Communications Refresher and Radio Basics

for

Cupertino Community Volunteers

April 13, 2023
Jim Oberhofer

Cupertino Citizen Corps

Topics for tonight

1. Welcome

2. Volunteer Overview

3. How Cupertino volunteers use radios

4. Radio best practices

5. Radio operations basics

6. Field references

7. What's next?

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Why volunteer?

- In the United States, volunteers hold up the foundation of civil society. They _help their neighbors_, _serve their communities_, and _provide their expertise_.   No matter what kind of volunteer work you choose to do, you are contributing in invaluable ways.

  How do you do this?

  - _bring your experience and expertise_ to whatever emergency we face

  - _augment the capabilities_ of local government with your training

  - help _speed the recovery_ after an emergency

Cupertino volunteer organizations

- **CERT** – *Community Emergency Response Team*
  Prepares residents for and responds to life-threatening events in their community.

- **Block Leader** –
  A neighborhood engagement program; helps neighbors get to know their neighbors and organize activities so neighbors can more easily communicate.

- **MRC** – *Medical Reserve Corps*
  a specialized function within CERT, uses volunteer expertise to promote public health throughout the year as well during times of emergency.

- **CARES** – *Cupertino Amateur Radio Emergency Service*
  FCC-licensed amateur radio operators who plan, prepare for, and respond to emergencies with backup and emergency communications for our community, city, and served agencies.

During an emergency, what's the plan?

1. **Take care of yourself**
   - Are you OK? Are you safe?

2. **Take care of your family**
   - Is your family OK? Do they need help or first aid?
   - Is your home or wherever you are OK? Or, should you get out now?

3. **Take care of your neighbors**
   - Activate the neighborhood emergency plan (if you have one).
   - Are your neighbors OK? Does anyone need help?
   - Can your neighborhood handle the local problems?
   - If not, what help do you need?
   - And, can you call for help?

During an emergency, what's the plan?

4. Take care of the community

- No matter where or how you choose to volunteer, during an emergency, there are a few things with which the City needs your help.

Emergency Tasks	Block Leader, NW	Citizen Corps	CARES
Assess your neighborhood	✓	✓	✓
Report your neighborhood status	✓	✓	✓
Request additional aid	✓	✓	✓
Receive and share city information	✓	✓	✓
Render local aid		✓	
ARK activations		✓	✓
Light Search and Rescue		✓	
Fire Suppression		✓	
Cribbing		✓	
Field-to-EOC communications			✓
EOC-to-County communications			✓

Where does help come from?
Emergency information flow

Neighborhoods [**Lindy**]   [**Woodhill**] ▪ ▪ ▪   [**Hyde**]

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Where does help come from?

Emergency information flow

City DOC/EOCs — **Cupertino**

Cupertino ARKs — **MVA** **RSA** **GGA** **LSA** **DZA** **CSA** **Public Works**

Monta Vista   Regnart   Garden Gate   Lawson   De Anza   Creekside
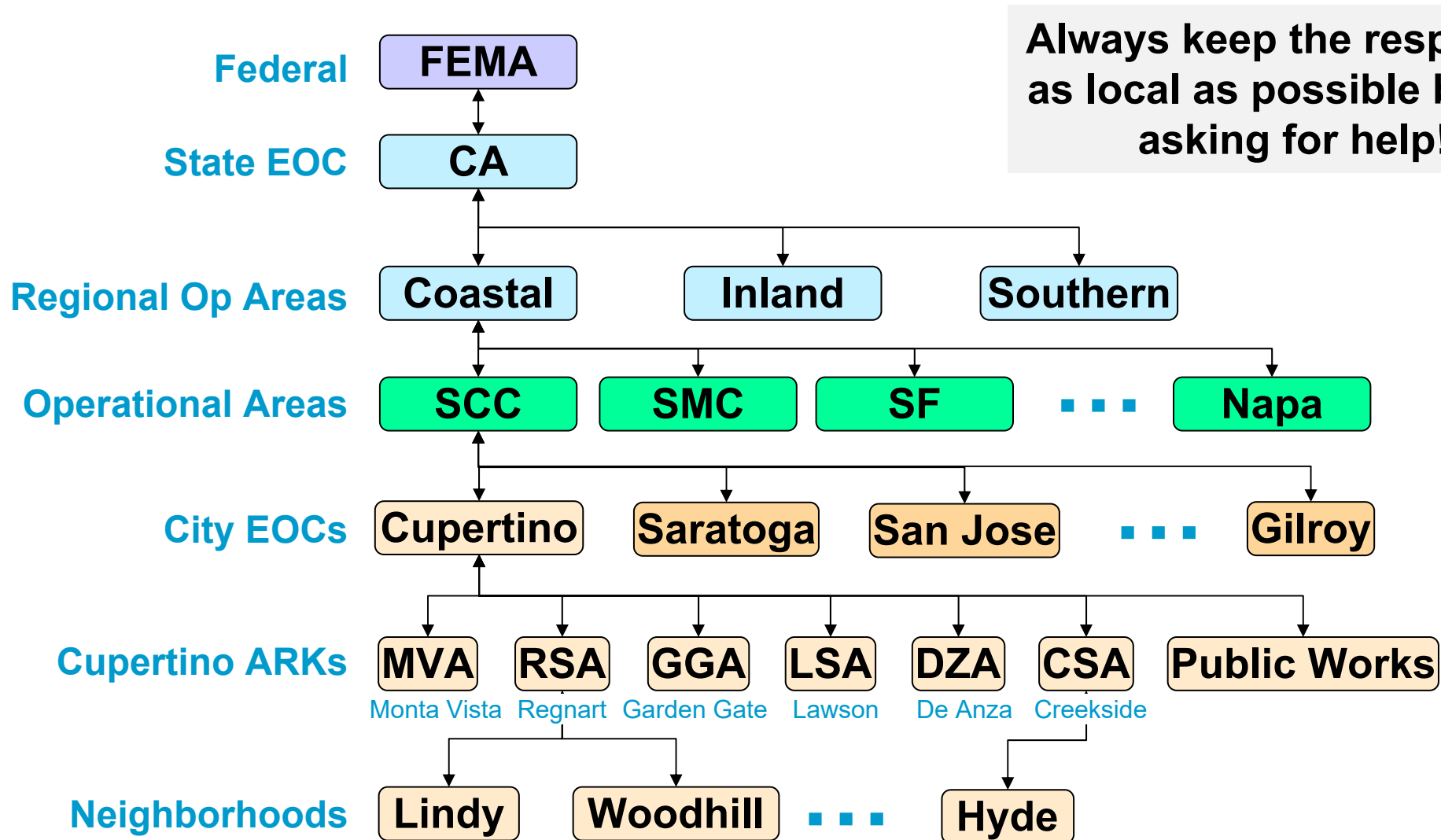
Neighborhoods — **Lindy** **Woodhill** ... **Hyde**

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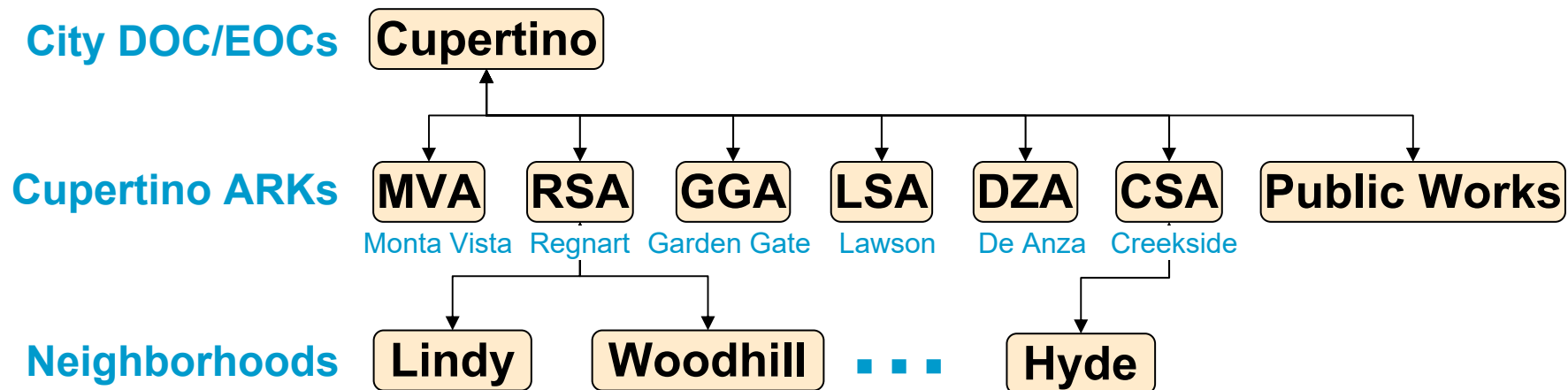
Where does help come from?

Emergency information flow

In general, ways to communicate

1. **Telephone/Cell phone –** requires the commercial phone system to be working

2. **Texting –** requires the cell phone infrastructure to be working

3. **Email –** requires the internet to be working

4. *Sneaker-net* – personally carrying information from one place to another

5. **Two-way radio** – a radio that can both transmit and receive a radio message

Two-way radio

Why

- Works when other communications methods fail
- Doesn't require the internet, telephone system, or commercial power
- Great for back-and-forth information exchanges
- Small, fairly inexpensive

When to use two-way radio

- When other communications methods are unavailable or failed (internet, cellular, landline phone system), or
- When communication systems are overloaded

When not to use

- If other communications methods are available, then use them
- You are close to the person with whom you want to communicate

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Typical radios used by volunteers

FRS (Family Radio Service)

- Inexpensive
- No FCC license
- Low transmit power (2 watts max)
- Permanently fixed antenna
- Limited distance

GMRS (General Mobile Radio Service)

- Slightly more expensive
- FCC License required
  - No test
  - License fee: $35, good for 10 years
  - One license covers the entire family
- Higher transmit power (5-50 watts)
- Detachable antennas
- Greater distance

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Typical radios used by volunteers

Ham Radio (Amateur Radio Service)

- More expensive
- License required
  - Multiple choice knowledge test
  - License fee: $35, good for 10 years
  - License covers only you
- Medium-high power (5-50+ watts)
- A lot more available frequencies
- Detachable antennas
- Santa Clara County Emergency Communications
  - Robust training opportunities
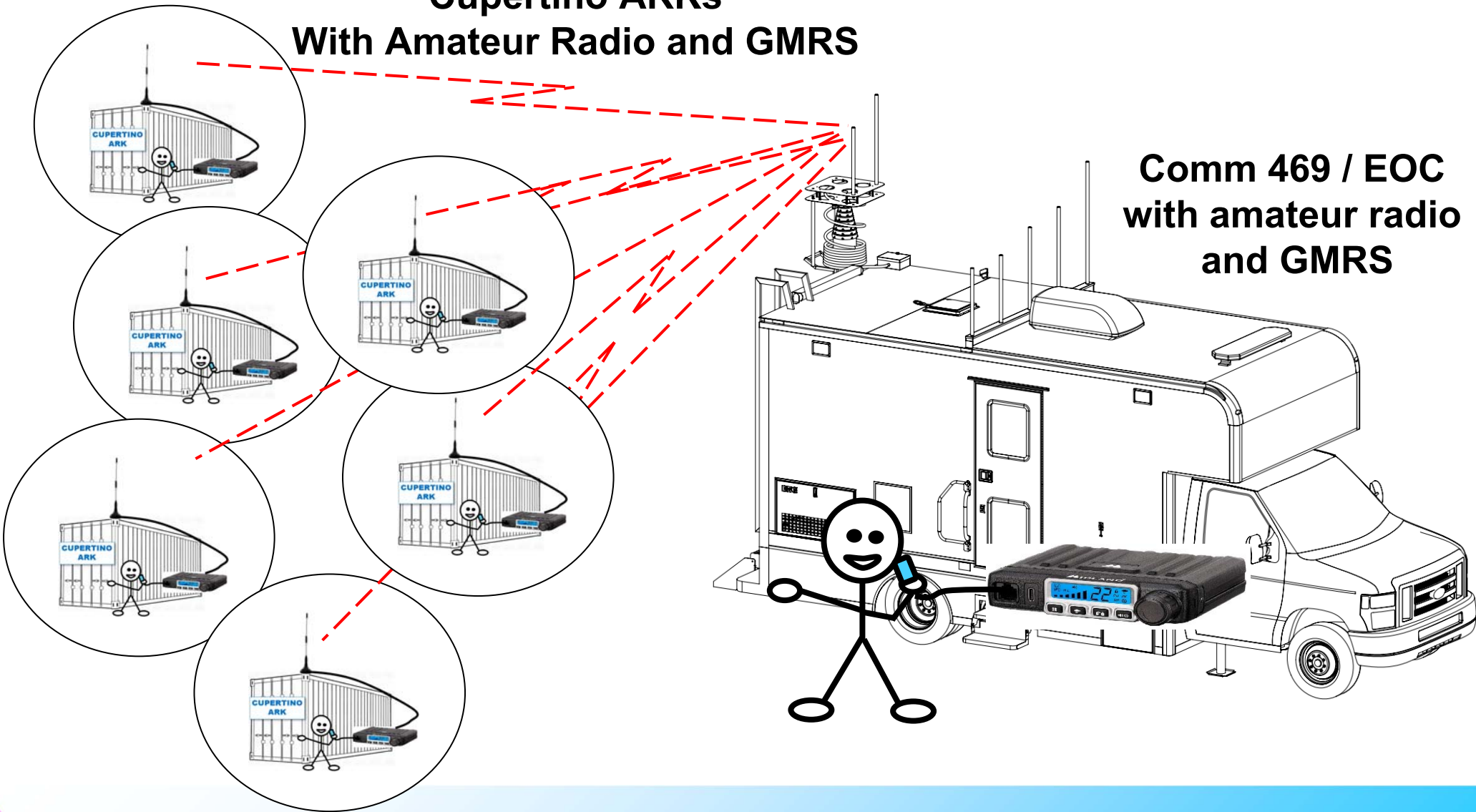
How will we use FRS and GMRS
ARKs and Field Teams

Mag Mount
Antenna

CUPERTINO
ARKs

FRS Radios
in the neighborhoods

GMRS Radios
at the ARKs
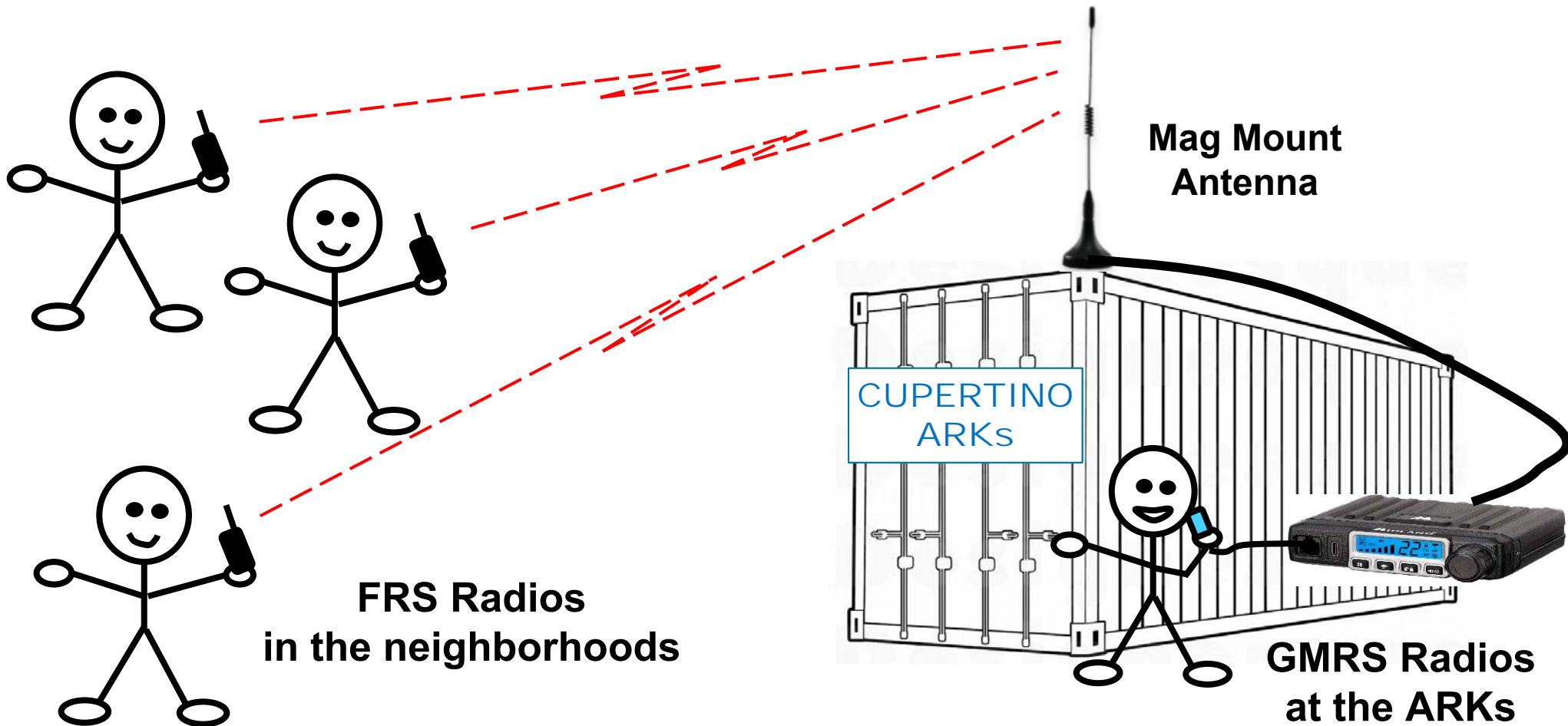
How will we use GMRS & Amateur Radio
ARKs and the EOC

**Cupertino ARKs
With Amateur Radio and GMRS**

**Comm 469 / EOC
with amateur radio
and GMRS**

Cupertino's FRS/GMRS Channel Plan

ARK Channels 1 thru 7

Neighborhood Channels 8 thru 14

GMRS, Rptr Channels 15 thru 22

| Zone / Function	Ch/Tone	FRS	GMRS
Z1: Monta Vista ARK	1 / 21 (136.5Hz)	2w	5w
Z2: Regnart ARK	2 / 22 (141.3Hz)	2w	5w
Z3: Garden Gate ARK	3 / 23 (146.2Hz)	2w	5w
Z4: Lawson ARK	4 / 24 (151.4Hz)	2w	5w
Z5: DeAnza ARK	5 / 25 (156.7Hz)	2w	5w
Z6: Creekside ARK	6 / 26 (162.2Hz)	2w	5w
Z7: EOC, Trailer	7 / 27 (167.9Hz)	2w	5w
CERT Tac channel 8	8 / 0	0.5w	--
CERT Tac channel 9	9 / 0	0.5w	--
CERT Tac channel 10	10 / 0	0.5w	--
CERT Tac channel 11	11 / 0	0.5w	--
CERT Tac channel 12	12 / 0	0.5w	--
CERT Tac channel 13	13 / 0	0.5w	--
CERT Tac channel 14	14 / 0	0.5w	--
Comm 469 Tac 15	15 / 35 (225.7Hz)	2w	50w
CUP CERT/GMRS*	20R / 31 (192.8Hz)	2w	50w
SJ Local Repeater	21R / 22 (141.3Hz)	2w	50w
SJ CERT/GMRS	22R / 16 (114.8Hz)	2w	50w

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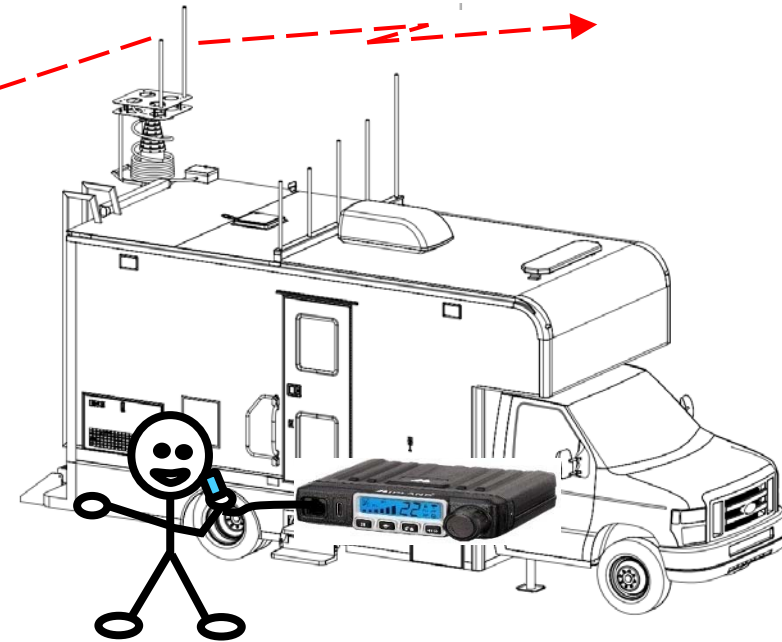
Who's on what channel?
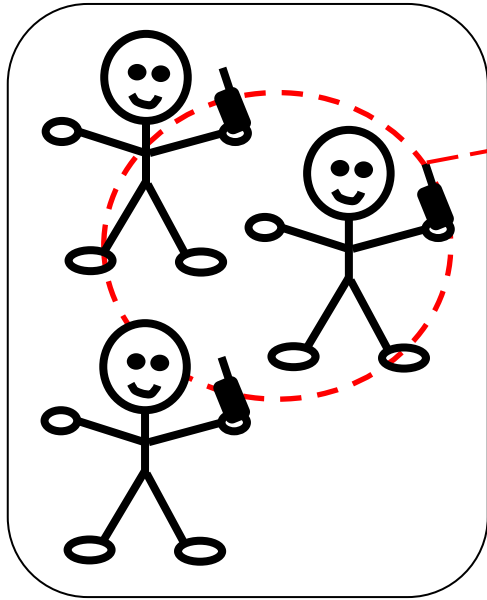
Neighborhood Team
- Talks among your neighbors
- Coordinates the local response
- Uses FRS channels 8 – 14
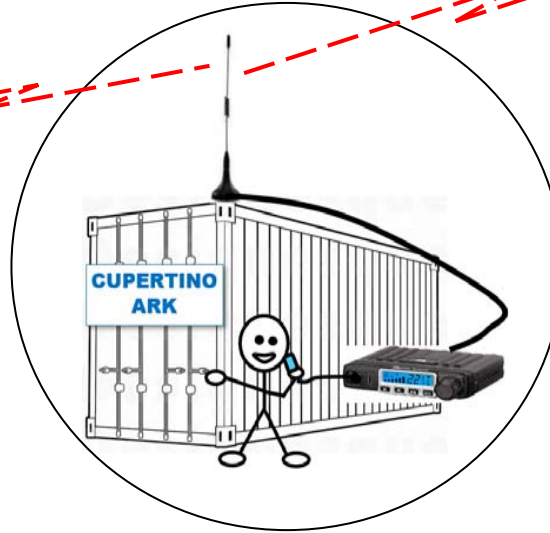
Each ARK
- Talks with local neighborhoods, individuals in the ARK zone
- Coordinates the Zone response
- Uses FRS/GMRS channels 1 – 6
- Talks to the EOC (amateur radio)

EOC/Comm 469
- Talks to the ARKs, CARES Teams
- Talks to the EOC, SCCo EOC
- Coordinates the City response
- Uses Amateur Radio or FRS/GMRS channel 1 – 7 to the ARKs

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Radio Best Practices

A radio is not a telephone

- On a telephone conference call or FaceTime or Zoom, everyone can hear everyone talking at the same time.

While using a radio,

- One person talks and everyone else listens.

- When you press your Push-to-Talk (PTT) button, you can't hear anyone else.

- If two people press their PTT buttons at the same time, a "double" occurs and many if not all listeners don't hear anything that they can understand.

Radio Best Practices

Using the Radio

1. Make sure you are on the correct channel / tone.
2. PTT = Push to Talk, not Push to Think.
3. Speak slowly and clearly.
4. Keep your messages as short as possible.
5. Don't shout. If other station cannot hear you, try changing your location.
6. Use plain English… 10-codes (such as 10-4) or slang.
7. Do not pass any sensitive information like victim or patient names over the radio unless asked for the name; these are public airwaves.

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Radio Operation Basics

- A **Radio Net is** a moderated conference call conducted over two-way *radio* on a specific FRS channel.

- Cupertino uses Radio Nets during emergencies for relaying messages, receiving status reports, and transmitting important information to those on the net.

- **Net Control Operator** – the person who runs the net.

- At some point, you may want to:

    1. Check in to the net
    2. Transmit status reports or request assistance
    3. Listen for, copy down, and pass on information to your neighborhood
    4. Check out of the net when you are all done

Radio Operation Basics

Making Contact

- Listen first, press & hold the PTT, take a breath, pass your message, and then release the PTT
  - *"Regnart ARK, this is Jim at Pine Brook Court checking in."*
- Consider using tactical names, not personal names
  - *"Regnart ARK, this is Lindy Lane checking in."*
  - *"Regnart ARK, this is Lindy Lane with a damage report."*
  - *"Lindy Lane, this is Team 1 with a status report."*
- When sending a message, key words can help
  - *"Regnart ARK, this is Three Oaks with an emergency message."*
- If the other station doesn't answer, wait and try again
  - They may be busy
  - Frees up the channel for others

Radio Operation Basics

1. ***CHECK IN*** to the local ARK Radio Net if you are at home and have a radio, or if you are assigned a task at the ARK. This does a few things:

    i.   Lets the ARK's Net Control know who is on the Net

    ii. Confirms you have your radio set correctly with the correct Channel and Tone for your ARK.

If you are…	You would say…
Creekside ARK	This is Sam, Net Control at Creekside ARK. Any Zone 6 stations, check in now and say your name and location.
Bob	Creekside ARK, this is Bob at Bollinger and Miller, checking in.
Creekside ARK	OK Bob, I have you checked in.
Angie	Creekside ARK, this is Angie at Hyde neighborhood, checking in.
Creekside ARK	Hi Angie, acknowledged.

Radio Operation Basics

2. ***CHECK OUT*** of the local ARK Radio Net when you need to leave the net or are back at the ARK. This does a few things:

    i.   Lets the ARK's Net Control know you are leaving the Net

    ii. Checking out does not mean that you may be done with your participation, it just that Net Control will no longer look for you on the Net.

If you are…	You would say…
Bob	Creekside ARK, this is Bob, I need to leave the net, checking out.
Creekside ARK	OK Bob, acknowledged.
Angie	Creekside ARK, this is Angie. I am back at the ARK and checking out.
Creekside ARK	Hi Angie, acknowledged.

Radio Operation Basics

Message Passing

1. Listen: Make sure the frequency is clear or Net Control is not talking to someone else whom you might not hear.

2. Tell the ARK Net Control Operator that you have a message to pass. The Net Control Operator will tell you when to pass the message.

3. To pass a very short, simple messages, you send the entire message, and the receiving station may simply say "copied" or "OK" or may read the message back to you.

4. For longer messages, say the message in logical phrases of about 4 to 7 word groups, without repetitions.

5. Talk slowly. The receiving station needs to write this message down!

6. Say **Break** when pausing and release the PTT key while you wait for the receiving station to write down your message and acknowledge you.

7. Always release the PTT key when you stop talking.

Radio Operation Basics
Message Passing example #1

You are part of your neighborhood's Team 3 doing a damage assessment and observe the following in front of 132 Sunrise Circle…

What do you report?

1. Who are you?
2. What is the problem?
3. Where is the problem?

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Radio Operation Basics
Message Passing example #1

If you are…	You would say…
Team 3	Creekside ARK, this is **TEAM 3** with a damage report.
Creekside ARK	OK Team 3, stand by… Ok, what is your message?
Team 3	Tree down and blocking the road by … Break.
Creekside ARK	OK, continue
Team 3	132 Sunrise Circle. Public Works is on scene… End of Message
Creekside ARK	OK Team 3, I acknowledge your message.

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Radio Operation Basics
Message Passing example #2

You are part of Regnart Ridge neighborhood, Your tactical call is "Regnart 1". All the power is out. When checking on your neighbors, you find this.

What do you report?

1. Who are you?
2. What is the problem?
3. Where is the problem?

Radio Operation Basics
Message Passing example #2

If you are…	You would say…
Regnart 1	Regnart ARK, this is **Regnart 1** with a damage report.
Regnart ARK	OK Regnart 1, stand by… Ok, what is your message?
Regnart 1	Regnart Road, all Power is out … Break.
Regnart ARK	OK, continue
Regnart 1	Tree on power lines by 1287 Regnart Road. End of Message
Regnart ARK	OK Regnart 1, I copy your message.

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CCC Field Comm Handbook
your new best friend!

Includes

1. Contact Information

2. Radio channels, frequencies

3. Radio operation basics

4. Operating on the CERT Radio Net

5. Passing message basics

6. CCC FRS & GMRS Radios

7. Phonetic Alphabet

8. Modified Mercalli Intensity Scale

Where's the book?!
bit.ly/CCommHandbook

**Cupertino Citizen Corps
Field Communications
Handbook**

March 2022

CUPERTINO
OFFICE OF EMERGENCY SERVICES

CUPERTINO
citizen★corps

Add this to your Go-Kit

1. Current Citizen Corps ID
2. Protective clothing
3. Safety Vest
4. Sturdy closed-toe shoes
5. Hard hat
6. Goggles
7. N95 mask
8. Whistle
9. Leather gloves
10. Personal first aid kit
11. Water and food
12. Sun block as needed

12. Clipboard
13. Pens (2)
14. Pad of 8.5" x 11" paper
15. ICS Forms: 211, 213, 214
16. Cupertino Forms: COES 105, 106
17. Flashlight and Batteries
18. AM Radio (portable)
19. FRS/GMRS Radio
20. Tape (i.e.: blue painters tape)
21. ARK Activation Handbook
22. ***CCC Field Communications Handbook***
23. Whatever else you may need

What's next?... this weekend
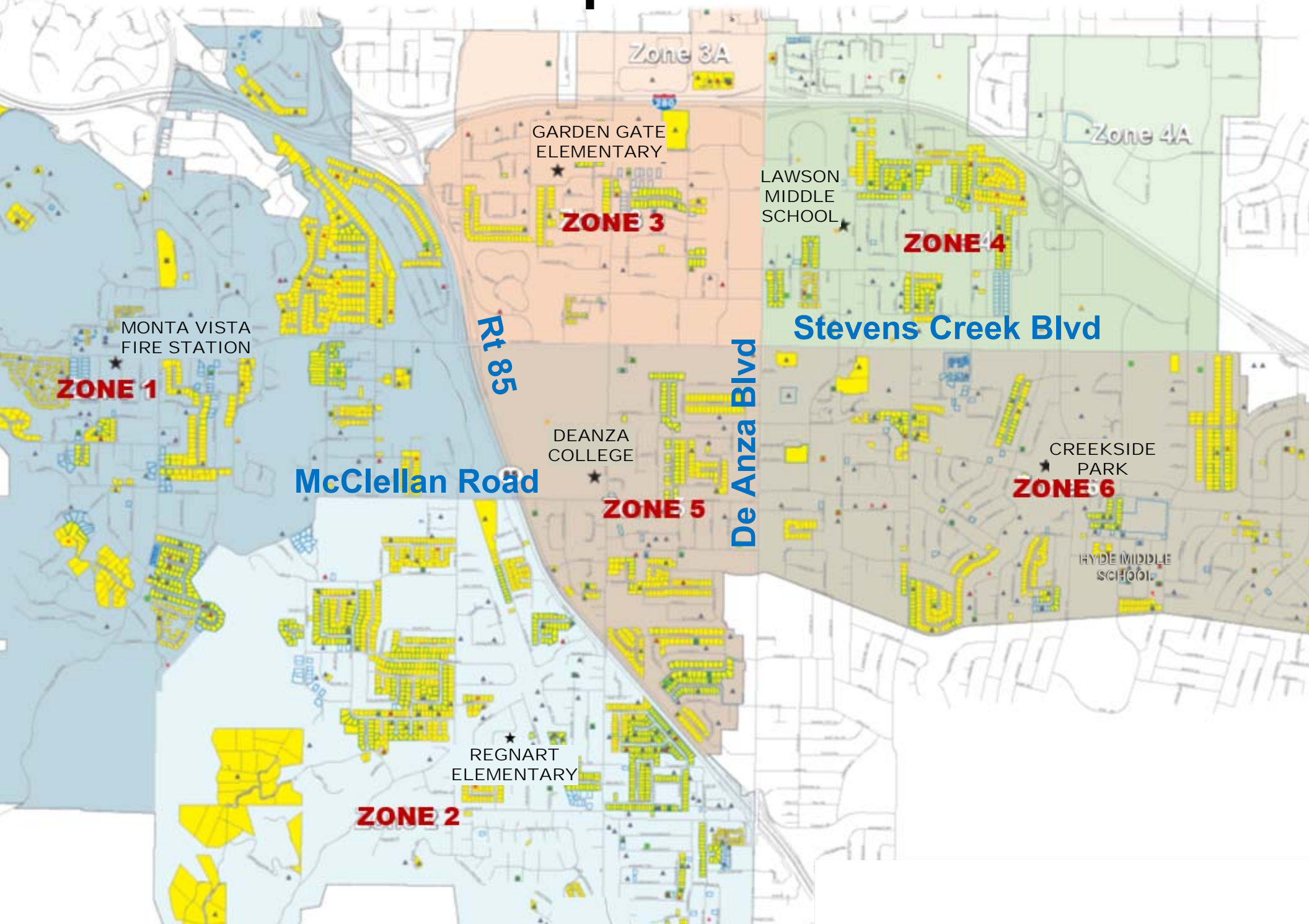## 15 April, 10:00am, City Hall

1. Come to the FRS radio hands-on session this Saturday:

    - Hands-on radio refresher

    - Have a radio?

        - Bring your FRS radio with you if you own one

        - Check or update your radio your channels and tones settings

        - Do a radio check to verify it all works

    - Don't have a radio?

        - We will have some for you to try and get on the air!

    - **Pick up your copy of the…**
        1. *CCC Field Communications Handbook*
        2. *Cupertino ARK Activation Handbook*

Where am I?... Cupertino ARK Zones

Zone 3A

Zone 4A

GARDEN GATE ELEMENTARY

ZONE 3

LAWSON MIDDLE SCHOOL

ZONE 4

Rt 85

MONTA VISTA FIRE STATION

Stevens Creek Blvd

ZONE 1

De Anza Blvd

DEANZA COLLEGE

McClellan Road

CREEKSIDE PARK

ZONE 5

ZONE 6

HYDE MIDDLE SCHOOL

REGNART ELEMENTARY

ZONE 2

Thank you!

Any Questions?

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Thank you!

If you have questions, comments, or feedback about this training, please email them Ken or myself at …

Ken: kennethe@cupertino.org

Jim: jimo@cupertino.org

Please join us this Saturday 15 April at City Hall Parking Lot for our FRS Hands-on session

Finally, easy links to this material

CCC Comm Handbook… https://bit.ly/CCommHandbook
These slides… https://bit.ly/2023CCommSlides

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