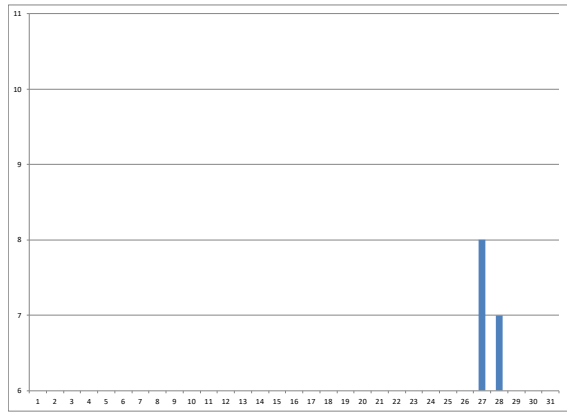
Simulcast Cell



Florence Gardens



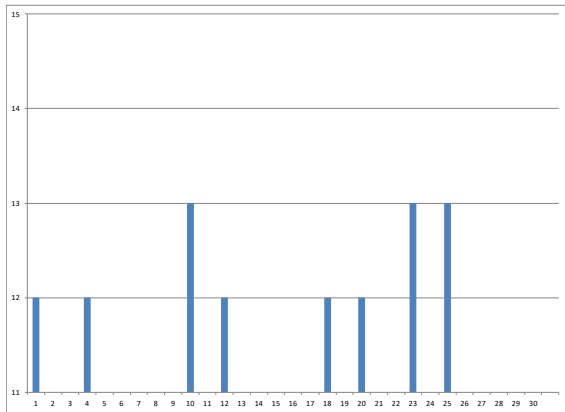
Shaw Butte



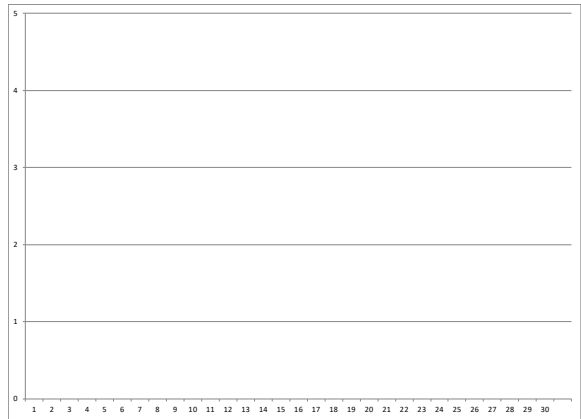
Thompson Peak

TRWC Administrator Update, September 12, 2019

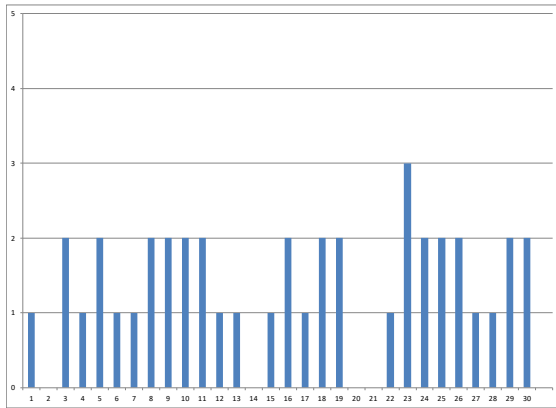
TOPAZ Peak Channel Usage, April, 2019



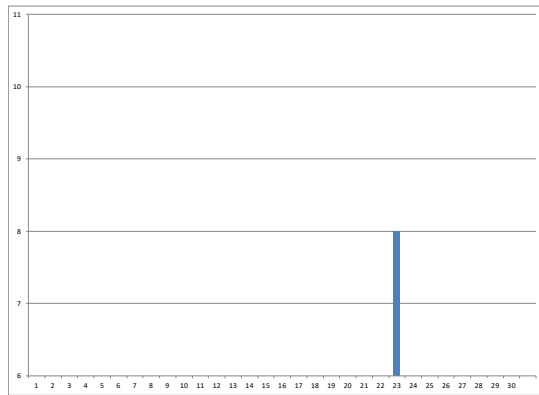
Simulcast Cell



Florence Gardens



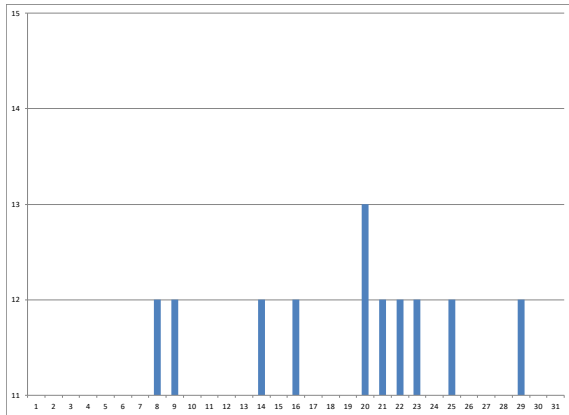
Shaw Butte



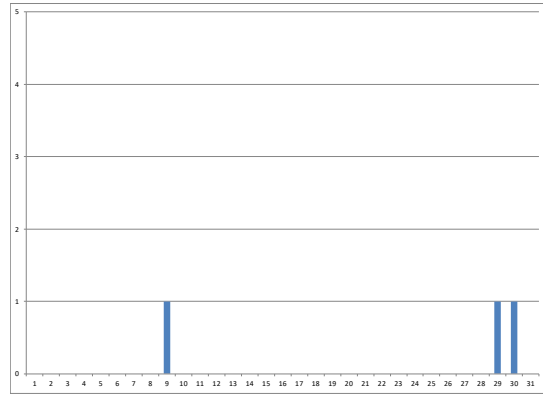
Thompson Peak

TRWC Administrator Update, September 12, 2019

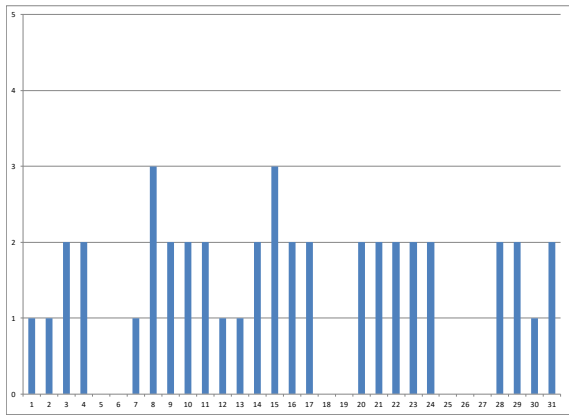
TOPAZ Peak Channel Usage, May, 2019



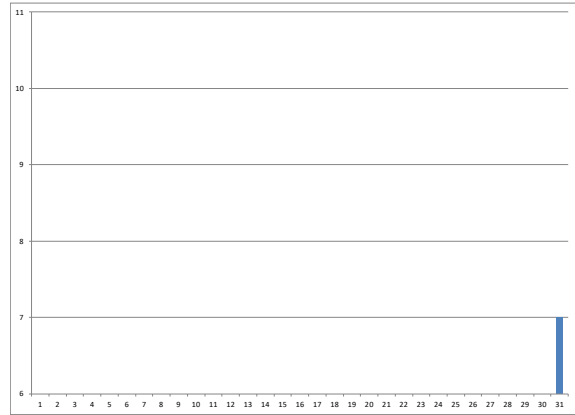
Simulcast Cell



Florence Gardens



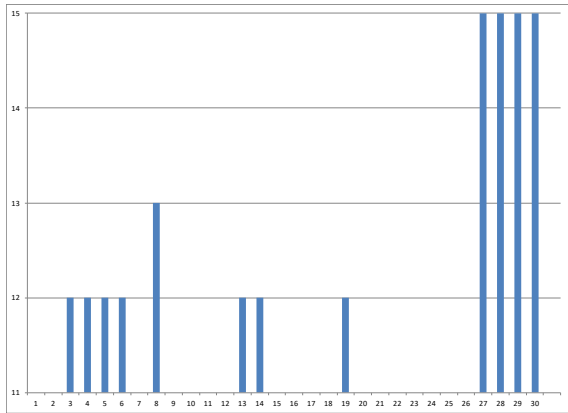
Shaw Butte



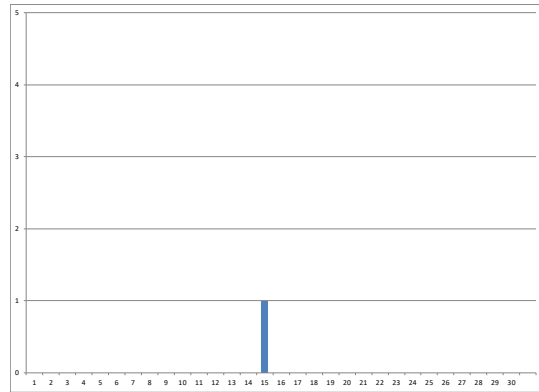
Thompson Peak

TRWC Administrator Update, September 12, 2019

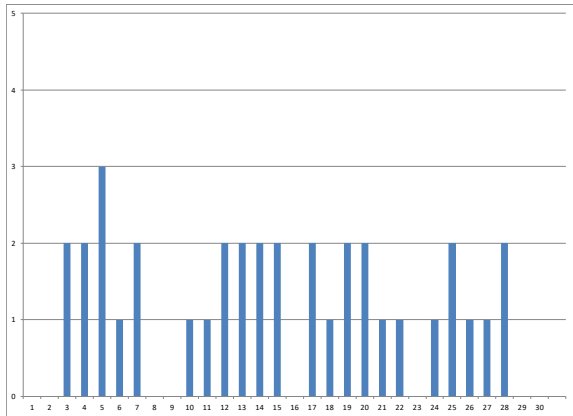
TOPAZ Peak Channel Usage, June, 2019



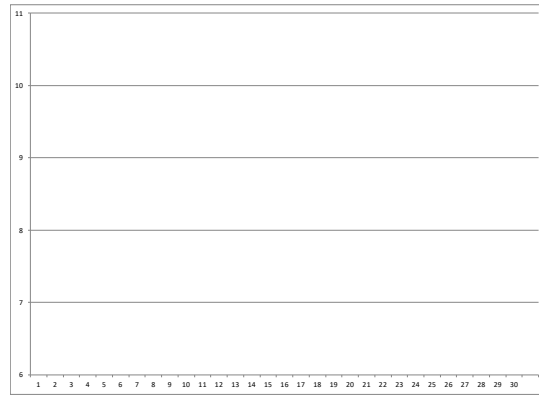
Simulcast Cell



Florence Gardens



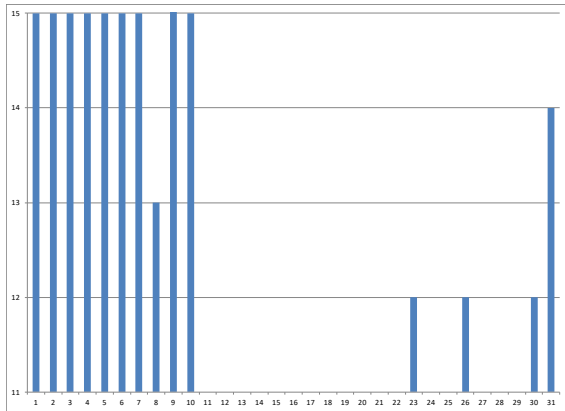
Shaw Butte



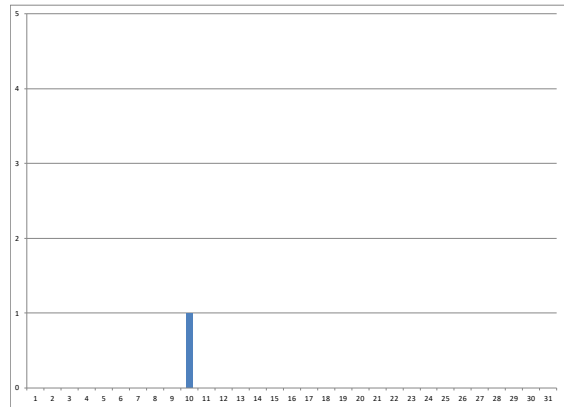
Thompson Peak

TRWC Administrator Update, September 12, 2019

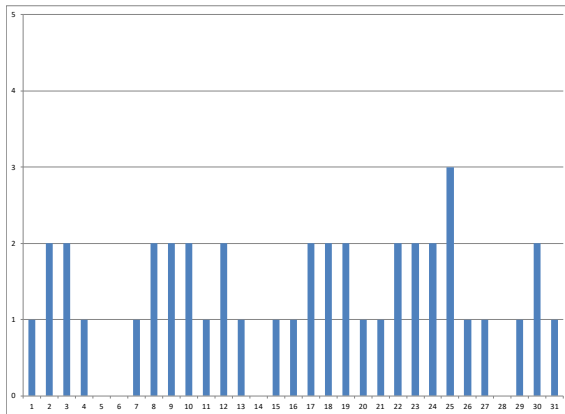
TOPAZ Peak Channel Usage, July, 2019



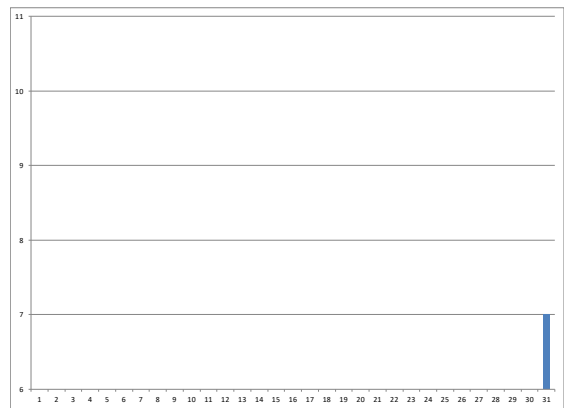
Simulcast Cell



Florence Gardens



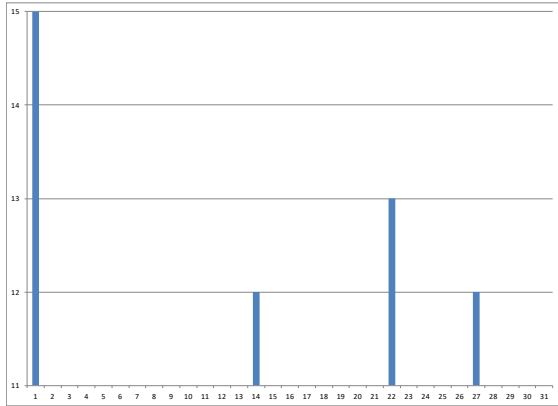
Shaw Butte



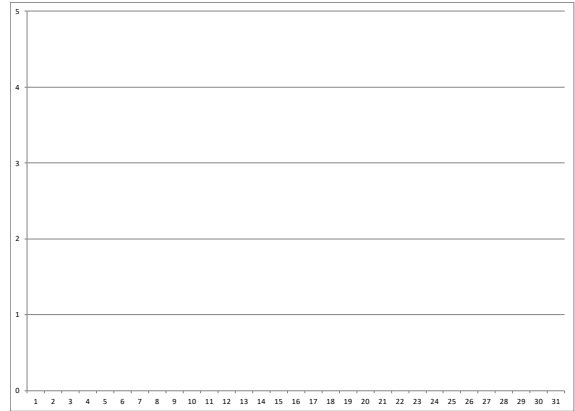
Thompson Peak

TRWC Administrator Update, September 12, 2019

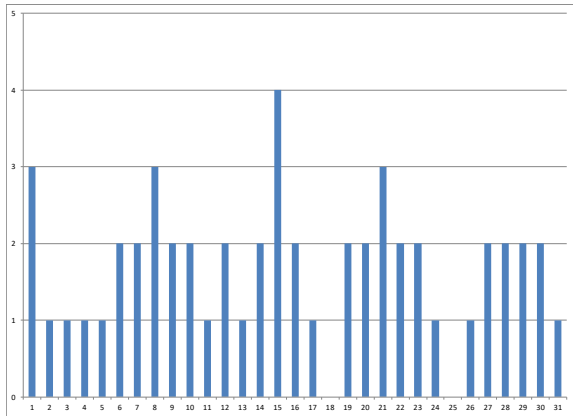
TOPAZ Peak Channel Usage, August, 2019



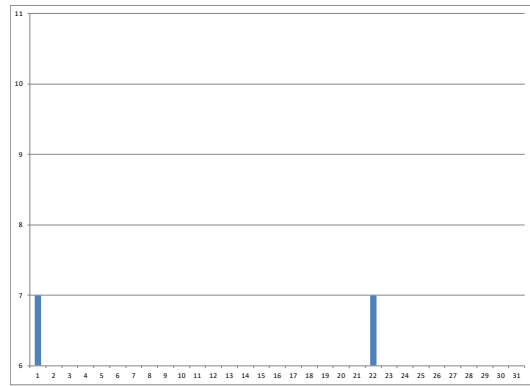
Simulcast Cell



Florence Gardens



Shaw Butte



Thompson Peak