

The Cities of Brownwood, Early, Bangs and the County of Brown, Texas are requesting proposals for upgrade of their joint dispatch center and public safety communications systems within the entire county.

The County of Brown, Texas is irregular in shape. Terrain ranges from river bottoms at 1270 ft. to ridges at 1968 ft. (AMSL). Brown County covers 957 square miles. Currently there are 197 mobile units and 272 portable units in service within the entire county. These units are primarily analog. This proposal requires mixed mode base and repeater radios (analog / P25 digital auto sensing). Brown County contains eleven (11) individual Fire Departments.

The attached request for proposal has been pre-engineered to determine site availability and optimal radio configuration for required coverage. Should the manufacturer or vendor responding to this Request for Proposal determine a more advantageous configuration to accomplish our goals, please do so with a complete explanation of the changes suggested.

It is not necessary that the proposal contain equipment buildings, towers to be constructed, generators, UPS, dispatch furniture or general electrical requirements, unless we specifically request such or your expertise includes these items.

Your proposal should include all related equipment, physical installation, comprehensive training, specific software required, specific hardware required for installation and other items as noted in the main body of the request for proposal.

Deadline for our receipt of your proposal is 5:00 PM Friday March 20, 2020.

Questions and or comments related to this request for proposal should be directed via email to:

rmccarter@brownwoodtexas.gov

POST OFFICE BOX 1389  
BROWNWOOD, TEXAS 76804



PHONE 325-646-5775  
FAX 325-646-0938

July 29, 2020  
Workshop

(Exhibit #1)

# **BROWNWOOD TEXAS AND BROWN COUNTY TEXAS JOINT DISPATCH CENTER AND COMMUNICATIONS UPGRADE PROJECT REQUEST FOR PROPOSAL**

## **PROJECT DESCRIPTION**

This project is to improve the public safety infrastructure radio systems in Brownwood, Texas and Brown County, Texas.

A complete study of the communications systems and capabilities of all public safety radio systems was started in May of 2019 and has been ongoing to the present day. Multiple reports of this study were presented to the city and county in the ensuing months.

The radio systems currently in place have serious issues. It is the intent of this Request for Proposal to perform construction of all tasks and components for Brownwood Texas and Brown County to have a superior communications system. Should any event happen within the jurisdiction of Brown County or sub divisions therein, there will be continuous communications so that there is always a clear line of Command and Control.

There are four major parts to this project. These are:

- Manufacturer discontinued equipment replacement.
- Radio Connectivity so that all public safety agencies in Brown County have reliable communications with dispatch and other units.
- Expansion of the number of tower radio sites from the current two tower radio sites to a total of eight tower radio sites.
- Providing for interoperability to handle any incident or situation.

FCC licensing will be completed before any work is to be performed, so items will not need to be delayed because of lack of FCC Authorizations to complete the tasks.

The following diagrams detail each radio component that needs replacement or upgrading to meet these goals. This project is divided into five (5) phases to meet immediate requirements and then to build out a complete county wide radio system that gives greatly increased coverage for mobile and portable units. Each phase builds upon the previous phase.

If the Vendor would like to suggest changes to these diagrams or designs, please feel free to do so, but label those changes as vendor additions and have the pricing for those additions as a separate section to your bids. Brownwood and Brown County are looking for a system that is reliable, efficient, and user friendly.

## **VENDOR REQUIREMENTS**

The selected vendor must provide proof that it has successfully performed similar jobs for public safety agencies, is familiar with the technology being proposed, and has a radio shop that is located within a 4 hour drive to all of the sites listed in the RFP. In addition, the shop must have a minimum of 2 technicians that are certified as technicians, either by a trade organization, or by exam from the Federal Communications Commission.

The radio shop must have a minimum of 2 communications service monitors, power meters, and other test equipment as required.

The shop must be an authorized service provider by the manufacturer for each piece of equipment that is being proposed.

The selected vendor must provide proof of liability insurance, and workers compensation insurance that meets the minimum standards of Brownwood, Texas within 15 days of being selected.

The selected vendor must also provide 24/7 "on call" availability and the plan that they have in place if there are multiple after hour calls.

## **GENERAL INFORMATION**

All equipment and associated materials are to be new and will have a warranty to be free of defects for a period of not less than 1 year starting on the date of system acceptance.

Vendor must not discriminate or tolerate harassment in the workplace.

The communications systems used in Brown County are critical for the needs and well being of the public safety officers and first responders. Any disruption of service must be coordinated with the designated contact person and with central dispatch at the LEC before any action is taken at any of the sites.

All tower work must have at least one person on the ground at all times for safety and comply with all associated tower safety protocols. Tower climbers shall be fully certified according to industry standards.

A maintenance fee schedule for years 1 through 5 must also be included as separate line items in the bid response.

## **VENDOR RESPONSE SHALL INCLUDE**

- Company information
- Industry References
- Sub-contractors that will be used in this project
- Detail of equipment including specifications
- Manufacturer literature for proposed equipment
- Vendor proposed delivery and installation schedule as agreed with Requestor
- Supporting data that will include maps, diagrams and/or any other supporting information for clarification of this project
- Detailed pricing schedule for requested project including:
  - Quantity
  - Unit
  - Manufacturer
  - Model
  - Description
  - Unit Price
  - Extended Price
  - Sub Total Groups
  - Project Total
- Vendor suggested changes or additions



## **GENERAL INSTALLATION DETAILS**

All equipment must be installed to good engineering standards and be compliant to the Motorola R56 installation standards or equivalent.

The equipment must be in cabinets with locking doors. All cable and power entrances to the cabinet must be protected from rodents or other pests having access to the cabinets.

Lightning protection must be provided on every cable, including the power lines and battery lines if external to the cabinets.

The cabinets must have an excellent electrical ground.

All radio transmission lines must have lightning protection with the ground lead going back to the main ground bus in each site.

All equipment and leads must be labeled such that maintenance technicians can easily identify each operating parameter and other items as pertinent for the maintenance of the equipment.

## **AWARD CRITERIA**

In choosing a vendor to fulfill this project, the following items will be considered in this order:

1. Bidder responds to all specifications and bid requirements.
2. The Vendor has previous experience in the public safety communications market.
3. The Vendor has at least 5 Public Safety agencies providing satisfactory references.
4. The Vendor meets the Vendor Requirements as specified in this RFP.
5. The evaluation by Requestor that the Vendor has the ability to fulfill the requirements of the contract.

Requestor reserves the right to reject any and all proposals, to consider alternatives, and to re-solicit proposals should the entries not meet the requirements of this RFP.

Also, Requestor reserves the right to not make the award on the lowest cost bid, but for the best fit of the system requirements.

## **PAYMENT TERMS**

Requestor will adhere to the follow payment schedule for this project per phase initiated:

35% upon Contract signing

15% upon delivery of equipment to Brownwood or Brown County

40% upon successful installation of all equipment

10% upon formal system acceptance and 60 days of flawless operation.

Payment terms are offered as a standard. More favorable terms would be appreciated.

## **ANTENNAS, DUPLEXERS, AND TRANSMISSION LINES**

### **ANTENNAS**

All antennas must be tested for proper band and frequency range, along with critical parameters measured and recorded.

All antennas must be mounted in such a way as to not interfere with other antennas and consideration should be made for the effects of tower shadowing on all side mounted antennas. The exact mounting locations for some of the antennas have not been determined at the time of the writing of this RFP.

Proper waterproofing of all outside connections is required.

### **DUPLEXERS**

All VHF duplexers must have 70 dB or greater isolation, must be of a BAND PASS-BAND REJECT type, and be swept with a tracking generator before installing into the system.

### **TRANSMISSION LINES**

All transmission lines must be properly terminated and swept with a Frequency Domain Reflectometer to confirm that the lines and terminations are properly connected.

All inter-bay jumper cables must be double shielded and also swept to confirm proper operation and loss for each cable. All testing must be recorded and archived. LMR240UF and LMR400UF cables are acceptable for these cables.

## **GROUNDING AND LIGHTNING PROTECTION**

### **GROUNDING**

All equipment must be grounded.

All lines must have lightning protectors on them and the lightning protectors must be grounded.

All transmission lines must have at least 1 ground kit on the line near the point where the line leaves the tower, and on some sites, one at the top of the line near the antenna, and one at the bottom of the line just before it goes into the building or equipment cabinets.

### **LIGHTNING PROTECTION**

All cables, power lines, control cables, or any other leads tied to the equipment must have the appropriate lightning protectors for the line being protected.

### **BACKUP POWER**

All primary sites must be provided with back-up power that is not relay switched. The battery capacity must allow the stations to work for a minimum of 8 hours.

All stations should switch to low power when on backup battery power if that option is available.

The batteries must have a useful life of 5 years or better.

### **FACTORY OR VENDOR STAGING**

As this system is quite complex, Requestor is insisting that the successful bidder of this project will assemble the entire system in the factory of the equipment manufacturer or in the vendor's shop where all cables will be pre-made, levels set, and a full set of system documentation provided as part of the factory staging.

## **FINAL ACCEPTANCE TEST**

A final acceptance test (FAT) will be performed that tests all functions of the new systems and will be recorded.

NOTE: The FCC Licensing will be started before the award of the system, so the FCC assigned frequencies for the systems should be set before this FAT is performed. Should the FCC Authorizations not be granted by the time that the FAT is to be performed, alternate channels will be provided for the different systems

## **MANUALS**

There shall be a full set of paper manuals for each piece of equipment at each site, and an additional set of manuals in soft copy to be provided for each piece of equipment. In addition, there should be a system diagram available at each site and available in soft copy for maintenance and expansion purposes.

## **SYSTEM OPTIMIZATION**

Each component and each separate system shall be optimized for proper levels to insure that every component is meeting required specifications. The results of these tests will be recorded and placed into the station records.

## CURRENT SYSTEM STATUS

### Dispatch

- System unreliable
- Limited number of channels – maxed out
- Raised floor inaccessible
- Lighting is poor
- Air conditioning and heating is marginal
- Four (4) dispatch positions at LEC

### Brown County Sheriff's Department

- Current coverage for mobiles is not sufficient
- Current coverage for portable radios is non-existent in areas
- RF interference from fire alarm channel
- Vehicles exhibit poor installation and maintenance of radios and antenna

### City of Brownwood

- Limited coverage for PD
- Limited coverage for FD
- Limited coverage for IT
- Limited coverage for Utilities

### VFD

- Limited coverage in multiple parts of Brown County
- Non-existent portable coverage

### Other cities

- Bangs – Multiple issues
- Early – Multiple issues

### Brown County Mobile Command Trailer

The Mobile Command Trailer is under the direction of the Brown County Sherriff's Department. Current configuration includes:

- 6 - Mobile Radios
- 1 - VHF Repeater
- 2 - Zetron Consoles
- Telex IP-223 units are used to bridge the consoles to the radios

## PROJECT PHASES

### PHASE 0

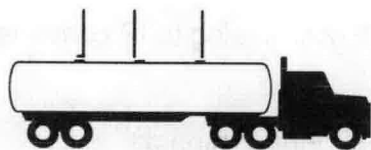
- This is a diagram of the current system
- There are 11 analog controlled radios at the Law Enforcement Dispatch Center (LEC) and one radio tower site (Round Mountain), plus a short (60 ft) tower at the LEC for limited coverage around the LEC
- The current dispatch console is IP and uses Telex IP-223 analog to IP converters to interface with the 11 radios at the LEC
- There are currently four (4) dispatch positions at the LEC
- A fifth dispatch position (backup) exists at Brownwood Fire Station #1

#### Mobile Command Trailer:

- 6 - Mobile Radios
- 1 - VHF Repeater
- 2 - Zetron Consoles
- Telex IP-223 units are used to bridge the consoles to the radios



# BROWNWOOD TX CITY AND BROWN COUNTY RADIO SYSTEM TOPOLOGY PHASE 0 EXISTING SYSTEM



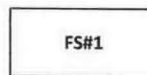
**MOBIL COMMAND TRAILER**

- 6 - Mobile Radios
- 1 - VHF Repeater
- 2 - Zetron Consoles

- |             |             |
|-------------|-------------|
| SO1 RX      | SO1 CTL LP  |
| PD1 RX      | FD1 CTL LP  |
| UHF BASE    | PD1 CTL LP  |
| 700 BASE    | UTIL CTL LP |
| 800 BASE    | FD2 CTL LP  |
| VHF IC BASE |             |

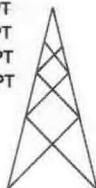


**LEC  
60 FT TWR**  
CONSOLE POS. 1-4  
CONNECTED VIA IP



**FS#1**  
CONSOLE POS. 5  
CONNECTED VIA IP

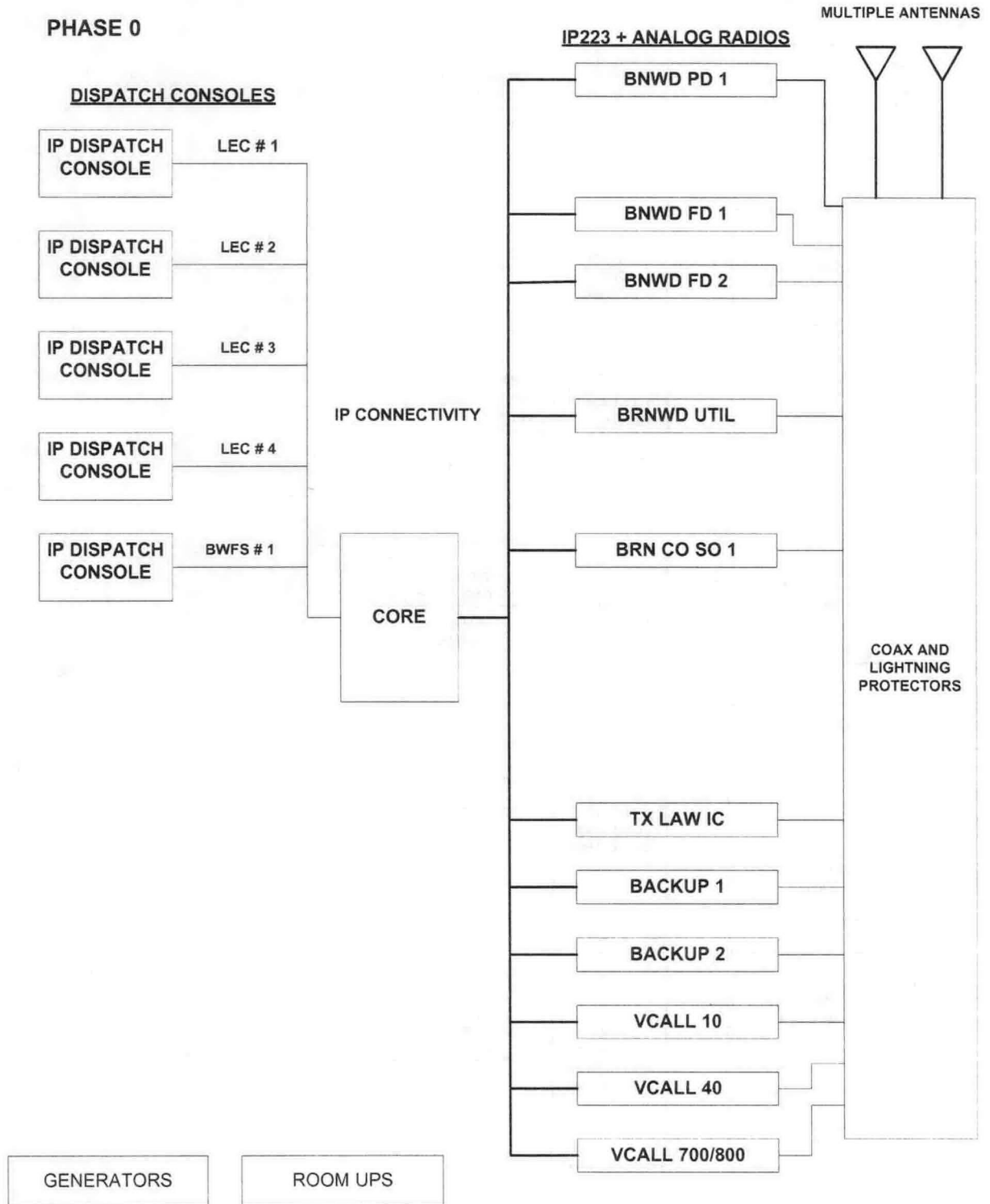
- SO1 RPT
- FD1 RPT
- PD1 RPT
- UTIL RPT
- ITOP RPT



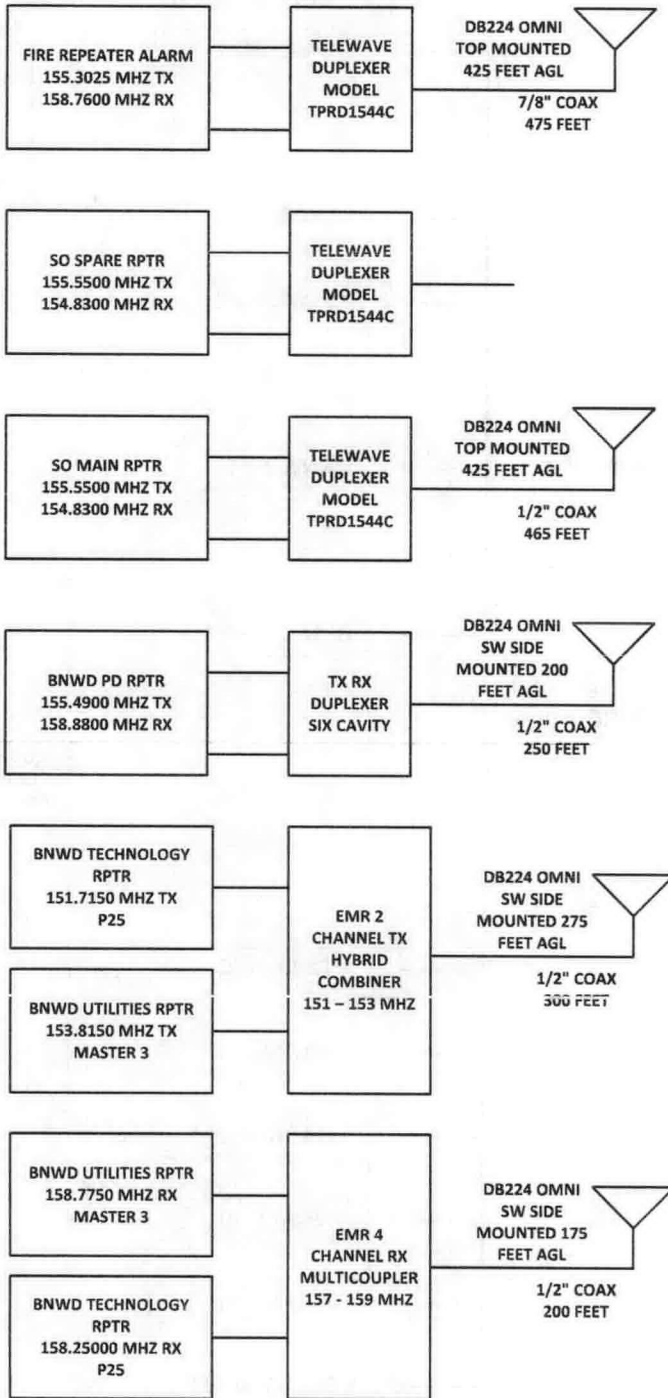
**ROUND  
MTN  
400 FT TWR**

# BROWN COUNTY / BROWNWOOD TEXAS COMBINED PUBLIC SAFETY DISPATCH SYSTEM

## PHASE 0



# CITY OF BROWNWOOD ROUND MOUNTAIN TOWER SITE



## PHASE 1

- Install 7 IP dispatch consoles (6 at the LEC and 1 at Brownwood Fire Station #1) and a Core CPU to interconnect the new IP hardware
- Install 11 IP radios at dispatch
- Raised Flooring should be replaced - currently inaccessible
- Upgrade furniture for total of six (6) dispatch positions
  - Keyboards
  - Computers and Other Components
  - Monitors
  - Microphones
  - Head Sets
  - Speakers
  - Battery Backups
  - Dispatcher Chairs
- Upgrade dispatch area lighting
- Upgrade dispatch area heating and air conditioning to accommodate increased equipment and personnel

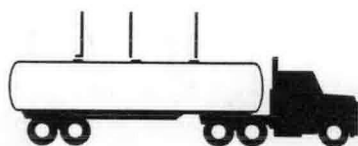
### UPGRADE MOBIL COMMAND TRAILER

- Install 2 IP consoles
- Install 4 multi-channel VHF Base IP radios
- Install 1 multi-channel UHF Base IP radio
- Install 1 700-800 MHz Base IP radio
- Install 1 VHF Repeater

# BROWNWOOD TX CITY AND BROWN COUNTY RADIO SYSTEM TOPOLOGY

## PHASE 1

### REPLACE CONSOLES AND LEC RADIOS WITH IP RADIO COMPATIBLE EQUIPMENT



**MOBIL COMMAND TRAILER**

- 2 - IP CONSOLES
- 4 - MULTI-CHANNEL VHF BASE
- 1 - MULTI-CHANNEL UHF BASE
- 1 - 700-800 MHz BASE
- 1 - VHF RPT

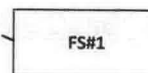
- SO1 RX
- PD1 RX
- UHF BASE
- 700 BASE
- 800 BASE
- VHF IC BASE

- SO1 CTL
- FD1 CTL
- PD1 CTL
- UTIL CTL
- FD2 CTL

**5 CONTROL STATIONS  
TO BE REPURPOSED IN  
PHASE 2**

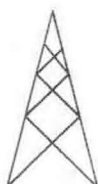


**LEC  
60 FT TWR  
CONSOLE POS. 1-6  
NEW 18 CHANNEL  
IP CONSOLES  
CONNECTED VIA  
NEW IP CORE AT  
LEC**



**CONSOLE POS. 7  
NEW 18 CHANNEL IP  
CONSOLE CONNECTED VIA  
IP CORE AT LEC**

- SO1 RPT
- FD1 RPT
- PD1 RPT
- UTIL RPT
- ITOP RPT



**ROUND  
MTN  
400 FT TWR**

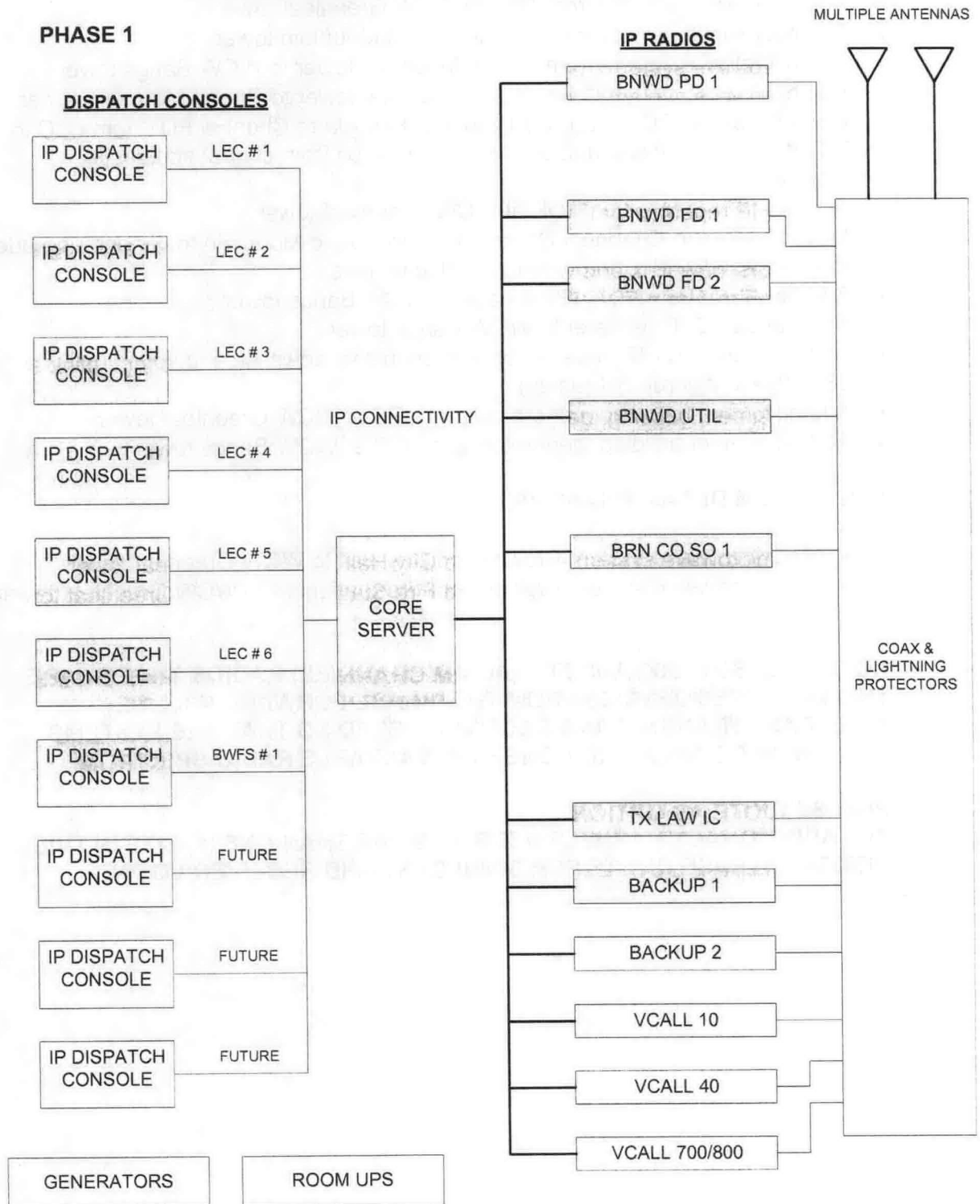
**ALL EQUIPMENT NOT IN  
PURPLE IS REPLACED IN  
PHASE 1**

#### PHASE 1 COMPONENTS

- 9 EACH 18 CHANNEL IP CONSOLES
- 1 EACH IP CORE
- 13 EACH VHF 100 WATT STATIONS
- 2 EACH UHF 100 WATT STATION
- 1 EACH 700 MHZ 50 WATT STATION
- 1 EACH 800 MHZ 50 WATT STATION
- 1 EACH 700/800 MHz BASE
- 1 EACH VHF REPEATER

# BROWN COUNTY / BROWNWOOD TEXAS COMBINED PUBLIC SAFETY DISPATCH SYSTEM

## PHASE 1





## PHASE 2

- Add WCW Greenleaf tower and WCW Bangs tower
- Add microwave system from LEC to WCW Greenleaf tower
- Add microwave system from LEC to Round Mountain tower
- Add microwave system from Round Mountain tower to WCW Bangs tower
- Add microwave system from WCW Greenleaf tower to Round Mountain tower
- Move IP radios (FD2, PD1, UTIL) except Fire Alarm Channel FD1 from LEC to WCW Greenleaf tower and convert these radios from control stations to repeaters
- Add new IP repeater for ITOP at WCW Greenleaf tower
- Move Fire Alarm Channel FD1 from LEC to Round Mountain tower and upgrade to simulcast downlink and voting uplink channels
- Add new Fire Alarm FD1 IP repeater to WCW Bangs tower
- Add Bangs PD IP repeater to WCW Bangs tower
- Add SO1 and PD1 IP base radios with simulcast downlink and voting uplink at LEC (Reconfigured RX radios)
- Add equipment building, generator, and UPS at WCW Greenleaf tower
- Add equipment building, generator, and UPS at WCW Bangs tower

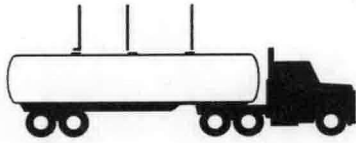
### **SEE SYSTEM DETAIL PHASE 2A**

- Add microwave system Brownwood City Hall to WCW Greenleaf tower
- Add microwave system Brownwood Fire Station #1 to WCW Greenleaf tower

**NOTE: ALL SO1, SO2 AND FD1 (ALARM CHANNEL) RADIOS THAT SHARE THE SAME FREQUENCIES FROM THIS PHASE FORWARD WILL BE SIMULCAST TRANSMIT AND RECEIVER VOTED SO THAT THE SYSTEMS BECOME WIDE AREA AND CONSERVE VALUABLE RADIO SPECTRUM**

**PLEASE QUOTE AS OPTION:  
ALL ADDITIONAL CHANNELS USED AT MORE THAN ONE (1) SITE IN THIS DESIGN - PLEASE QUOTE FOR SIMULCAST AND RECEIVER VOTING.**

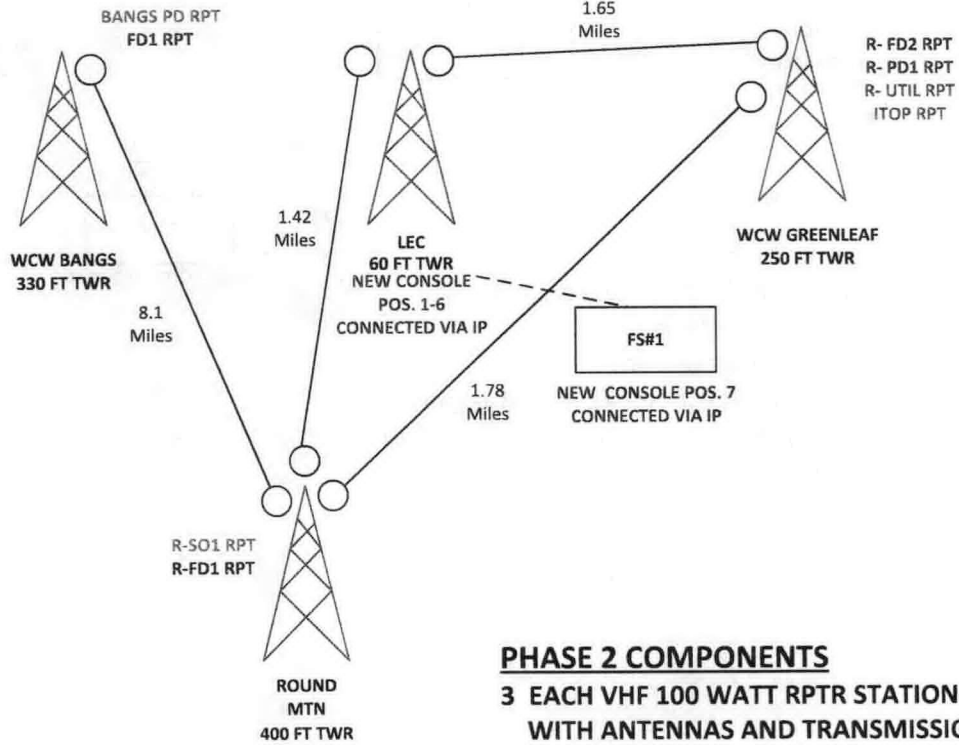
# BROWNWOOD TX CITY AND BROWN COUNTY RADIO SYSTEM TOPOLOGY PHASE 2



**MOBIL COMMAND TRAILER**

- 2 - CONSOLES
- 4 - MULTI-CHANNEL VHF BASE
- 1 - MULTI-CHANNEL UHF BASE
- 1 - 700-800 MHz BASE
- 1 - VHF RPTR

- SO1 BASE
- PD1 BASE
- UHF BASE
- 700 BASE
- 800 BASE
- VHF IC BASE

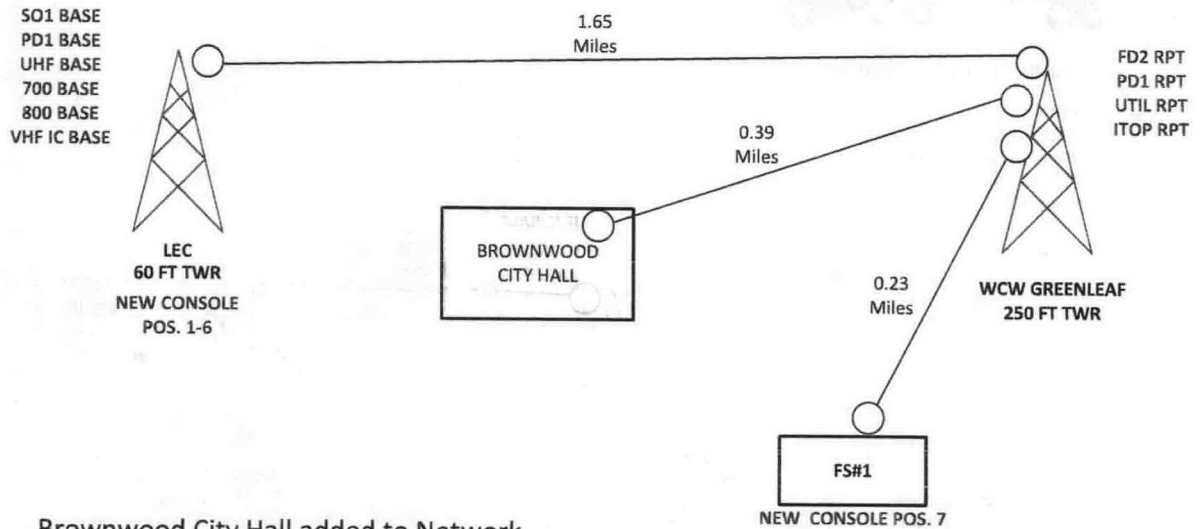


## **PHASE 2 COMPONENTS**

- 3 EACH VHF 100 WATT RPTR STATIONS WITH ANTENNAS AND TRANSMISSION LINES
- 4 EACH HOPS MICROWAVE
- 2 EACH EQUIPMENT BUILDINGS
- 2 EACH UPS SYSTEMS
- 2 EACH GENERATORS

**R- = REPURPOSED RADIOS FROM PHASE 1**

## BROWNWOOD TX CITY AND BROWN COUNTY RADIO SYSTEM TOPOLOGY PHASE 2A



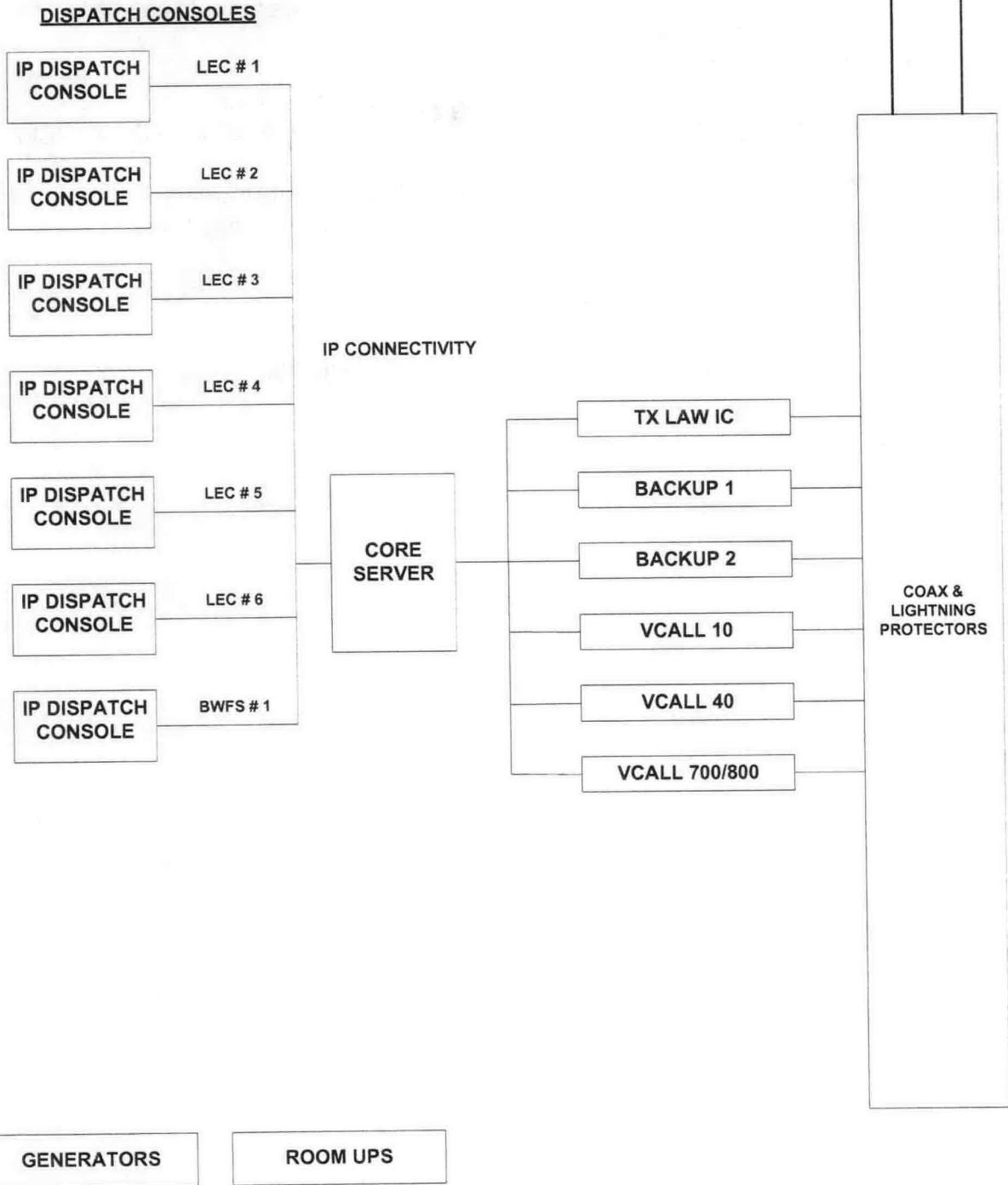
- Brownwood City Hall added to Network
  - Network Monitoring
  - Network Programming
  - Internet Connection – Remote Diagnostics and Software Upgrades (Only as Needed)
- Brownwood Fire Station #1 added to Network
  - Eliminate Ubiquiti Link
  - Keep Equipment Consistant
  - Connect Console Position 7 – (Backup)

**PHASE 2A COMPONENTS**  
**2 EACH HOPS MICROWAVE**  
**2 EACH ROUTERS**

# BROWN COUNTY / BROWNWOOD TEXAS COMBINED PUBLIC SAFETY DISPATCH SYSTEM

## PHASE 2

## IP RADIOS



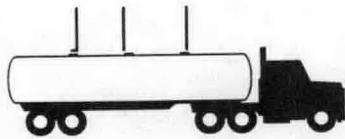
### PHASE 3

- Add DPS May tower
- Add microwave from LEC tower to DPS May tower
- Add simulcast and receiver voting IP radios for SO1 and FD1 at DPS May tower
- Add UPS system for new radios at DPS May tower
- The existing building and generator at DPS May tower should be sufficient for new equipment - please confirm
- Add WCW Early Tower
- Add microwave from DPS May tower to WCW Early tower
- Add simulcast and receiver voting IP radios for SO1, SO2 and FD1 at WCW Early tower
- Add Early 1 and Early 2 repeater radios at WCW Early tower
- Add equipment building, generator, and UPS at WCW Early tower

### **SEE SYSTEM DETAIL PHASE 3A**

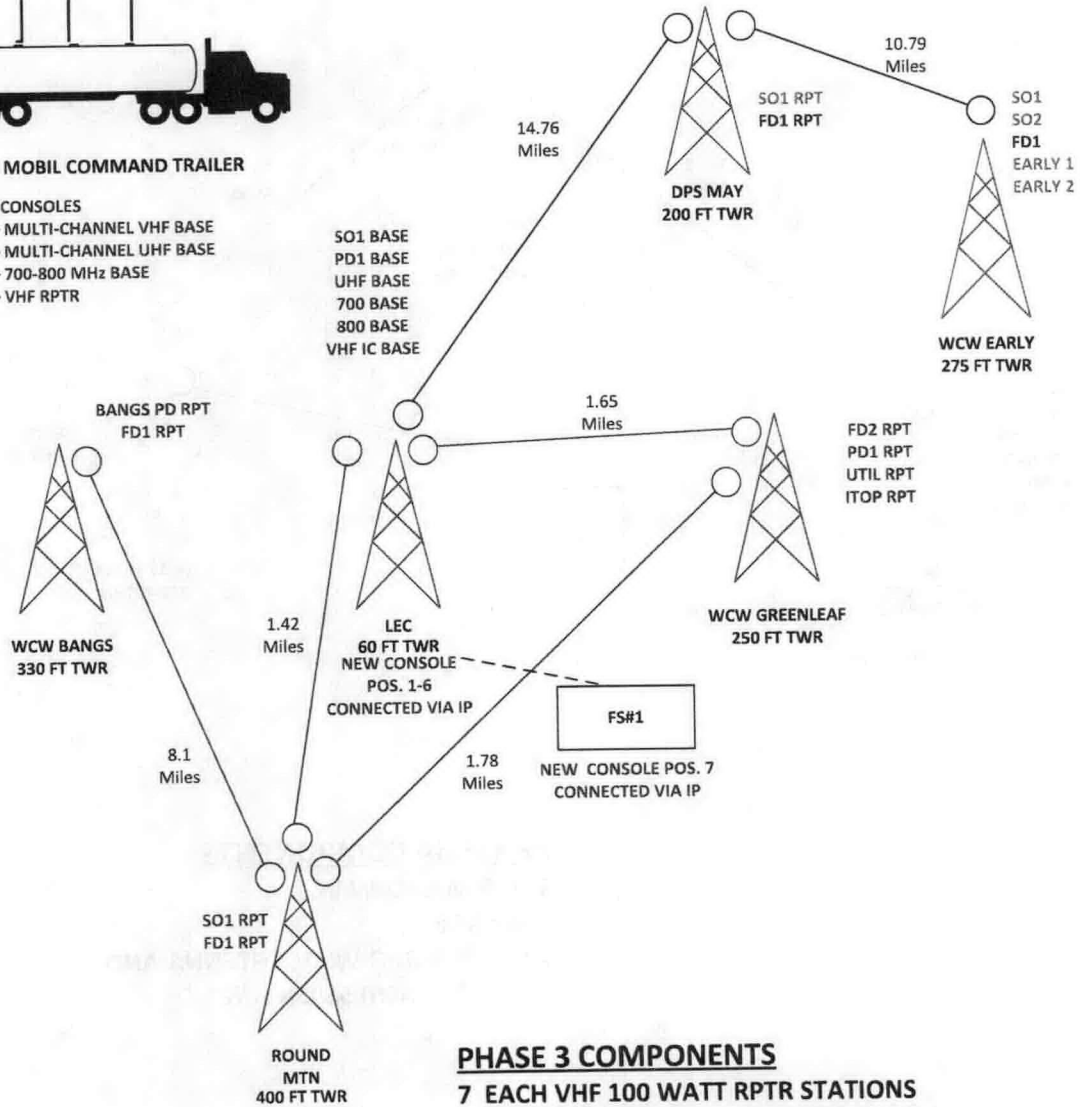
- Add microwave system Early City Hall to WCW Early tower

# BROWNWOOD TX CITY AND BROWN COUNTY RADIO SYSTEM TOPOLOGY PHASE 3



**MOBIL COMMAND TRAILER**

- 2 - CONSOLES
- 4 - MULTI-CHANNEL VHF BASE
- 1 - MULTI-CHANNEL UHF BASE
- 1 - 700-800 MHz BASE
- 1 - VHF RPTR

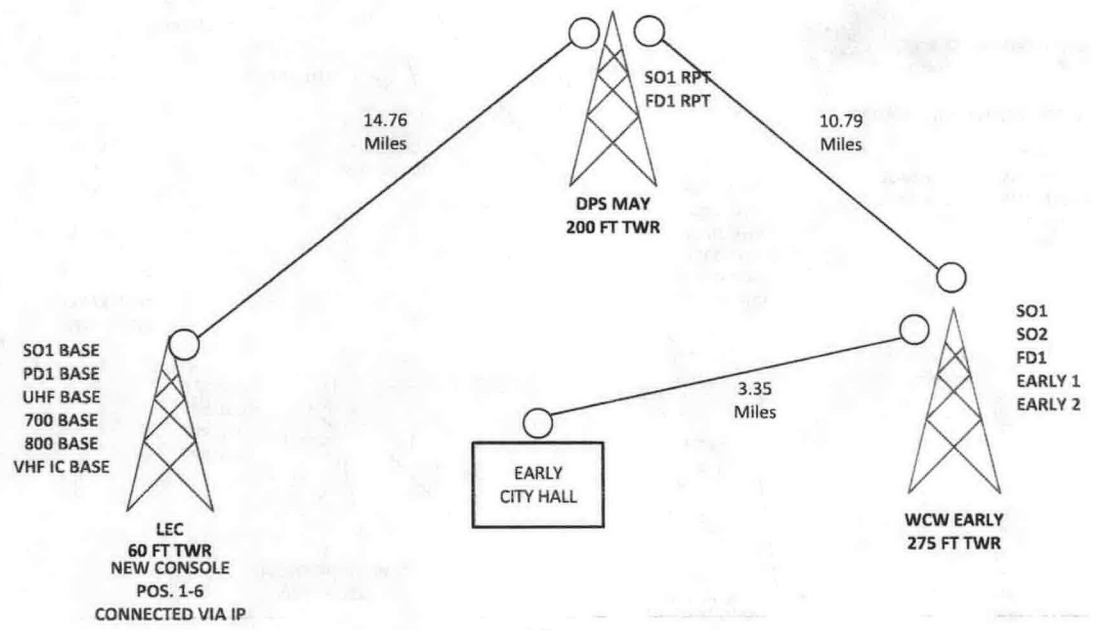


### PHASE 3 COMPONENTS

- 7 EACH VHF 100 WATT RPTR STATIONS WITH ANTENNAS AND TRANSMISSION LINES
- 2 EACH HOPS MICROWAVE
- 1 EACH EQUIPMENT BUILDINGS - EARLY
- 2 EACH UPS SYSTEMS
- 1 EACH GENERATOR - EARLY



# BROWNWOOD TX CITY AND BROWN COUNTY RADIO SYSTEM TOPOLOGY PHASE 3A



## PHASE 3A COMPONENTS

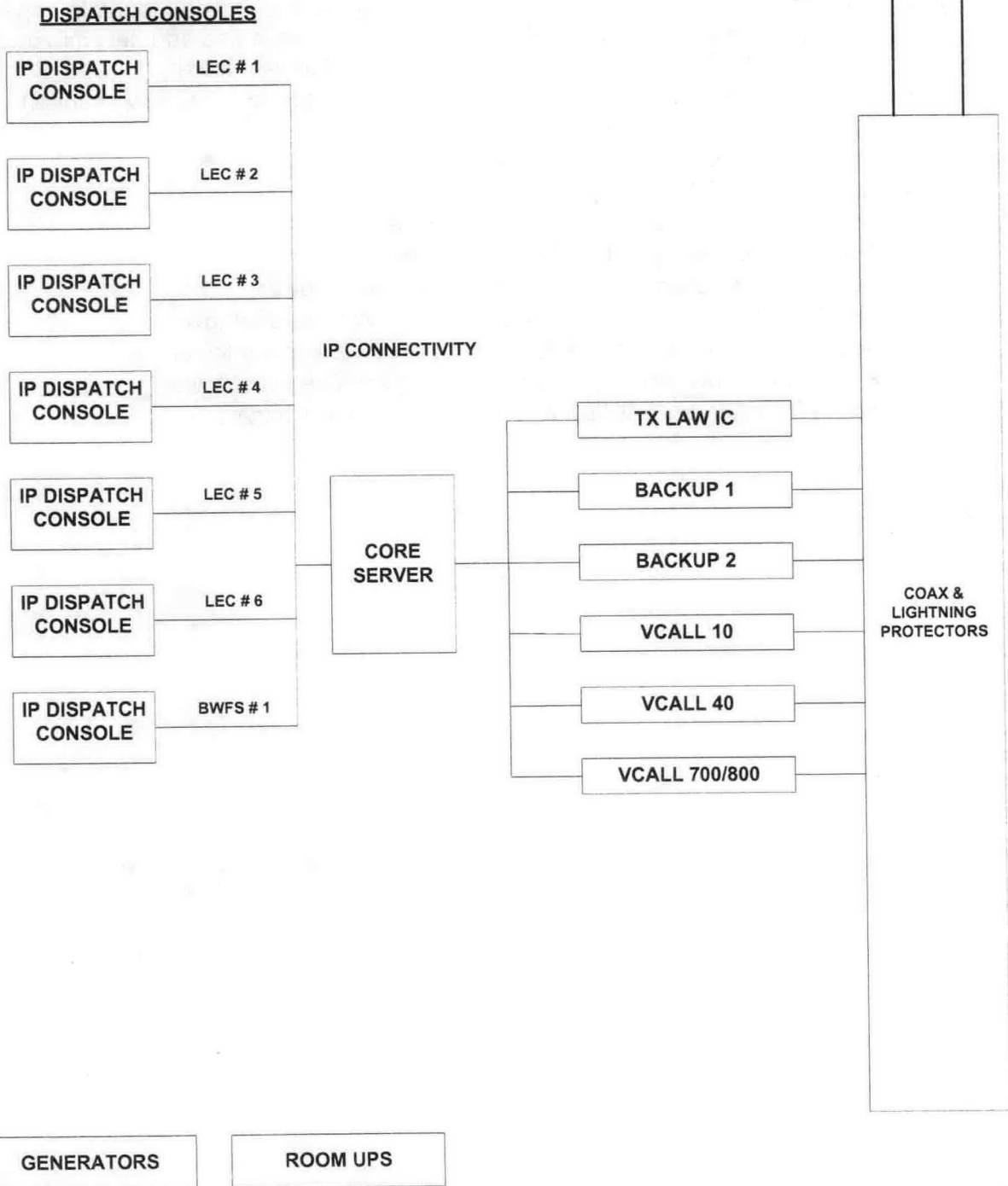
- 1 HOP MICROWAVE
- 1 ROUTER
- 1 VHF IP RADIO WITH ANTENNA AND TRANSMISSION LINE

# BROWN COUNTY / BROWNWOOD TEXAS COMBINED PUBLIC SAFETY DISPATCH SYSTEM

## PHASE 3

## IP RADIOS

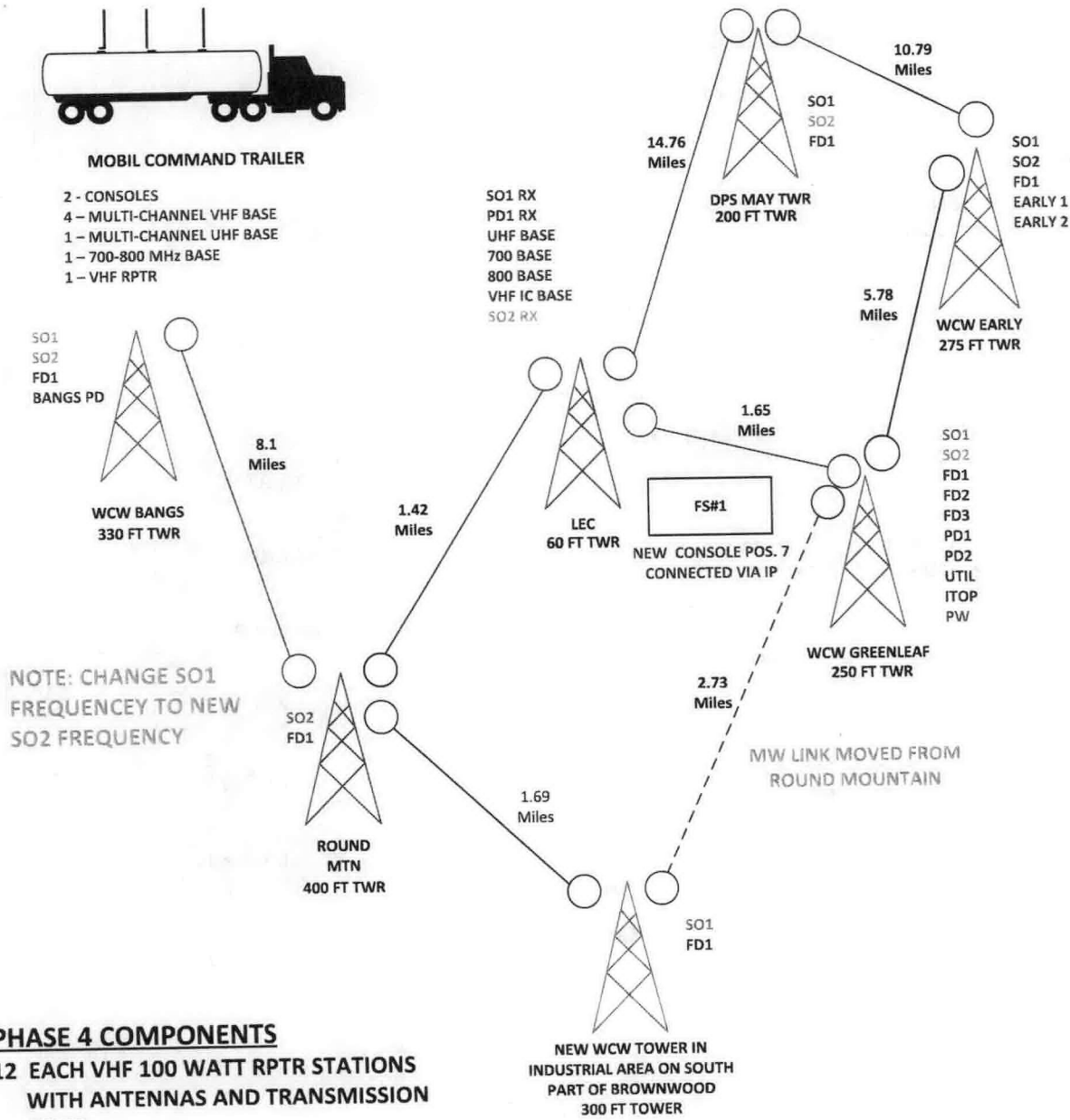
MULTIPLE ANTENNAS



#### PHASE 4

- Add WCW tower at Industrial area
- Add SO1 repeater at WCW tower in Industrial area
- Add FD1 repeater at WCW tower in Industrial area
- Add equipment building, generator, and UPS at WCW Industrial Area tower
- Add microwave ring to city system (Move Greenleaf to Round Mountain hop from Round Mountain tower to WCW tower in Industrial area and add new microwave hop from WCW Industrial area tower to Round Mountain tower)
- Change the SO1 channel at the Round Mountain site to SO2 (new channel)
- Add SO1 repeater at WCW Bangs tower site
- Add SO2 repeater at WCW Bangs tower site
- Add SO2 at LEC
- Add SO1 repeater at WCW Greenleaf tower site
- Add SO2 repeater at WCW Greenleaf tower site
- Add FD1 Fire Alarm repeater at WCW Greenleaf tower
- Add City of Brownwood FD3 repeater at WCW Greenleaf tower
- Add City of Brownwood PW repeater at WCW Greenleaf tower
- Add City of Brownwood PD2 repeater at WCW Greenleaf tower
- Add SO2 repeater at DPS May tower site (Shift to Phase 3)

# BROWNWOOD TX CITY AND BROWN COUNTY RADIO SYSTEM TOPOLOGY PHASE 4



- PHASE 4 COMPONENTS**
- 12 EACH VHF 100 WATT RPTR STATIONS WITH ANTENNAS AND TRANSMISSION LINES
  - 2 EACH HOPS MICROWAVE
  - 1 EACH EQUIPMENT BUILDINGS - INDUSTRIAL
  - 1 EACH UPS SYSTEM
  - 1 EACH GENERATOR - INDUSTRIAL

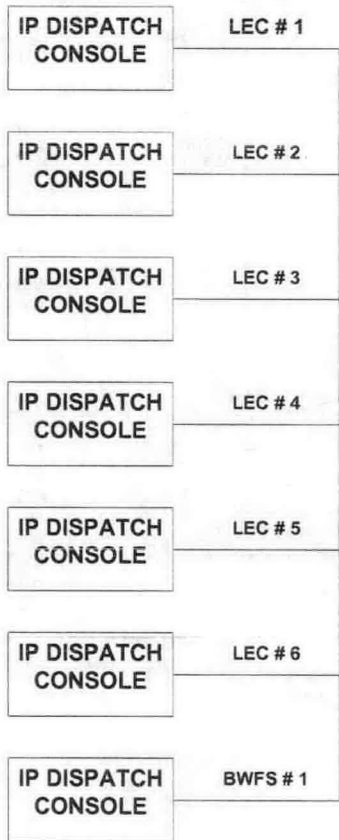
# BROWN COUNTY / BROWNWOOD TEXAS COMBINED PUBLIC SAFETY DISPATCH SYSTEM

**PHASE 4**

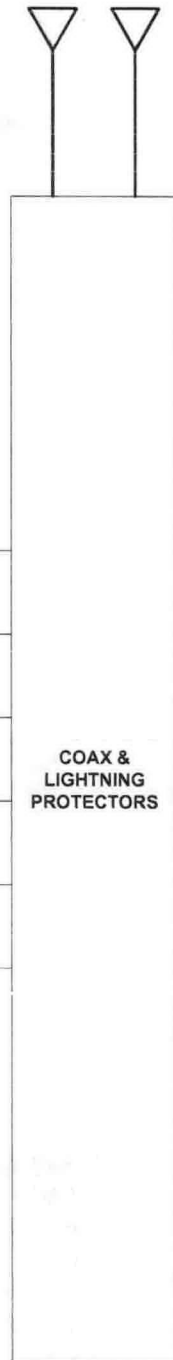
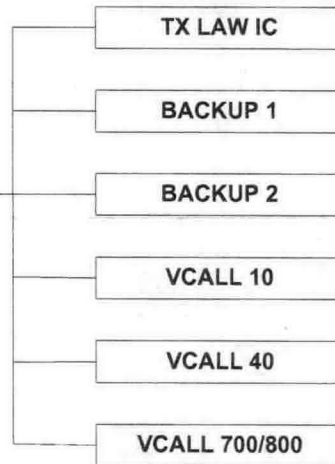
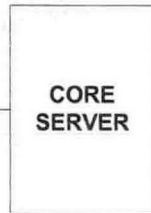
IP RADIOS

MULTIPLE ANTENNAS

DISPATCH CONSOLES



IP CONNECTIVITY



**GENERATORS**

**ROOM UPS**

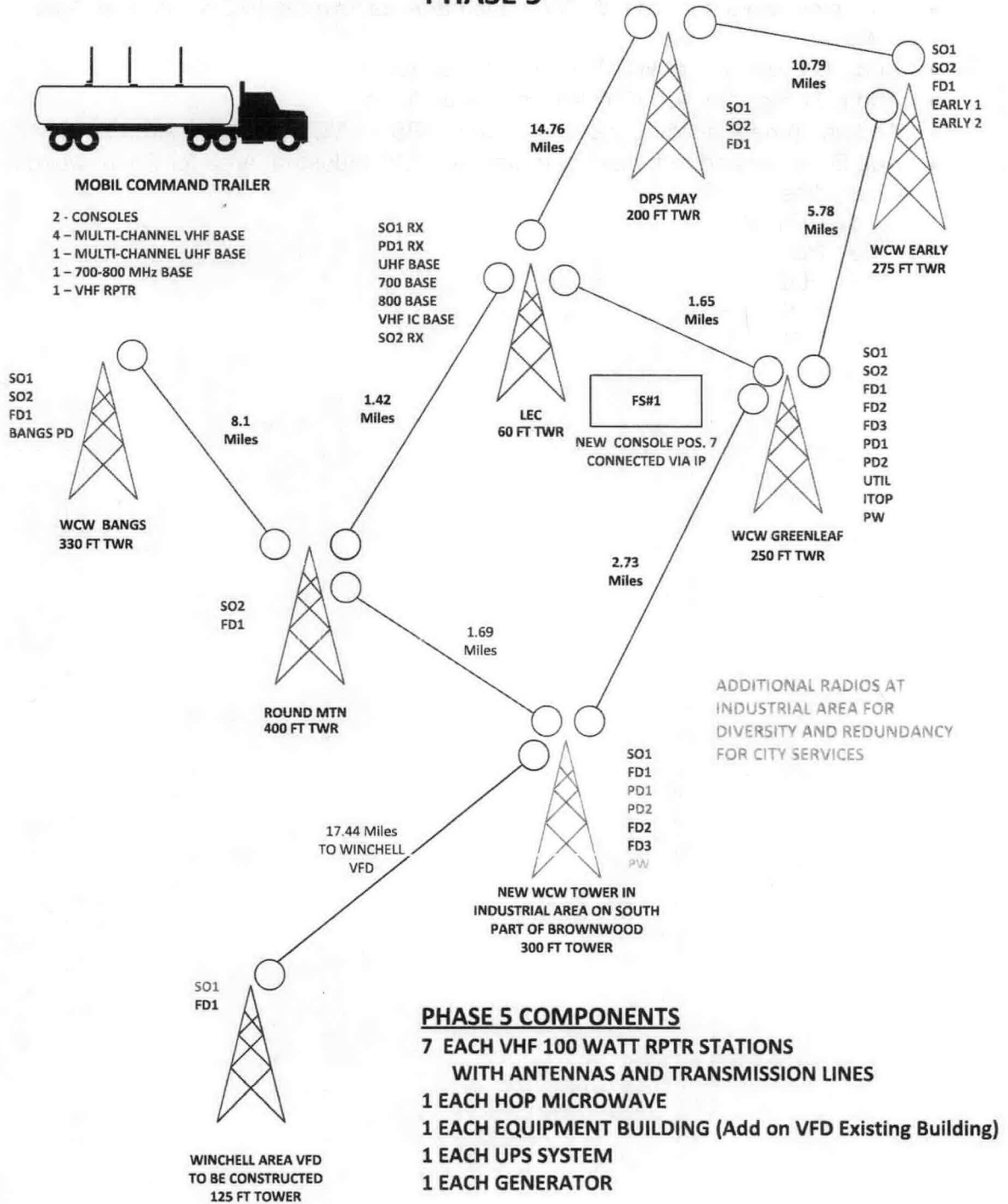
## PHASE 5

New construction of 125 ft. tower at Winchell VFD (Brown County)

- Add microwave hop from WCW Industrial Area tower to WCW Winchell Area tower
- Add SO1 repeater at WCW Winchell Area tower
- Add FD1 repeater at WCW Winchell Area tower
- Add equipment building, generator, and UPS at WCW Winchell Area tower
- Add Diversity and redundancy radios at WCW Industrial Area for Brownwood  
City radios:
  - PD1
  - PD2
  - FD2
  - FD3
  - PW



# BROWNWOOD TX CITY AND BROWN COUNTY RADIO SYSTEM TOPOLOGY PHASE 5



## PHASE 5 COMPONENTS

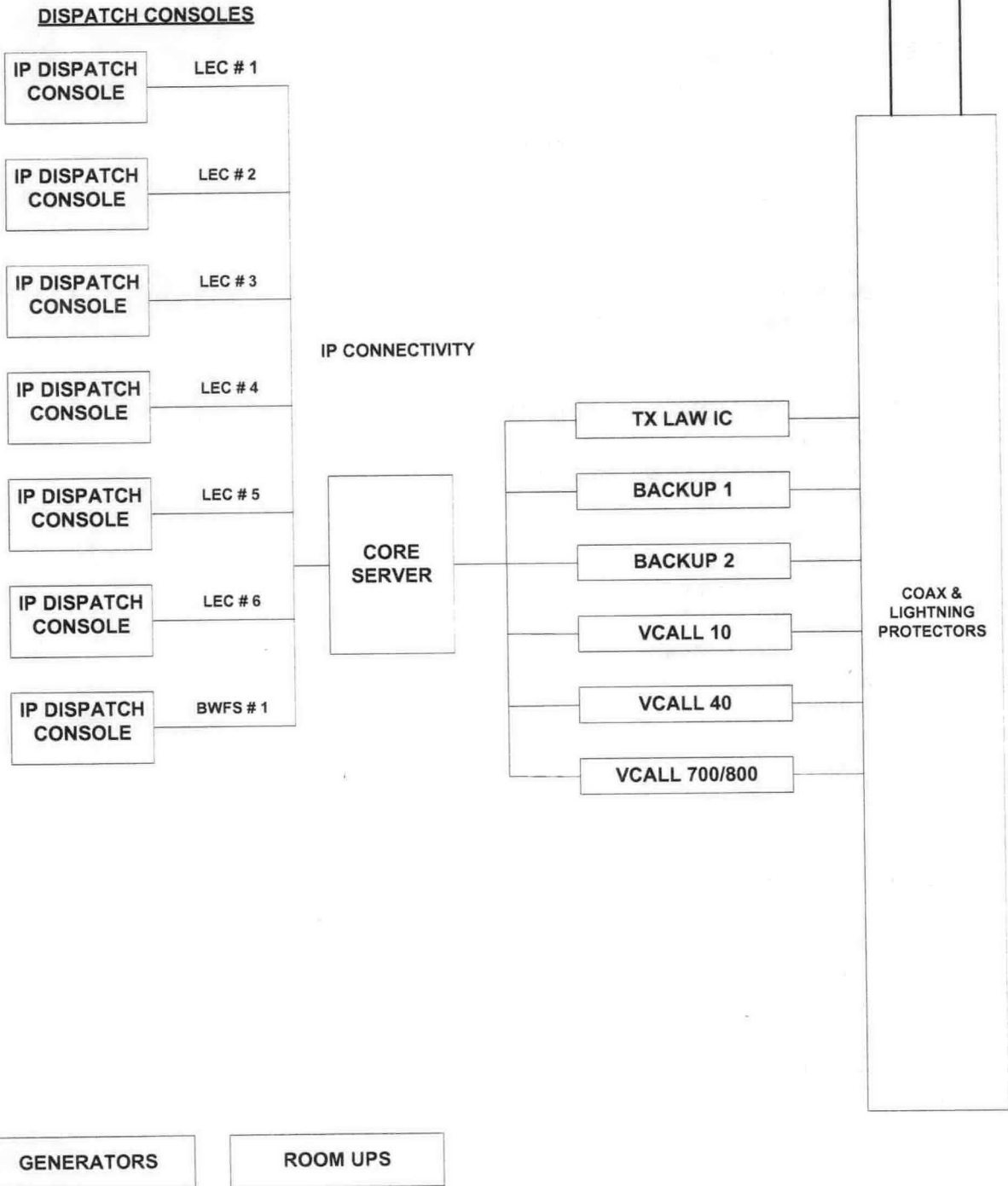
- 7 EACH VHF 100 WATT RPTR STATIONS WITH ANTENNAS AND TRANSMISSION LINES
- 1 EACH HOP MICROWAVE
- 1 EACH EQUIPMENT BUILDING (Add on VFD Existing Building)
- 1 EACH UPS SYSTEM
- 1 EACH GENERATOR

# BROWN COUNTY / BROWNWOOD TEXAS COMBINED PUBLIC SAFETY DISPATCH SYSTEM

**PHASE 5**

IP RADIOS

MULTIPLE ANTENNAS



## **ADDITIONAL NOTATIONS FOR CONSIDERATION**

In addition to the radio console dispatch equipment and radios detailed in this RFP, the following items need to be upgraded or replaced as deemed necessary at the LEC dispatch center to fully utilize the potential of the newly installed systems:

### **DISPATCH EQUIPMENT**

- Console Furniture
- Keyboards
- Computers and Other Components
- Monitors
- Microphones
- Head Sets
- Speakers
- Battery Backups
- Dispatcher Chairs

### **DISPATCH - COMMON (Back Room Electronics)**

- Gateways
- Uninterruptable Power Supplies
- Air Conditioning
- Antennas
- Transmission Lines
- Lightening Protection
- Grounding
- Back-up Generators
- Electrical
- Lighting
- Cable Trays
- Racks
- Miscellaneous

### **PHYSICAL DISPATCH**

- Flooring
- Electrical
- Lighting
- AC / Heat
- Walls
- Cable Runs
- Window Treatments

## COMPLETED PROJECT SITE EQUIPMENT DETAIL

The following diagrams show the equipment configuration that is required upon the completion of this project for all system radios. Microwave equipment and requirements will be discussed following this section.

Long antennas will be 6 dB gain.

Short antennas will be unity gain or up to 3 dB gain.

All antennas will be tested prior to installation to verify specifications. Results will be recorded.

Tower top mounts for antennas will be as recommended by antenna manufacturer.

Tower side mounts for antennas will be three (3) foot standoff arm mount configuration.

All transmission lines will be 7/8 inch diameter.

All transmission lines will be swept prior to installation. Results will be recorded.

Transmission lines will have lightning protectors at the building interior where they enter the building.

Transmission lines will have grounding kits installed at the top, bottom of the vertical run before the transmission line leaves the tower and at the entrance to the building.

All antenna systems will be line swept following installation. Results will be recorded.

All existing antenna systems that are to be used in this project will be line swept to determine usability. Results will be recorded.

Any visible defects in antennas or mounts will be noted.

Telecom buildings (equipment shelters) as required will be of the "Fibrebond" type or configuration. Size of the building must be large enough to accommodate rack mounted equipment and other requirements for the site.

A concrete slab (leveled) is required for the building

The building will require heating and air conditioning sufficient to maintain interior temperature as required by the installed equipment.

The building will have a built-in transmission line portal.

The building will have adequate interior lighting and motion sensitive (LED) exterior lighting at the entrance.

Each building will require an UPS in the interior to provide a minimum of 3 hours run time for the installed equipment.

Each building will require an external propane fueled generator with automatic cut-in should power company electrical supply fail. Generator will be sized to supply minimum 5 day power requirements.

All equipment will be grounded to a common rack ground and rack grounds will be grounded to a common building ground.

Additional 110 volt common power outlets will be mounted in the interior of the building as required.

Alarm notification will be provided via IP to Dispatch if:

1. Incoming main power is interrupted
2. The UPS is engaged or fails
- 3 The generator is engaged or fails
4. Radio Failure
5. Equipment room temperature too high - A/C failure

SNMP alarm server required in Dispatch.

Fencing will be installed as necessary.

All radios and associated equipment will be rack mounted.

All radios with GPS are Simulcast TX and Voting RX.

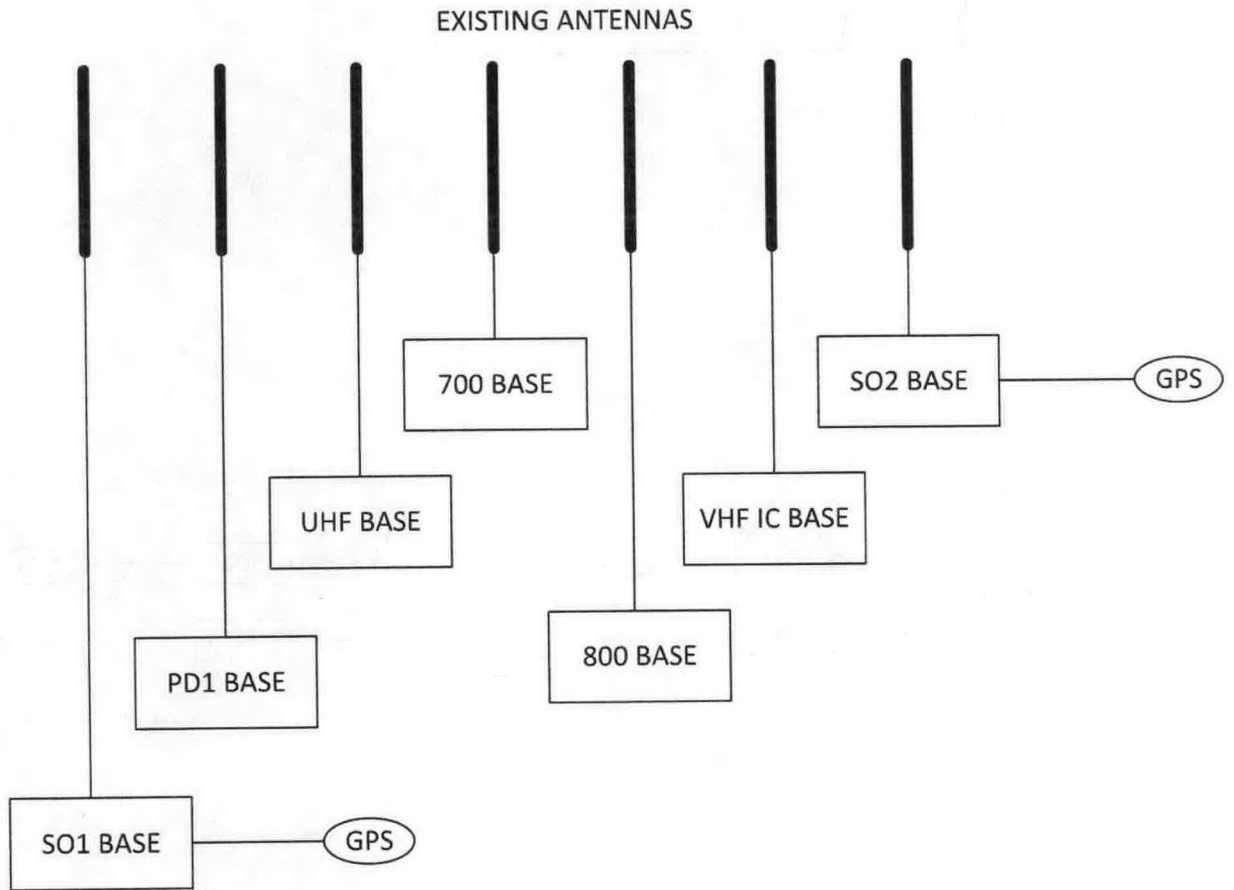
All TX Combiners are Hybrid Combiners.

Duplexers must be BpBr type duplexers.

Interior connector cables must be PIM resistant.

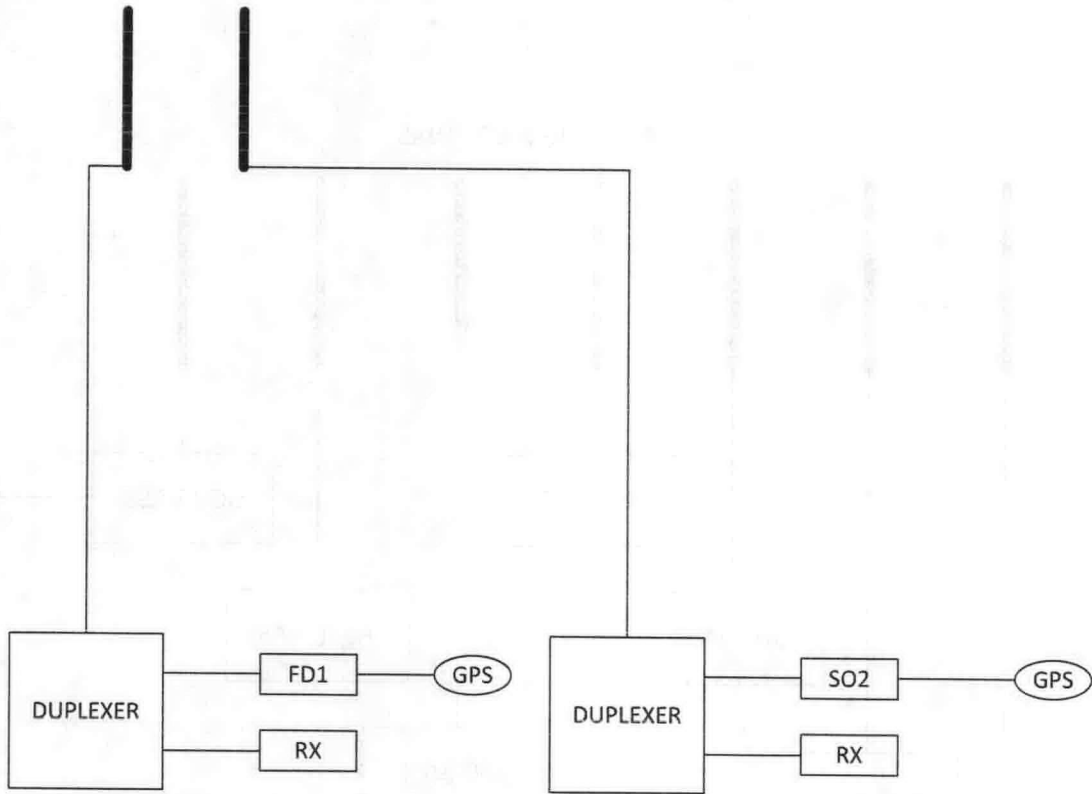
# BROWN COUNTY RADIO SITE DETAIL DRAWING

## LEC TOWER AND ROOFTOP



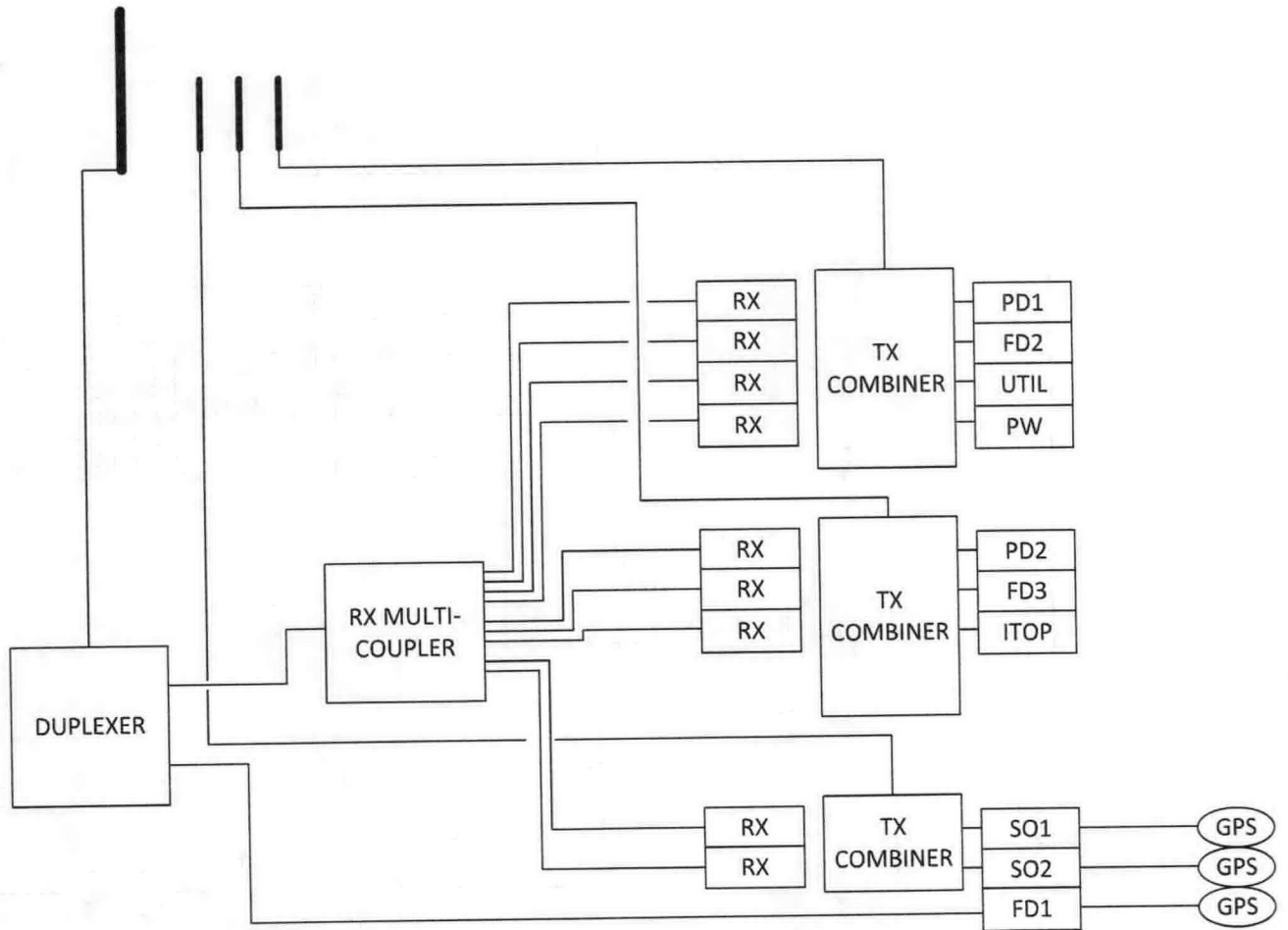
# BROWN COUNTY RADIO SITE DETAIL DRAWING

## ROUND MOUNTAIN



# BROWN COUNTY RADIO SITE DETAIL DRAWING

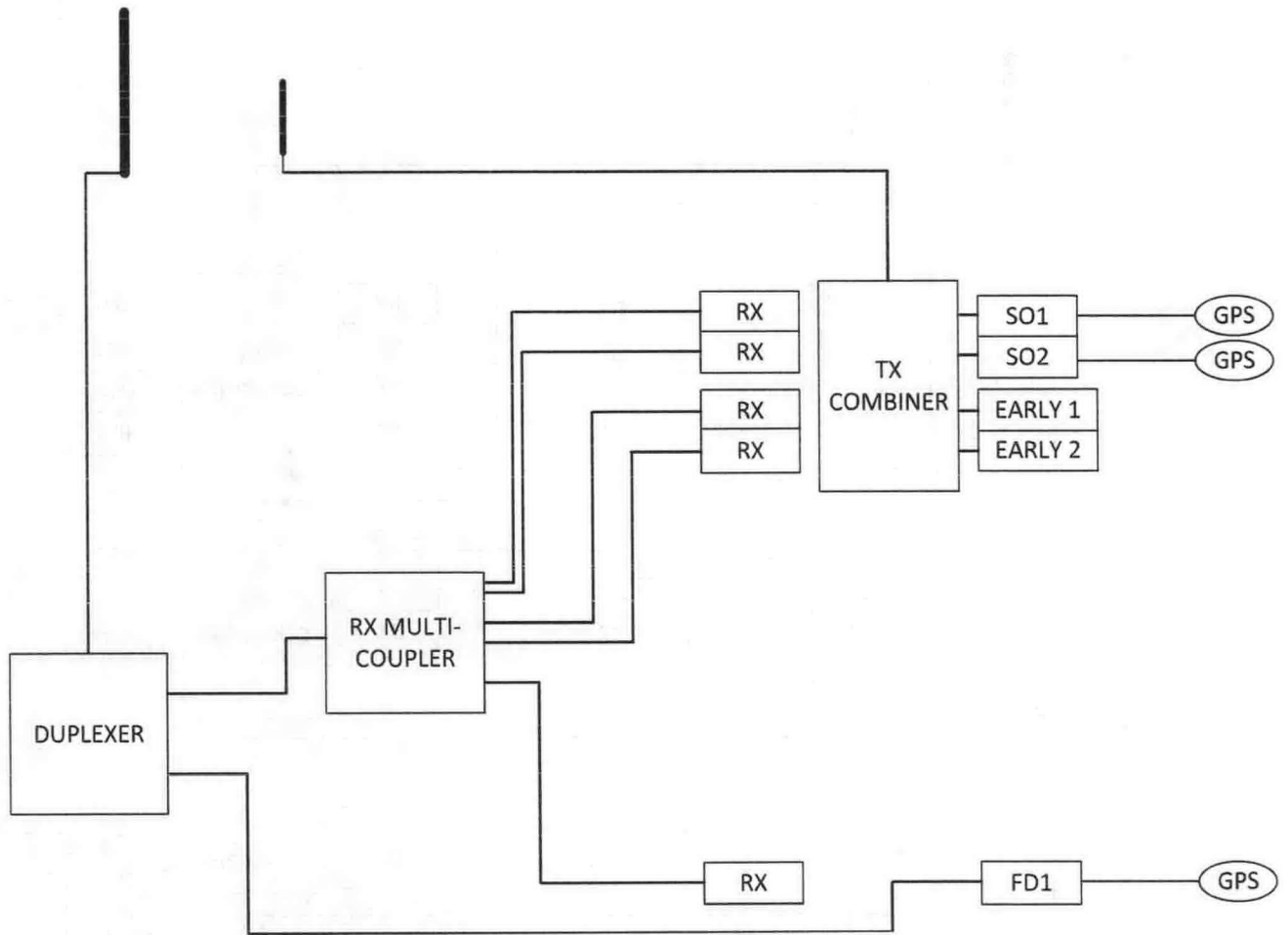
## WCW GREENLEAF





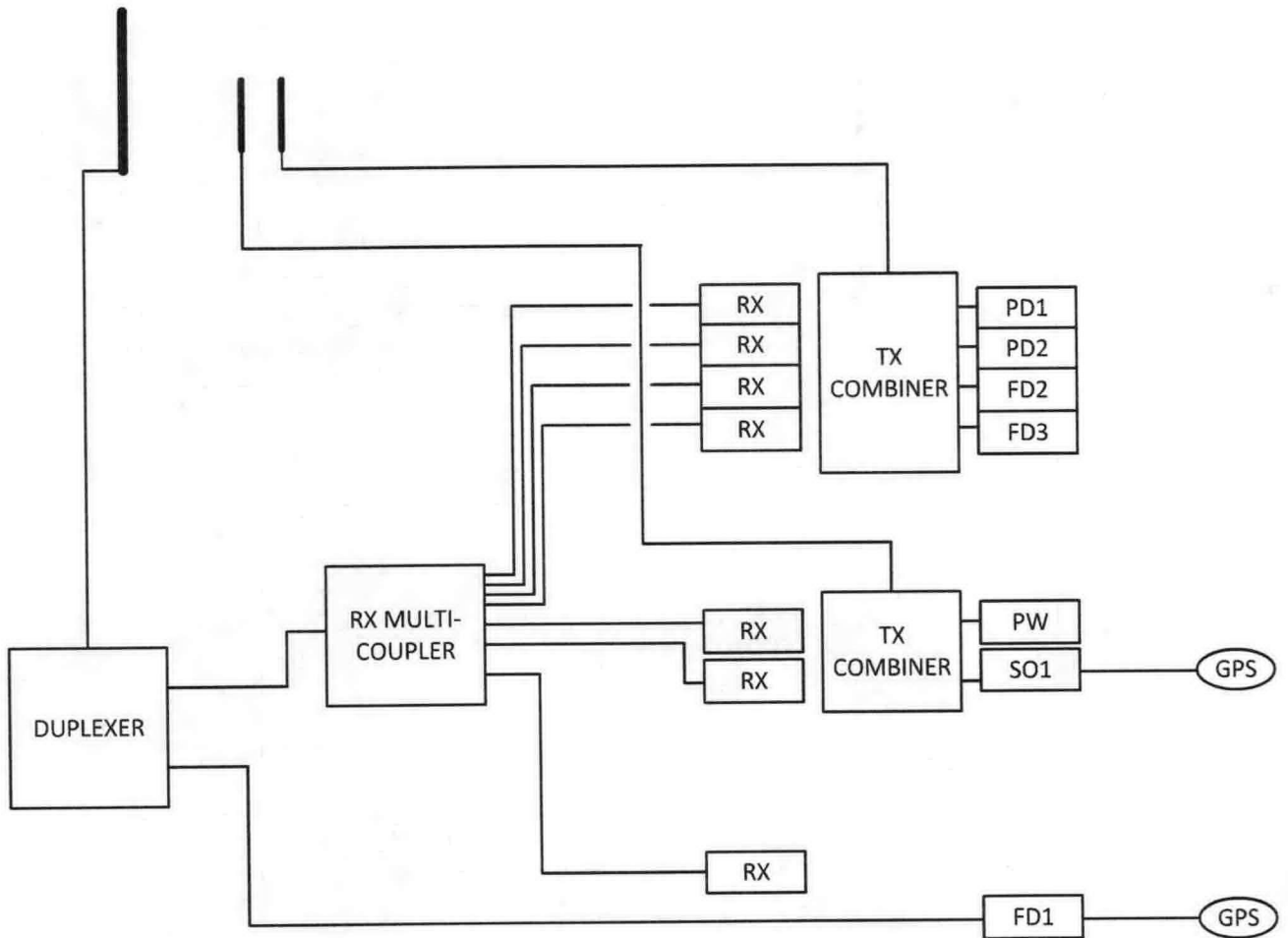
# BROWN COUNTY RADIO SITE DETAIL DRAWING

## WCW EARLY



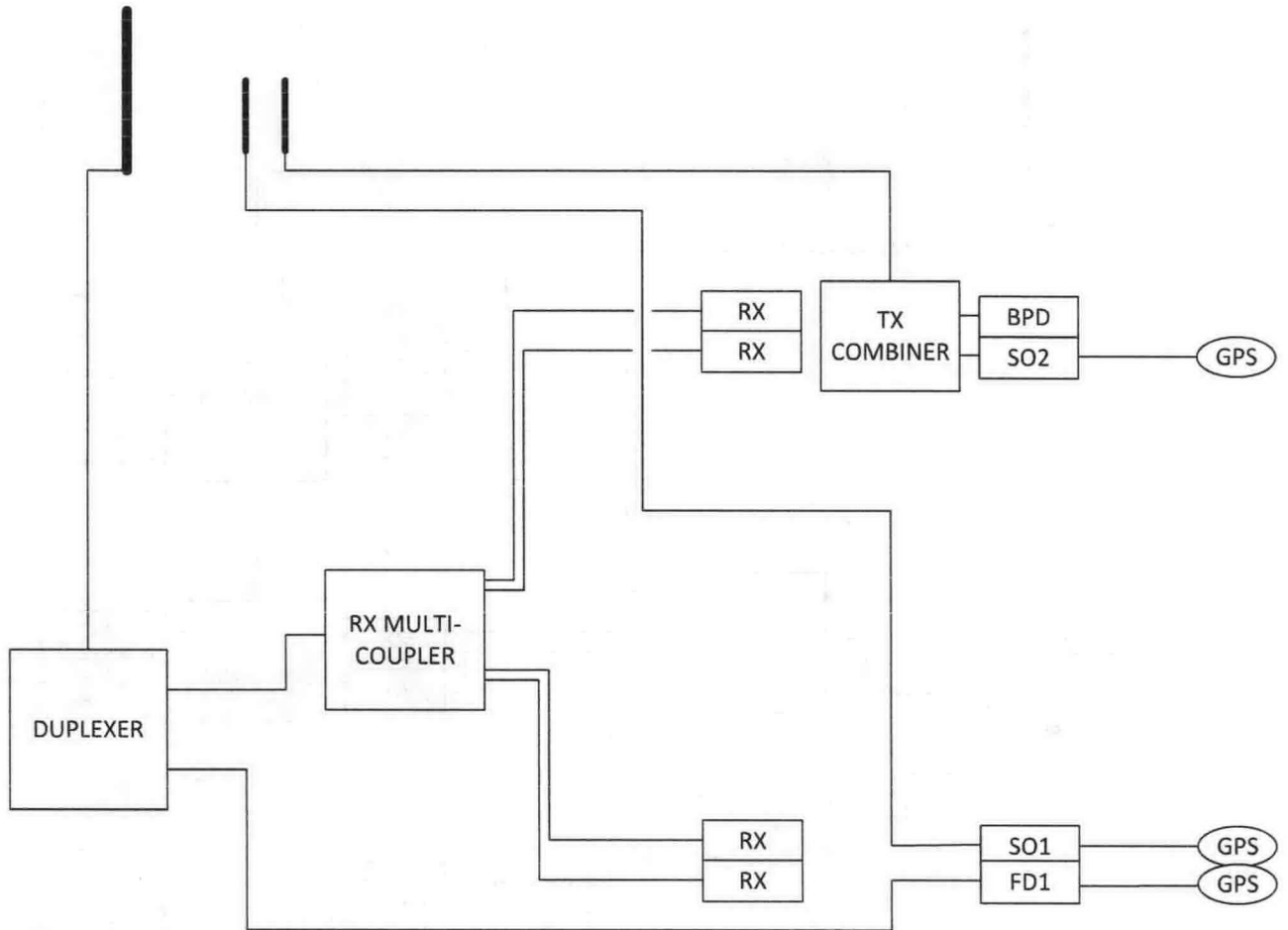
# BROWN COUNTY RADIO SITE DETAIL DRAWING

## WCW INDUSTRIAL



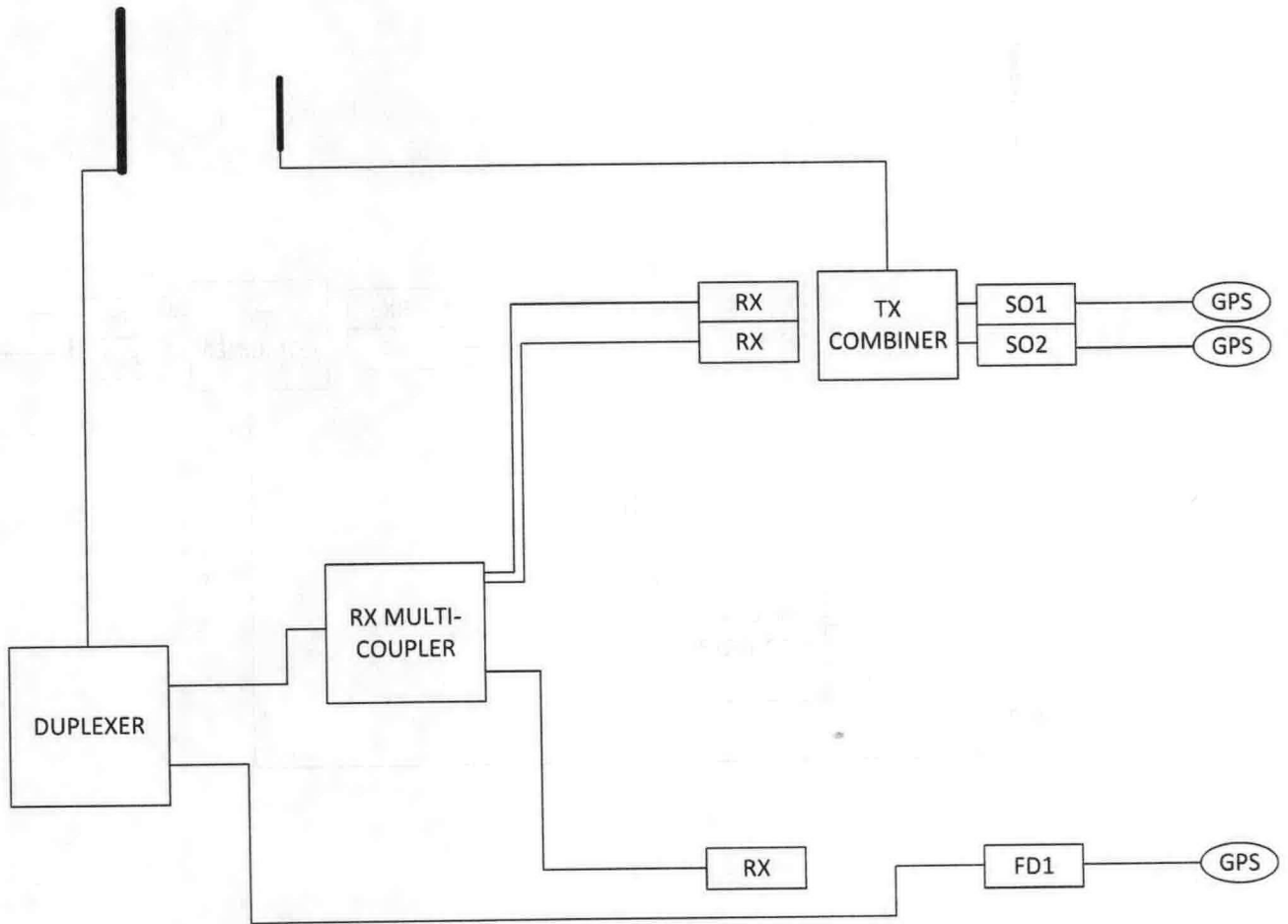
# BROWN COUNTY RADIO SITE DETAIL DRAWING

## WCW BANGS



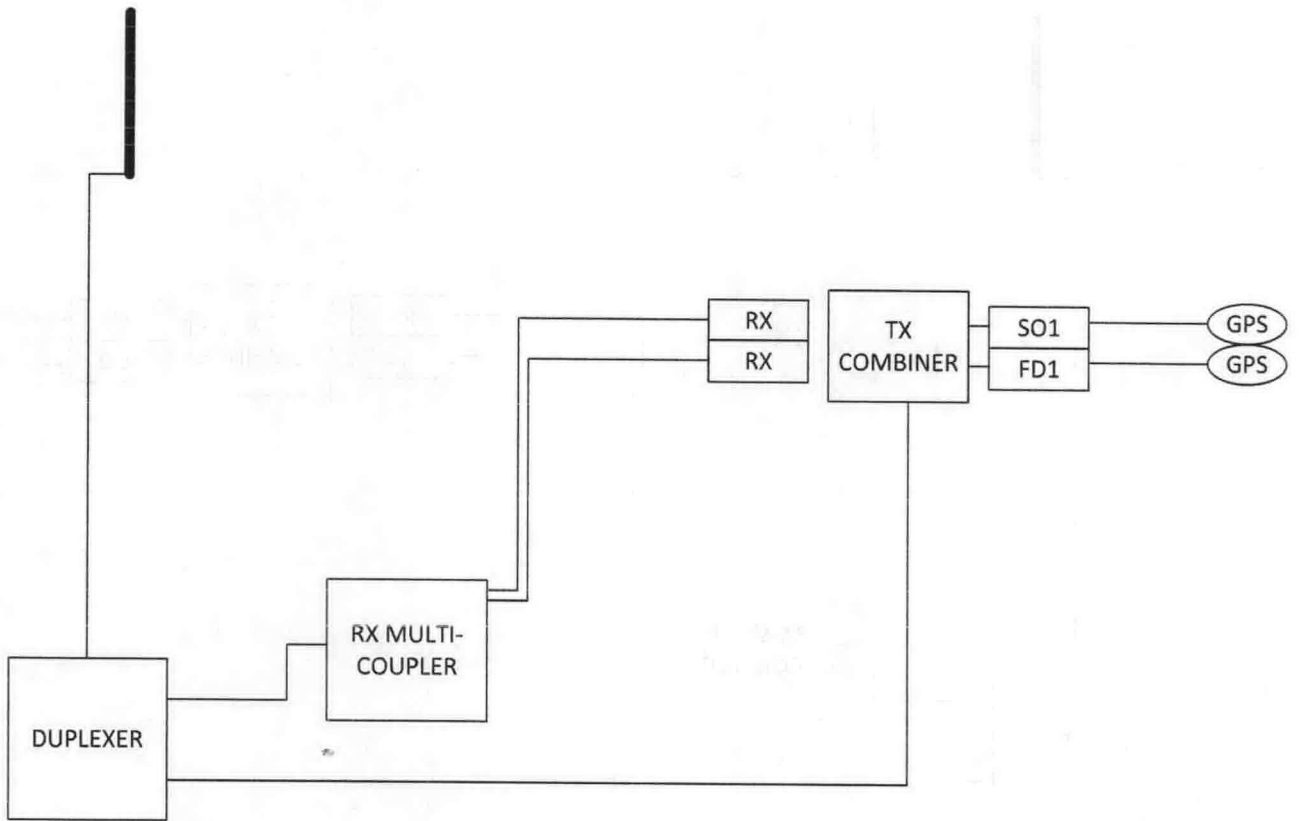
# BROWN COUNTY RADIO SITE DETAIL DRAWING

DPS MAY



# BROWN COUNTY RADIO SITE DETAIL DRAWING

## WINCHELL AREA



## MICROWAVE CONNECTIVITY

Upon completion of this project, microwave connectivity for all 11 sites will be established.

Each microwave hop will require 2 Cambium High Gain antennas of the following specifications.

Cambium PTP 670

Frequency	4.9 GHz
Gain	27 dBm
Dimensions	8 in. X 12.5 in. X 3.5 in.
Weight	6.8 lbs.
30 watt maximum power consumption + mounting hardware	

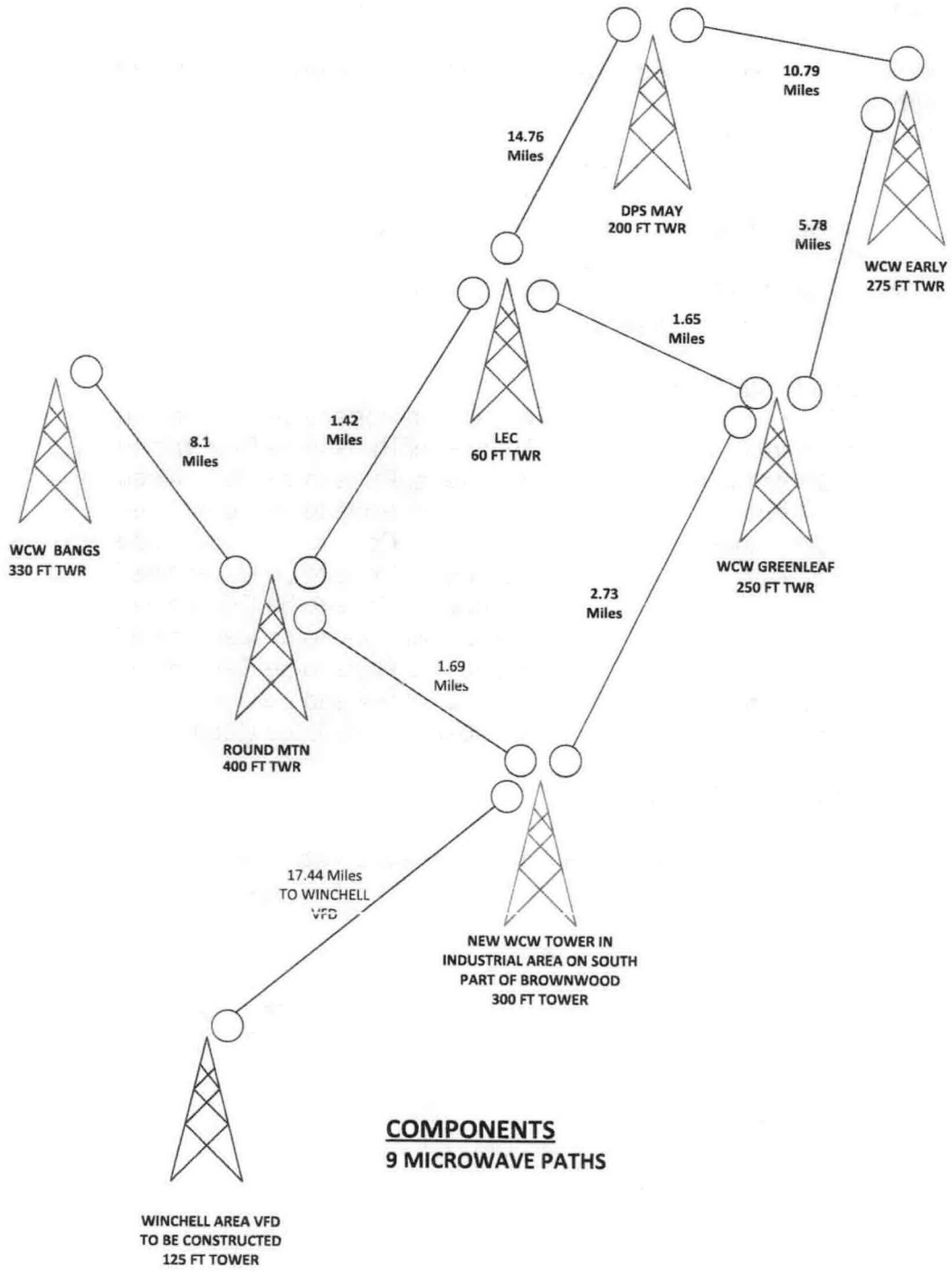
Routers will be rack mounted

LEC	Number of Ports to be Determined
Greenleaf	Number of Ports to be Determined
WCW Industrial	Number of Ports to be Determined
WCW Early	Number of Ports to be Determined
WCW Bangs	Number of Ports to be Determined
DPS May	Number of Ports to be Determined
Round Mountain	Number of Ports to be Determined
Winchell	Number of Ports to be Determined
Brownwood FS1	Number of Ports to be Determined
Brownwood CH	Number of Ports to be Determined
Early CH	Number of Ports to be Determined

Cabling will be Shielded CAT 5 E.

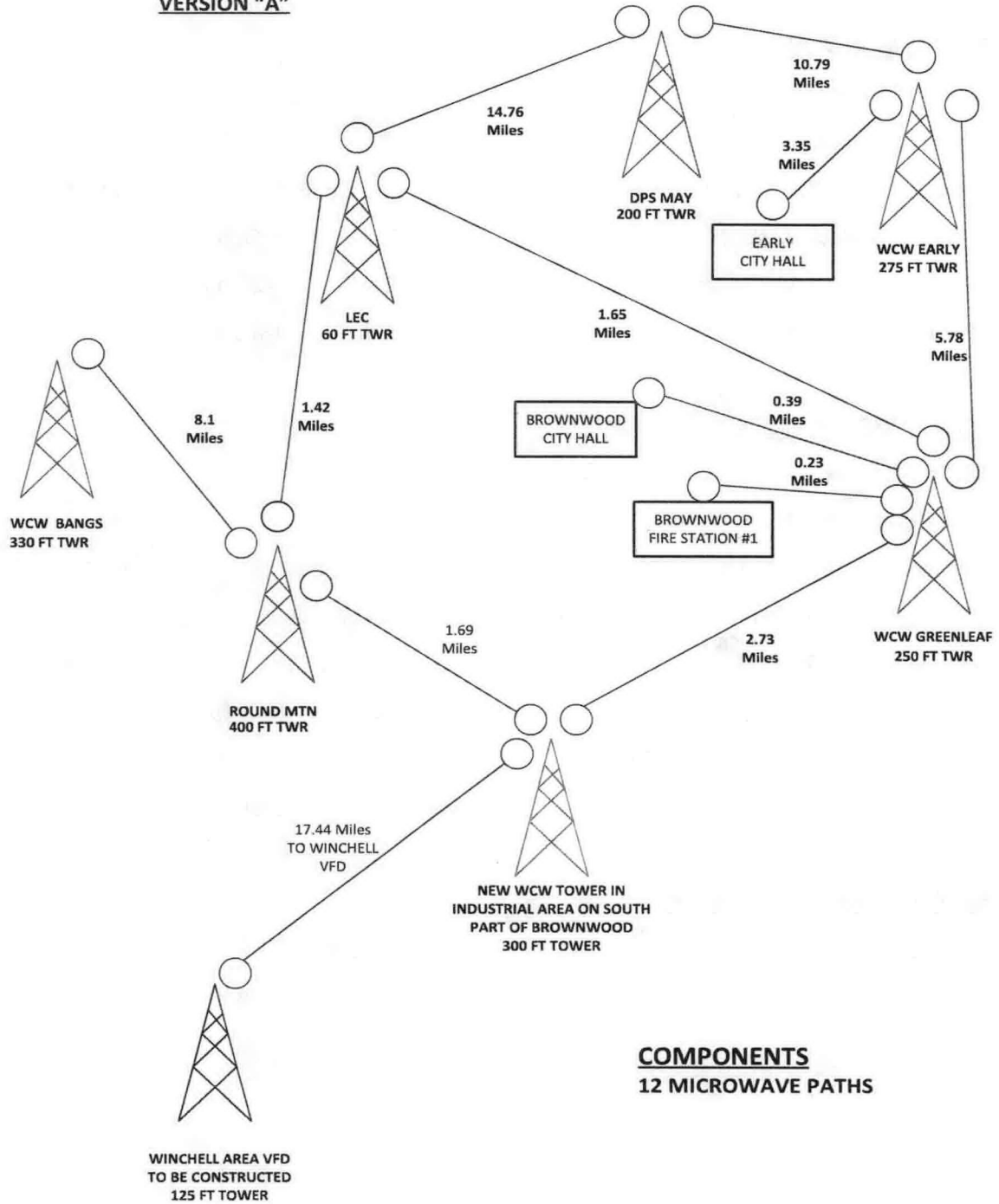
Appropriate lightning protection will be installed on each cable run.

# BROWNWOOD TX CITY AND BROWN COUNTY MICROWAVE CONNECTIVITY



# BROWNWOOD TX CITY AND BROWN COUNTY MICROWAVE CONNECTIVITY

VERSION "A"



**COMPONENTS**  
**12 MICROWAVE PATHS**



## BROWNWOOD TX CITY AND BROWN COUNTY

### SITE LISTING

#### ROUND MOUNTAIN

ASR = 1063741

FRN = 0014465546

Latitude = 31 - 42 - 16.6 N	Longitude = 099 - 00 - 06.1 W	NAD83
Ground Elevation (AMSL)	= 444.7 m	1459 ft
Overall Height above Ground (AGL)	= 127.9 m	420 ft
Overall Height (AMSL)	= 572.6 m	1879 ft

#### TEXAS DPS - MAY, TX

ASR = 1220104

FRN = 0001672419

Latitude = 31 - 55 - 12.5 N	Longitude = 098 - 54 - 00.1 W	ASR
Latitude = 31 - 55 - 12.5 N	Longitude = 098 - 54 - 00.2 W	FCC
Latitude = 31 - 55 - 11.49 N	Longitude = 098 - 53 - 58.25 W	Google
Ground Elevation (AMSL)	= 600.0 m	1968 ft
Overall Height above Ground (AGL)	= 61.0 m	200 ft
Overall Height (AMSL)	= 661.0 m	2168 ft

#### BROWNWOOD LEC (TOWER)

Latitude = 31 - 43 - 30.54 N	Longitude = 99 - 00 - 15.64 W	Google
Ground Elevation (AMSL)	= 420 m	1378 ft
Existing Tower	= 18 m	60 ft

**WCW - GREENLEAF - LATTICE TOWER**

ASR = 1278720

FRN = 0001650860

Latitude = 31 - 43 - 10.6 N                      Longitude = 098 - 58 - 38.1 W                      ASR

Ground Elevation (AMSL)                      =            406.6 m            1334 ft

Overall Height above Ground (AGL)            =            76.2 m            250 ft

Overall Height (AMSL)                        =            482.8 m            1584 ft

**WCW - BANGS, TEXAS - GUYED TOWER**

1496 County Road 138, Bangs, TX 76823

ASR = 1297654

Latitude = 31 - 43 - 38.1 N                      Longitude = 099 - 08 - 10.1 W                      ASR

Latitude = 31 - 43 - 37.23 N                      Longitude = 099 - 08 - 9.01 W                      Google

(ASR Location Off 128 ft)

Ground Elevation (AMSL)                      =            499.6 m            1639 ft

Overall Height above Ground (AGL)            =            100.6 m            330 ft

Overall Height (AMSL)                        =            600.2 m            1969 ft

**WCW - EARLY, TEXAS - LATTICE TOWER**

0.7 miles E on Hwy 377

ASR = 1048657

FRN = 0001665751

Latitude = 31 - 45 - 49.0 N                      Longitude = 098 - 53 - 35.0 W                      ASR

Ground Elevation (AMSL)                      =            466.3 m            1530 ft

Overall Height above Ground (AGL)            =            83.8 m            275 ft

Overall Height (AMSL)                        =            550.1 m            1805 ft

**WCW - BROWNWOOD INDUSTRIAL - GUYED TOWER - To Be Constructed**

Latitude = 31 – 40 – 54.90 N	Longitude = 98 – 59 – 27.60 W	Google
Ground Elevation (AMSL)	= 426.7 m	1400 ft
Proposed New Tower	= 91.4 m	300 ft

**WINCHELL VFD - To Be Constructed**

Latitude = 31 – 28 – 25.33 N	Longitude = 99 – 9 – 36.52 W	Google
Ground Elevation (AMSL)	= 408 m	1340 ft
Proposed New Tower	= 55 m	125 ft

**BROWNWOOD CITY HALL**

Latitude = 31 – 43 – 11.10 N	Longitude = 98 – 59 – 00.79 W	Google
Roof Top Elevation (AMSL)	= 410 m	1346 ft

**BROWNWOOD FIRE STATION #1**

Latitude = 31 – 43 – 01.64 N	Longitude = 98 – 58 – 47.54 W	Google
Roof Top Elevation (AMSL)	= ?	

**EARLY CITY HALL**

Latitude = 31 – 44 – 35.28 N	Longitude = 98 – 56 – 42.80 W	Google
Ground Elevation (AMSL)	= 434 m	1423 ft

**BROWNWOOD TX AND BROWN COUNTY TEXAS  
CONSOLIDATED RADIO SYSTEM UPGRADE  
ADDENDUM #1 TO  
REQUEST FOR PROPOSAL  
MARCH 25, 2020**

All radio repeaters must be capable of mixed Analog and P25 Phase 1 modes of operation.

All channels except Bangs PD, Early 1, and Early 2 must be capable of simulcast transmit and receiver voting.

An additional multi-channel VHF repeater is to be located at Brownwood Fire Station #1 that will be capable of operating full duplex on Channel FD1. We will need a power supply, UPS, duplexer, antenna, transmission line, and full installation with the antenna mounted on the top of the belfry at FS#1. This station will be used as a backup for the county for communications should all other sites be disabled. It needs to be controlled by either a nearby walkie-talkie or low power mobile that is not part of this RFP.

Add an extra radio repeater at the Industrial Tower site for the following channels to include simulcast transmitters and receiver voting:

IT Operations  
Utilities

In addition, the two-channel combiner at the Industrial Site will now be a 4-channel hybrid combiner and channels PW, UTILITIES, ITOPS, will need GPS receivers with antennas at the Industrial and Greenleaf sites.

All VHF transmitters will be operating in the VHF Public Safety band from 153 – 155 MHz and all VHF receiver inputs to the repeaters will be operating in the VHF Public Safety band from 158 – 159 MHz band.

The radio logging component must be accomplished by one of the following three methods:

1. Radios added at dispatch to receive all 12 dispatch channels currently in use with audio output to the current radio and 911 logging system with date and time stamps on each transmission
2. Devices added at dispatch to receive all 12 dispatch channels currently in use with audio output to the current radio and 911 logging system with date and time stamps on each transmission
3. An internal logging system that is part of the dispatch console system that can easily be reviewed with date and time stamps on each transmission and the data stored to a separate server that can be archived and retrieved as needed.

All transmitter combiners should be the hybrid type because we might have to use adjacent frequencies for some of the channels yet to be applied for.

If the vendor selects not to provide the duplexers, receiver multi-couplers, or combiners, Brownwood / Brown County will provide them. Please note in the response if that option is being invoked.

Brownwood / Brown County will provide the following material and equipment as their part of the project:

- Equipment Buildings
- Generators
- Concrete Pads for the Buildings and Generators
- UPS Systems
- IP Alarm Server
- All Towers except Winchell
- All Dispatch Furniture and Chairs
- AC Power in the Dispatch Room
- Lighting in the Dispatch Room
- HVAC in the Dispatch Room
- All general physical improvements in the Dispatch Room
- AC Power to the Remote Transmitter Sites
- All Electrical Wiring

The IP Routers will be supplied by Brownwood / Brown County if the vendor chooses not to provide them.

**BROWNWOOD TX AND BROWN COUNTY TEXAS  
CONSOLIDATED RADIO SYSTEM UPGRADE  
ADDENDUM #2 TO  
REQUEST FOR PROPOSAL  
MARCH 26, 2020**

Provide 1 each IP Dispatch Console at the Early Texas City Hall in the Police Department Dispatch Room. This will connect to the main dispatch system at the Brownwood / Brown County Law Enforcement Center through the IP Microwave link that is part of Phase 3A in the main RFP. (See page 22) This will bring up the total number of identical dispatch consoles to a quantity of 10.

# CITY OF EARLY, TEXAS - RADIO SITE DETAIL DRAWING

## EARLY CITY HALL

