



Cheboygan County Board of Commissioners

MISSION STATEMENT

Cheboygan County officials and staff will strive to provide public services in an open and courteous manner and will responsibly manage county resources.

**Board Planning Session Meeting
April 25, 2018
9:30 a.m.**

Audie's Restaurant at Mackinaw City

Agenda

1. Call to Order
2. Roll Call
3. Invocation/Pledge of Allegiance
4. Approve Agenda
5. **CITIZENS COMMENTS**
6. **SCHEDULED VISITORS/DEPARTMENT REPORTS**
7. **ADMINISTRATOR'S REPORT**
8. **OLD BUSINESS**
9. **NEW BUSINESS**
 - A.
10. **BOARD PLANNING SESSION**
 - A. Review of Board Goals
 - B. CCE 911 Radio Project
 - C. Economic Development Discussion
 - D. Solid Waste Plan
 - E. Infrastructure Project Review
11. **CITIZENS COMMENTS**
12. **ANY ADDITIONAL BOARD MEMBER TOPICS**
13. **ADJOURN TO THE CALL OF THE CHAIR**

ADMINISTRATOR'S REPORT
BOARD PLANNING SESSION
4-25-18

REVIEW OF BOARD

GOALS:

Staff will review Board Goals as related to the strategic budgeting process for Board confirmation or modification.

CCE 911

RADIO PROJECT:

Staff will briefly review the CCE Radio Study that was presented to the Board last year. Staff will then discuss the proposed revisions to the CCE 911 Articles of Incorporation needed to clarify items in the existing agreement as well as provide the necessary language to pursue the funding necessary for the project through a bonding or phone surcharge vote to implement the project. This topic will be discussed jointly by Board of Commissioner members at CCE's Annual Tri-County Meeting to be held Wednesday, May 23, 2018 at 12:00 P.M. at the Headlands Waterfront Event Center in Mackinaw City.

SOLID WASTE

PLAN:

The Solid Waste Plan has been placed back on the agenda for further discussion as related to an amendment for transfer station siting clarification and enforcement provisions. Staff will review the amendment process.

INFRASTRUCTURE

PROJECT REVIEW:

Staff will review the status of the Jail Project and discuss the needed work scope changes to the Marina project to keep the project budget in the original \$800,000 project cost budget.

STRATEGIC PLANNING- BUDGETING

PROCESS

Strategic planning-budgeting is a unified process of identifying the goals of an organization and allocating the resources necessary to work toward the outcomes that support the identified goals. The steps of strategic planning-budgeting are:

- **Develop goals**
- **Identify objectives and outcomes**
- **Appropriate funds to meet the objectives that are designed to produce the outcomes that support the goals of the organization**
- **Review, monitor and analyze**

The Cheboygan County Board of Commissioners has a sustained history of developing goals to promote a higher quality of life, a safe environment and to promote balanced growth and positive interaction with all citizens of the County. The board developed the County's County Vision and Mission Statements as well as Commission Goals with facilitation assistance from Michigan State University Extension Staff. The board then directed the administrator and management team to develop a plan of action to implement the mission, vision and goals. Each department then developed goals and objectives specific to their department to work toward achieving the mission, vision and overall goals of the County.

STRATEGIC PLANNING-BUDGETING

VISION-MISSION-GOALS

*A **VISION** statement indicates how an organization views its ideal, or ultimate, goal. The Board of Commissioners has established the following vision statement:*

The County of Cheboygan will strengthen its position as a diverse, family oriented community while promoting a higher quality of life, a safe environment, balanced growth and positive interaction with all citizens.

*A **MISSION** statement assists an organization in easily communicating to a variety of constituencies what it does, who it serves, and how it does so. The Board of Commissioners has established the following mission statement:*

Cheboygan County Officials and Staff efficiently provide public services with pride and in an ethical and courteous manner through responsible management of county resources.

GOAL

GOALS focus the direction of an organization's work, under the guidance from the vision and mission statement.

Goals are long term in nature and will not often change.

The five goals of the Board of Commissioners are:

- 1. PUBLIC SAFETY – To focus on providing services beneficial to the citizens of Cheboygan County in the areas of public health, safety and security.**
- 2. ECONOMIC DEVELOPMENT – To promote and encourage economic development through our continued efforts of collaborations with our partners.**
- 3. QUALITY COUNTY SERVICE – To work diligently to provide courteous, efficient, quality service.**
- 4. RECOGNIZING SOCIAL ISSUES-To work diligently to address social needs, recognizing the limited role of counties and working together with state and federal governments in their role.**
- 5. ADDRESSING MULTIPLE FACILITY NEEDS – To continue development of capital improvement schedules to maintain county assets.**
- 6. COLLABORATION-SERVICE – To explore continued expansion of collaborative activities.**



C.C.E.
CENTRAL DISPATCH AUTHORITY
Robert D. Bradley
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June 22, 2017

Jeff Lawson
Cheboygan County Administrator
870 South Main St.
Cheboygan, MI 49721

Dear Mr. Lawson,

At the regularly scheduled meeting of the Charlevoix, Cheboygan, Emmet Central Dispatch Authority Board of Directors on June 21st 2017, a motion was passed regarding the future of public safety radio communications in the three county region. The motion was in support of two recommendations contained in a report prepared by the CCE 911 Radio Subcommittee for our Board of Directors. The motion as passed is as follows:

Motion by Mr. MacInnis with Support from Mr. Stephens that the CCE Board of Directors recommend to the Boards of County Commissioners in Charlevoix, Cheboygan and Emmet Counties to implement a technology change to the 800 MHz Radio System and approve a funding option to implement this project and furthermore the CCE Board of Directors directs CCE staff to begin contract discussions with the MPSCS and to prepare an RFP to obtain future quotes from vendors for the necessary equipment to transition to an 800 MHz system in Charlevoix, Emmet and Cheboygan Counties for all emergency responders within.

Motion carried with Roll Call Vote.

Yeas; Cain, MacInnis, Wallace, Dohm, Rocheleau, Stephens, Richards, Riddle.

Nays; Christensen.

A copy of the aforementioned report is included with this letter for your review as well.

Please share this information with the appropriate parties within your County. We stand ready to assist you and others in the consideration of our report and any other matter related to this topic. If we can be of any further assistance on this very important topic, please let us know.

Respectfully,

Robert Bradley



CCE Central Dispatch Radio Study

BY: CCE 911 Radio Subcommittee 5-25-17

CCE-911 RADIO STUDY

THIS REPORT IS CREATED TO REVIEW THE CURRENT PUBLIC SAFETY RADIO SYSTEM IN THE CHARLEVOIX, CHEBOYGAN & EMMET COUNTIES (CCE) FOR THE PURPOSE OF IMPROVING EMERGENCY COMMUNICATIONS, AGENCY RADIO INTEROPERABILITY AND ADDRESSING COMMUNICATION SAFETY CONCERNS

OVERVIEW

The purpose of this report is to summarize the radio system study to identify the best radio system technology to ensure communication interoperability and address safety concerns related to emergency communications for the Law Enforcement, Fire and EMS/First Responder agencies served by the 911 Central Dispatch Authority. The report will review the current VHF system utilized by the organization identifying the pros and cons of this system as compared to changing technology to an 800 MHz radio system to serve the agencies and the public.

PROBLEM:

In 1996, the new Central Dispatch Authority (CCE) system went operational with the latest in technology utilizing Very High Frequency (VHF) radio technology. Narrowbanding was ordered by the FCC due to the limited availability of channels due to usage resulting in channel congestion. The FCC ordered the first round of narrowbanding resulting in channel width being reduced from 25 kHz to 12.5 kHz which was completed in 2013. Narrowbanding resulted in the loss of radio coverage in the C.C.E. service area requiring system upgrades to try and re-establish communication strength and reliability. Improvements since 2013 have resulted in improving limited areas within the service area. C.C.E. 911 has expended \$600,000 to upgrade the system to make it usable and account for FCC regulations (Clark, 2016). The FCC is again looking into another narrowbanding requirement reducing channel width to 6.25 KHz though the date has not been set (Bercovici, 2006). According to information obtained by Tele-Rad, it appears probable that within four to seven years it could come to fruition (Kooyers, 2016). This would require additional funds to be spent to comply with FCC regulations and again attempt to

re-establish communications strength and reliability. Additional narrowbanding is also projected to make portables, mobiles, and paging, base-station and repeater radios obsolete, resulting in a further loss of coverage or capacity (Security, 2011). Even with projected future upgrades to the VHF system, interoperability among agencies in the CCE area is minimal at best and among regional and state agencies is non-existent.

The question is: With the reality of narrowbanding being implemented in the near future do we transition to the 800MHz system or invest in upgrades to the VHF system?

BACKGROUND

CCE is the 9-1-1 Public Safety Answering Point, or PSAP, for the counties of Charlevoix, Cheboygan, and Emmet. CCE intakes both emergency and non-emergency 9-1-1 calls for service.

CCE dispatches for 13 law enforcement agencies, 25 fire departments, 6 EMS agencies, and 11 Medical First Responder squads across the tri-county region. In addition to these, CCE often works directly with other agencies including hospitals, utility companies, towing services, the Office of Emergency Management, the DNR, alarm companies, other dispatch centers, etc.

The scope of coverage for CCE is three counties, with a land area of approximately 1,730 square miles, which includes Beaver Island, and covers approximately 4,500 miles of roadways. The estimated population is 85,000 permanent residents. This number typically triples during the summer months.

Mission of CCE

The mission of CCE Central Dispatch is to positively enhance the lives of people living in and traveling through our communities by processing and dispatching emergency and non-emergency calls for assistance, while providing primary critical support to our emergency service agencies by compiling, maintaining, and providing accurate information to assist their response to these calls.

History of CCE

CCE was established in 1992 by the counties of Charlevoix, Cheboygan, and Emmet, and their respective townships, cities, and villages to provide enhanced 9-1-1 and emergency dispatch services for its communities. Construction of the Dispatch Center was completed in 1995, and CCE began live operation in June 1996.

CCE is governed by a Board of Directors with representation from County Commissioners, Township Officials, and City or Village representatives from each county. The Technical Advisory Committee (TAC) makes recommendations to the Board regarding operations and policy. The TAC is made up of public safety members from law, fire, and EMS services from each county.

Emergency Services

Currently there are 44 emergency service agencies in the three counties with most utilizing the VHF system as their main voice communications with CCE. Most departments have some form of 800MHz communications via prep radios for talk a round and events but not as a standard in voice communication. Because of this lack of interoperability, emergency services rely on third party communication from CCE in inter-departmental operations.

With the events of September 11, 2001, the national, state and local goal is interoperability between all emergency operations. Federal rulings through the Department of Homeland Security created a hierarchy within the emergency services which led to the creation of the ICS System (Incident Command System). This system allows for proper set up, coordination and management of an incident command center that relies on interoperability from one location among all emergency services (FEMA, 2016). On a local level we look at interoperability as the ability of field units and agencies to talk and share data in real time, when needed as authorized (Justice, 2006).

FACTS:

- The current VHF system will again be narrow banded resulting in more loss of coverage
- Interoperability between agencies does not exist, especially outside of CCE, with VHF
- Infrastructure will have to be developed with regard to towers and repeaters for VHF
- The 800MHz tower coverage already exists but will need added channels
- CCE 911 is already set up for 800MHz communications through current consoles
- Due to narrowbanding current VHF coverage in the three counties stands at 70% (911, 2015) (Annex A1-A4)
- Current 800MHz coverage stands at 98.4% (Michigan State Police, 2015) (Annex B1-B4)

ASSUMPTIONS:

- Lack of coverage with future narrowbanding will occur which will result in officer safety concerns and reduced timeliness for first responders
- Lack of interoperability between agencies inside/outside of CCE will hamper coordination efforts on operations
- Inadequate service provided in the near future with the current VHF system
- Age of current system will result in expenditures for continuous upgrades and replacement of obsolete and/or maintaining of equipment

POSSIBLE COURSES OF ACTION

MAINTAIN EXSISTING VHF RADIO SYSTEM

Currently, CCE operates the primary VHF radio system on twenty-two (22) separate tower sites located with the three counties of Charlevoix, Cheboygan and Emmet. Thirteen (13) of these towers are for full transmission of voice radio for emergency services. Nine of the towers are a mix of receive or transmit only to fill in gaps created by tower spacing and topography (Clark, 2016). The current VHF system only provides a 70% coverage average for the three counties.

➤ Pros

- Current system in use
- Emergency communication
- Dispatch services
- Fire paging capabilities exist
- Good data transmission capabilities

➤ Cons

- Narrowbanding will affect the efficiency and reliability of the system
- Funding to maintain systems

- Upgrading current bases and field radios
- Upgrading existing towers
- Adding additional towers
- Patching network to attempt interoperability
- Lack of coverage
- Lack of interoperability
- Voice clarity issues
- Radio spectrum is becoming more congested
- Some current equipment is not P25 compliant

CHANGE TO STATE 800 MHz RADIO SYSTEM

Currently the MPSCS maintains twelve (12) tower sites providing 800 MHz coverage in the three counties. A study was completed by the Michigan State Police in October 2015 for coverage of the 800 MHz system in the three counties. CCE did a follow up study in July of 2016 and found the MSP study to be accurate which included better signal strength, clarity of voice, and reliability of coverage based on portable talkback as compared to the current VHF system (Clark, 2016). The 800 MHz system showed a coverage average of 98.4% over the three counties. The MPSCS covers 59,000 square miles and is in operation in 61 counties and pending in three others. In addition there are 244 towers operated by the MPSCS in the State of Michigan (Annex C).

➤ Pros

- System security
- Mission critical communication
- Voice clarity
- Interoperability
- 98.4% coverage

- Fire paging capabilities exist
- Continuity of communications in dispatch
- System upgrades by State
- P25 compliant
- Technical support/monitoring 24/7 by State
- No congestion issues (narrowbanding N/A)

➤ Cons

- Funding to change systems
- Concerns of a state run system

On October 24, 2016 stakeholders attended a conference at NCMC with MPSCS in order to obtain needed information to convert to the State 800 MHz system. This conference was conducted by Brad Stoddard, Director of MPSCS. Mr. Stoddard presented a power point outlining the MPSCS service to public safety and citizens, the operations of MPSCS, upgrades and costs (Annex D). MPSCS is a state function, but not a State Police run organization. All towers in the CCE area be it state or local towers, are all used for voice communication and paging. According to Mr. Stoddard the MPSCS will provide continuous upgrades to all towers at no charge locally, but rather from the State's General Fund. There will be however fees associated with local tower maintenance and tower monitoring. Mr. Stoddard explained the MPSCS does monitor tower sites with a 24/7 service at a cost of \$5,500 annually; this would apply to the Topinabee tower site with 800 equipment to enhance Cheboygan County. Along with costs associated with the 800 system there is a one-time \$250 per radio fee for initial set up.

Currently 68% of fire and law in the state operates on the MPSCS and 88% are local users. The system is recognized as one of the best in the world for interoperability (Stoddard, 2016). The system is set up to provide continuous operations throughout the state. As explained by Stoddard, the State is broken up into zones and if a zone goes down, the system re-routes to provide connectivity. This also includes cyber-attacks. Mr. Stoddard went on to explain that the MPSCS has multi-level protections in place for cyber-attacks and anti-virus updates are continuous. If one site goes down in the event of a cyber-attack, that zone is shut down and the system re-routed to keep service. Another advantage is because of the interoperability if

CCE goes down, it allows for transfer to another agreed dispatch center to provide seamless transition for coverage.

Mr. Stoddard commented on CCE's current towers explaining that a study will need to be conducted to know exactly what upgrades in channels there will need to be to switch systems. Any channel upgrades will be at the cost of local stakeholders (CCE). Current estimates are there may need to be an additional 11 channels added to the tower systems. These channels are currently estimated at a cost of \$133,000.

Mr. Stoddard also explained that there is no limit on talk groups and no additional fees associated with talk groups. Credit from MPSCS was also explained. Credit is a percentage back to the stakeholders as a whole for MPSCS to utilize local towers. This credit may be as much as 5% of the costs associated with tower construction. These credits, if applicable, would be used to offset certain costs such as subscriber activation.

FINANCIAL ANALYSIS

COST COMPARISON OF SYSTEMS

VHF System Infrastructure Upgrades

A thorough review of the current VHF radio system infrastructure and field testing of portable VHF radios have confirmed that there are areas of weak and unreliable signal coverage, most of this is with portable radios and the ability to "Talk Back" to dispatch or other units. There are a few areas where portable radio coverage is unreliable in "Receive" mode, meaning hearing transmissions from dispatch.

The task would be to enhance our current VHF radio system to duplicate as closely as possible the same portable radio coverage that is offered by the Michigan Public Safety Communication System 800 Radio system in all three Counties (Charlevoix, Cheboygan and Emmet Counties) which is approximately 98.4% coverage.

Areas identified as needing infrastructure upgrades, including new tower construction or leasing space on existing towers owned by other entities.

Budgetary numbers were compiled based on previous projects of similar scope in our three Counties or other known projects within our Region or State. These budgetary numbers are presented below in phases. It is recommended that all communications equipment upgrades should be replaced with equipment that is approved to be in compliance with any future narrowbanding that may be mandated by the FCC for VHF radio systems.

Phase 1 – Additional tower construction costs or proposed tower lease cost projections

Phase 2 – Narrowband compliant upgrades to communications system equipment that is in place at current or proposed tower sites

Phase 3 – Ongoing maintenance costs for VHF communications equipment at current and proposed tower sites (demonstration of 1 year, 5 year and 10 year costs)

Phase 4 – Replace existing agency's current field radios (portable and mobile) to be compliant with future narrowbanding as mandated by the FCC

Phase 1 – Improves Charlevoix and Cheboygan Counties

Through radio tests and preliminary discussions with radio industry experts we determined that the following sites that were identified as needing new tower sites with both VHF radio send and receive voice and paging capabilities.

- Bliss area of Northwest Emmet County
- Boyne City area of Charlevoix County
- East Jordan area of Charlevoix County
- Forest Waverly area of Cheboygan County
- Melrose Township area of Charlevoix County

The above identified sites would require either new tower construction or a lease option on an existing tower site.

Option 1 – CCE Owns Towers

Proposed Construction of Towers for New Sites for VHF

Anticipated new construction on five (5) towers at approximately 180 foot with equipment shelters, backup generators, site prep, FCC licensing and related costs is anticipated to be approximately \$500,000 to \$600,000 PER SITE. ** This does not include any land acquisition or communications equipment for in the tower shelter. Pricing estimates are based on previous projects and do not include any inflationary costs figures for tower steel or other components.*

Anticipated cost estimates for the necessary communications equipment for each tower site is approximately \$250,000 - \$300,000 per site. ** This includes repeaters, receivers, mux, antennas, cables, programming, GPS clocks, etc. All of this equipment would be compliant with any future narrowbanding as mandated by the FCC. **We are NOT guaranteed FCC approval for licensing our frequencies at any of these sites.*

A preliminary conservative estimate to build these five (5) new tower sites to fill in the VHF signal in the above mentioned areas is over four and a half million (\$4,500,000) dollars.

** A preliminary engineering study was not completed for this report. A study would be conducted as part of final engineering for any future improvements at an estimated cost of \$25,000 to identify estimated coverage percentage of VHF system upgrades. It must be noted that an engineering study can provide estimated coverage but cannot guarantee VHF coverage at or above the 98% target.*

Option 2 – CCE Leases Towers

Proposed Leasing of Tower Space for New Sites for VHF

Using current tower lease costs provided for our current VHF radio system deployment, we took a median cost averaged out per our four (4) leased tower sites. This averaged cost is approximately \$1,030 per month per site. Using this cost a projected long term lease of towers is shown below for all five (5) proposed sites.

New Tower Sites estimated lease cost per month	\$5,150
New Tower Sites estimated lease cost per year	\$61,800
New Tower Sites estimated lease cost for 5 years	\$309,000
New Tower Sites estimated lease cost for 10 years	\$618,000

Anticipated cost estimates for the necessary communications equipment for each leased tower site is approximately \$250,000 - \$300,000 per site. ** This includes repeaters, receivers, mux, antennas, cables, programming, GPS clocks, etc. All of this equipment would be compliant with any future narrowbanding as mandated by the FCC. **We are NOT guaranteed FCC approval for licensing our frequencies at any of these sites.*

Phase 2 – Costs Related to Future Narrowbanding

The following is an estimated price summary of the cost to upgrade all current radio communications equipment that is NOT compliant with future narrowbanding as may be mandated by the FCC. These are estimated costs provided by radio industry experts based on current equipment pricing. These costs are highlighted to show the cost of upgrading existing radio equipment and does not include above pricing for the equipment list for new tower locations (either tower construction or leasing on existing tower sites).

CCE-911

Replace approximately 63 repeaters at a cost of \$20,000 each	\$1,260,000
Replace approximately 15 Mux (channel mixers) at a cost of \$35,000 each	\$ 525,000
FCC licensing, project development and system programming	\$ 300,000
Credit for equipment purchased in phase 1	\$ (275,000)
Estimated total costs of upgrading equipment for narrowbanding	\$1,810,000

Phase 3 – Subscriber Radios

The VHF radios that are currently in use by the various Public Safety agencies will continue to work on our VHF system. It should be noted that VHF radios may need to be P25 compliant to be eligible for various grant funds. VHF radios will need to be P25 compliant to meet future narrowbanding requirements as mandated by the FCC. This includes all portable radios, mobile radios and pagers.

The estimated cost to upgrade all agencies to a P25/narrow band compliant radio is as follows;

All Law Enforcement Agencies

Portable VHF Radios	\$1,028,520
Mobile VHF Radios	\$508,270
Base Stations	\$86,615
Marine Radios	\$64,285

Total Law Enforcement VHF \$1,687,690

All Fire Departments

Portable VHF Radios	\$2,828,420
Mobile VHF Radios	\$1,133,525
Dash Mount VHF Radios	\$89,205
Base Stations	\$147,755
VHF/800 Pagers	\$452,640
Total for Fire VHF	\$4,651,545

All EMS Agencies

Portable VHF Radios	\$604,310
Mobile VHF Radios	\$181,335
Base Stations	\$10,190
VHF/800 Pagers	\$93,840
Total EMS VHF	\$889,675
TOTAL VHF RADIOS	\$7,228,910

**The above pricing reflects State of Michigan pricing on radios and does not include any special offers, discounts, rebates, etc. The above pricing does not include vehicle installation costs.*

Assumes High End of Construction Costs

Option 1 Phase 1 - Improves Charlevoix County - Owns Towers

Boyne City Area	
Tower Build	\$ 600,000.00
Equip	\$ 300,000.00
East Jordan Area	
Tower Build	\$ 600,000.00
Equip	\$ 300,000.00
Melrose Township Area	
Tower Build	\$ 600,000.00
Equip	\$ 300,000.00
Total Charlevoix County	<u>\$ 2,700,000.00</u>

Phase 1 - Improves Cheboygan County - Owns Tower

Forest Waverly Area	
Tower Build	\$ 600,000.00
Equip	\$ 300,000.00
Total Cheboygan County	<u>\$ 900,000.00</u>

Phase 1 - Improves Emmet County - Owns Tower

Bliss Area	
Tower Build	\$ 600,000.00
Equip	\$ 300,000.00
Total Emmet County	<u>\$ 900,000.00</u>

Option 1	Phase 1 - Total - Owns Towers		\$ 4,500,000.00
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Option 2	Phase 1 - Improves Charlevoix County - Leases Towers		
	Boyne City Area		
	Tower Lease	5yr	\$ 61,800.00
	Equip		\$ 300,000.00
	East Jordan Area		
	Tower Lease	5yr	\$ 61,800.00
	Equip		\$ 300,000.00
	Melrose Township Area		
	Tower Lease	5yr	\$ 61,800.00
	Equip		\$ 300,000.00
	Total Charlevoix County		<u>\$ 1,085,400.00</u>
	Phase 1 - Improves Cheboygan County - Leases Tower		
	Forest Waverly Area		
	Tower Lease	5yr	\$ 61,800.00
	Equip		\$ 300,000.00
	Total Cheboygan County		<u>\$ 361,800.00</u>
	Phase 1 - Improves Emmet County - Leases Tower		
	Bliss Area		
	Tower Lease	5yr	\$ 61,800.00
	Equip		\$ 300,000.00
	Total Emmet County		<u>\$ 361,800.00</u>
Option 2	Phase 1 - Total - Leases Towers		\$ 1,809,000.00
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	Phase 2 - Costs Related to Future Narrowbanding		
	Phase 2 - Total		<u>\$ 1,810,000.00</u>
			<hr/> <hr/>
	Phase 3 - Radio Costs		VHF
	CCE911		
	Radios		
	Law		\$ 1,687,690.00
	Fire		\$ 4,651,545.00
	EMS		\$ 889,675.00
	Total Radio Costs		<u>\$ 7,228,910.00</u>
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Total Infrastructure Costs	
Assuming Option 1 - Owns Towers	\$ 6,310,000.00

Total Infrastructure Costs	
Assuming Option 2 - Leases Towers	\$ 3,619,000.00



Total VHF Project Costs	
Assuming Option 1 - Own Towers	\$ 13,538,910.00

Total VHF Project Costs	
Assuming Option 2 - Lease Towers	\$ 10,847,910.00

COST ESTIMATE TO CHANGE RADIO SYSTEM TECHNOLOGY TO 800 MHz RADIO SYSTEM

The coverage study conducted by the MPSCS and confirmed by 911 staff through a follow up field study identifies coverage of 98.4% in the CCE service area by the existing MPSCS 800 MHz system. The study graded the reliability of coverage of the MPSCS 800 radio system along with the voice quality and signal reliability of the system. The Michigan State Police radio testing team and 911 team spent several days in Charlevoix, Cheboygan and Emmet Counties doing field tests to confirm coverage results. Although the study identified 98.4% coverage, there are areas of weak and unreliable signal coverage that were identified during the field test that will require infrastructure investment to improve coverage. These areas were primarily in the City of Charlevoix (mostly in buildings), areas around the Village of Alanson and points along Interstate I-75 North of the Wolverine area caused by topography. There were relatively few areas where portable radio coverage was unreliable in "Receive" mode, meaning hearing transmissions from dispatch, the weaknesses occurred in the "Talk Back" mode when trying to communicate with dispatch or other field units. Infrastructure upgrades projected to be needed to address coverage gaps in the identified area consist of new tower construction or leasing space on existing towers owned by other entities and adding necessary equipment.

The following information provides budgetary numbers based on State of Michigan pricing provided to CCE 911 from the regional Motorola Manufacturer Representative and the Motorola Regional Sales Representative to address coverage issues. It is noted that a detail engineering study would need to be conducted to provide estimated coverage improvement

projections prior to construction. It is also noted that a study provides a projection of coverage improvements and cannot guarantee coverage correction under all circumstances. Budgetary numbers are presented below in phases.

Phase 1.A, 1.B, – Additional 800 MHz Communications equipment of new tower construction to enhance coverage and ongoing maintenance costs for 800 communications equipment at current MPSCS Tower sites and proposed additional 800 Tower sites (demonstration of 1 year, 5 year and 10 year costs)

Phase 2 – Additional 800 MHz channel resources will need to be added to the MPSCS tower system to accommodate the increase radio and paging communication traffic throughout Charlevoix, Cheboygan and Emmet County areas

Phase 3 – Replace existing agency’s current field radios (portable and mobile) with 800 MHz radio system

Phase 1.A – Improves Charlevoix County

Through radio tests and preliminary discussions with radio industry experts it has been determined that the following geographic sites will require new tower sites/radio system infrastructure with both 800 radio send and receive voice and paging capabilities.

- City of Charlevoix, Charlevoix County

The above identified site would require either adding 800 MHz communications gear to existing Tower sites, the construction of new Tower sites or a lease option on an existing tower site.

Option 1

Presented in discussion was the addition of what is called a “Tower in a Box”, it is considered a self-contained site that is fully integrated complete 800 MHz site with extra channel resources in the City of Charlevoix area. While this has not been deployed in Michigan it was presented to staff as an alternative solution to provide 800 MHz coverage in the City of Charlevoix area. While we have not received an official quote, the estimated budgetary cost of this is approximately \$345,000.

Option 2

Addition of two Tower Top Amplifiers (TTA) to be located on the existing MPSCS East Jordan tower site (7809) and an administration building within the City of Charlevoix to provide improved 800 MHz coverage over the City of Charlevoix and area. The cost of adding the TTAs to site 7809 and an administration building is approximately \$35,000 each for a total of \$70,000. Along with adding the TTAs, it would be recommended to add bi-directional 800 MHz antennas into the City of Charlevoix administrative building and to the Charlevoix County administrative building at a cost of approximately \$50,000 for each building site for a total of \$100,000.

Based on the information we have received at this time, we believe that this site would offer the best coverage and resources for 800 MHz in the City of Charlevoix area.

Phase 1.B – Improves Cheboygan County

Through radio tests and preliminary discussions with radio industry experts it has been determined that the following geographic sites will require new tower sites/radio system infrastructure with both 800 radio send and receive voice and paging capabilities.

- Village of Alanson area
- Interstate I-75 north of the Wolverine area

Anticipated cost estimates for the necessary 800 MHz communications equipment for the CCE owned Topinabee Tower site is approximately \$900,000. ** This includes repeaters, receivers, mux, antennas, cables, programming, GPS clocks, etc. All of this equipment would be compliant with the Michigan Public Safety Communications as required.*

It is possible (and has been proposed) that the above identified site would require adding 800 MHz communications gear to the existing CCE owned Tower site and that this communication gear could utilize CCE’s current microwave system from tower to tower. If this is an approved application, it is possible that approximately \$150,000 would be realized in cost savings on Phase 1.B.

Below is an estimate of ongoing and future costs to maintain/support the 800 MHz communications equipment for fully integrated monitoring by the MPSCS as part of their system network.

Estimated Radio maintenance for current and proposed equipment per year	\$5,500
Estimated Radio maintenance for current and proposed equipment for 5 years	\$27,500
Estimated Radio maintenance for current and proposed equipment for 10 years	\$55,000

Phase 2 – Additional 800 MHz Channel Resources

Transitioning from our current VHF radio platform to the MPSCS 800 will require additional 800 MHz channel resources to be added to the current MPSCS tower system within Charlevoix, Cheboygan and Emmet Counties. In March of 2017, the MPSCS updated the number of channels needed to support the system from six (6) at an estimated cost of \$50,000 each to eleven (11) at an estimated cost of \$133,182 each. The budgetary expense numbers for eleven (11) additional channel resources totals \$1,465,002.

CCE Channel Requirements for MPSCS	
Date: 3/17/2017	
Site	Number of Channels
7202	0
7203	1
7205	1
7802	1
7803	1
7804	2
7805	1
7806	0
7808	1
7809	1
7901	1
7206	0
7304	1
Total	11

Phase 3 – Subscriber 800 MHz Radios

The 800 radios that are currently being recommended for use by the various Public Safety agencies will work on the existing Michigan Public Safety Communication System (MPSCS).

It should be noted that 800 MHz radios being proposed are fully digital and P25 compliant by FCC standards to be eligible for various grant funds. This includes all portable radios, mobile radios and pagers.

The estimated cost to switch all agencies to an 800 MHz radio that is P25 FCC compliant is as follows;

All Law Enforcement Agencies

Portable 800 MHz Radios	\$1,028,520
Mobile 800 MHz Radios	\$508,270
800 MHz Base Stations	\$86,615
800 MHz Marine Radios	\$64,285
Total Law Enforcement Radios	\$1,687,690

All Fire Departments

Portable 800 MHz Radios	\$2,828,400
Mobile 800 MHz Radios	\$1,133,525
Dash Mount 800 MHz Radios	\$89,205
800 MHz Base Stations	\$147,755
VHF/800 Pagers	\$452,640
Total for Fire Department Radios	\$4,651,545

All EMS Agencies

Portable 800 MHz Radios	\$604,310
Mobile 800 MHz Radios	\$181,335
800 MHz Base Stations	\$10,190
VHF/800 Pagers	\$93,840
Total EMS Agency Radios	\$889,675
TOTAL 800MHz RADIOS	\$7,228,910

**The above pricing reflects State of Michigan pricing on radios and does not include any special offers, discounts, rebates, etc. The above pricing does not include vehicle installation costs.*

Phase 1.A - Improves Charlevoix County

Option 1	Charlevoix County		
	Infrastructure		
	Tower in a Box		\$ 345,000.00
Option 2	Charlevoix County		
	Infrastructure		
	Tower Top Amplifier	<i>EJ Site 7809</i>	\$ 35,000.00
	Tower Top Amplifier	<i>NEW - City Admin</i>	\$ 35,000.00
	Bi-Directional Antenna	<i>City Admin Bldg</i>	\$ 50,000.00
	Bi-Directional Antenna	<i>County Admin Bldg</i>	\$ 50,000.00
			\$ 170,000.00

Phase 1.B - Improves Cheboygan County

Cheboygan County		
Infrastructure		Up to
Retrofit Existing Topinabee Tower		\$ 750,000.00
To MPSCS Specs		\$ 150,000.00
		\$ 900,000.00

Required MPSCS Monitoring of CCE 911 Owned Site

	Cheboygan County	<i>Topinabee Site</i>	
\$ 5,500.00	Annually	5yr	\$ 27,500.00

Phase 2 – Required Channel Resources

\$ 1,465,002.00

Phase 3 - Radio Costs

800 Mhz

CCE911

Radios

Law

\$ 1,687,690.00

Fire

\$ 4,651,545.00

EMS

\$ 889,675.00

Total Radio Costs

\$ 7,228,910.00

Total Infrastructure Costs

Assuming Option 1 - Tower in a Box

\$ 2,737,502.00

Total Infrastructure Costs

Assuming Option 2 - TTAs/BDA's

\$ 2,562,502.00

Total 800 Project Costs

Assuming Option 1 - Tower in a Box

\$ 9,966,412.00

Total 800 Project Costs

Assuming Option 2 - TTAs/BDA's

\$ 9,791,412.00

CONCLUSION

Based on the review of maintaining the current VHF system or moving to an 800 MHz system; this report concludes that moving to the 800 MHz system will provide the best radio system to serve the public within the CCE 911 service area. The 800 MHz system provides the following:

- System security
- Mission critical communication
- Voice clarity
- Interoperability
- 98.4% coverage
- Continuity of communications in dispatch
- System upgrades by State
- P25 compliant
- Technical support/monitoring 24/7 by State
- No congestion issues (narrowbanding N/A)

RECOMMENDATION

- **It is recommended by the Radio Study Committee that the CCE Board of Directors recommend to the Board of County Commissioners in Charlevoix, Cheboygan and Emmet Counties to implement a technology change to the 800 MHz Radio System and approve a funding option to implement this project.**

FUNDING OPTIONS

Two primary options are available to fund the estimated cost to transition to an 800MHz radio system. The options are:

- **A dedicated property tax millage**

And/or

- **An increase to the phone surcharge fee within the 911 service area.**

A detail review of funding options will be provided in a separate report for review by the Board of Commissioners in Charlevoix, Cheboygan and Emmet Counties.

Executive Summary

UPDATING THE CURRENT RADIO SYSTEMS IN THE TRI COUNTY (CCE) AREA FOR BETTER INTEROPERABILITY AND ADDRESSING SAFETY CONCERNS

PROBLEM:

In 1996 the new C.C.E. Central Dispatch Authority (CCE) system went operational with the latest in technology utilizing Very High Frequency (VHF) radio technology. Narrowbanding was ordered by the FCC due to the limited availability of channels due to usage resulting in channel congestion. The FCC ordered the first round of narrowbanding resulting in channel width being reduced from 25 kHz to 12.5 kHz which was completed in 2013. Narrowbanding resulted in the loss of radio coverage in the C.C.E. service area requiring system upgrades to try and re-establish communication strength and reliability. Improvements since 2013 have resulted in improving limited areas within the service area. C.C.E. 911 has expended \$600,000.00 to upgrade the system to make it usable and account for FCC regulations (Clark, 2016). The FCC is again looking into another narrowbanding requirement reducing channel width to 6.25 kHz though the date has not been set (Bercovici, 2006). According to information obtained by Telerad, it appears probable that within four to seven years it could come to fruition (Kooyers, 2016). This would require additional funds to be spent to comply with FCC regulations and again attempt to re-establish communications strength and reliability. Additional narrowbanding is also projected to make portables, mobiles, and paging, base-station and repeater radios obsolete, resulting in a loss of additional coverage or capacity (Security, 2011). Even with projected future upgrades to the VHF system, interoperability among agencies in the CCE area is minimal at best and among regional and state agencies is non-existent.

The question is: With the reality of narrowbanding being implemented in the near future do we transition to the 800MHz system or invest in upgrades to the VHF system.

POSSIBLE SOLUTIONS:

- Transition to the 800MHz radio system

Phase 1.A - Improves Charlevoix County

Option 1	Charlevoix County	\$ 345,000.00
	Tower in a Box	

Option 2	Charlevoix County	\$ 170,000.00
	Tower Top Amplifiers / Bi-Directional Antennas	

Phase 1.B - Improves Cheboygan County

Cheboygan County	\$ 900,000.00
-------------------------	----------------------

Required MPSCS Monitoring of CCE 911 Owned Site

\$ 5,500.00	Cheboygan County	<i>Topinabee Site</i>	\$ 27,500.00
	Annually	5yr	

Phase 2 - Required Channel Resources

\$ 1,465,002.00

Phase 3 - Radio Costs

CCE911	800 Mhz	
Total Radio Costs	\$ 7,228,910.00	

Total 800 Project Costs

Assuming Option 1 - Tower in a Box	\$ 9,966,412.00
---	------------------------

Total 800 Project Costs

Assuming Option 2 - TTAs/BDAs	\$ 9,791,412.00
--------------------------------------	------------------------

- Keep and maintain the current VHF system which will include network patching, future towers, and a transition to new VHF radio systems equipment

Option 1	Phase 1 - Improves Charlevoix County - Owns Towers	
	Total Charlevoix County	\$ 2,700,000.00
	Phase 1 - Improves Cheboygan County - Owns Tower	
	Total Cheboygan County	\$ 900,000.00
	Phase 1 - Improves Emmet County - Owns Tower	
	Total Emmet County	\$ 900,000.00
	Phase 1 - Total - Owns Towers	\$ 4,500,000.00
Option 2	Phase 1 - Improves Charlevoix County - Leases Towers	
	Total Charlevoix County	\$ 1,085,400.00
	Phase 1 - Improves Cheboygan County - Leases Tower	
	Total Cheboygan County	\$ 361,800.00
	Phase 1 - Improves Emmet County - Leases Tower	
	Total Emmet County	\$ 361,800.00
	Phase 1 - Total - Leases Towers	\$ 1,809,000.00
	Phase 2 - Costs Related to Future Narrowbanding	
	Phase 2 - Total	\$ 1,810,000.00
Phase 3 -	Radio Costs	
	CCE911	VHF
	Total Radio Costs	\$ 7,228,910.00
	Total VHF Project Costs	
	Assuming Option 1 - Own Towers	\$ 13,538,910.00
	Total VHF Project Costs	
	Assuming Option 2 - Lease Towers	\$ 10,847,910.00

RECOMMENDATIONS:

- It is recommended by the Radio Study Committee that the CCE Board of Directors recommend to the Board of County Commissioners in Charlevoix, Cheboygan and Emmet Counties to implement a technology change to the 800 MHz Radio System and approve a funding option to implement this project.
- It is recommended the CCE Board of Directors allow staff to begin contract discussions with the MPSCS and to prepare an RFP to obtain future quotes from vendors for the necessary equipment to transition to an 800 MHz system in Charlevoix, Emmet and Cheboygan Counties for all emergency responders within.

Robt Brady on behalf of *Michael Cain* Approved Not Approved

Chair CCE Board of Directors

Works Cited

911, C. (2015).

Bercovici, M. (2006). *FCC Narrowbanding Mandate*. IAFC.

Clark, G. (2016, August 15). Assistant Director CCE. (T. Cook, Interviewer)

FEMA. (2016, November 09). *Incident Command System Resources*. Retrieved from FEMA:
<https://www.fema.gov/incident-command-system-resources>

Justice, U. D. (2006, March). *Communications Interoperability Basics for Practitioners* .
Retrieved from <http://www.ojp.usdoj.gov/nij>

Kooyers, M. (2016, August 15). President Telerad. (T. Cook, Interviewer)

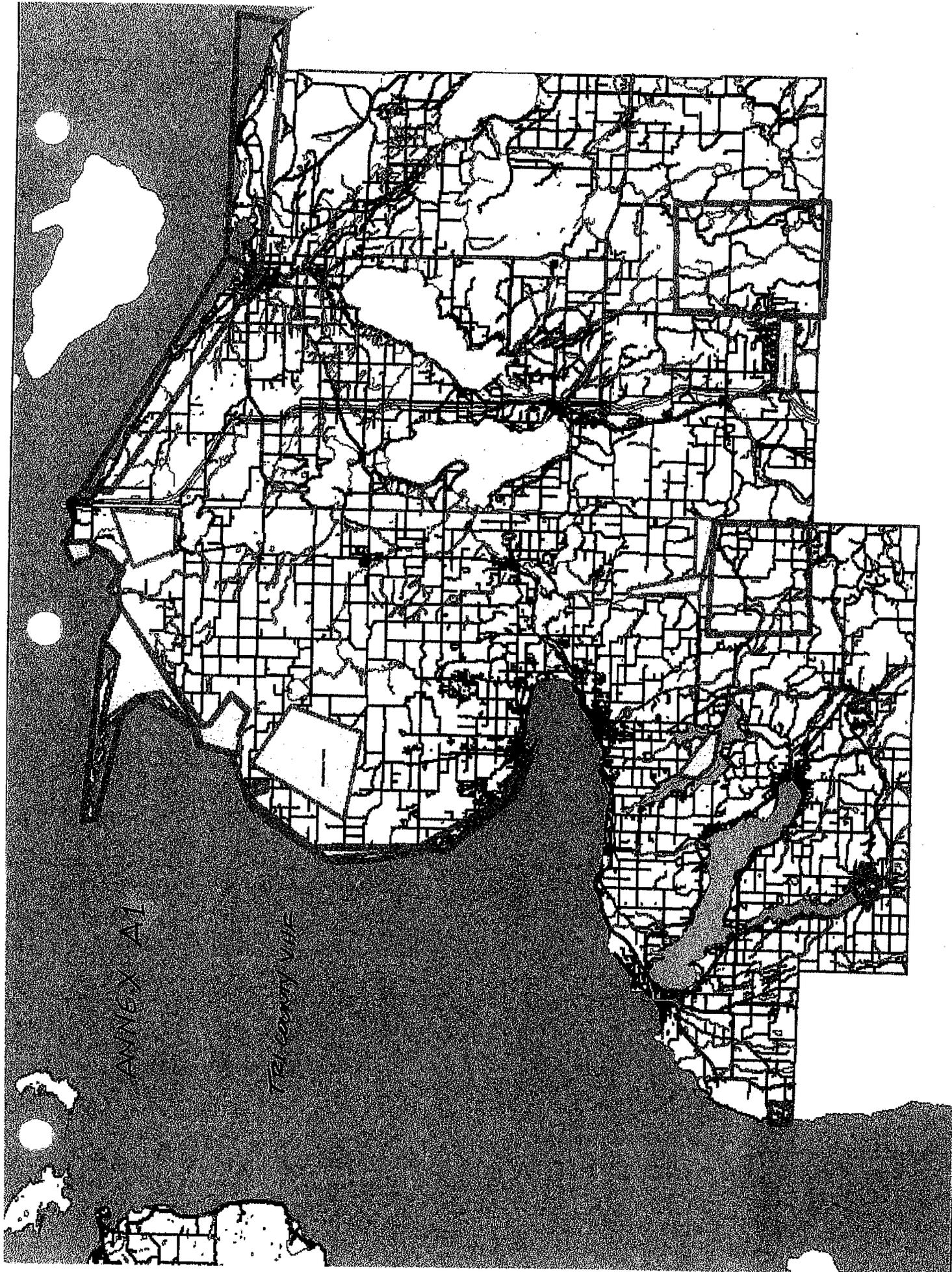
Michigan State Police. (2015).

Security, H. (2011, March). *A Practical Guide to Narrowbanding*. Retrieved from
<http://www.ok.gov.gov/homeland/documents/OECNarrowbandingGuide>

Stoddard, B. (2016). Michigan's Public Safety Communications System.

ANNEX A1

TRI COUNTY VHF



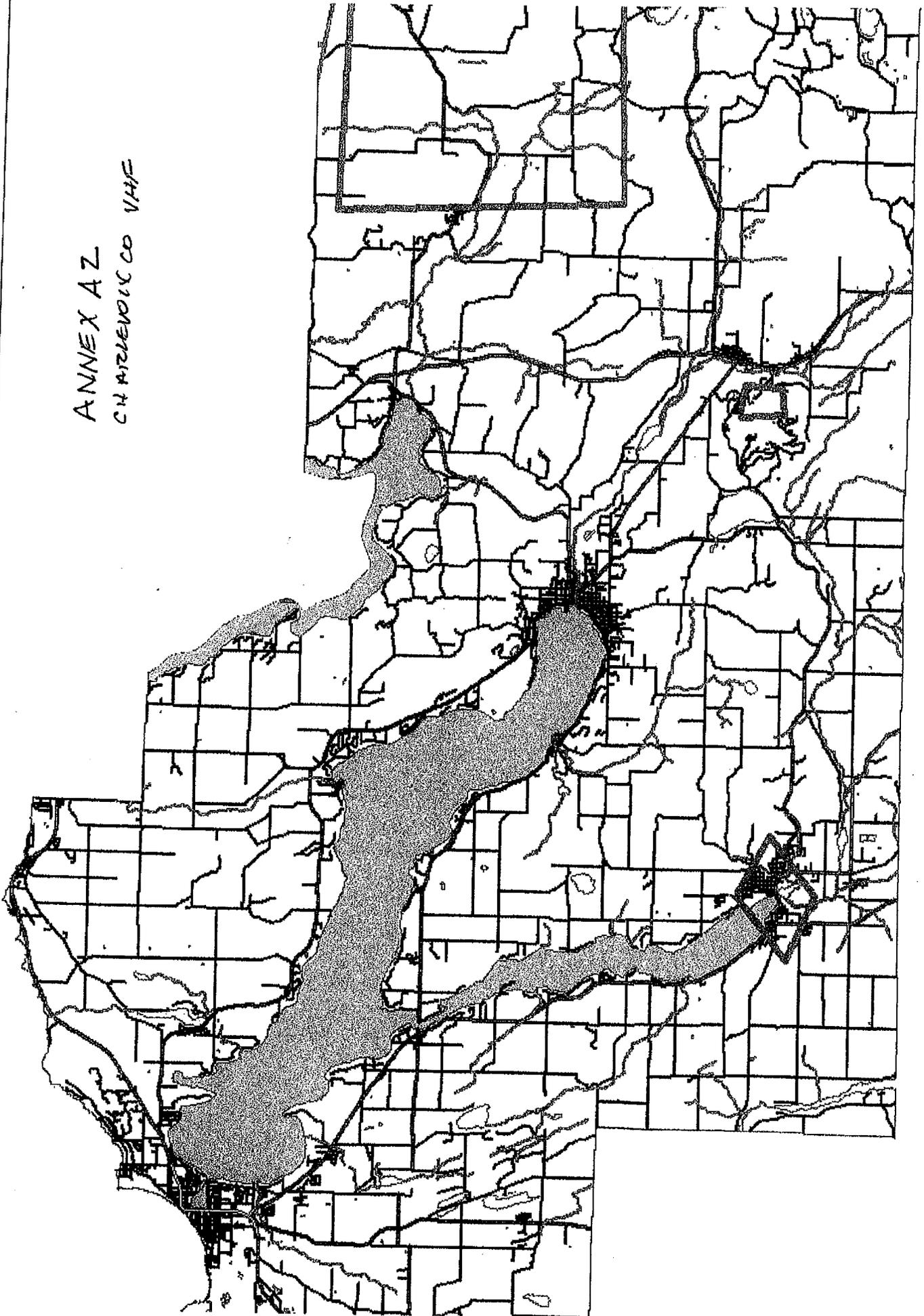
ANNEX A1

TELECOMM UNIT

ANNEX A2

CHARLEVOIX CO VHF

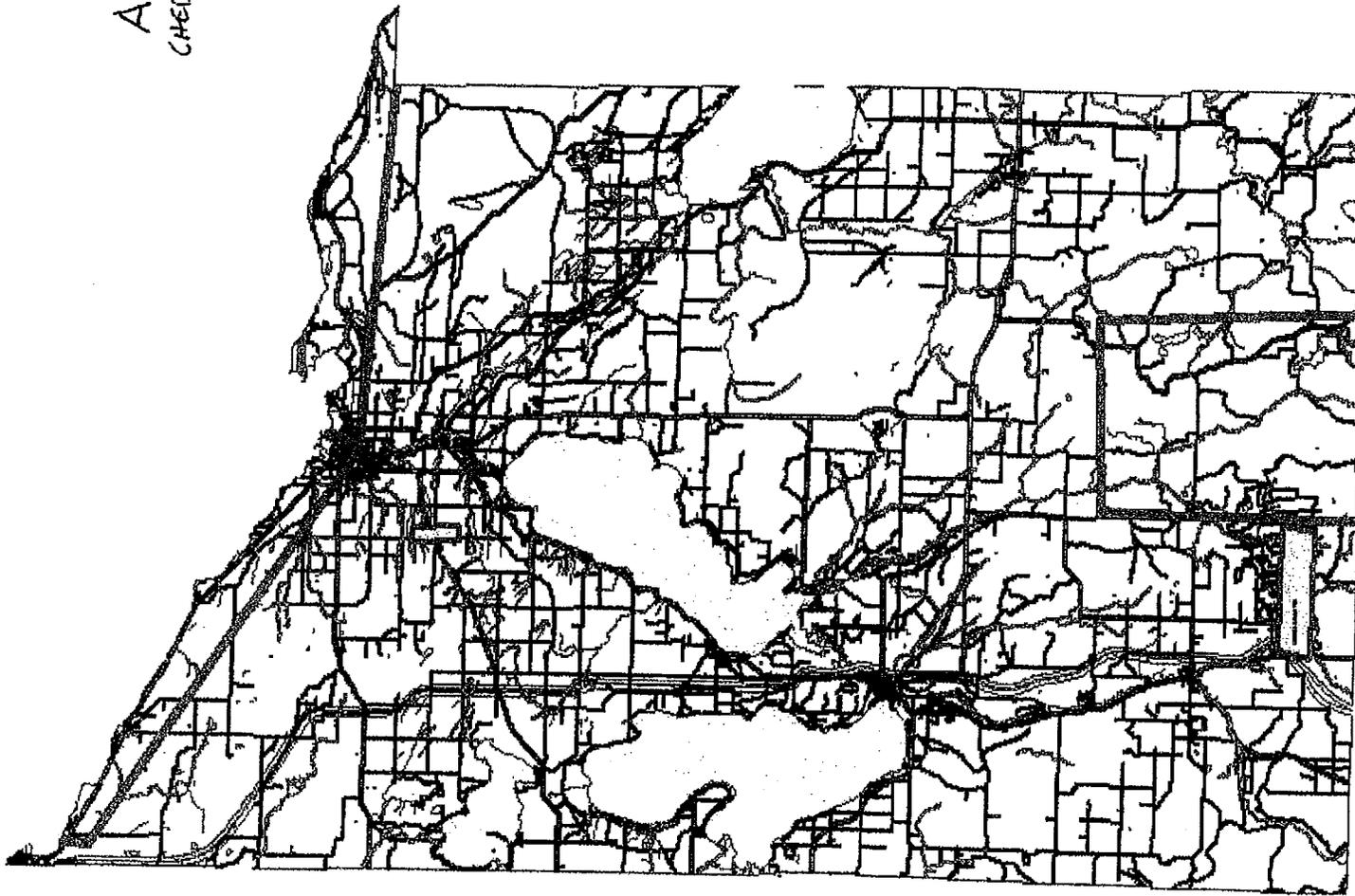
ANNEX AZ
CHARRIENOUX CO VME



ANNEX A3

CHEBOYGAN CO VHF

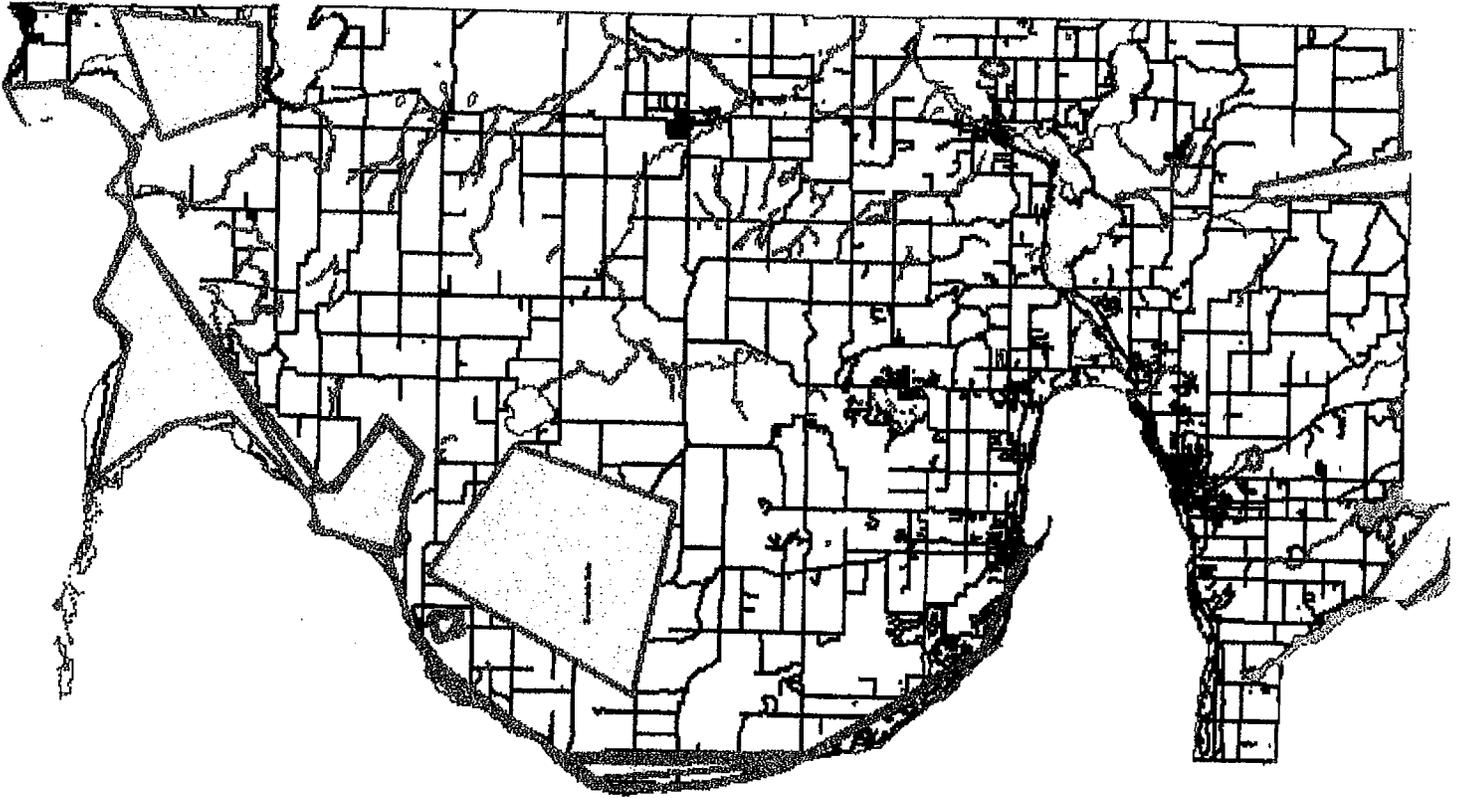
ANNEX A3
CHEBOYGAN CO VHF



ANNEX A4

EMMET CO VHF

ANNEX A41
EMMET CO VEH

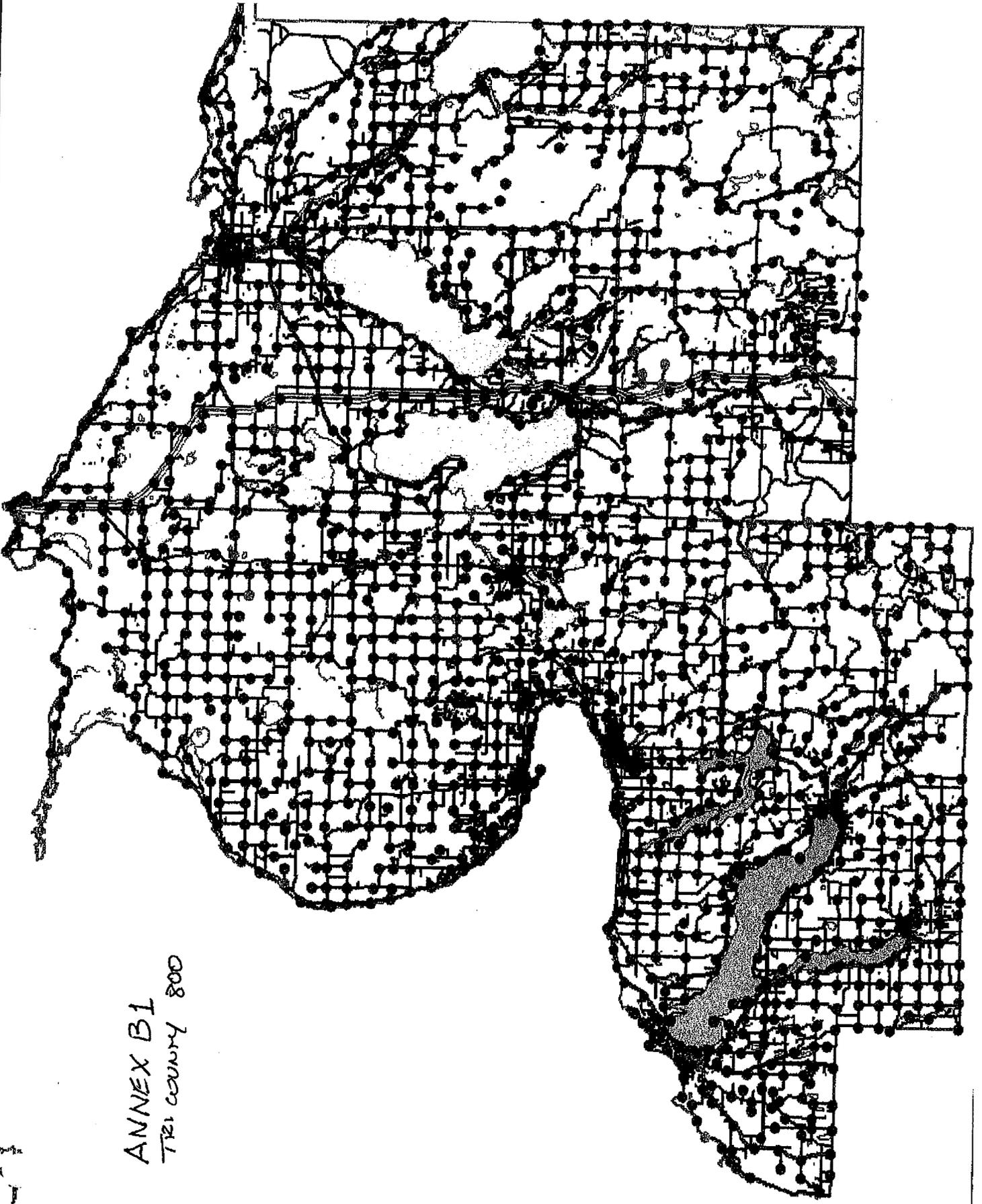


ANNEX B1

TRI COUNTY 800

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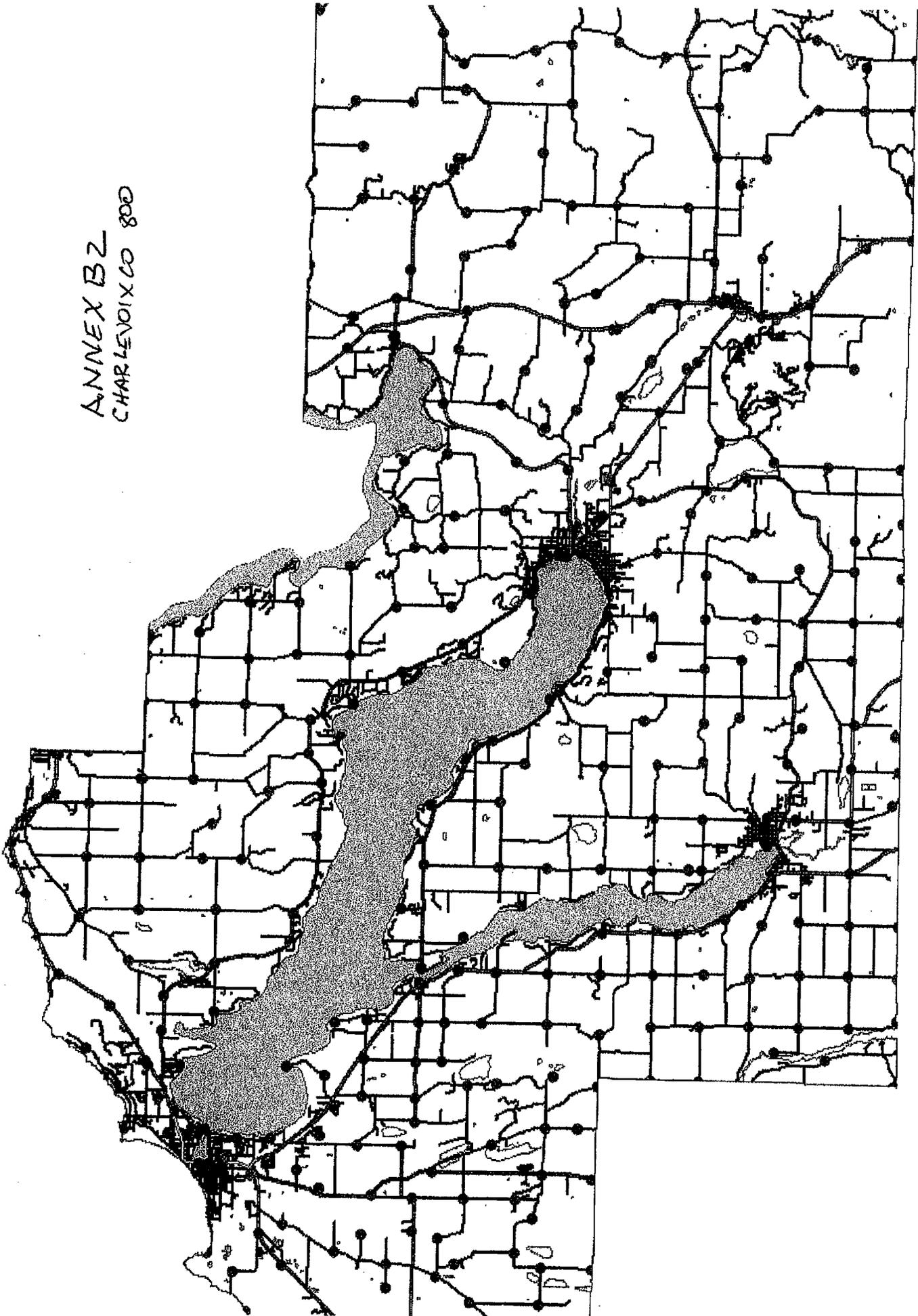
ANNEX B1
TRI COUNTY 800



ANNEX B2

CHARLEVOIX CO 800

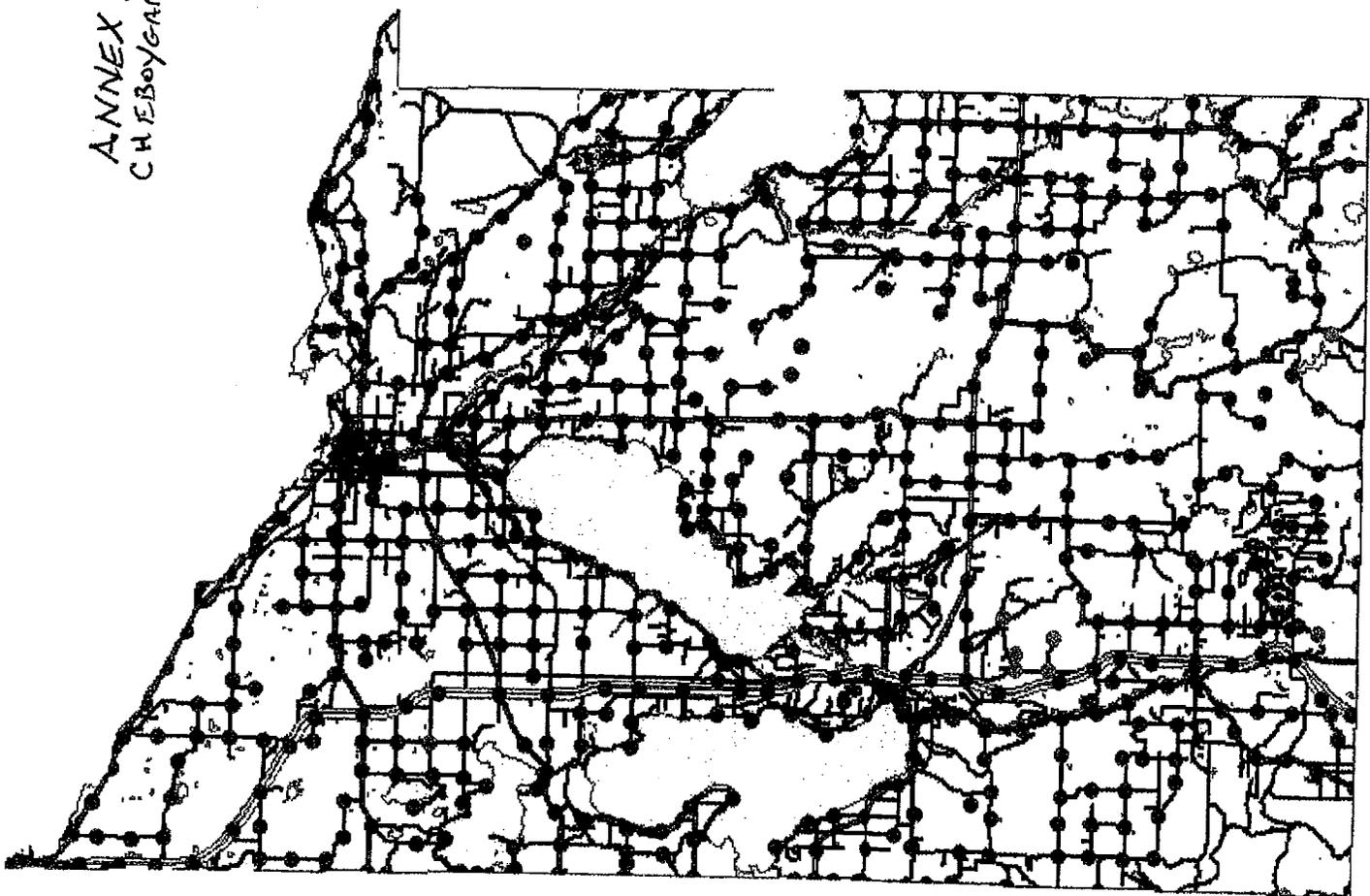
ANNEX BZ
CHARLEVOIX CO 800



ANNEX B3

CHEBOYGAN CO 800

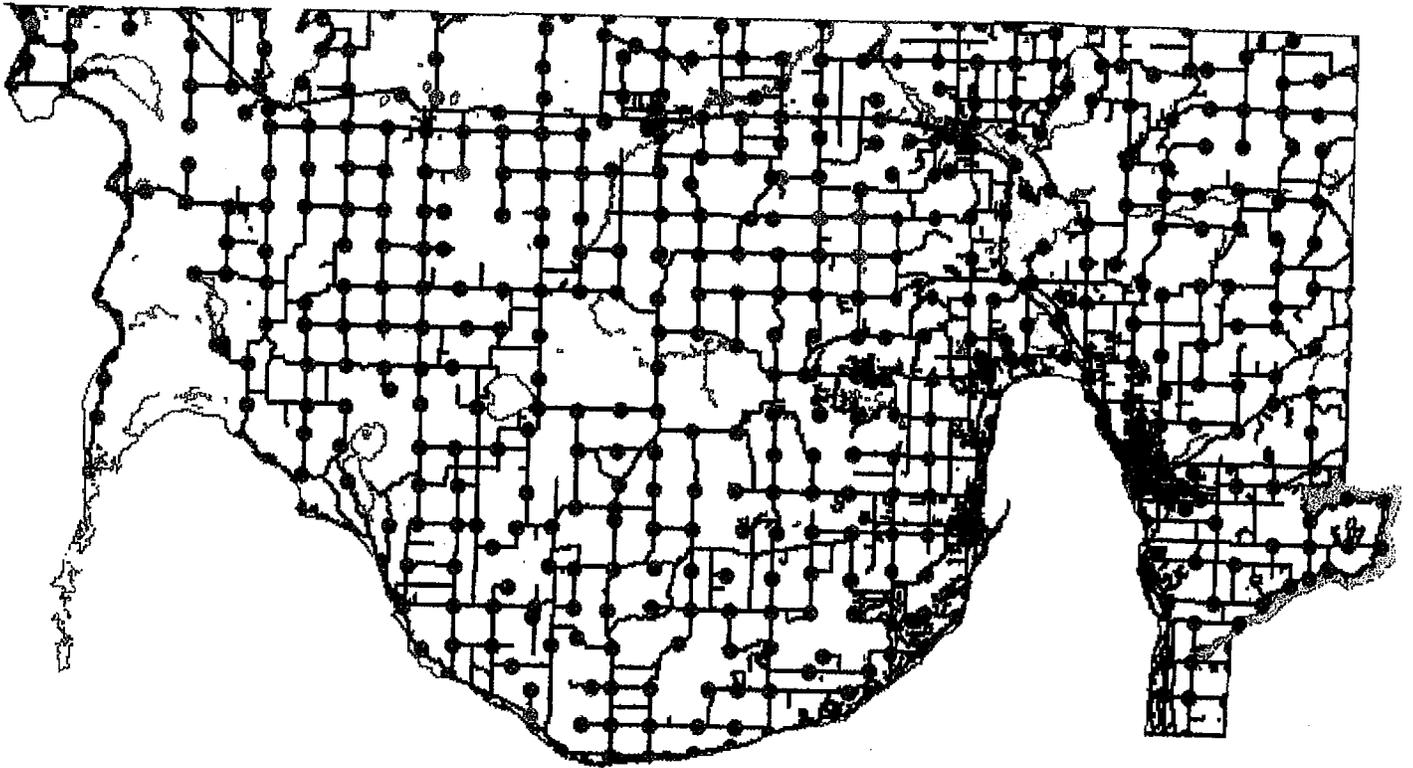
ANNEX B3
CHEBOYGAN CO 800



ANNEX B4

EMMET CO 800

ANNEX B4
EMMET CO 800



ANNEX C

MICHIGAN'S PUBLIC SAFETY COMMUNICATIONS SYSTEM



ANNEX C

Michigan's Public Safety Communications System

It's not just a radio. It's a partnership.

FACT SHEET

The importance of the MPSCS

The Michigan's Public Safety Communications System (MPSCS) is not just a radio. It's a partnership.

The system:

- Spans 59,415 square miles
- Serves more than 1,468 federal, state and local public safety agencies.
- Includes 244 tower sites with more than 50 state and local public safety dispatch centers and a network communication center that serves more than 68,000 radios.
- P25 compliant Motorola Smartzone 7.13 trunked communication system.
- Operates on the 800/700 MHz frequency range.
- An 800 MHz Mutual Aid system at 180 of 244 sites across the state provide further interoperability and a backup to the trunked system.
- Provides border interoperability with Indiana, Ohio and Wisconsin
- The Network Communications Center (NCC) is staffed 24x7x364 providing system monitoring, prompt response to failures, assignment and activation of interoperable talkgroups, and technical support for Michigan's first responders.

System Security

- Member agencies control the use of their proprietary talkgroups. Sharing of proprietary talkgroups between agencies requires the approval of the agency that controls the talkgroup.
- Strict control of the system key has been established; the system key is required to program a radio for use on the system. By doing so, we insure that no unauthorized radio can use the system.
- The system is compatible with DES-XL, DES-OFB, AES and ADP radio encryption. Over the Air Rekeying (OTAR) is available for most encryption schemes.

Emergency Communication

- The system is designed to provide multiple levels of disaster recovery in the event of a connection or hardware failure.
- If an individual site loses connectivity to the system, the site reverts to "Site Trunking". During "Site Trunking", subscriber units will look for adjacent sites with an acceptable signal level that still has wide area connectivity. For units that are unable to find an acceptable candidate, localized trunking operations are maintained by the site in "Site Trunking".
- Simulcast systems (multiple tower sites acting in unison) that lose connectivity to the wide area system will enter into a "Site Trunking" mode that continues to provide trunking operations for all sites in the simulcast system.
- Several deployable emergency resources are available including

*Numbers current as of December 2014

68,757

Mobile and Portable
Radios on the System

1,468

Federal, State and Local
Public Safety Agencies Served

244

Tower Sites

(64 sites are locally owned but integrated into the MPSCS)

55

911 Dispatch Centers
248 Console Positions

11

Million/Month Push-To-Talks

59,415

Square miles the Michigan's Public
Safety Communication System Spans



Michigan's Public Safety Communications System

It's not just a radio. It's a partnership.

FACT SHEET *continued*

a six channel trunked portable site, various gateways and convention resources for cross system and cross band interoperability, and satellite platforms for phone and data connections.

- Emergency caches of radios are strategically positioned across the state and can be deployed in an emergency.
- MPSCS staff includes COMTs, radio technicians, and radio engineers that are available to assist any member agency with an emergency deployment.

Interoperability

- MPSCS provides interoperability between local, state, federal and private first responders.
- We also support interoperability with legacy and non-standards-based systems through gateways and patches.
- All radios on the system contain event talkgroups which can be reserved and activated when required. Event talkgroups provide the capability for common talkgroups between all MPSCS radios.
- All radios on the system contain the 800MHz national interoperability channels for "off-system" interoperability.
- Agencies responding to emergencies or chases that span jurisdictional boundaries can easily coordinate on statewide or event talkgroups by switching talkgroups on their radio or via dispatchers through a console patch.
- In partnership with MSP EMHSD, we host the annual Michigan Statewide Interoperable Communication Training Conference.

Dispatch Services

- MCC 7500 dispatch consoles can be programmed to support your agencies specific needs. Including control of conventional resources, traditional two tone fire paging, as well as 800 alert paging and console resource patching, which simplify operations and enhance efficiencies.
- In the event of overflow or dispatch center evacuation, member agencies can have dispatch redundancy at another member's location in as little as 30 seconds. By simply loading a console configuration, a backup dispatch location can have full dispatch capabilities.
- The MPSCS 800 alert paging solution for fire station alerting is available to provide a single system solution.
- Console Aliasing is available allowing local control of radio ID naming for display on dispatch consoles. Instead of radio IDs being displayed when a unit

transmits, aliasing allows dispatch centers to link a user name or unit ID to the radio ID, allowing dispatchers to quickly see who is calling, saving time when it counts.

Financial Overview

- One common question is who owns the infrastructure? The state of Michigan owns 180 of the MPSCS sites. The other 64 sites remain the property of the municipality, county or agency that purchased it. Agencies that provide infrastructure when joining the system receive credit for that infrastructure but retain ownership.
- MIC fees, subscriber fees and user fees all refer to the same thing - the MPSCS fee structure. More information on our current fee structure can be found under policies and procedures at michigan.gov/MPSCS.
- MPSCS biannually performs system upgrades if a system component - the magic black box - is no longer supported or doesn't meet specifications. It's upgraded at no charge to our members. Thus, users are provided with newer technology without the aggravation of securing additional funds.

MPSCS Remediation (Lifecycle) Project

- The Lifecycle Remediation Project will span 10 years and focus on remediating infrastructure equipment that is no longer supported across all 244 MPSCS sites. This effort will include microwave and 800/700 MHz RF equipment and will be accomplished in multiple phases over seven years. At no additional cost to the users.

Future

- Currently MPSCS is deploying an automatic vehicle location and automatic resource location system for state of Michigan agencies. The system will allow dispatch and command users to track both mobile and portable units. MPSCS has designed the system to support local users and plans to offer this service to our customers in the future.
- Advanced text messaging will allow users to efficiently send and receive freeform or canned text messages to and from subscribers radios or dispatch operators.
- MPSCS is helping to lead the effort to build a Michigan data exchange hub for public safety. The system will allow the efficient and secure sharing of CAD data between systems. The goal is to reduce incident response times and improved service to the citizens. This system could save each dispatch center the costs of creating individual CAD interfaces for partner agencies.



Michigan's Public Safety Communications System

It's not just a radio. It's a partnership.

GRAND TRAVERSE COUNTY Q & A's

Are there model migration plans for communities moving to the MPSCS from VHF?

- No migration is the same. Unique circumstances and situations make each one a little different, but Motorola and the MPSCS have experience with migrating hundreds over to the MPSCS. We will work with you to customize the migration to reduce operational impact to its minimum.

An overview of the maintenance and monitoring of the MPSCS

- A well-defined preventative maintenance plan is used to ensure the MPSCS sites and infrastructure are at optimal performance. Our trained staff fully supports the 800 MHz base stations, microwave, DC power plants, UPS, emergency generators, servers, towers, tower lighting, antenna systems, etc.
- The MPSCS Network Communications Center (NCC) continuously monitors the performance and readiness of the system core, more than 245 towers and dispatch consoles integrated into the MPSCS network using multiple diagnostic computers. The NCC is staffed 24x7x365 with senior-level technicians who have full management and control of the system. If an issue develops that cannot be resolved by the NCC staff remotely, they will contact the appropriate MPSCS shop or on-call staff to respond according to the established MPSCS emergency response plan. Continuous monitoring of the performance of the MPSCS by the NCC ensures Michigan's first responders have dependable communications as they provide service to Michigan's residents.

How does programming of the radios take place?

- Each radio requires a unique radio programming template (serial number and system identification) that must be provided by the MPSCS Radio Programming Unit. Most radio programming templates are sent by email to the local vendor or agency for installation into their subscriber radios using the appropriate radio manufacturer's programming software. An agency may also request that MPSCS program the template into the radio at the local MPSCS Radio Shop for a nominal fee.

Who constructs the templates and how are they maintained? What is the turnaround time?

- The MPSCS Template Design Unit is responsible for the design and construction of the radio programming templates. The design of an agency's communications plan and translation into an operational radio template design can take between 21 and 120 days, depending on complexity and

obtaining agreements from neighboring agencies when sharing Talkgroups. Once a template design is finalized and approved by the agency, the Radio Programming Unit constructs the individual radio programming template typically occurs within 21 days.

How is interoperability with VHF accomplished?

- This can be accomplished using gateways and patches.

Is there a strategic plan for the future of the system?

- MPSCS is deploying an automatic vehicle location and automatic resource location system for state of Michigan agencies. The system will allow dispatch and command users to track both mobile and portable units. MPSCS has designed the system to support local users and plans to offer this service to customers in the future.
- Advanced text messaging will allow users to efficiently send and receive free-form or canned text messages to and from subscriber radios or dispatch operators.
- MPSCS is helping to lead the effort to build a Michigan data exchange hub for public safety. The system will allow the efficient and secure sharing of CAD data between systems. The goal is to reduce incident response times and improved service to the citizens. This system could save each dispatch center the costs of creating individual CAD interfaces for partner agencies.
- MPSCS is getting closer to rolling out a 700/800 fire paging solution.

What are the user fees and how are they structured?

- The fee structure is available on our web site: www.michigan.gov/mpscs.
- Most radios are operating at the "full" service level (\$16.67 per month with unlimited Talkgroups) due to the extensive interoperability (Talkgroups) they program into their radios.

What is the status of the trial for 800 MHz paging?

- It is still under investigation. There may be situations where this will work well under specific and unique circumstances and operations. We are looking carefully at how this may impact the radio system capacity (i.e., GOS).



Michigan's Public Safety Communications System

It's not just a radio. It's a partnership.

GRAND TRAVERSE COUNTY Q & A's *continued*

What are the current capabilities of the existing infrastructure that we would utilize on a daily basis?

- Subscriber radios will automatically switch between towers without user intervention to maintain communications over a large service area. Missing calls due to poor coverage is minimized because the radios are continually looking for the best tower. This is critical during times of a pursuit or responding to emergencies.
- A properly designed radio template with multiple Talkgroups minimizes monitoring unnecessary voice traffic as typical encountered on a VHF or UHF repeater system.
- Interoperability during times of emergencies becomes critical and must be readily available within the radio templates. Normal communication is easily resumed when the event is stabilized.
- Reliability is a prominent capability of the system that benefits members. The MPSCS has multiple layers of automatic redundancy to mitigate technical issues. The tower sites are interconnected by microwave removing the frequent outage caused by Telco line failures. All sites have emergency generator, UPS and battery backup power that are tested weekly to ensure storms and other disturbances don't result in communications outages during power failures.

Can the system be overloaded?

- We regularly monitor radio traffic load and strive to maintain a 2 percent or better GOS. This is accomplished by adding channels to sites where the load is trending higher over time. Planning involves the collection of proposed radio traffic information provided by potential new users. This data is used to perform a traffic study to determine the optimal number of channels needed to support the new load.

Has the system ever been upgraded?

- Eleven system releases (major software and hardware upgrades) have been successfully implemented to stay current with emerging technologies since the MPSCS went live in 1997. All subscriber units have continued to operate during system upgrades without additional programming or updates due to the Project 25 standards.
- The MPSCS is currently operating at System Release 7.13. An upgrade to System Release 7.15 is planned for the fall of 2015.
- All system upgrades have been funded by the MPSCS.

What are some of the challenges when using MPSCS?

- Coverage expectations and requirements are sometimes difficult to quantify from new users. Our recommendation is always to test the system first to make sure it meets coverage requirements and expectations. The coverage that exists today is based on the number of towers and their locations. Coverage can be enhanced by adding system infrastructure (new towers) to improve wide-area coverage or adding bidirectional amplifiers to improve coverage in specific buildings. There are processes in place that allow the addition of new infrastructure to the system.

Why do some communities build up to a simulcast system?

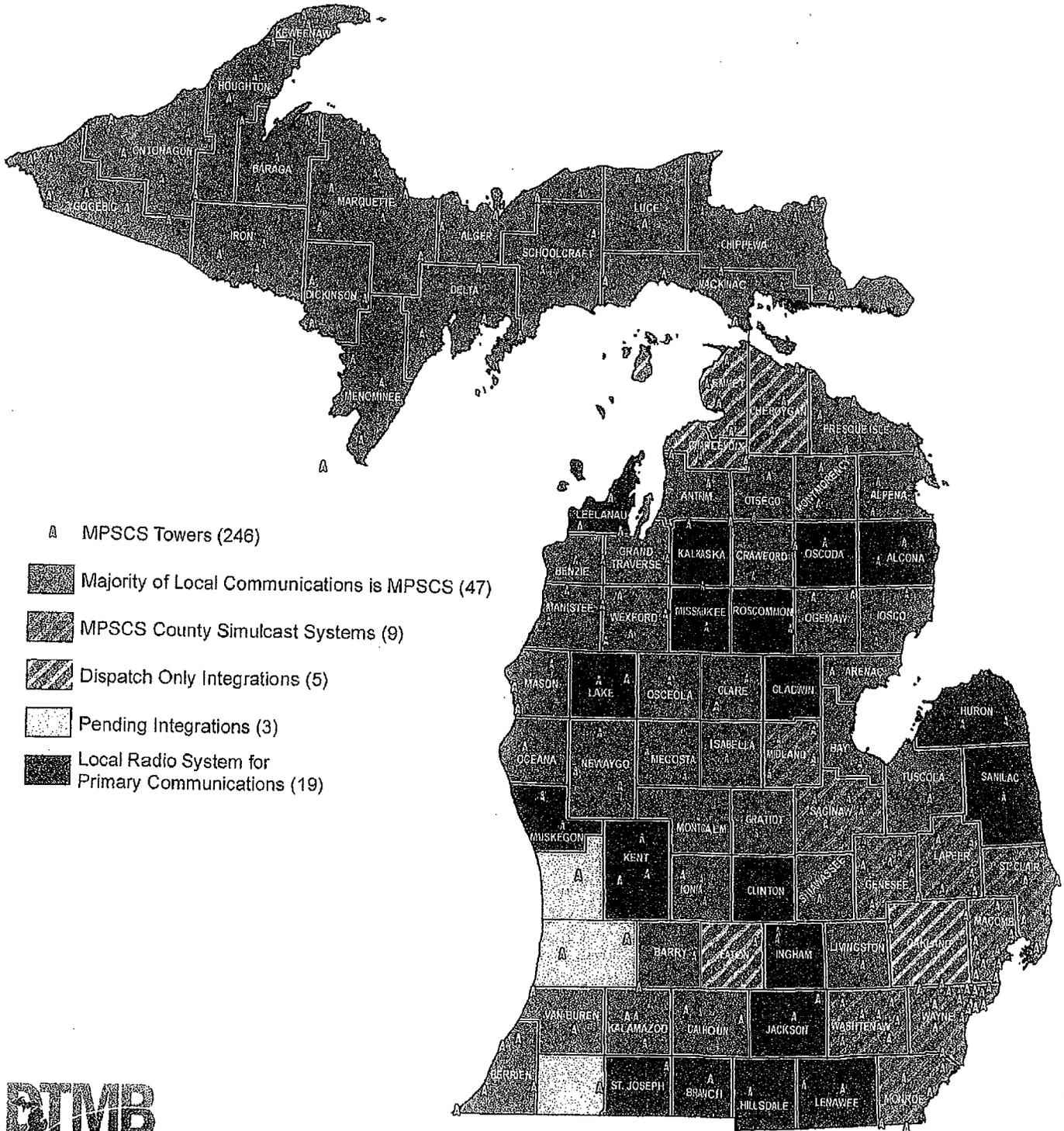
- Simulcast takes advantage of limited spectrum resources (e.g., 800 MHz spectrum) while improving radio coverage. Some communities have strict coverage requirements, including heavy in-building coverage. This drives up the number of towers needed. The quantity of potential users will drive the channel count high. These two factors can make simulcast the best choice, especially in areas where spectrum is limited, since each channel/frequency (800MHz frequency) in the simulcast system is reused at each site. Both multisite and simulcast will work well, and it will depend on the particular situation.

Have there been scanning difficulties?

- When using the Talkgroup scan feature, there is no guarantee that a user will hear all conversations on that Talkgroup. A call will not be routed to a tower unless there is a user affiliated to that tower. Scanned Talkgroups do not affiliate to the system. For example, if there are only two users affiliated to tower X on Talkgroup A and both are scanning Talkgroup B, neither will receive a call generated on Talkgroup B. The only way audio on Talkgroup B will be routed to tower X is if a radio on Talkgroup B becomes affiliated to tower X and enters this scenario. This is a characteristic of a wide-area multisite trunked system. Channel assignments for scanning can be forced; however, spectrum utilization efficiency is diminished. Simulcast systems will behave differently.



Michigan's Public Safety Communications System



A MPSCS Towers (246)

Majority of Local Communications is MPSCS (47)

MPSCS County Simulcast Systems (9)

Dispatch Only Integrations (5)

Pending Integrations (3)

Local Radio System for Primary Communications (19)

ANNEX D

MICHIGAN'S PUBLIC SAFETY COMMUNICATIONS SYSTEM

ANNEX D

Michigan's Public Safety Communications System

It's not just a radio. It's a partnership.

C.C.E. Central Dispatch Authority
October 24, 2016



DTMB

Michigan's Public Safety Communications System

- Michigan's statewide 800 MHz digital trunked radio communications network providing Public Safety and citizens with stable, secure, and reliable communications
- Providing interoperability between local, state, federal, tribal and private first responders
- Based on national standards and leading technology
- One of the largest and most mature P25 trunked communications systems in the world



DTMB



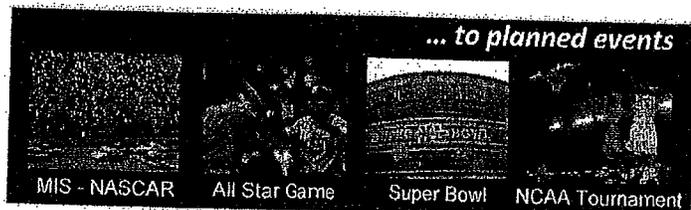
Service to Citizens

From unplanned emergencies:



- Increased/Enhanced interoperability for first responders
- Shared Services and Consolidation.
- Savings across government by reducing:
 - Parallel infrastructure
 - Multiple disparate radios
 - Operating costs
 - Hardware and software costs
 - Maintenance costs

... to planned events

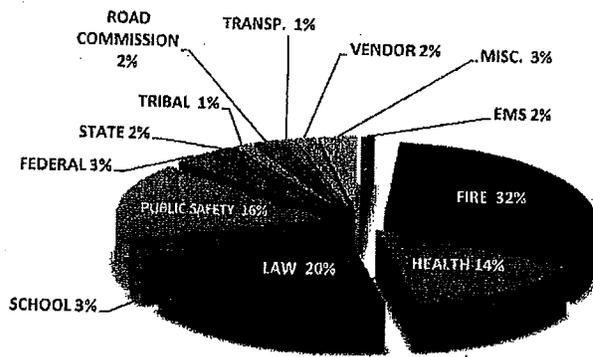


DTMB

Michigan's Public Safety Communications System



MPSCS Evolution From One to Many



Agencies	
EMS	24
Fire	487
Health	219
Law	308
Miscellaneous	45
Public Safety	251
Road Commission	29
School	39
State	25
Transportation	16
Federal	48
Tribal	22
Vendor	28
Grand Total	1,541

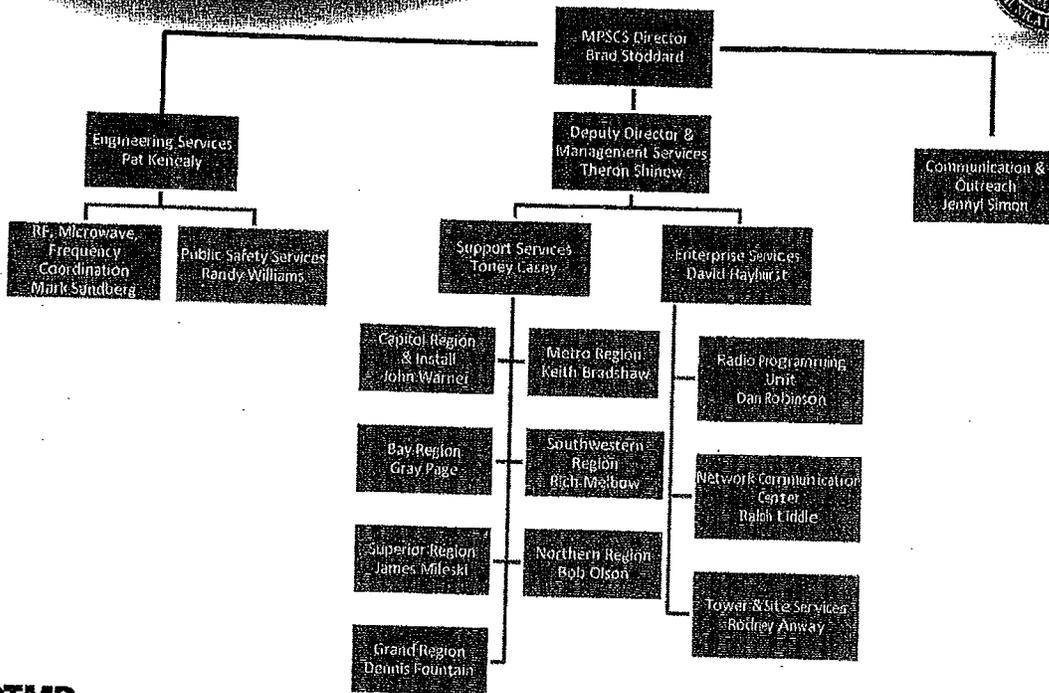
Radios Approved for System
 5 Mobile Manufacturers = 21 models
 7 Portable Manufacturers = 28 models

2002	September 2016
8,000 mobile and portable radios	78,460 mobile and portable radios (881% increase)
180 tower sites	247 tower sites (64 sites are locally owned but integrated into the MPSCS)
6 Dispatch Centers 38 console positions	68 Dispatch Centers (1033% increase) 270 console positions (610% increase)
2 million/month Push-To-Talks (PTT)	13 million/month Push-To-Talks (PTT) (550% increase)
152 agencies with interoperable voice and data communications	1,541 agencies with interoperable voice and data communications (914% increase)

DTMB

Michigan's Public Safety Communications System

Operations



BTMB

Michigan's Public Safety Communications System

5

New MPSCS Subscriber Fee Model – One-Time-Flat Rate Radio Fee

In the past, partners gain access to the MPSCS through an annual subscription fee - assessed per radio and tiered by the number of talkgroups

Old Plan

	Number of Radios	Cost Per Year	Total	10 Year Total
Example A	123	\$200/per radio	\$24,600/Year	\$246,000

The new structure makes membership in MPSCS more affordable and provides public service agencies with the greatest opportunity for interoperable radio resources, improved response and local agency support

New Plan

	Number of Radios	Cost Per Year	Total
Example A	123	One-time \$250	\$30,750

BTMB

Michigan's Public Safety Communications System

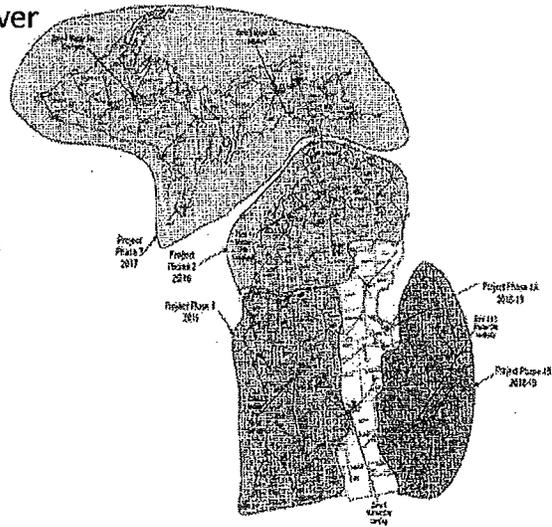
6



MPSCS

Remediation Project Phases

- Project will be completed in phases over multiple years from 2015 - 2022
- Minimal impact to users
 - Limited downtime (planned and communicated)
 - Does not impact subscriber radios
- State is funding the \$150M project through General Fund Appropriation



Michigan's forward-thinking strategy
Voice + Data = Interoperability

MPSCS Paging Solution

- Digital P25 audio is much clearer than narrow band analog fire paging audio
- Allows agencies to end maintenance responsibility and cost of a separate system
- Simplifies dispatcher process and reduces time needed to send critical messages





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August 15, 2016

CCE Central Dispatch/911 - MPSCS (Michigan Public Safety Communication System)
Proposed Radio System Project Discussion Points

Background

The FCC has passed down several mandates and dates for system changes regarding Public Safety radio over the past 15+ years. This included narrow banding the current VHF radio system utilized by CCE 911 and it's response agencies.

Dispatch Consoles

CCE Central Dispatch upgraded our radio console platform in 2013 to meet and exceed these requirements / mandates. A Motorola MCC7500 radio console was installed and with this a fully integrated interface into the MPSCS system was established. This interface allows full access to the MPSCS radio system as used throughout the State of Michigan. CCE 911 has successfully created both "fixed and manual patches" between our VHF and 800 radio systems, this allows broadcasting and communications on both types of radio systems. CCE 911's radio consoles are fully and operationally ready for a complete or partial conversion to the MPSCS 800 MHz radio system platform.

Response Agency's Field Radios

Currently the primary radios used by response agencies is a VHF platform. There is a mix of 800 MHz radios operating on the MPSCS system being used in the field, primarily the Michigan State Police and a few Law Enforcement and EMS agencies. Post Narrow banding, VHF radio coverage sustained estimated losses of 30% +/- as measured by portable talk back coverage (a field responder talking to dispatch on a handheld radio). In the CCE 911 coverage areas of Charlevoix, Cheboygan and Emmet Counties, this is compounded by our topography. 800 MHz radio coverage testing was completed in October 2015 in all three Counties (except Beaver Island) by the Michigan State Police, the results show an approximately 98.4 % coverage with portable radios.

A follow up review of coverage and additional testing on areas of concern throughout the three Counties were completed at the end of July 2016 to validate the MSP testing. The July testing did a comparison of our current VHF radio in a side by side test with 800 MHz radio.

Overall the July testing shows that the 800 MHz outperformed the current VHF radio system. Areas of review consisted of signal strength, clarity of voice, and reliability of coverage, the testing format was based on portable talkback.

Radio System Backbone

The current VHF system has been in use since CCE 911 went on the air in 1996 when CCE911 purchased some of their original equipment. Since 1996, upgrades have been made through the addition of primary and secondary (transmit or receive) tower sites across our three (3) Counties System to improve coverage issues. In addition in 2014 Simulcast and component upgrades were made in preparation of the FCC mandated narrow banding on the VHF system. Early estimates of diminished signal strength and coverage loss was severely underestimated (10-15%). Post narrow banding estimates are now 30-35% coverage loss (this does not take in to account our areas topography). Many adjustments have been made during and since narrow banding to deal with the degradation of coverage.

Tower Sites

Currently CCE 911 operates our primary VHF radio system on twenty-two (22) different tower sites located within Charlevoix, Cheboygan and Emmet Counties, of these sites thirteen sites are full transmit and receive (with Simulcast) for the various law and fire/EMS frequencies, the remaining nine (9) sites are a mix of transmit only or receive only, these sites were designed to fill in gaps to enhance radio coverage for law and fire/EMS frequencies.

Currently the MPSCS maintains twelve (12) tower sites (including the Mackinaw City site that is currently being under development) that provide 800 MHz coverage in Charlevoix, Cheboygan and Emmet Counties.

Technical Maintenance

The MPSCS 800 MHz radio platform is the current and future radio communications platform throughout the State of Michigan. Current and future Radio System upgrades and replacement of backbone equipment is the responsibility of the MPSCS. Future costs and expenses for local systems would only be for replacement hardware in dispatch where the computers are at end of life or have surpassed normal lifecycle operations. Field responder radios are the responsibility of local jurisdictions after the warranty and or replacement lifecycle has been exceeded. All system software upgrades in the future (minimum of eight (8) years) will be handled by MPSCS without additional costs to CCE 911.

Technical Operations

Converting to the MPSCS system would provide full interoperability locally, regionally, and for events such as major disasters, and MABAS (Mutual Aid Box Alarm System) activations – the system would be P25 compliant (Association of Public-Safety Communication Officials APCO Project 25).

While VHF radio coverage was optimized for our area of operations within Charlevoix, Cheboygan and Emmet Counties, today, our VHF radio coverage is not guaranteed outside of the County borders. 800 MHz radios will allow response agencies and dispatch to communicate with each other inside and outside of our three (3) County's borders as well with participating agencies as well as neighboring agencies from Counties around us.

Currently Interoperable Communications between agencies is cumbersome at best and can and does present officer safety hazards during events that cross jurisdictional boundaries. Interoperable Communications with outside responding agencies (State and Federal) are currently on large events.

The 800 MHz system would allow other agencies (i.e. Road Commission, Parks & Rec, Schools, Public Works, Transit Authorities, Health Departments etc.) the opportunity to convert their systems to 800 MHz using the infrastructure proposed. Many of these agencies like the Health Department operate across County lines currently.

Currently the MPSCS has 1,490 user agencies with 72,800 radios currently being used throughout the State of Michigan. Many of our Neighboring Counties are either currently using the 800 MHz for Law Enforcement (Antrim, Otsego, Mackinac, Presque Isle, Crawford, Grand Traverse, Roscommon, etc.) and these same Counties are in the various stages of reviewing 800 MHz for Fire and EMS (including 800 paging).

Cons

Currently we are hearing that 800 Paging is experiencing some areas of in-building coverage loss, this is expected to improve with future upgrades to the newly released 800 pagers.

The higher costs of 800 MHz field radios versus the VHF field radios that are currently being used.

Short term operations would continue to utilize a portion of the existing VHF system for Fire and EMS paging.

Financial

Pros

Motorola has offered CCE and its Response Agencies deeply discounted price for a proposed VHF to 800 MHz migration project. The deadlines for the originally proposed discounts have passed, but it is expected that new future funding opportunities will be presented.

As most of you know, the State of Michigan has eliminated the annual user fees ("Mic Fees"). Currently there is a one-time activation fee to bring a new radio onto the system.

With current cash and lease to own programs being offered by Motorola, it appears that the project could be done without agency fees. By going with the lease to own option, we would be eligible to apply for grants at the local, State and Federal level to help offset the project costs, (however, as 911 is not a recognized profession by the feds we would need to partner with Fire and Law Enforcement to apply for any grants).

Cons

A migration to the 800 MHz radios for Responder Agencies will be costly. Determining the source of covering the costs will require an in depth discussion at the County, City and Township levels to determine the best and most efficient way of handling this.

FCC NARROWBANDING MANDATE

A Public Safety Guide for Compliance





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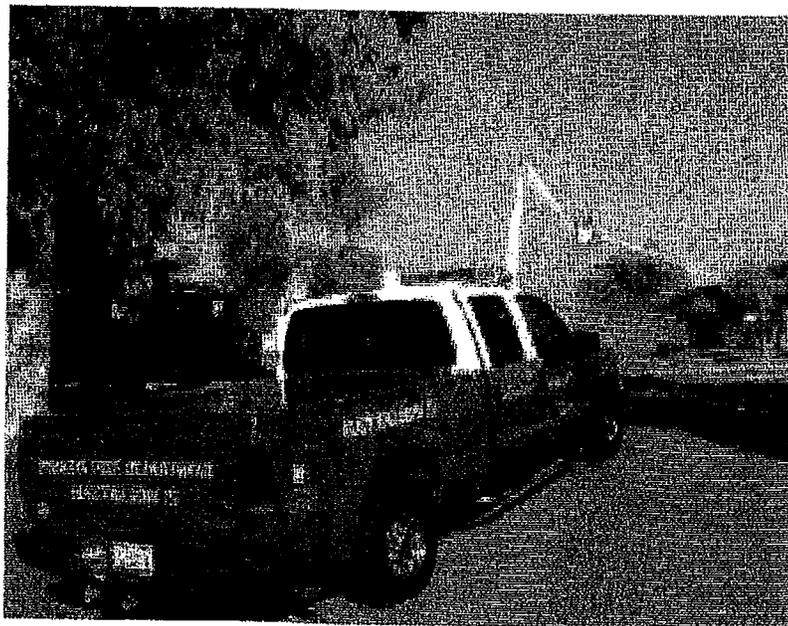
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We greatly appreciate the contribution of Nicole Donath for this publication.

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CHAPTER 1: AN INTRODUCTION TO NARROWBANDING

WHAT IS THE PURPOSE OF THIS BROCHURE?

The International Association of Fire Chiefs (IAFC) and the International Municipal Signal Association (IMSA) have put together this brochure to provide guidance to state and local public safety entities on requirements being imposed by the Federal Communications Commission (FCC) that often are referred to as “**mandatory narrowbanding**.” These requirements apply to applicants for and licensees of privately operated mobile radio systems — both voice and data — in the following spectrum bands:

VHF (150–174 MHz: available nationwide)

UHF (421–430 MHz: available only in Detroit, Buffalo, and Cleveland)

(450–470 MHz: available nationwide)

(470–512 MHz: shared with UHF-TV, available only in 11 cities)



CHAPTER 1: AN INTRODUCTION TO NARROWBANDING

In this brochure, we discuss in detail what is meant by narrowbanding and what you must do to comply with the FCC's requirements. Please keep in mind that compliance is not optional; licensees that fail to comply may face serious consequences, possibly including the loss of their licenses.

WHAT IS MANDATORY NARROWBANDING?

Licensees in the private land mobile VHF and UHF bands traditionally have employed systems that operate on channel bandwidths of 25 kHz. "Narrowbanding" refers to a requirement by the FCC that — on or before January 1, 2013 — all existing licensees implement equipment designed to operate on channel bandwidths of 12.5 kHz or less or that meets a specific efficiency standard (discussed in more detail in Chapter 2). What this means is that licensees will need to convert their existing wideband (25 kHz) systems to narrowband (12.5 kHz) operation. **Any equipment that is not capable of operating on channels of 12.5 kHz or less will need to be replaced.**

In addition to the FCC's deadline of January 1, 2013 for all licensees to cut-over to new narrowband equipment, there are some "interim" deadlines. For example, there is a date by which no more new or modified operations on 25 kHz bandwidth channels may be initiated, and there are certain deadlines that apply to equipment manufacturers and importers. These interim deadlines are discussed in Chapter 2.

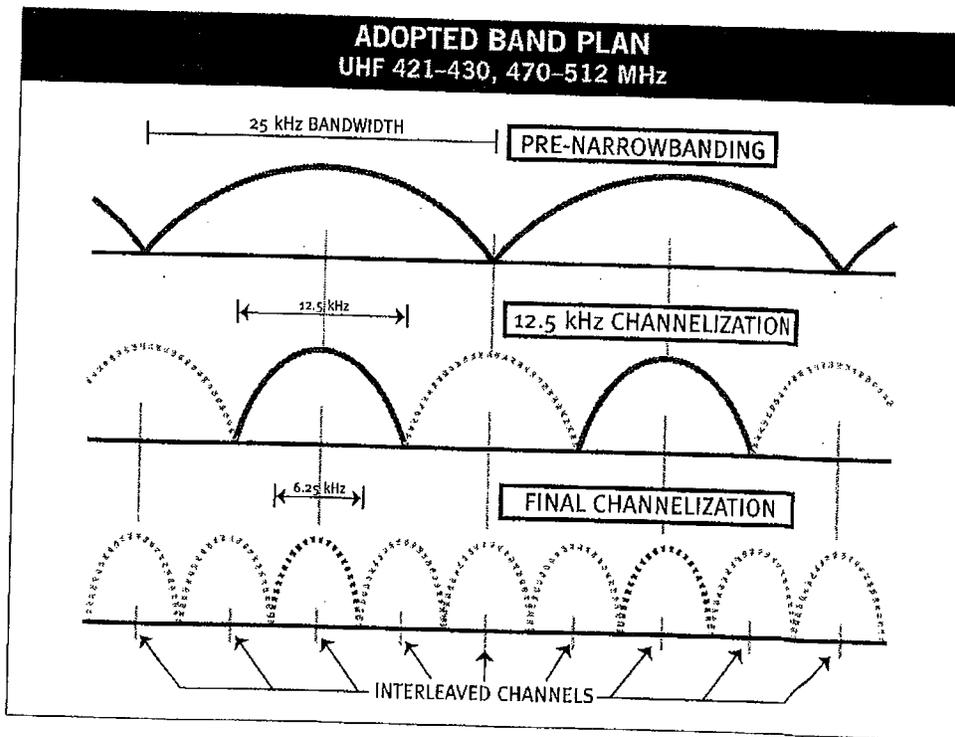
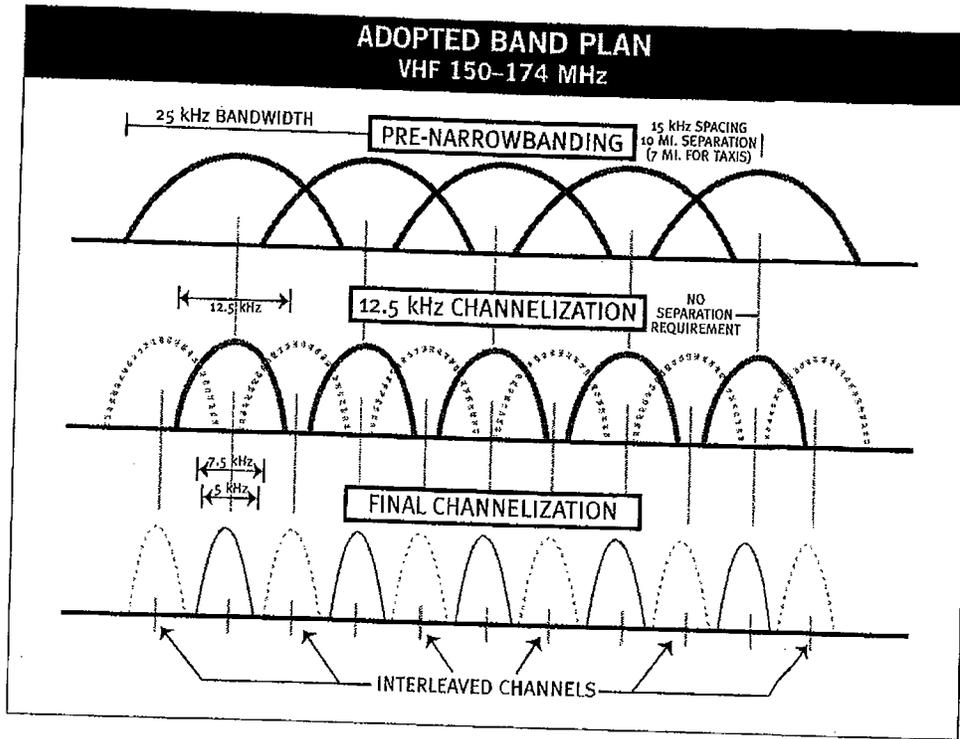
The FCC expects that licensees ultimately will implement equipment that is designed to operate on channel bandwidths of 6.25 kHz or less. However, there currently is no deadline set for making this transition.



CHANNELIZATION PLANS

The charts on the next page demonstrate how the channelization plans for the VHF and UHF bands are changing as a result of narrowbanding. The top segment of each chart shows the current (pre-narrowbanding) configuration. The middle segment shows the relevant channelization for the upcoming migration to 12.5 kHz channels. The bottom segment shows the channelization plan for the expected (but not yet mandated) future migration to 6.25 kHz equipment.

CHAPTER 1: AN INTRODUCTION TO NARROWBANDING



CHAPTER 1: AN INTRODUCTION TO NARROWBANDING

NARROWBANDING MYTHS

One of the main reasons that IAFC and IMSA have published this brochure is to dispel some common misconceptions about the rebanding process and the FCC's requirements.

Myth #1: Licensees must implement digital equipment. One common misconception is that narrowbanding is a requirement to "go digital." The FCC's narrowbanding rules do not dictate that any particular type of equipment modulation be employed. You may continue to operate analog equipment, even after the January 1, 2013 deadline, provided that your equipment meets the FCC's narrowbanding (12.5 kHz) standards. However, you may want to use the FCC's narrowbanding requirement as an opportunity to upgrade to digital technology, which is less susceptible to adjacent channel interference and offers capabilities not available on analog systems.

Myth #2: Each licensee will end up with twice as many channels. Compliance with the FCC's narrowbanding requirements will not necessarily entitle you to license two 12.5 kHz channels where previously you had one 25 kHz channel. In general, each licensed 25 kHz channel will be converted into a 12.5 kHz channel having the same center operating frequency. If you would like to add additional channels to your system, license(s), you will need to justify your need for those additional channels in accordance with the FCC's rules.

Myth #3: Narrowbanding is the same thing as "rebanding." Rebanding refers to a process that is currently underway in the 800 MHz band, whereby some licensees are being required to retune or replace their equipment in order to operate on alternative 800 MHz frequencies. The purpose of this rebanding effort is to alleviate interference to public safety licensees in the 800 MHz band. This rebanding process has nothing to do with mandatory narrowbanding, which is a requirement that applies only to VHF and UHF spectrum users.

WHAT ARE THE BENEFITS OF NARROWBANDING?

The purpose of mandatory narrowbanding is to promote more efficient use of the VHF and UHF land mobile bands. Today, these bands are highly congested, and there often is not enough spectrum available for licensees to expand their existing systems or implement new systems. As licensees convert to equipment that operates on narrower channel bandwidths, new channels will become available for licensing by parties that need them. It also is hoped that the narrowband conversion will spur the development and use of new technologies that will further promote efficient spectrum use, be less susceptible to interference, and provide licensees with enhanced capabilities.



CHAPTER 1: AN INTRODUCTION TO NARROWBANDING

SOME IMPORTANT CAUTIONARY NOTES...

Before moving on to the details of the FCC's requirements, we wanted to pass along some general words of caution and advice:

Narrowbanding is not optional. Licensees cannot simply ignore the FCC's narrowbanding rules. If you are licensed in the VHF and/or UHF land mobile bands and not currently operating on narrowband (12.5 kHz) equipment, you will be affected. Your existing wideband system will need to be modified or replaced by January 1, 2013, and failure to comply may result in serious consequences.

Interference may occur. Even prior to January 1, 2013, your operations on wideband (25 kHz) equipment may become increasingly subject to interference from new adjacent channel narrowband systems that are being implemented by other licensees in the vicinity of your operating area. To minimize this risk, you may want to consider making your narrowband transition as soon as practicable, subject to budgetary processes.

Your transition may be gradual. You need not convert your system to narrowband equipment all at once. Instead, you may make the transition over time by purchasing and installing, in several phases, "dual band" equipment—meaning equipment that is capable of operating in both a 25 kHz and 12.5 kHz bandwidth mode. In this way, your new equipment can operate alongside your "old" 25 kHz equipment, at least up until the final "cut-over" deadline of January 1, 2013.

Buyer beware. Ignorant or disreputable equipment vendors may try to "unload" either new or used equipment that is capable of operating only in a 25 kHz bandwidth mode. **Do not buy this equipment!** You likely will find yourself needing to replace it before you have fully reaped the expected benefits of your purchase.

CHAPTER 2: THE FCC'S NARROWBANDING RULES

"REFARMING"

The FCC's narrowbanding requirements were adopted during the course of a proceeding known as "refarming" that was initiated in 1992. The basic purpose of this proceeding was to enhance spectrum efficiency in the VHF and UHF land mobile bands. "Refarming" entails not only mandatory narrowbanding, but also the consolidation of twenty separate radio services into two radio pools: a Public Safety Pool and an Industrial/Business Pool. While service pool consolidation already has occurred, narrowbanding is not yet complete. The FCC's narrowbanding requirements and deadlines are discussed below.

NARROWBANDING DEADLINES FOR LICENSEES

As discussed in Chapter 1, the FCC's basic narrowbanding requirement is that VHF and UHF land mobile spectrum users must migrate to narrower bandwidth equipment in accordance with certain FCC deadlines. The FCC's rules do not require licensees to employ any particular type of equipment or satisfy other technical standards in order to meet this requirement — **either analog or digital modulation is permitted.**

The deadlines below apply only to the transition to equipment that operates on channels of 12.5 kHz bandwidth or less; there currently is no date certain migration requirement for a second-phase narrowbanding to 6.25 kHz channels.

Beginning on January 1, 2011, the FCC will no longer accept applications for new VHF or UHF systems that operate on channels exceeding 12.5 kHz, *unless the efficiency standard is satisfied.* (See below for an explanation of the efficiency standard.)

Beginning on January 1, 2011, the FCC will no longer accept applications for modification of VHF or UHF systems that increase the station's authorized interference contour and that operate on channels exceeding 12.5 kHz, *unless the efficiency standard is satisfied.*

As of January 1, 2013, all existing licensees must operate on channels with a bandwidth of 12.5 kHz or less, *unless the efficiency standard is satisfied.*

WHAT IS THE "EFFICIENCY STANDARD"?

As noted above, licensees may meet an efficiency standard instead of satisfying the requirement to operate of channels with a bandwidth of 12.5 kHz or less.

For voice operations, the efficiency standard is satisfied if the equipment is capable of transmitting at least one voice channel per 12.5 kHz of bandwidth. In other words, voice equipment operating on a channel bandwidth of up to 25 kHz will be permitted if the equipment supports two or more voice channels.

For data operations, the efficiency standard is satisfied if the equipment is capable of supporting a minimum data rate of 4800 bits per second per 6.25 kHz of channel bandwidth.

ARE THERE ANY EXCEPTIONS TO THE BASIC NARROWBANDING REQUIREMENT?

Apart from the option of satisfying the above efficiency standard, the only general exception is that *paging-only* channels are *not* subject to the FCC's narrowbanding requirements. In the public safety radio pool, only the following channels are designated as paging-only: 152.0075 MHz and 157.450 MHz.

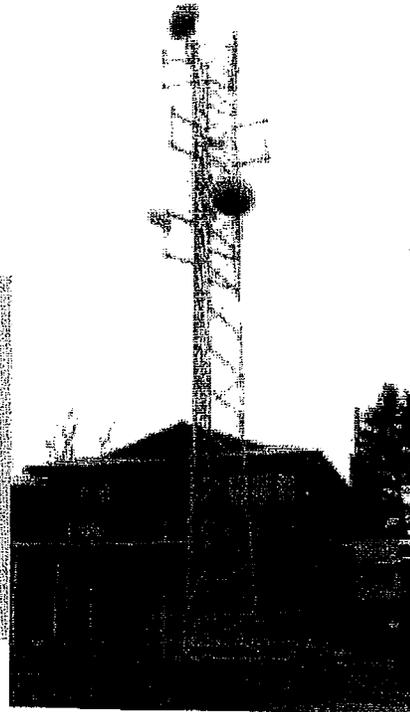
You may be conducting paging operations on channels that are not designated as paging-only. The exception does not apply to these channels. Thus, your operations on such channels will be subject to mandatory narrowbanding.

EQUIPMENT CERTIFICATION DEADLINES

Certain of the FCC's narrowbanding deadlines apply to equipment manufacturers, rather than licensees. However, it is useful for licensees to be aware of these deadlines so that they know what to expect with regard to equipment availability.

Equipment certification is the process by which manufacturers obtain approval from the FCC to market new types of equipment. In general, the FCC's goal in the equipment certification process is to ensure that the equipment complies with all of the agency's technical requirements. The FCC has adopted the following narrowbanding-related deadlines with respect to equipment certification:

February 14, 1997 — Applications for certification of VHF or UHF equipment received by the FCC on or after this date will not be granted unless the equipment has the capability of operating on a channel bandwidth of 12.5 kHz or less or meets the spectrum efficiency standard of one voice channel per 12.5 kHz of channel bandwidth (for voice systems) or 4800 bits per second per 6.25 kHz of channel bandwidth (for data systems). Equipment that can operate in a dual mode (on both 25 kHz and 12.5 kHz channels) is acceptable.



CHAPTER 2: THE FCC'S NARROWBANDING RULES

January 1, 2005 — Applications for certification of VHF or UHF equipment received by the FCC on or after this date will not be granted unless the equipment has the capability of operating on a channel bandwidth of 6.25 kHz or less or meets the spectrum efficiency standard of one voice channel per 6.25 kHz of channel bandwidth (for voice systems) or 4800 bits per second per 6.25 kHz of channel bandwidth (for data systems). Dual or multi-bandwidth mode equipment is acceptable, as long as it is capable of operating on channels of 6.25 kHz or less.

However, the FCC has stayed enforcement of this January 1, 2005 deadline pending resolution of a request by certain manufacturers for deferral of the deadline. The manufacturers believe that enforcement of the deadline is premature until an industry technical standard is adopted for 6.25 kHz equipment. For the time being, therefore, the January 1, 2005 deadline is not in effect.

ANOTHER EQUIPMENT-RELATED DEADLINE

VHF and UHF transmitters that operate with a maximum channel bandwidth greater than 12.5 kHz may not be manufactured in or imported into the United States after **January 1, 2011** unless the efficiency standard is satisfied.

ARE THERE ANY OTHER RELEVANT FCC REQUIREMENTS?

In essence, no. Mandatory narrowbanding in the VHF and UHF bands basically boils down to a series of deadlines for moving to narrower channel operations or equipment that satisfies the efficiency standard. The only exception is for paging-only channels.

ENSURING COMPLIANCE

The FCC's narrowbanding requirements (as outlined above) are fairly straightforward. However, licensees must plan ahead in order to ensure compliance. Licensees also may be faced with a host of complex issues and decisions in determining how and when to conduct their narrowband transition. In the next chapter, we provide guidance on some of the relevant issues and considerations that may arise.



CHAPTER 3: PRACTICAL AND TECHNICAL CONSIDERATIONS

DO LICENSEES NEED TO DO ANYTHING TODAY?

If you are operating a wideband (25 kHz) system in the VHF or UHF land mobile band, you may continue to do so until January 1, 2013. As a practical matter, however, you may want to start planning and preparing for your narrowband conversion now. Here are some important reasons why you may want to get started sooner rather than later:

Interference. As other licensees complete their transition to narrowband (12.5 kHz) channels, new channels likely will become available for licensing. It is possible that new operations could be licensed within your operating area on a channel that is only 12.5 kHz removed from a channel on which your 25 kHz system is licensed to operate. The likely result is interference to your operations. The best way to protect yourself against such interference is to implement your own narrowband conversion.

Note: Before the potentially interfering operations are initiated, the other licensee probably will be expected to notify you of the potential for interference. However, you likely will not be able to prevent the new licensee from deploying its system. Therefore, unless and until you complete your transition to narrowband equipment, you will be increasingly at risk of interference from new narrowband operations by other licensees.

Safety. Many public safety agencies use their VHF and UHF systems for important safety-related communications, both during emergency situations and in the course of day-to-day operations. For these agencies, it is particularly important that the transition to narrowband equipment be achieved as smoothly as possible and with the minimal amount of disruption to system operations. The more time you have to plan how to carry out your transition, the less likely it is that your critical operations will be disrupted during the cut-over process.

CHAPTER 3: PRACTICAL AND TECHNICAL CONSIDERATIONS

Budgetary Factors: Public safety agencies typically are subject to a rigorous budgetary process, whereby it may take many months to obtain approval for large expenditures. You will need to factor the duration of this budgetary process into your determination as to when to initiate narrowbanding efforts. If you do not allow enough time for "red tape," you may find yourself unable to meet the FCC's January 1, 2013 deadline.

Although it is not imperative that you take any action today, there is at least one thing that you should make sure *not* to do: *do not buy any more equipment that operates only in a 25 kHz mode.* This equipment soon will become obsolete, as you will need to replace it with narrowband equipment by January 1, 2013, or perhaps sooner, depending upon when you implement your narrowband transition. If you find yourself in a position where you need to replace existing equipment that is no longer functional or you would like to expand existing operations, but you are not ready to fully convert to a narrowband system, the best option is to implement dual mode (12.5/25 kHz) equipment to operate in the interim. If, on the other hand, you are installing in an entirely new system, you can implement narrowband equipment at the outset, thereby avoiding the need to convert.

WHAT IS THE SIGNIFICANCE OF THE 2011 "INTERIM" DEADLINE?

As discussed in Chapter 2, beginning on January 1, 2011, licensees will be permitted to apply for new systems or to expand their existing systems *only* if they will be utilizing 12.5 kHz bandwidth (or less) equipment or equipment that satisfies the efficiency standard. Therefore, you will need to take this deadline into consideration if you are planning to implement a new system or to make modifications to your existing system.

■ SYSTEM MODIFICATIONS

If you are planning system modifications that entail the use of new equipment, and you will be applying for FCC approval for these system modifications before January 1, 2011, you are *not* required to implement narrowband equipment. However, we highly recommend



that you at least implement dual mode equipment in connection with these modifications; otherwise, you will need to replace your newly installed equipment with narrowband equipment by January 1, 2013.

If you are planning system modifications that will expand your station's interference contours, and you will be applying for FCC approval *on or after* January 1, 2011, you will need to implement narrowband (12.5 kHz) equipment or equipment that meets the efficiency standard. Dual mode equipment will no longer be acceptable for your modified operations. As a result, you may need to convert your entire system to narrowband equipment at this time — even if before the January 1, 2013 deadline for converting existing operations — so that your modified operations using 12.5 kHz equipment may be integrated with your existing operations.

■ NEW SYSTEMS

Regardless of whether you will be implementing a new system before or after January 1, 2011, it makes sense to install narrowband equipment. Before January 1, 2011, you also have the option of using dual mode (12.5/25 kHz) equipment. However, you should not implement 25 kHz equipment in connection with a new system; as already discussed, such equipment will need to be replaced before too long and could become susceptible to interference from other licensees operating narrowband systems.

SYSTEM CONVERSION: PLANNING AND IMPLEMENTATION

Once you are ready to embark on the process of converting your existing 25 kHz system to a new, narrowband (12.5 kHz) system, what will need to be done? Although certain tasks and considerations will be specific to your particular operational needs and internal procedures, there are several basic steps that all licensees generally will need to take.

■ ESTABLISHING A TIMETABLE

You will want to set some general benchmarks for when you plan to initiate and complete the various steps described below. These steps do not necessarily need to be completed in the order in which they are listed here, and some steps may overlap or occur simultaneously. The length of time that you will need to allow for each step will depend on such factors as the size and scope of your system and the nature of your internal budgetary processes.

Of course, you will want to start the whole process soon enough to ensure that you will be able to complete your narrowband migration by the FCC's deadline of January 1, 2013. If you currently rely on your system for interoperability with one or more other entities, you will need to consider when those other entities will be making their narrowband transitions.

■ INITIAL PLANNING ACTIVITIES

The people that are most familiar with your existing VHF or UHF system from an operational and technical standpoint will need to be involved in the planning process. Working with your technicians and/or engineers (whether internal staff, outside consultants or both), you will want to assess the current and expected future operational needs of your organization. Perhaps your existing radio system does not fully meet these needs; narrowbanding presents an opportunity to upgrade to new technologies that may provide enhanced capabilities. You may also want to consider migrating to an entirely different spectrum band, such as the 700 MHz or 800 MHz band.

CHAPTER 3: PRACTICAL AND TECHNICAL CONSIDERATIONS

As part of the planning process, you will want to develop a plan as to how and when you will actually carry out your transition from wideband to narrowband equipment so as not to disrupt key communications. Among other things, you may want to consider such factors as the expected weather during the time of year you plan to conduct your migration and whether there are any scheduled events in your area that may affect your agency's mission and place greater demands on your radio system during certain periods. Once you have selected a vendor for your new equipment (see below), you also will want to work with that vendor on a plan for ensuring a smooth transition.

■ SYSTEM DESIGN AND PROCUREMENT

After assessing your operational needs, the next step is to solicit bids from one or more equipment vendors for narrowband systems capable of meeting these needs. We recommend that you be as specific as possible in letting vendors know your requirements. Before making a final decision regarding what system to purchase, you may want to request a demonstration of the equipment you are considering and/or conduct some research as to whether other customers have been satisfied with that equipment. You also will want to make sure that the vendor you select is aware of the FCC's narrowbanding deadline of January 1, 2013 and will be capable of meeting that deadline.

■ FUNDING

Once you have selected your new narrowband system, the next step is to secure the necessary funding through your applicable internal processes. For many public safety agencies, these processes can be time-consuming and arduous. Therefore, it is important to make sure that, in preparing your transition timetable, you have included enough time for obtaining funding approval.

Further, because a large expenditure of public funds such as what would be entailed in the purchase of a new radio system may be subject to a high level of scrutiny, you will want to present a strong justification in your budget proposal. Among other things, you may want to emphasize that the new system is needed in order to comply with FCC requirements and that you have conducted a rigorous analysis in determining that the particular new system you selected will best meet your agency's needs.

■ FREQUENCY COORDINATION

Before you can begin implementing your new system, you will need to complete the frequency coordination process and apply to the FCC to modify your license(s) in accordance with your new system specifications. IAFC and IMSA are certified public safety frequency coordinators, and we are available to assist with this process. We can be contacted at:

International Municipal Signal Association (IMSA)
200 Metro Center Blvd., Suite 6
Warwick, RI 02886
P: (401) 738-2220
F: (401) 738-7336
mailto: fireems@imsasafety.org

The general purpose of the frequency coordination process is to minimize the likelihood that new or modified systems will cause interference to or receive interference from existing systems. In the narrowbanding context, this process primarily entails identifying available channels for your new system.

In many cases, licensees' new narrowband systems will be operating on only the same central operating frequencies as are currently used for their existing wideband systems (but with a narrower channel bandwidth). If that is your situation, the frequency coordination process should be fairly simple and straightforward, so long as you are not also looking to increase your operating power and/or antenna height. However, if you are seeking to license any additional channels for use with your new system, your ability to do so will be subject to channel availability and a satisfactory demonstration of need for these additional channels in accordance with the FCC's rules.

Once you have successfully completed the frequency coordination process, you may file your FCC Form 601 application(s) for modification through an FCC-designated frequency coordinator. You now are ready for the final stage of your transition...

■ SYSTEM IMPLEMENTATION

Upon the filing of your application(s), you can immediately begin system implementation pursuant to Conditional Temporary Authority (CTA). CTA is a procedure applicable in the VHF and UHF bands whereby, with some limited exceptions, applicants for new systems or system modifications may begin operating in accordance with their pending applications prior to the grant of those applications by the FCC.

Once the FCC grants your application(s), you will have **twelve months** in which to complete your narrowband migration consistent with your modified licensing authority. The FCC's rules also require that you submit a Notification of Construction on FCC Form 601, Schedule K within 15 days of the expiration of your twelve month construction period. Under the Automated Termination program recently implemented by the FCC, a licensee that has failed to file a timely Notification of Construction will be notified that its authorization, location or frequency that was subject to the construction requirement has automatically terminated.

Thus, in completing your system implementation, you will want to "keep on your radar" not only the FCC's ultimate narrowbanding deadline of January 1, 2013, but also your twelve-month construction deadline and the obligation to file a timely Notification of Construction.



CHAPTER 3: PRACTICAL AND TECHNICAL CONSIDERATIONS

INTEROPERABILITY

Interoperability is the ability of two or more organizations to communicate or share information (voice, data, video, etc.) on a real-time basis. Interoperability may be *intra-jurisdictional*, such as where a city's police department communicates with that city's fire department during a common emergency situation. Interoperability also may be *inter-jurisdictional*, such as where fire departments from multiple localities communicate with one another while battling a widespread blaze.

Some agencies use their VHF or UHF systems for purposes of interoperability. If your VHF or UHF system is or will be used for interoperability with other entities, you will want to try to coordinate the timing of your respective narrowband migrations. Otherwise, your ability to interoperate may be impeded for some time. If you are unable to coordinate your timing, you may want to consider whether there are any interim measures that could be implemented to allow some degree of interoperability during the period that one agency has converted and the other has not.

You also should be aware that federal government licensees in the VHF and UHF bands must complete their narrowband conversions by January 1, 2008. Thus, state and local entities will find it difficult to interoperate with federal agencies (in the VHF/UHF bands) unless they also complete their own conversions by that time.

SAFECOM

If you would like to learn more about interoperability and the options that are or may become available to you in this regard, we recommend visiting the SAFECOM Web site at <http://www.safecomprogram.gov/>.

SAFECOM is a communications program sponsored by the U.S. Department of Homeland Security and driven by public safety practitioners; its mission is to promote more effective and efficient interoperable wireless communications by and among local, tribal, state, and federal public safety entities. SAFECOM's Web site provides members of the public safety community with a wealth of information and resources to help it meet its communications and interoperability needs.



ALTERNATIVE SPECTRUM BANDS

Before moving forward with your narrowband conversion, which may necessitate replacement of your entire radio system, you may want to consider whether it would be in your agency's interests to migrate instead to a completely different frequency band. Two possibilities are the 700 MHz and 800 MHz bands, as both include public safety spectrum allocations for land mobile operations.

■ 700 MHz

In 1998, the FCC adopted new rules for use of the spectrum in the 764–776 and 794–806 MHz bands, which were reallocated from television broadcast services to public safety use. These new rules allow, among other things, the licensing by public safety entities of general use narrowband (6.25 kHz) channels, narrowband (6.25 kHz) low power channels, and wideband (50 kHz) general use channels, subject to regional plans that are prepared by regional planning committees and approved by the FCC. This spectrum will not be available for use in all geographic areas until existing TV stations vacate the spectrum, which is to occur by February 2009.

Implementing a new 700 MHz system may have some advantages over converting to a narrowband VHF or UHF system. For example:

Exclusivity. The 700 MHz band is licensed on an exclusive basis, while the VHF or UHF bands are licensed only on a shared basis. As a practical matter, this means that 700 MHz band systems are entitled to greater protection against harmful interference.

Channel Availability. The VHF and UHF bands are highly congested and may remain so to some extent even after narrowbanding. The "new" allocation at 700 MHz should provide adequate spectrum for the licensing of new systems, as well as the subsequent expansion of those systems.

Enhanced Functionality. As noted above, the 700 MHz public safety allocation includes both narrowband (6.25 kHz) and wideband (50 kHz) channels. This channel plan allows licensees the flexibility to use their 700 MHz systems for a variety of applications, including voice, data, and video.

Interoperability. About 10 percent of the 700 MHz band public safety spectrum is dedicated for interoperability purposes and administered at the state level. Therefore, migrating to a 700 MHz system could provide you with enhanced opportunities for future interoperability. The 700 MHz spectrum also has the potential for interoperability with neighboring 800 MHz public safety systems. However, whether you will be able to take advantage of this potential for interoperability will depend on whether the agencies with which you seek to communicate also have the capability to operate in the 700 MHz and/or 800 MHz bands.

There also may be some disadvantages associated with a move to 700 MHz. To begin with, the continued existence of broadcast licensees on some of this spectrum may prevent you from moving before February 2009. Also, general propagation characteristics are

CHAPTER 3: PRACTICAL AND TECHNICAL CONSIDERATIONS

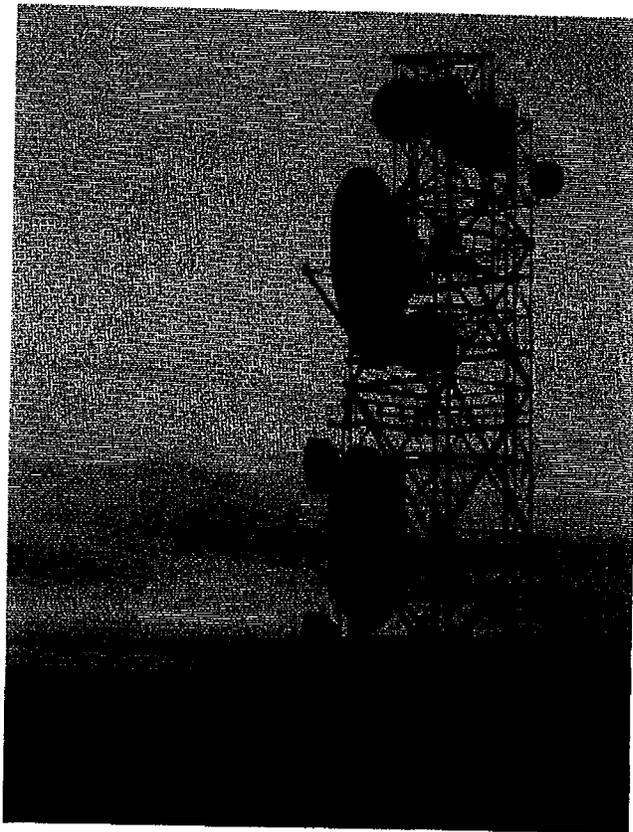
somewhat less favorable at 700 MHz than in the UHF and VHF bands. What this means is that more infrastructure typically will be needed at 700 MHz, making the 700 MHz option somewhat more costly.

■ 800 MHz

A portion of the spectrum in the 806–824/851–869 MHz land mobile band is dedicated for public safety operations. Some of this public safety spectrum is licensed in accordance with FCC-approved regional plans, while some may be licensed without such restrictions. The particular channels that are available for public safety use will be changing to some extent as a result of the ongoing band reconfiguration efforts in this band (see discussion of “rebanding” in Chapter 1).

Like the 700 MHz band public safety allocation, the 800 MHz band spectrum has the advantage of being licensed on an exclusive — rather than a shared — basis. In addition, some newly-vacated 800 MHz band channels (not presently assigned for public safety use) will become available for licensing only by public safety entities for a three-year period following the completion of rebanding. Public safety agencies may want to take advantage of this opportunity to secure additional spectrum.

Potential disadvantages of moving to 800 MHz include (like at 700 MHz) less favorable propagation, the associated higher equipment costs, and a possible need to delay implementation. In the 800 MHz band, the cause for possible delay is that the FCC has imposed temporary licensing freezes on a region-by-region basis while the rebanding process is occurring. Thus, before embarking on a plan to implement a new 800 MHz system, you will want to determine when the freeze will be lifted in your region. It is anticipated that rebanding will be completed in all regions by June 27, 2008.



SOURCES OF ADDITIONAL INFORMATION

We hope that this brochure has answered many of your questions about mandatory narrowbanding. However, every licensee is unique, and further questions may arise as you assess your particular needs and embark on the narrowbanding process. The following are some additional resources that may be of help to you.

IAFC/IMSA. We are available to answer your narrowbanding questions and/or refer you to others who may be able to assist you. Specific inquiries may be directed to IAFC at (703) 273-0911.

Other Frequency Coordinators. There are several certified public safety pool frequency coordinators other than IAFC and IMSA. These coordinators also may be able to assist you with the narrowbanding process. The contact information for these other coordinators is available at: <http://wireless.fcc.gov/publicsafety/coord.html-sub512>.

The FCC's Web Site. The FCC's "refarming" home page is located at: http://wireless.fcc.gov/services/index.htm?job=operations&id=private_land_radio. This Web site includes a link to the agency's various refarming-related decisions, including decisions related to mandatory narrowbanding.

Telecommunications Legal Counsel. If you are unsure of how or whether the FCC's narrowbanding requirements apply in your particular situation or you find yourself facing complicated licensing issues — such as the need for a rule waiver and/or an extension of one of the FCC's narrowbanding deadlines — you may want to contact telecommunications legal counsel. Counsel can assist you in ensuring that your important license rights are not placed in jeopardy as a result of the FCC's narrowbanding requirements. If you would like assistance in selecting legal counsel, please contact us.

CHAPTER 4: CONCLUSIONS

Below, some final thoughts with which we wanted to leave you...

- **Become familiar with the FCC's requirements and take them seriously.** It is important for licensees to understand the FCC's various narrowbanding requirements and deadlines, including the efficiency standard and the limited exceptions to mandatory narrowbanding (see Chapter 2). We urge you not to take these requirements lightly. At this time, it is unclear how, exactly, the FCC will go about enforcing its ultimate narrowbanding deadline of January 1, 2013. However, it is likely that those who fail to comply will face serious penalties such as *monetary fines* or *license cancellation*. Armed with accurate information, you will be prepared to take necessary action to avoid such undesired consequences.
- **Narrowbanding is both an opportunity and a challenge.** Complying with the FCC's mandatory narrowbanding requirements can be a complex, time-consuming, and costly process. However, narrowbanding also presents an opportunity for public safety agencies to improve their communications capabilities. Through narrowbanding, licensees can achieve greater spectrum availability and interference protection, enhanced opportunities for interoperability, and system upgrades to advanced technologies. For some agencies, the optimal approach may be to migrate to an alternative frequency band, such as 700 MHz or 800 MHz. The key is to assess your communications needs and to develop a plan as to how best to meet them.
- **Be wary of sales pitches.** This warning cannot be repeated too often. Vendors may misunderstand the FCC's rules or misrepresent them in an effort to sell equipment. What appears to be a bargain may actually be a "rip-off" if what you are purchasing is single-mode 25 kHz equipment that soon will become obsolete. Be particularly careful in the purchase of used equipment — you do not need to be funding someone else's narrowband conversion. The more familiar you are with the FCC's requirements, the less likely that a vendor or other unscrupulous party will be able to take advantage of you.
- **Know where to turn for advice and assistance.** You need not go through the narrowbanding process alone. At the end of Chapter 3, we provided some additional sources of information on narrowbanding. We hope you will avail yourself of these or other reliable resources as questions arise. With adequate information and planning, a successful narrowband conversion is well within your reach.



Introduction – What is Narrowbanding?

In December 2004, the Federal Communications Commission (FCC) announced that all non-Federal radio licensees operating 25 kHz systems in the 150-174 MHz and 421-512 MHz bands (VHF and UHF) must migrate to more efficient 12.5 kHz (narrowband) channels by January 1, 2013.¹ Unfortunately, many critical emergency response radio systems used today still operate on 25 kHz radio channels.

The FCC rule applies to both conventional and trunked radio systems and affects all FCC-licensed State and local emergency response radio systems. Wideband radio operation will violate FCC regulations beginning in 2013, and agencies that do not meet the deadline face “enforcement action, including admonishments, monetary forfeitures, and/or license revocation, as appropriate.”²

Transitioning to narrowband radio can make some portable, mobile, paging, base-station and repeater radios obsolete, resulting in a loss of coverage or capacity. Emergency response radio system operators across the US have begun implementing these changes, but coordination with interoperability partners is necessary to avoid disruption of crucial communications capabilities.

This guide is provided by the US Department of Homeland Security’s (DHS) Office of Emergency Communications (OEC) to showcase best practices for overcoming common challenges when transitioning to narrowband. The guide contains five State case studies that illustrate lessons learned by emergency response communities during the narrowband transition. The appendices give further assistance in terms of a customizable letter to raise awareness of the narrowband transition among local stakeholders, background information about the narrowbanding decision, and a step-by-step guide to narrowbanding one’s FCC license. This guide is an ideal companion to the “FCC Narrowbanding Mandate: A Public Safety Guide for Compliance” published by the International Association of Fire Chiefs and the International Municipal Signal Association.

Key Deadlines

(1) As of **January 1, 2011**, the FCC no longer accepts applications for new wideband 25 kHz operations or expansion of existing wideband 25 kHz operations.

(2) By **January 1, 2013**, all non-Federal FCC licensees operating on the VHF and UHF bands must use 12.5 kHz (11.25 kHz occupied bandwidth) or narrower channels or use technology that achieves the narrowband equivalent of one channel per 12.5 kHz of channel bandwidth (voice) or 4800 bits per second per 6.25 kHz (data).

As of **January 1, 2011**, no new 150-174 MHz or 421-512 MHz wideband equipment may be certified. Production and sale of existing models may continue until January 1, 2013. After January 1, 2013, all 150-174 MHz or 421-512 MHz band equipment manufactured, imported, or certified in the United States must be capable of super-narrowband transmissions (6.25 kHz).

Risks

Non-Compliance: The FCC has stated it will take any non-compliant systems off the air after the deadline or assess Federal penalties including fines. Additionally, the FCC will begin refarming the new 12.5 kHz channels created by narrowbanding, which could result in interference with any wideband channels still in operation.

¹ Federal Communications Commission Third Memorandum Opinion and Order, Third Further Notice of Proposed Rule Making and Order, WT Docket No. 99-87, 19 FCC Rcd 25045 (2004).

² FCC Public Notice DA-09-2589, released December 11, 2009.

Reduced Coverage: Some jurisdictions may experience a reduction in narrowband coverage compared with wideband. It may be necessary to install additional equipment to maintain coverage, particularly in large rural areas.

Confusion about the mandate: There are several myths about narrowbanding which may hinder compliance. See below for a list of common myths with corrections.

- Myth: Only digital radios are narrowband-compliant.
 - **Truth:** Project 25 (P25) radios satisfy the narrowbanding requirement, but purchasing digital equipment is not necessary in order to narrowband.
- Myth: Narrowbanding doubles each licensee's channels.
 - **Truth:** Narrowbanding does not entitle licensees to twice as many channels, or any extra channels.
- Myth: Frequencies will shift.
 - **Truth:** Channel centers will stay the same, so there is no need to change frequencies. Licensees will simply narrow around their existing channel center.
- Myth: Only new equipment is narrowband-compliant.
 - **Truth:** Equipment may not need to be replaced. Many radios, particularly models manufactured after 1997, are narrowband-capable and can be reprogrammed.
- Myth: Narrowbanding and rebanding are the same.
 - **Truth:** Rebanding is currently taking place in the 800 MHz bands and is unrelated to narrowbanding.

Benefits

More space/More efficient use of spectrum: The emergency response community is running out of channels in the VHF and UHF bands. The FCC plans to redistribute (refarm) newly created channels to help new emergency responder agencies obtain channels and enable existing agencies to expand.

Transition of old equipment: Since manufacturers began making narrowband-capable equipment in 1994, non-compliant equipment is likely to be more than 16 years old. Many agencies will realize significant safety benefits by upgrading to new equipment with more capacity and features.



FEMA Incident Command System Resources



Navigation The purpose of this webpage is to provide materials related to the implementation of the Incident Command System (ICS). The intended audience for this section is individuals, families, communities, the private and nonprofit sectors, faith-based organizations, and local, state, tribal, territorial, insular area, and Federal governments.

Search

Languages

National Incident Management System (/national-incident-management-system)

Doctrine Supporting Guides & Tools (/nims-doctrine-supporting-guides-tools)

Training (/training-0)



Implementation Guidance & Reporting (/implementation-guidance-and-reporting)

Alerts (/national-incident-management-system-alerts)

Regional Contacts (/fema-regional-nims-contacts)

The Incident Command System (ICS) is a management system designed to enable effective and efficient domestic incident management by integrating a combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure. ICS is normally structured to facilitate activities in five major functional areas: command, operations, planning, logistics, Intelligence & Investigations, finance and administration. It is a fundamental form of management, with the purpose of enabling incident managers to identify the key concerns associated with the incident—often under urgent conditions—without sacrificing attention to any component of the command system.

Please visit the [ICS Resource Center](http://training.fema.gov/EMIWeb/IS/ICSResource/index.htm) ([//training.fema.gov/EMIWeb/IS/ICSResource/index.htm](http://training.fema.gov/EMIWeb/IS/ICSResource/index.htm)) for more information.

> ICS Materials



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MAR. 06

Communications Interoperability: Basics for Practitioners

NCJ 212978

Key Points

- Interoperability is the ability of field units and agencies to talk and share data in real time, when needed and as authorized.
- Real-time data exchange is critical to public safety.
- Communications interoperability is often a challenge because public safety agencies use radios that operate in various frequency bands.
- Different agencies (police, fire) or agencies from neighboring jurisdictions often do not use the same frequency.
- Other obstacles include frequency availability and equipment incompatibility.
- Products are available to facilitate limited interoperability.
- Achieving interoperability requires addressing operational as well as technical obstacles to include common procedures and governance agreements.
- NIJ, through its CommTech program, works to develop solutions to these problems.

COMMUNICATIONS INTEROPERABILITY CHALLENGES

Frequency incompatibility. Public safety agencies from different jurisdictions often need a coordinated response during operational activities such as critical incident response, mutual aid events, or joint task force operations. Different agencies use public safety radio communications equipment that is often incompatible, so responders may not be able to talk with each other directly via radio. Public safety radio systems are often incompatible because they operate in different frequency bands similar to the AM and FM bands of a car radio.¹ Just as an AM radio cannot pick up an FM radio station, public safety radios in one frequency band cannot pick up transmissions from those operating in another band.

Precious time can be lost while dispatchers manually relay emergency communications between radio systems. Sophisticated technology to include analog and digital radio trunking systems has compounded this issue. Even if two radio systems are operating in the same frequency band, one manufacturer's radio usually cannot successfully receive signals/transmissions from another's. This is also true of some nontrunked radio products that operate within the same band. As a result, when responding to a major incident, agencies often use inefficient, nonradio methods to indirectly relay messages, severely obstructing an immediate response.

Equipment incompatibility. Interoperability can be facilitated if all agencies throughout a region purchase compatible equipment and create an



infrastructure that operates in a single frequency band. The cost of deploying such a system, however, is often too great, considering that system characteristics may require replacement of equipment and/or the construction of additional tower sites. Characteristics of different frequency bands are such that the best solution for one agency may not be the best for another. For example, some radio bands perform more effectively in urban areas than in rural areas, and some work better within buildings. Finally, radio channels may not be available to support all agency requirements within a single band.

Limited interoperability can often be achieved by deploying equipment that receives a radio transmission from one frequency and automatically retransmits it on another frequency. These systems fall into the general category of gateway interconnect devices.² Such systems can often be deployed without major changes to an existing radio system infrastructure and can vary in capability and cost.

POSSIBLE SOLUTIONS

Additional spectrum allocation. The Federal Communications Commission has allocated public safety frequencies in the 700 MHz band. As this band becomes available, it will provide opportunities for agencies or coalitions of agencies to obtain much-needed additional channels. The 700 MHz band provides additional capacity, but it also introduces another potentially incompatible band.

Standards-based equipment. A number of initiatives can help solve these interoperability challenges,³ and standards continue to be developed. For example, Project 25 compliance allows standards-based radio equipment made by different manufacturers to interoperate. This will eliminate many interoperability challenges as more efficient and backward-compatible standards are developed. Multiple manufacturers of standards-compatible equipment facilitate an environment more conducive to a competitive procurement process.

However, neither standards nor additional spectrum will provide a complete solution to interoperability challenges. Agencies will continue to use radio systems that operate in different frequency bands, choosing the bands that best suit their needs. NIJ,

through its CommTech program, is working to help develop solutions to these problems and to provide information about this issue to the law enforcement and public safety community.

OUTLOOK

Interoperability challenges extend beyond technical and cost issues. Interagency planning and governance among participating agencies is critical. Technology can enable interoperability, but public safety executives must foster collaborative interagency relationships to utilize fully any deployed capability. Policies and procedures must be developed to determine who can authorize a link and under what circumstances and what radio protocol will be used. Plain English is recommended, but users may also need a limited set of agreed-upon codes. Multiagency training is important to provide realistic practice using radios to communicate with officers of other agencies. Finally, it is important that field officers use interoperability equipment frequently as part of their daily operations to ensure familiarity and preparedness for a major incident.

FOR MORE INFORMATION

- NIJ's CommTech Web site:
<http://www.ojp.usdoj.gov/nij/topics/commtech/>
- Regional National Law Enforcement and Corrections Technology Centers:
 - Northeast (Rome, NY) 888-338-0584
 - Southeast (Charleston, SC) 800-292-4385
 - Rocky Mountain (Denver, CO) 800-416-8086
 - Western (El Segundo, CA) 888-548-1618
 - Northwest (Anchorage, AK) 866-569-2969
- Rural Law Enforcement Technology Center
866-787-2553

NOTES

1. See NIJ InShort, *Radio Spectrum*, NCJ 212975, February 2006.
2. See NIJ InShort, *Interoperability Gateways/Interconnects*, NCJ 212976, April 2006.
3. Global Justice XML will provide a standard for data exchange and interoperation at data level.



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OTTAWA COUNTY AND GRAND TRAVERSE COUNTY DISCUSSIONS

Proposed OCCDA - MPSCS (Michigan Public Safety Communication System) Radio Project Fire Service Concern and Discussion Point

OCCDA has heard concerns from Fire Agencies about communication on mutual aid calls with agencies outside of Ottawa County that don't utilize 800 MHz coverage. These concerns are currently being handled efficiently throughout Michigan and across the country where different agencies have the similar situations. To address this concern consider the following:

- Currently there are 497 Fire Agencies utilizing MPSCS for Fire Operations today.
- The 800 MHz coverage proposed for Ottawa County exceeds the current system's coverage today. This coverage design was done with Motorola and OCCDA Staff.
- Motorola has worked with OCCDA to include a VHF analog (P25 Upgradeable) Simulcast overlay of two (2) VHF channels at the 10 proposed sites. This increases our current Countywide VHF simulcast footprint. (Currently 5 sites)
- OCCDA will also provide dual band 800/VHF Portables for Fire Command staff as well as 800 MHz Mobiles in Fire apparatus.
- These changes would allow Fire to communicate with surrounding agencies on VHF, while providing full interoperability with Law and other state and local agencies via 800MHZ.
- Initially Fire would remain on VHF for dispatch and Fire could eventually migrate to 800MHZ over time. Fire paging would remain on VHF at this time.
- These changes to VHF will address the maintainability and life cycle issues that First Responders and OCCDA currently face.

These modifications to the proposal will allow Ottawa County first responders to have interoperability with surrounding county agencies and provide flexibility for our County to be positioned for today and as neighboring counties migrate to MPSCS. This allows Ottawa County to be prepared for the future, reduce our risk with the current system, increased interoperability, and affords significant savings on this proposed radio project.

1.) Incident Paging. OCCDA can maintain and operate the current VHF Simulcast Paging system. There are a number of counties (Livingston, Saginaw, Genesee, Lapeer) that are operating 800 voice communications and VHF paging. Virtually any of the existing fire agencies, Paid or Volunteer who are using MPSCS or any other P25 800 MHz system for primary functions and are using paging are doing so on another band. There are over XXX fire departments in this state alone which operate this way and were in the same position you are in deciding a new technology. Some agencies will also simulcast pages over vhf and an 800MHz talkgroup for those not wanting to carry a vhf pager. This is not a new objection and one that has been overcome, time and time again. To try and accommodate those people who don't want two systems, there is a company who is partnered with MPSCS and is beta testing an 800 MHz paging solution that can be evaluated at a later time.

2.) Utilizing Incident Command on an active incident, and adding various fireground operations. Are 800 MHz portables capable of scanning multiple channels?

Yes, you are able to scan 800 MHz conventional (fireground) and trunking systems on a radio. You may also have talk groups for the various Incident command channels that can serve to clean up the onsite noise and chatter. Depending on how you run it, IC can be achieved with radios for different bands or a single band radio on site and multiple radios for the incident commander to stay in touch with Dispatch. You can only have one priority channel as there is only one talk path in any radio on any system. Scanning multiple bands whether UHF/800, VHF/UHF, 800/ VHF, will always present some affiliation delays as you cross different system types.

3.) Interoperability with an adjacent department or county on VHF or UHF.

VHF can be retained for fireground or there are several other ways to communicate. The use of multiband radios, interoperability at the incident command level to manage coordination, or the wholesale change out at the user level. You also still have patching capability at the console level. The trend in Michigan and the country is more and more agencies are leaving VHF/UHF due to interference, interoperability issues, and standardizing with statewide systems. This has been the trend for the last 8 years. MPSCS has grown to over 60K users of all disciplines in Public Safety on the system and is one of the most successful models in North America for interoperability. Also, with the trends that are taking place, many of your existing neighbors are at different phases of evaluating or planning to Join MPSCS.(ie Kent, Allegan Law

Enforcement with Fire looking as well, and Muskegon (Sheriff's Dept has moved to MPSCS). All new technologies which are being developed for next generation public safety are all being designed around private LTE which is in the 700 band and directly adjacent to public safety 800MHz (Firstnet..Etc). If you are VHF today and are dealing with someone who is UHF or 800, you have found ways to interoperate and you have that equipment today to do so. Those solutions can continue to be utilized and assets utilized for the departments.

4.) Fireground operation reception in a commercial building or occupied structure?

The 800 MHz band penetrates buildings better than VHF. This is a simple matter of physics with the 800MHz band being a smaller wavelength than VHF or UHF which allows better building penetration. On top of that, the coverage we have designed the system for far out performs your current system in particular to in building coverage. With over 72% of the county having coverage for heavy density buildings, that provides inherent coverage elsewhere in the county. There are also guaranteed coverage that goes along with this solution, something you don't have today. 800 MHz radios can be programmed with conventional channels for radio to radio communications in areas for fireground or extreme topographical challenged areas.

5.) All departments have vested a great deal of taxpayer dollars to comply with the unfunded mandate for narrow band compliancy. What happens to this equipment that is five (5) years old? Tele-Rad re-sell the equipment for a profit?

Unfortunately, this also is not an uncommon problem. "We were forced to buy new equipment so because of that we have to stay". The county had to address an imminent issue the best way it could based on the situation. This doesn't mean that this takes away the responsibility to design and implement a solution that carries the county into the future. The implementation for a project of this size will easily be 15-18 months. At that point, much of this equipment will be 6.5 to 7 years old and some older if they were upgradeable based on narrowbanding. You have support issues looming for your Quantars down the road. The current system today and much of the upgrading done at tower sites etc can be utilized with the potential new system. The user equipment can be retained for interop or for a backup in the event there is a catastrophic event to MPSCS. The coverage issues that exist today with VHF will still exist. There are secondary markets that could be looked at but typically don't yield great value on equipment that is 5+ years old. That is a decision the authority would have to evaluate. Tele-Rad typically does not sell used equipment since they are assets of the county.

6.) Municipalities who've invested in repeater systems. Will they remain operable?

This would be an OCCDA question to address, but I would think they could still operate if you chose to have them as a backup system

7.) What are the hidden fee's that will be assessed to the fire departments after purchase of new equipment i.e. Mic & Maintenance Fee's, additional mobiles and portables?

There are MPSCS user fees today. There are two proposals today at DTMB which are targeted at reducing or eliminating the annual fees altogether. OCCDA would receive credits for the assets and system equipment you would bring to the system. you would receive 50% of the value of that equipment in user credits(i.e. \$7M in assets and equipment = \$3.5M in credits. 1850 radios @ 200 per year = 370,000 in fees. It would take 9.54 years before a user fee would be paid on any radios. Maintenance fees are an OCCDA decision. Maintain the equipment yourself with the staff you have, hire MPSCS, or hire Motorola to take care of it. Look at the cost options as with any system, maintenance is a critical piece of ensuring your investment is taken care of. The real point is you have multiple options to address that. There are no hidden fees. If you choose to handle radios on a break/fix basis, then you have no monthly fees for subscriber maintenance. If you choose to put them on a maintenance contract, you then will have a budgetable maintenance cost for your fleet. It really falls to OCCDA and its agencies how they want to proceed.

8.) Upgrade our current system rather than switching to 800 MHZ?

Due to narrow banding, coverage has decreased, and OCCDA continues to upgrade the current infrastructure. Much of the backbone is close to end of life and no support. Digital Simulcast Trunking (MPSCS) provides reliable and robust connectivity, secure communications, enhanced interoperability and resiliency; all crucial elements for Ottawa County. The MPSCS is based on shared services or build once/ leverage often. The cost of upgrading and maintaining an independent system exceeds the total cost of ownership (TCO) of MPSCS.

9.) How will this system be paid for?

This would be an OCCDA decision. Motorola can provide an aggressive lease rate which can be structured to meet revenue streams, length of term, number of payments annually, and no down payment.

OCCDA New Radio System Informational Meeting - November 12, 2015

Questions / Concerns / Ideas / Answers

- Should we move fast and pursue within six weeks?**

Moving forward now provides us with an actionable plan on communications and encompasses the two options we have been discussing. P25 is clearly the direction communications is going and looking across the US, P25 800 MHz solutions are the standard being deployed. This option and its financial incentives are a huge win for the county as it provides Law Enforcement with the direction they were looking to improve coverage and interoperability with 70,000 other Michigan Public Safety users. The trunking solution also provides Fire the ability to migrate to a system that will not be bound by county lines. The addition of a new VHF simulcast solution also provides us with the ability for fire to move at their own comfort level to test the 800 system, addresses the serviceability of our current system, and maintains grant and previous investments in the longer term. If fire were to migrate to 800 like many other counties, we have a fantastic backup VHF system to fall back on with radios that can be used if necessary.
- Base agreement – should it meet federal standards?**

Yes, any new radio system should be P25, the Federal Standard, designed for interoperability and creates efficiencies. That system today in Michigan is MPSCS. In an effort to be able to reuse existing user equipment and individual repeaters, we have proposed an analog VHF system for fire. This removes concerns of previous investments from narrow banding and grants, but it positions Fire with being able to move forward with P25 VHF in the future with the new radios and stations being capable of doing P25 with software upgrades. An example of P25 interoperability is all Michigan Public Safety users can utilize the MPSCS P25 radio network for cost savings and coverage throughout Michigan with seamless interoperability because of the P25 standard. There are currently 70K users on the system today and putting in the 800 MHz solution in Ottawa County expands those capabilities for all.
- Verify 5 million in savings**

The savings for an order in 2015 is actually \$6,500,000 dollars once the expansion of the VHF radio system to 10 sites and providing dual band radios for users is figured into the equation. This was offered by Motorola to allow a longer transition/evaluation period for fire. These savings are above and beyond state contract and will not be extended after 2015.
- Why now and not next year – (fiscal year for Motorola ends the end of December)**

Motorola's fiscal year ends on December 31 and the incentives offered will not be extended. The project provides the VHF expansion and dual band radios so that the County can move forward for those ready to move, while offering a migration to departments who need more time. This new solution also allows Law Enforcement the

opportunity to have interoperability with their work partners immediately within the County and beyond. This maintains interoperability with current users and mutual aid, puts an actionable plan in place to addressing the risk of failure with the current system, and improves coverage and interoperability with the network of over 70,000 state, local and federal users across the state.

Cost of radio replacement

The radios provided come with a one-year warranty commencing upon use of the system. If a radio needs replaced, compatible radios range from \$1,600-\$5,000 depending on models, features and functionality desired.

All of the Motorola APX family of radios is available at substantial discount on the State of Michigan purchase contract and available for all Public Safety agencies.

The APX 6000 is the most popular radio for public safety. The price will vary based on options, for budgetary purpose agencies should budget approximately \$3500 for radio replacement or expansion of their fleet.

Interoperability – The MPSCS is a standards-based “shared” system using Project 25 (P25) standards

This suite of standards allows radios from different P25 manufacturers to operate on the system. Interoperability on the MPSCS is achieved through the sharing of talk groups between and amongst the other agencies on the MPSCS. Sharing of talk groups between agencies is allowed as long as there is a sharing agreement in place between the two agencies. This agreement provides local agencies the freedom and control they need to manage the privacy of their talk groups. Interoperability with other agencies that are not members of the MPSCS can be made by connecting radio equipment or linking communications paths between the two systems through a gateway. These gateway connections can be managed at a dispatch console via patching or can be patched separately. Since this type of connection is not often P25 (i.e., the most common is analog), there can be some degradation of audio quality. Interoperability gateways also require an agreement between the affected parties as they can impact a system's capacity.

Fire ground operations included?

Fire ground is direct simplex operation and is available in both VHF and 800MHz in the proposed solution. There will be no loss of Fire ground or Tactical channels. Each MPSCS radio has 800 MHz talk around (TAC) statewide channels that are used for fire ground as well.

Why go with 800 Mhz, not VHF upgrade

The current proposal includes both. 30 of the 35 statewide systems in the US are 7/800 MHz Trunking systems. This is by design and not accident. Just in the Midwest alone neighboring states such as IN, IL, MN, and OH are all P25 800MHz trunking systems which have tens of thousands of Police, Fire, and EMS users on the systems.

MPSCS is 800 MHz and provides efficiencies to avoid duplicative spending for infrastructure and statewide coverage and interoperability with 70,000 other State users.

The 800 MHz spectrum offers exclusive use of channels and is a coordinated band enabling interference free combining in multi-channel systems. Trunking supported by the 800 MHz band offers greater channel capacity than the VHF conventional system can offer. An analog VHF upgrade on its own would simply be a temporary band aid approach and will not be compatible with P25 interoperability standards. The current proposal provides a new VHF fire simulcast system upgradeable to P25 to meet the standard. The MPSCS 800 MHz proposal meets the P25 standard as proposed.

We have nothing to compare cost with – another system?

The pricing for Ottawa County uses Michigan State Contract pricing plus the stated incentives for a 2015 Order. This means Ottawa County is buying all equipment below contracted price. The cost of the proposed VHF system and upgrade to dual band radios is at no additional cost to the County when purchased in conjunction with the 800 MHz system. The question of pricing was also asked to Dir Stoddard and he commented on how aggressive the pricing was from Motorola and had not seen this level of pricing before.

Are there other vendors? Other vendors been contacted?

Motorola is the only vendor who can provide infrastructure for MPSCS. This was awarded via contract and Motorola is the sole provider of this equipment. This proposal and incentives provided is for the purchase of the infrastructure and radios as one purchase and is providing both infrastructure and radios below contract price.

We have not seen the proposal.

The final proposal including the VHF enhancements will be provided.

Building Penetration?

The proposed system will deliver reliable communications in medium size buildings such as office buildings and plants within Grand Haven, Holland, and the Georgetown areas and in smaller size buildings in the rural areas. The radio coverage map included in the proposal shows the guaranteed coverage within the county inside these types of buildings. The radio Sites were selected based on the building density and high incident rates within certain areas of the county in collaboration with OCCDA technical staff.

Will there be \$200 tax per radio to be paid to the State

A major change of the voice subscriber fees took place on 10/01/15; the new voice subscriber fee now is a onetime activation fee per subscriber unit of \$250.00. Template creation and modifications are a no cost work effort of the MPSCS.

Infrastructure credits can be used for the subscriber activation fees to reduce or eliminate those fees based on your investments.

There is not a second proposal with 800 or fire on VHF

Hearing the concerns from Fire, the original proposal was modified to address those concerns. There is one proposal which covers all of the County's needs. The 10 sites with VHF and 800 MHZ covers the County with world class coverage and interoperability. Due to the request to include a VHF overlay solution after the initial proposal was created, Motorola is currently in the process of updating language, equipment lists, and statement of work to show these changes. We will be providing the updated proposal in short order.

Who pays

OCCDA has run cost scenarios and forward projects at a conservative 3% rate. Based on these calculations OCCDA can pay for the system at the substantially discounted price including the VHF upgrade.

Who will do ongoing maintenance and operational costs?

The MPSCS can provide maintenance & site monitoring on a time & materials basis. These costs are invoiced yearly to the member agency.

The member also has the option to contract with another vendor for maintenance and monitoring of the locally owned and integrated sites. A contracted vendor must meet or exceed the MPSCS standards for maintenance & monitoring of the integrated sites.

The member agency will be responsible for the maintenance and servicing of dispatch consoles, mobile, portable and control station subscriber units. MPSCS does not offer any installation / maintenance / repair services related to the dispatch consoles and subscriber units.

Upgrades to the MPSCS infrastructure including locally owned simulcast systems are done by the MPSCS with funding provided by the Legislature.

How do we get equipment back – replaced – who pays?

The lifecycle on these portables and mobiles is typically 12-15 years depending on how well the equipment is cared for and used. OCCDA will pay for the initial equipment. It is difficult to predict that far out as to who will pay what at that time and what the circumstances will be.

Who will do maintenance?

See previous answer.

Does the State take over?

No, as stated in the meeting, the equipment that is purchased in this project is the County's equipment. You maintain it and ensure it is operating properly. You maintain autonomy while leveraging the State's Core.

The State does not assume or take over locally owned towers or integrated sites. The locally owned towers and sub-sites remained owned by the member agency.

The MPSCS Integration Agreement identifies a long term relationship between the member agency and MPSCS to ensure stability.

The additional benefit is that you also leverage other MPSCS investments made by locals and the State.

Who owns the equipment?

OCCDA owns the infrastructure and will issue the equipment to the users. Users will maintain their own user equipment and OCCDA will take care of the infrastructure. Current equipment owned today will remain with the individual agencies.

Does this include the public works, state parks, who has access to this system?

Today the MPSCS has public works, state parks, federal parks, public schools, public transportation, EMS, federal, tribal and other agencies using the MPSCS as their primary communications. Many times a community's supporting agencies are added after the initial deployment of the First Responders radios. Yes, all above agencies have access to the system DNR is currently a user as well as State Parks.

What are other dispatcher centers doing?

There are 62 - 911 dispatch centers using Michigan's Public Safety Communications System (MPSCS) for primary dispatch.

As Radio Consoles need to be replaced Dispatch Centers similar and also smaller in size to OCCDA have invested in the console that will connect them to MPSCS. Narrow banding affected counties more than what was anticipated; therefore counties have been investing in or building a plan to migrate to MPSCS. As an example more recently, Midland County, similar to Ottawa, invested in more infrastructure to provide coverage for both Fire and Law. There are many dispatch centers that can be called out. A few are Washtenaw, Livingston, Lapeer, Wayne, and Genesee. Below is a contact for Midland. This county recently went through the same decision as you with the same reservations from Fire.

Midland County Central Dispatch - Lisa Hall 989-839-6464

What are the specific mandates?

An integrated site or system must meet the minimum technical and maintenance standards as established by the MPSCS.

The MPSCS works with a member agency to develop a communications plan that is responsive to their needs. The member agency determines the number of Talk groups they require for their communications plan.

Sharing of Talk groups require written approval of the owner agency and requesting agency. Enabling Emergency Alert functionality on a subscriber unit requires the Radio Control Manager (RCM) or written agreement with an MPSCS member agency who could monitor the Emergency Alerts. The Radio Control Manager (RCM) feature is included in the proposal.

Fire Chiefs heard the paging would be on VHF and radio on 800

The current proposed solution is to keep fire Paging/Voice on VHF using the same pagers as today. There is an 800 MHz paging solution from Unication that was recently certified on MPSCS. If fire would like to evaluate that solution while they are operating as they are today, they are welcome to do so. Outside of additional VHF sites for voice and paging coverage, no provisions have been made for 800 MHz pagers.

Surrounding counties, where are they at – Muskegon, Allegan, Kent, how will this affect interoperability?

Allegan County has an end of life EDACS for which they are releasing requirements in December. Kent County is considering MPSCS. Motorola has provided budgetary pricing and coverage maps to Kent. Muskegon County is still considering options at this time, but fire has the same reservations around if they were to go and others don't. Sheriff's Dept purchased 800 radios to improve interoperability. All have had meetings with MPSCS discussing options of joining the system.

How old is the new equipment – sitting on a shelf for how long?

The equipment for this system will be built to order, including mobiles and portables. They will be installed with the latest software compatible with the system. No warranty will start on the system or radios until beneficial use begins on the system.

Narrow Banding Grant – 3 year portable, are we held liable with the grant, grant provisions?

The updated proposal includes 2 VHF countywide simulcast channels. These channels allow for full operation of all existing VHF radios. Grant audits will therefore not be an issue.

- What is the schedule for the radios – to be replaced?**
Radios will be issued and training will begin based upon the agreed project schedule. In the event the county wishes to start using the dual band radios prior to that, they can be issued based on OCCDA policies.

- How would financing broadly if property tax at 4% and a following year tax is at 5%, who will pay this difference?**
Cost calculations have been run using 3% as a baseline. It would be advantageous to the Citizens (tax payers) of Ottawa County for Law, Fire and OCCDA to partner beginning in 2016 to apply for grants toward this purchase. This would save interest payments moving forward, and there are not any penalties for early payment of the "lease to own" agreement.

- Been buying part on Ebay – determine time line**
The current VHF simulcast system is utilizing many critical components approximately 20 years old. These components include critical transmitters on all primary channels, simulcast control equipment and most importantly simulcast audio quality circuit boards. For several years Tele-Rad has been working with OCCDA staff to source these items from third party manufactures and used equipment brokers including searching internet sources such as eBay.

- County own medical?**
Plan is to leave Medical where they are. Current UHF equipment will remain in place, but capacity is available for Medical to join the proposed system design. The MPSCS system is accepted as an approved medical control in the event OCCDA elects to migrate Medical control in the future.

- System put to fire chiefs – why is it still good**
Contract utilizing Tele-Rad as its local service partner. The system has many dated components and has been using third party manufactured components to keep it operational for several years. Maintenance contract costs have escalated over recent years as a result. The 2016 Motorola Maintenance Contract for the existing system includes best effort clauses due to lack of availability of critical components. The current VHF system has been maintained since its inception under a Motorola contract.

□ **Are there other manufacturers?**

Several models of subscriber radios manufactured by multiple vendors have been evaluated, tested and approved for use on the MPSCS radio network. A list of approved subscriber radios is posted on the MPSCS web site and is updated as new radios are approved.

Motorola is the only vendor who can provide simulcast system & integrated dispatch consoles equipment compatible with the MPSCS.

□ **This system proposal is for ten towers, what if down the road we need three more, who pays?**

Motorola is guaranteeing the 800 MHz coverage with a thorough and rigorous Coverage Acceptance Test Plan as part of the contract to prove we are meeting or exceeding radio coverage as shown on the coverage map. If we do not meet the radio coverage as proposed, then Motorola will resolve the problem at no cost to the County.

□ **Is there an analysis done for the project?**

The need has been identified and on the OCCDA Strategic and Capital Budget Plans since 2002. It was again revisited in 2011 when narrow banding occurred. It was determined at that time and coupled with a serviceability and obsolescence issue that what was done in narrow banding was a short term solution (4-6 years). Radio projects of this size take 15-18 months to implement so therefore we are at our threshold to move forward to ensure mission critical communications stays current and we build a system for the future.

□ **How do towers help other counties – will we get cost back**

Due to the physics of the radio waves, the County's towers will provide coverage beyond its borders. By the same fact, MPSCS towers in other counties, existing and future towers, will provide additional coverage and interoperability to Ottawa.

Yes, the MPSCS system is made up of State owned and local owned towers; the MPSCS sees value in the infrastructure that Locals bring to the existing and future MPSCS users. Because of this value the MPSCS provides on-going system upgrades, provide Anti-Virus updates, offer system maintenance, monitoring support at a time and material basis to the infrastructures local owner, and provides credits to offset their subscriber activation fee.

□ **Some townships have repeaters, how will these work with 800**

Existing township VHF repeaters will remain in place and can be utilized by agencies using their Dual Band radios as well as existing radios on VHF. The updated proposal protects the usable life of VHF repeaters and infrastructure currently in place by providing for the continued use of all fire VHF equipment.

- **Private public safety, hospitals – will they be able to acquire equipment under a reduced cost?**

All Equipment is available on the State of Michigan contract and available to agencies listed above.

- **Proposal system capacity**

The 12 channel 800Mhz proposed trunked system takes advantage of the greater efficiency of trunking vs. conventional radio systems. Currently, 5 VHF channels operate today in a conventional mode with all channels not available at all sites. The 12 trunked channel system will be greater than 2 x the capacity of the current system. The twelve channel system allows for traffic from current MPSCS users, New Ottawa County users as well as expansion for incidents and growth.

- **How many simultaneous calls can be made at one time?**

On the current VHF system, depending on which site you are hitting, up to 4 simultaneous calls can take place today. With the new solution proposed 2 simultaneous calls on VHF and 11 on 800 MHz. You will still have the same number of talk around channels in VHF plus talk around capability in 800MHz. This increases total amount of channels by more than 3X.

- **Who makes the final decision?**

OCCDA Policy Board with a team approach of stake holder input.

- **Why were committees by passed?**

Sometimes an opportunity provides itself and don't go through the regular process. Members of the OCCDA staff have been engaged in researching the MPSCS system for over two years. The radio committee did visit in July at Motorola Solutions headquarters in Schaumburg, IL for an opportunity to review alternative technologies as well as the APX subscriber radios and the MCC 7500 dispatch consoles.

- **There has been no positive comment from fire chiefs using 800**

There are 497 fire agencies with about 14,000 radios on the MPSCS radio system. Some Fire agencies on the MPSCS exclusively use 800MHz for fire and fire ground communications. The physics of 800 MHZ spectrum is superior to VHF both in terms of wavelength (better for use in buildings) and no intermodulation (interference).

The baseline to satisfaction with a system is the coverage. The coverage designed in the Ottawa County system will provide coverage superior to today's VHF coverage due to the number of sites and the physics of 800 MHZ compared to VHF in buildings. Here are a few examples of counties who have joined MPSCS:

Saginaw County, Midland County, Lapeer County, Genesee County, Detroit FD, Wayne and Washtenaw County and Livingston County(800/V)

Please feel free to reach out to:

Chief Jim Peterson
Saginaw Twp Fire
989-792-9691

Marysville FD (St Clair Co)
Tom Konik
989-348-8190

Fredrick Fire
Doug Pratt
989-390-2301

Lapeer City FD (Lapeer Co)
Terry Kluge
810-664-0833

City of Livonia
Jon Unruh
734-466-2133

Others can be provided upon request.

- Ebay – what parts are being ordered, fire chiefs have not even heard of this.**
The current VHF simulcast system is utilizing many critical components approximately 20 years old. These components include critical transmitters on all primary channels, simulcast control equipment and most importantly simulcast audio quality circuit boards. For several years Tele-Rad has been working with OCCDA staff to source these items from third party manufactures and used equipment brokers including searching internet sources such as eBay.
- 3 to 5 year received funding on Narrow Banding through grants and what was left the money came from municipalities – how can this be explained to townships**
All current VHF radios purchased during narrow banding can be utilized on the new VHF proposed solution and can be served as backup and expanded fire ground communication.
- P25 compliant?**
The 800MHz solution is P25 compliant. Moving to VHF P25 would prevent the reuse of existing VHF radios. Hearing concerns as listed in the previous question and several others led us to an analog solution today which maximizes previous investments and positions the agencies with equipment that can make the jump to P25 VHF in the future if desired with newly provided mobiles and portables.

- Would like to hear from Dispatch technicians – what are the problems**
 OCCDA staff have done a good job of sustaining the current 20+ year old VHF system. The current 5 site VHF system is having difficulty with in building penetration and Fire paging in some areas. OCCDA technical staff have questions around operational procedures, and some technical questions many of which are addressed in these questions and / or can be resolved with Motorola engineering, MPSCS staff, and OCCDA sub-committees.
- Bus drivers, coast guard are on VHF, it is how we communicate now, how with 800**
 Law enforcement still retains existing VHF equipment and Fire has dual band radios. Dispatch will have VHF/800 capabilities. Coast Guard also has 800 MHz radios.
- Is Ebay or is cost the issue**
 As outlined in previous questions both of these issues are concerning to the County and its users. Both the current age and sustainability of the system are cause for great concern.
- What is the reason for not exploring other systems**
 We went to our longtime communications partner Motorola. We asked them to look at VHF, UHF, and 800. We asked them to look at needs for today, improving coverage, Interoperability, and where we should be in the next 10-15 years. At the technology briefing much of this was discussed and a recommendation from Motorola that the best position for Ottawa County for the long term was a P25 800 MHz solution. This being based on where the growth continues in the state, Interoperability, Federal requirements for grants and being P25 compliant as well as where technology is being developed at in the 700/800 MHz bands.

MPSCS is designed for exactly this purpose, one system to save taxpayer dollars while providing interoperability statewide; the goal of the P25 Standard.
- Why only Motorola**
 Motorola is the chosen vendor for the MPSCS system and is the only provider for infrastructure add-ons to MPSCS. Motorola provided us a bundled price which gives OCCDA the opportunity to save several millions of dollars. If we were to break off parts of the solution, the incentives offered will be removed. It is a complete solution to meet the needs of the County. Motorola has provided more than 90% of the radios in use on MPSCS.

- The current system when implemented there were gaps, if new system in place who will fill the gaps**
 Motorola is guaranteeing the 800 MHz system with a thorough and rigorous Coverage Acceptance Test Plan as part of the contract to prove we are meeting or exceeding radio coverage as shown on the coverage map. If we do not meet the radio coverage, then Motorola will resolve the problem at no cost to OCCDA.
- Kalamazoo has 800 with dead spots and had to put repeaters in buildings, who pays for the cost**
 Kalamazoo took a different approach by not adding any sites initially when joining the system to enhance desired in building coverage. A different approach was taken in our design for our County. If after coverage testing, there are deficiencies identified this should be addressed proactively with an ordinance on new construction and therefore developers pay the cost. If individual buildings require BDA's (in-building repeaters), that would be at the building owner's cost.
- Should be testing before buying**
 Coverage cannot be tested without sites being built and the system deployed. Every design is specific to the topography of the county and can/should be designed to the coverage required. Prior to go live, countywide testing will be done with County and Motorola personnel to determine coverage and potential issues jointly.

Motorola is guaranteeing the 800 MHz system with a thorough and rigorous Coverage Acceptance Test Plan as part of the contract to prove we are meeting or exceeding radio coverage as shown on the coverage map. If Motorola does not meet the radio coverage, then Motorola will resolve the problem at no cost to the County.
- Number of channels?**
 12 trunked channels on 800 MHz
 2 conventional VHF channels
 Plus talk around/ fire ground on both 800/VHF
- Connectivity for backhaul?**
 Motorola will work with OCCDA, Ottawa County, the intermediate school district and the Board of Public Works to utilize their fiber networks or existing 4.9 links. Ethernet connections will need to be extended to each site. Motorola and MPSCS will work with Ottawa County during the implementation phase to define and design the connectivity.
- How much for a VHF total system upgrade?**
 The VHF system upgrade is being provided at no additional cost to OCCDA with the current proposal.

□ **Radio pricing for dual band / single moving forward**

A new radio ranges from \$1,600-\$5,000 depending on models, features and functionality desired.

All of the Motorola APX family of radios is available at substantial discount on the State of Michigan purchase contract and available for all Public Safety agencies.

The APX 6000 is the most popular radio for public safety. The price will vary based on options, for budgetary purpose agencies should budget approximately \$3500 for radio replacement or expansion of their fleet.

Board of Commissioners Committee Agenda Item

Committee: Public Health & Safety
From: Jason Torrey, Central Dispatch/911
RE: Michigan Public Safety Communications System (MPSCS)

Meeting Date: July 1, 2015

INFORMATION

Effective communications is the foundation for an efficient and effective emergency services response system. The conventional radio system used in Grand Traverse County today has been around for a very long time. This technology is limited in its functionality and the infrastructure design does not meet the countywide coverage needs of our public safety agencies. First responder safety and rapid responses to citizen emergencies are dependent upon quality radio communications.

The Technical Subcommittee of The 911 Board of Directors has been actively researching options for the improvement of radio communications for ALL first responders in Grand Traverse County. The options are really quite limited. We can maintain the VHF system we have, while investing in infrastructure upgrades and improvements to maximize the system functionality. The other options are to build our own state of the art 800 MHz system at a significant cost to county taxpayers, or leverage the existing technology provided for through the MPSCS, that is already being paid for by the taxpayers, and considered to be a proven and financially feasible solution.

The Michigan Public Safety Communications System is a Motorola Astro P25 trunked communications system and designed as a "state of the art" system that services federal, state, and local public safety agencies statewide. The tax payers of Michigan have been supporting the build out and maintenance costs for over a decade. Through partnerships established with nearly 1,500 Michigan public safety agencies, the MPSCS has proven to be the radio communications system of choice, while providing maximum coverage, reliability, and interoperability.

EVALUATION OF BENEFITS

The MPSCS:

Spans 59,415 square miles.

Serves more than 1,468 federal, state and local public safety agencies.

Infrastructure includes 244 towers sites that service nearly 69,000 radios.

Operates on the 800MHz and 700MHz frequency range.

Network Communications Center (NCC) is staffed 24x7x365, providing system monitoring, prompt response to failures, assignment and activation of interoperable talkgroups, and technical support for first responders.

COVERAGE STUDY

The importance of quality audio cannot be stressed enough. The most challenging aspect to a communications system is the portable talk back capabilities. Portable radios usually operate at a maximum of 5 watts and therefore need more significant infrastructure compared to a mobile radio, and they are also the radio used most often by first responders in the field while conducting on scene investigations and incident management.

Grand Traverse County explored the idea of partnering with the MPSCS back in 2004, and as part of that process a coverage study was conducted to analyze the county VHF system as it compared to the MPSCS 800MHz at the time. As current as December, 2014 another coverage study was conducted to reassess that coverage. The results of those studies are summarized below:

The Circuit Merit (CM) Rating System is used to evaluate voice quality. The scale ranges from a low of 0 to a maximum of 5.0. CM ratings of 3.0 or higher are considered passing scores, while anything below a CM 3.0 is considered a failure.

2004 Study

MPSCS - There were 477 points tested for portable to base ratings with an average CM rating of 4.88 out of a possible 5.0. The percent of CM 3.0 or greater ratings was 98.74%. The percent at 3.0 or less was 1.26%.

County VHF – There were 539 points tested for portable to base ratings with an average CM rating of 3.21. The percent of CM 3.0 or greater ratings was only 71.99%. The percent at CM 3.0 or less was 28.01%.

2014 Study

In December of 2014, the Michigan State Police Communications Radio Unit conducted another coverage test of the MPSCS. 17 local public safety officials participated in testing 719 points in Grand Traverse County. The rating for MPSCS in Grand Traverse County was 98.05% at CM 3.0 or higher. This test also included every school library, cafeteria, and main office area as well as several in building tests along with selected trouble spots known to local first responders.

MPSCS MEMBERSHIP BENEFITS

97% statewide mobile coverage, and 98% Grand Traverse County portable coverage.

24x7 system monitoring

User Training

System maintenance, technology upgrades, and software enhancements included

Maximum interoperability

RADIO SELECTION

The Technical Subcommittee of the 911 Board of Directors was tasked with finding the radio solution to meet the needs of all Grand Traverse County first responders. Although there is a wide array of MCSPS approved radios that are system compatible, further research indicated that there are only a few that are commonly used. The primary radio manufacturers on the system are:

Motorola	72,457	95.8%
Kenwood	1,563	2.2%
EF Johnson	1,275	1.8%
Tait	146	0.2%

Each public safety agency was tasked with exploring the benefits of each radio manufacturer independently. The technical team also solicited on site demonstrations of the most popular radio models on the system, including Motorola, EF Johnson, and Kenwood.

Several follow up discussions with other users from our region found that a majority prefer the Motorola product as a superior selection to the others. They cite the physical design, noise cancelling technology, and service after the sale as being the driving force for selecting the Motorola product. The Motorola brand backbone of the MPSCS also makes for ease of programming and integrated technology. A commitment to invest in the Motorola MCC7500 dispatch consoles also serves as the integrated middle management piece that services both the subscriber units as well as the connectivity to the Motorola Astro P25 backbone.

The Motorola brand radio is the most widely used radio on the system and was the featured radio during the coverage testing. They are also an American manufacturer, whom has a reputation for providing excellent service after the sale, state of the art noise cancelling technology, longevity and durability.

VHF SIMULCAST PAGING

Paging concerns have been a long standing issue in Grand Traverse County. Effective and efficient alerting systems are the key to getting first responders on scene as quickly as possible. As with several communities facing these challenges, it is understood that quick, one page alerting systems are the key to an effective notification process. We currently page 6 fire stations with multiple paging messages, thus consuming extra time from the dispatch staff and lost response time from first responders that are waiting for the second message. These multiple paging configurations have developed from degradation of service through narrowbanding and the need to reach broad geographic boundaries.

Coverage and engineering studies of potential paging sites locations indicate that partnering with the MPSCS to collocate on their existing towers will provide not only the best paging coverage, but also provide for monitored, secure, and emergency power located at each of the paging locations. The very robust MPSCS network connectivity would be utilized to support this functionality.

IMPLEMENTATION PLAN

- Approval from Board of Commissioners
- Sign membership agreement
- Develop communications plan and initial template design
- Obtain letters of concurrence to ensure interoperability
- Finalize template
- Order radios
- Schedule training
- Program radios
- Deploy enhanced VHF simulcast paging system utilizing MPSCS infrastructure.

PRICING SUMMARY

The MPSCS has also made a commitment to invest \$150 million dollars in lifecycle upgrades that include the replacement of equipment at all 244 sites on the system. Northern Lower Michigan is scheduled for these upgrades in the fall. A commitment from Grand Traverse County to partner with the MPSCS prior to the projected fall upgrades will allow for the necessary build out, accommodating the additional radios to happen in conjunction with these projects, thus saving hundreds of thousands of additional infrastructure costs.

Motorola provides state contract pricing, and the 911 Board of Directors and technical team has worked to incentivize this proposed investment and has received a pricing summary that provides for rates below state contract. A proposed pricing summary with lease options is attached. The pricing summary accounts for a standard purchase and a one-for-one replacement of every first responder portable and mobile radio in Grand Traverse County. A standard radio package was chosen based on functionality, a thorough evaluation, and a needs assessment.

ATTACHMENTS

- MPSCS – Fact Sheet
- Grand Traverse County Technical Advisory Q&A session
- MPSCS – Infrastructure overview
- MPSCS – Service Centers
- Proposed VHF simulcast paging solution coverage study
- Proposed base radio package, including mobile/portable radio, antenna, battery, charger, speaker microphone, programming, and a 5 year warranty
- Subscriber maintenance costs
- Pricing Summary
- Leasing Options

RECOMMENDATION

The 911 Board of Directors is requesting approval to:

Review and negotiate a contract for the purchase of the proposed Motorola brand 800MHz radio units and VHF paging solution in a bundled package with the previously approved MCC7500 dispatch consoles.

Sign into a membership agreement with the Michigan Public Safety Communications System (MPSCS)

PRICING

Individual Pricing for MCC7500 Consoles, VHF Simulcast Paging, and 800MHz Subscribers All pricing is based on State of Michigan Contract 071B2200101	
MCC 7500 Six (6) Position Console and NICE IP Logger	\$670,013
Trade In Six (6) Centracom Gold Elite	-\$18,000
Order by August 4 th , 2015	-\$65,000
Console Total with Trade in and Incentives	\$587,013
VHF Simulcast Paging	
Six (6) Site One Channel VHF Analog Simulcast Paging	\$507,397
Discount for a contract by August 4 th , 2015 for all items as proposed.	-\$50,000
System Total with Incentives	\$457,397
MPSCS Subscribers	
APX 800 MHz Mobiles and Portables	\$3,215,509
Discount (\$400 per radio for 795 units) for a contract by August 4 th , 2015 for all items as proposed.	-\$318,000
Subscribers Total with Incentive	\$2,897,509
Total Project	
Total Cost MCC7500 Consoles, VHF Simulcast Paging, and 800MHz Subscribers	\$4,392,919
Total Discount	-\$451,000
Total Project with Incentives	\$3,941,919
Bundle Incentive for a contract by August 4 th , 2015 for all items as proposed	-\$350,000
Total Project with Bundle Incentive	\$3,566,919

Motorola's Lease quote can be found on the following page.





Date: June 8, 2015

Financing proposal for: Grand Traverse County, MI

Motorola Customer Financing recognizes that each opportunity presents unique issues and characteristics. Therefore, our approach involves understanding our customer's operational goals and financial objectives. Should you feel another financing structure is required, Motorola Customer Financing would welcome the opportunity to work with you.

Transaction Type: Municipal Lease-Purchase Agreement / Tax Exempt Financing

Lessor: Motorola Solutions, Inc. (or its Assignee)

Lessee: Grand Traverse County, MI

Amount: \$3,586,919.00

Down Payment: \$0.00

Balance to Finance: \$3,586,919.00

Equipment: As per the Motorola Solutions equipment proposal.

Title, Insurance, & Maintenance: Title to the equipment will vest with the Lessee, and the Lessee will be responsible to insure & maintain the equipment as outlined in the lease contract.

Taxes: Personal property, sales, leasing, use, stamp, or other taxes are for the account of the Lessee.

	<u>Option One</u>	<u>Option Two</u>
Lease Term:	Six (6) annual pmts	Nine (9) annual pmts
Lease Start Date:	Q2 2015	Q2 2015
Lease Rate: ***	2.390%	2.977%
*** Please note this special financing offer is being subsidized by Motorola Corporate to the bank and such subsidy is limited, subject to change, including elimination, and is only available for financed transactions.		
Lease Pmt Factor:	0.183097	0.139249
Lease Payment:	\$653,090.64	\$464,588.14
Payment Commencement:	First annual pmt due 1/1/2017	First annual pmt due 1/1/2017

Please be advised the rates above are indicative of current market conditions and should be used for INFORMATIONAL PURPOSES ONLY. The actual lease rates will be locked on a mutually agreed upon date closer to the actual order date and will reflect then-current market conditions.

Program Highlights: Low, tax exempt financing interest rates... the most cost effective & easiest way for State & Locals to raise cash.

Eliminate miscellaneous financing costs associated with bonding... NO special counsel fees, underwriter's fees, origination costs, or reserve fund requirements. Every dollar you borrow gets allocated towards your project.

No pre-payment penalties provided payment is made on a regularly scheduled lease payment date.

Lease Payments are subject to annual appropriation, so the Lessee DOES NOT pledge its full faith and credit.

Future equipment upgrades can easily be accommodated via add-on lease schedules, restructuring already existing deals, etc.

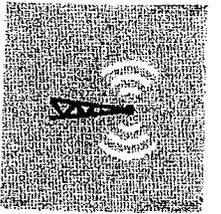
Qualifications: Receipt of a properly executed documentation package.

The interest portion of the Lease Payments shall be excludable from the Lessor's gross income pursuant to Section 103 of the Internal Revenue Code.

Receipt of a copy of the last 2 year's audited financial statements and current year's budget from the Lessee.

This proposal should not be construed as a commitment to finance. It is subject to final credit approval.

For questions concerning this quote, please contact: Paul Mecaskey
Motorola Solutions Credit Company LLC
847-538-3707
pjm@motorolasolutions.com



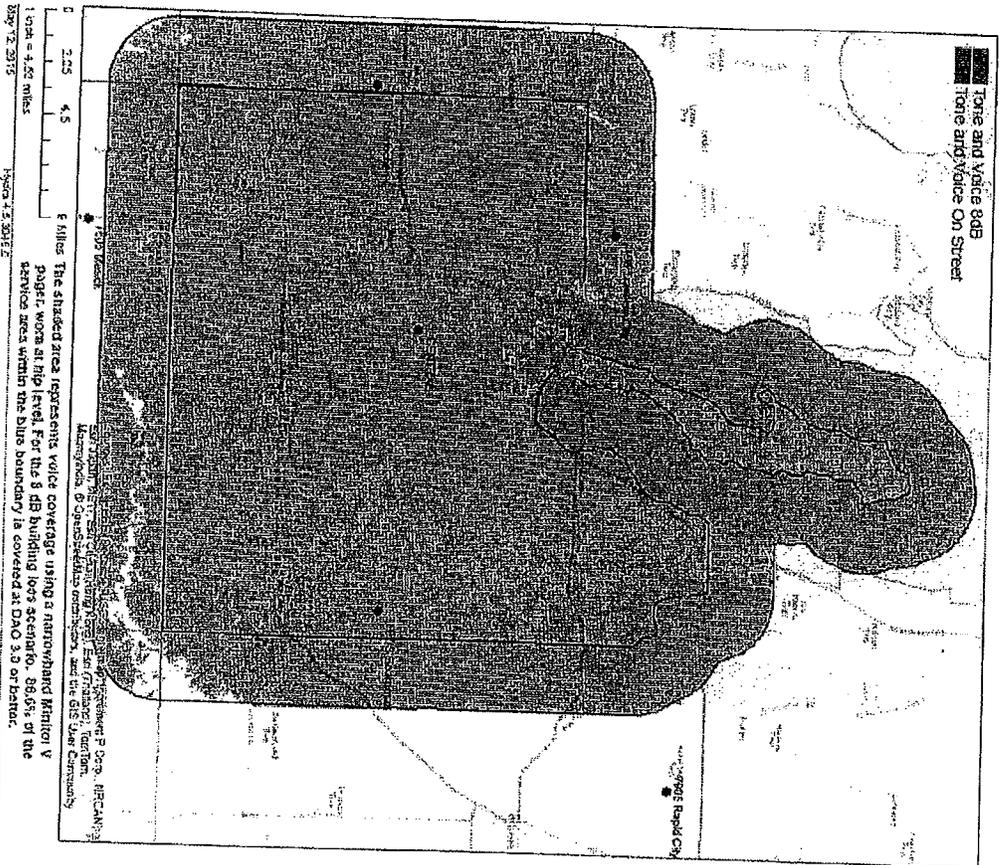
UTILIZING MPSCS AND CENTRAL TOWER

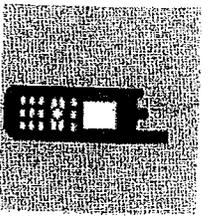


MOTOROLA

Grand Traverse County, Michigan
VHF Simulcast Paging System Voice Coverage

For Informational
Purposes Only





MOBILES AND PORTABLES



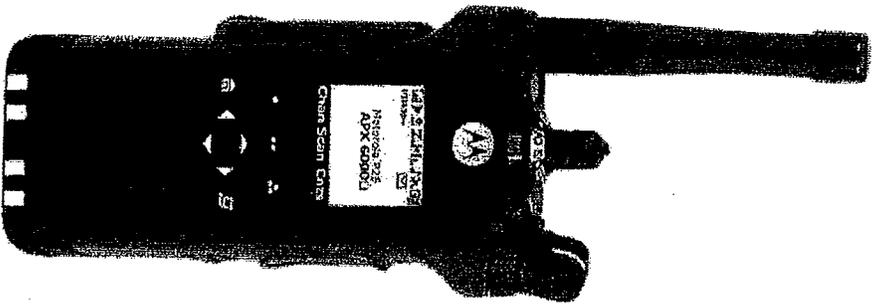
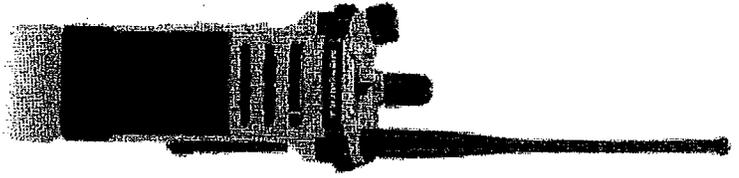
APX6000 Model 2.5

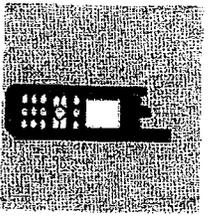
- Antenna
- Battery
- Charger
- Speaker Microphone
- Programming
- 4 Years SFS



Sample Options

- XE Rugged Housing \$496.00 (\$800.00)
- Man down \$93.00 (\$150.00)
- AES/DES-XL/DES-OFB \$700.00 (\$1129 ENCRYPTION W/ Multi Key
- Multi Unit Charger \$591.00 (\$788.00)
- XE Speaker Microphone \$251.25 (\$335.00)



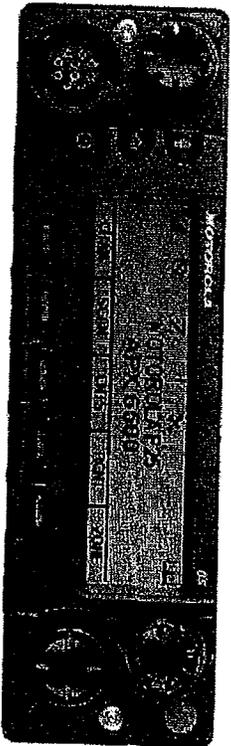


MOBILES AND PORTABLES



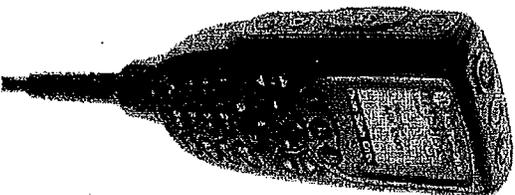
APX6500 O5 Dash Mount

- Speaker
- Microphone
- Antenna
- Programming
- Removal / Installation
- 4 years SFS



Sample Options

- O3 Control Head \$320.00 (\$More than O5)
- Remote Mount \$106.64(\$More than Dash Mount)
- Dual Control Head \$454.00(\$732.00)
- AES/DES-XL/DES-OFB \$700.00 (\$1129.00)
ENCRYPTION W/ Multi Key



RADIO OPTIONS



APX™ 6000 PROJECT 25 PORTABLE RADIO

Delivering outstanding performance in a compact form factor without sacrificing the features you need most. The APX™ 6000 is the next generation of ruggedly-reliable performers that gives you the advanced features such as Mission Critical Wireless and GPS location tracking in a small, P25 Phase 2 capable radio. Whether you're on patrol or racing to a fire, the APX 6000 puts you in greater control of your safety, response time and technology investment.

Focus on the task not the technology, with the real-world ready radio that turns mission critical into mission complete.

CUTTING-EDGE FEATURES IN A COMPACT SIZE

- Innovative T-grip design gives you a secure grip and better control
- High-contrast color display is easy to read in different lighting conditions
- Top display is quick to read while looking down, at a glance or from an angle
- Universal push-to-talk button with enhanced grooves is easy to find by "touch"

EXCELLENT AUDIO YOU CAN HEAR LOUD AND CLEAR

- Excellent audio ensures voice communications are intelligible, even in high noise environments
- Dual sided 2 microphone noise canceling technology
- Equipped with the latest AMBE digital voice vocoder

FUTURE-READY TECHNOLOGY TO RELY ON TODAY

- Small P25 Phase 2 capable radio that provides twice the voice capacity
- Backwards and forwards compatible with all Motorola mission critical radio systems
- Supports applications like Mission Critical Wireless and GPS location tracking for greater safety

- Universal Push-to-Talk
- T-Grip
- Dual Battery Latch
- Orange emergency button
- 16 position rotary switch
- 2 position concentric switch
- 3 position toggle switch
- 3 programmable side buttons
- Transmit LED indicator
- Backlit Keypad:
 - Home and Data buttons
 - 3 soft keys
 - 4 direction navigation key
 - 4 x 3 keypad
- Full Bitmap Display:
 - 2 lines of icons
 - 4 lines x 14 characters of text
 - Status icons

PRODUCT SPEC SHEET
APX™ 6000



FEATURES AND BENEFITS:

- Available in 700/800 MHz, VHF, UHF R1, and UHF R2 bands
- Trunking standards supported:
 - Clear or digital encrypted ASTRO®25 Trunked Operation
 - Capable of SmartZone®, SmartZone Omnilink, SmartNet®
- Analog MDC-1200 and Digital APCO P25 Conventional System Configurations
- Narrow and wide bandwidth digital receiver (6.25 kHz equivalent/25/20/12.5 KHz)
- Embedded digital signaling (ASTRO & ASTRO 25)
- Available in 3 models
- Integrated GPS capable
- Intelligent Lighting
- Radio Profiles
- Unified Call List (Models 2.5 and 3.5 only)
- User programmable voice announcement
- Meets Applicable MIL-STD-810C, D, E, F and G
- IP67 standard (submersible 1 meter, 30 minutes)**
- Yellow and green colored housing options
- Custom recess label areas

Superior Audio Features:

- 0.5 W high audio speaker
 - Dual microphones
 - 2-mic noise canceling technology
 - Utilizes Windows XP, Vista and Windows 7 Customer Programming Software (CPS)
 - Supports USB communications
 - Built in FLASHport™ support
- Full portfolio of accessories including IMPRES batteries, chargers and audio devices

OPTIONAL FEATURES:

- Mission Critical Wireless***
- Enhanced Encryption capability
- Programming Over Project 25
- Over the Air Rekey
- Text Messaging
- Man Down
- Rugged submersible housing** (2 meters, 2 hours)

*Per the FCC Narrowbanding rules, new products (APX6000 UHF R1, UHF R2) submitted for FCC certification after January 1, 2011 are restricted from being granted certification at 25KHz for United States - State & Local Markets only.

** Radios meet industry standards (IP67) for immersion.

*** Compatible with BT 2.0 and HSP and PAN BT Profiles

TRANSMITTER - TYPICAL PERFORMANCE SPECIFICATIONS

		700/800	VHF	UHF Range 1	UHF Range 2
Frequency Range/Bandsplits	700 MHz 800 MHz	763-776, 793-806 MHz 806-824, 851-870 MHz	136-174 MHz	380-470 MHz	450-520 MHz
Channel Spacing		25/20/12.5 kHz	25/20/12.5 kHz	25/20/12.5 kHz	25/20/12.5 kHz
Maximum Frequency Separation		Full Bandsplit	Full Bandsplit	Full Bandsplit	Full Bandsplit
Rated RF Output Power Adj ¹		1-3 Watts Max	1-6 Watts Max	1-5 Watts Max	1-5 Watts
Frequency Stability ¹ (-30°C to +60°C; +25°C Ref.)		±0.00010 %	±0.00010 %	±0.00010 %	±0.00010 %
Modulation Limiting ¹		±5 kHz / ±4 kHz / ±2.5 kHz	±5 kHz / ±2.5 kHz	±5 kHz / ±2.5 kHz	±5 kHz / ±4 kHz / ±2.5 kHz
Emissions (Conducted and Radiated) ¹		-75 dB	-75 dB	-75 dB	-75 dB
Audio Response ¹		+1, -3 dB	+1, -3 dB	+1, -3 dB	+1, -3 dB
FM Hum & Noise	700 MHz 800 MHz	-48 dB/-47 dB -46 dB/-45 dB	-47 dB -45 dB	-47 dB -45 dB	-47 dB -45 dB
Audio Distortion ¹	700 MHz 800 MHz	0.60 % 1 %	0.50 %	0.50 %	0.50 %

BATTERIES FOR APX 6000

Battery Capacity / Type	Dimensions (HxWxD)	Weight	Battery Part Number	Battery Capacity
Li-Ion IMPRES 2150 mAh IP67***	3.39" x 2.34" x 1.46"	5 oz	PMNN4403	2150 mAh
Li-Ion IMPRES 2900 mAh IP67	3.07" x 2.34" x 1.65"	6.53 oz	NNTN7038	2900 mAh
Li-Ion IMPRES 4200 mAh IP67	5.07" x 2.34" x 1.65"	11.29 oz	NNTN7034	4200 mAh
Li-Ion IMPRES 4100 mAh FM ² IP67	5.07" x 2.34" x 1.65"	11.29 oz	NNTN7033	4100 mAh
NiMH IMPRES 2100 mAh IP67	5.12" x 2.34" x 1.57"	11.82 oz	NNTN7037	2100 mAh
NiMH IMPRES 2000 mAh FM ² IP67	5.12" x 2.34" x 1.57"	11.82 oz	NNTN7036	2000 mAh
NiMH IMPRES 2000 mAh FM ² Rugged	5.12" x 2.34" x 1.57"	11.82 oz	NNTN7035	2000 mAh
NiMH IMPRES 2100 mAh Rugged	5.12" x 2.34" x 1.57"	11.82 oz	NNTN7573	2100 mAh
Li-Ion IMPRES 2300 mAh FM ² Rugged	3.39" x 2.34" x 1.65"	6.53 oz	NNTN8092	2300 mAh



RADIO MODELS			
	MODEL 1.5	MODEL 2.5	MODEL 3.5
Display	Full bitmap monochromatic LCD top display 1 line text x 8 characters 1 line of icons No menu support Multi-color backlight	Top display plus: Full bitmap color LCD display 4 lines of text x 14 characters 2 lines of icons 1 menu line x 3 menus White backlight	Top display plus: Full bitmap color LCD display 4 lines of text x 14 characters 2 lines of icons 1 menu line x 3 menus White backlight
Keypad	none	Backlight keypad 3 soft keys 4 direction Navigation key Home and Data buttons	Backlight keypad 3 soft keys 4 direction navigation key 4x3 keypad Home and Data buttons
Channel Capacity*	96	1000	1000
FLASHport Memory	64 MB	64 MB	64 MB
700/800 MHz (763-870 MHz)	H98UCD9PW5AN Q360EF	H98UCF9PW6AN Q380EF	H98UCH9PW7AN Q360EF
VHF (136-174 MHz)	H98KGD9PW5AN Q360EG	H98KGF9PW6AN Q380EG	H98KGH9PW7AN Q360EG
UHF Range 1 (380-470 MHz)	H98QDD9PW5AN Q360EH	H98QDF9PW6AN Q380EH	H98QDH9PW7AN Q360EH
UHF Range 2 (450-520 MHz)	H98SDD9PW5AN Q360FC	H98SDF9PW6AN Q380FC	H98SDH9PW7AN Q360FC
Buttons & Switches	Large PTT button ■ Angled On/Off volume control ■ Orange emergency button ■ 16 position top-mounted rotary switch ■ 2-position concentric switch ■ Multi-color backlight ■ 3-position toggle switch ■ 3 programmable side buttons		
Transmitter Certification			
700/800 (764-869 MHz)	AZ489FT5863		
VHF (136-174 MHz)	AZ489FT3829		
UHF Range 1 (380-470 MHz)	AZ489FT4892		
UHF Range 2 (450-520 MHz)	AZ489FT4903		
FCC Emissions Designators			
FCC Emissions Designators	11K0F3E, 16K0F3E, 8K10F1D, 8K10F1E, 8K10F1W, 20K0F1E**		
Power Supply			
Power Supply	One rechargeable 2150 mAh Li-Ion Battery Standard (PMNN4403), with alternate battery options available.		

RECEIVER - TYPICAL PERFORMANCE SPECIFICATIONS					
		700/800	VHF	UHF Range 1	UHF Range 2
Frequency Range/Bandsplits	700 MHz 800 MHz	763-776 MHz 851-870 MHz	136-174 MHz	380-470 MHz	450-520 MHz
Channel Spacing		25/20/12.5 kHz	25/20/12.5 kHz	25/20/12.5 kHz	25/20/12.5 kHz
Maximum Frequency Separation		Full Bandsplit	Full Bandsplit	Full Bandsplit	Full Bandsplit
Audio Output Power at Rated ¹		500mW	500mW	500mW	1000 mW
Frequency Stability ¹ (-30°C to +60°C; +25°C Ref.)		±0.00010 %	±0.00010 %	±0.00010 %	±0.00010 %
Analog Sensitivity ²	12 dB SINAD	0.250 µV	0.216 µV	0.234 µV	0.234 µV
Digital Sensitivity ⁴	1% BER (800 MHz) 5% BER	0.347 µV (0.333 µV) 0.251 µV	0.277 µV 0.188 µV	0.307 µV 0.207 µV	0.307 µV 0.207 µV
Selectivity ¹	25 kHz channel 12.5 kHz channel	75.7 dB 67.5 dB	79.3 dB 70 dB	78.3 dB 68.1 dB	78.3 dB 67.5 dB
Intermodulation		80 dB	80.5 dB	80.2 dB	80.2 dB
Spurious Rejection		76.6 dB	93.2 dB	80.3 dB	80.3 dB
FM Hum and Noise	25 kHz 12.5 kHz	-54 dB -48 dB	-53.8 dB -48 dB	-53.5 dB -47.4 dB	-53.5 dB -47.4 dB
Audio Distortion ¹		.9 %	1.20 %	0.91 %	0.91 %



PRODUCT SPEC SHEET
APX™ 6000

PORTABLE MILITARY STANDARDS 810 C, D, E, F & G										
	MIL-STD 810C		MIL-STD 810D		MIL-STD 810E		MIL-STD 810F		MIL-STD 810G	
	Method	Proc./Cat.	Method	Proc./Cat.	Method	Proc./Cat.	Method	Proc./Cat.	Method	Proc./Cat.
Low Pressure	500.1	I	500.2	II	500.3	II	500.4	II	500.5	II
High Temperature	501.1	I, II	501.2	I/A1, II/A1	501.3	I/A1, II/A1	501.4	I/Hot, II/Basic Hot	501.5	I/A1, II/A2
Low Temperature	502.1	I	502.2	I/C3, II/C1	502.3	I/C3, II/C1	502.4	I/C3, II/C1	502.5	I/C3, II/C1
Temperature Shock	503.1	I	503.2	I/A1C3	503.3	I/A1C3	503.4	I	503.5	I/C
Solar Radiation	505.1	II	505.2	I	505.3	I	505.4	I	505.5	I/A1
Rain	506.1	I, II	506.2	I, II	506.3	I, II	506.4	I, III	506.5	I, III
Humidity	507.1	II	507.2	II	507.3	II	507.4	1 Proc	507.5	II/Aggravated
Salt Fog	509.1	I	509.2	I	509.3	I	509.4	1 Proc	509.5	1 Proc
Blowing Dust	510.1	I	510.2	I	510.3	I	510.4	I	510.5	I
Blowing Sand	1 Proc	1 Proc	510.2	II	510.3	II	510.4	II	510.5	II
Immersion	512.1	I	512.2	I	512.3	I	512.4	I	512.5	I
Vibration	514.2	VIII/F, Curve-W	514.3	I/10, II/3	514.4	I/10, II/3	514.5	I/24	514.6	I/24
Shock	516.2	I, III, V	516.3	I, V, VI	516.4	I, V, VI	516.5	I, V, VI	516.6	I, V, VI
Shock (Drop)	516.2	II	516.2	IV	516.4	IV	516.5	IV	516.6	IV

DIMENSIONS OF THE RADIOS WITHOUT BATTERY		
	Inches	Millimeters
Length	5.47	139
Width Push-To-Talk button	2.39	60.7
Depth Push-To-Talk button	1.40	35.6
Width Top	2.98	75.7
Depth Top	1.58	40.1
Depth Bottom of Battery	1.24	31.5
Weight of the radios without battery	10.9 oz	309 g

ENCRYPTION	
Supported Encryption Algorithms	ADP, AES, DES, DES-XL, DES-OFB, DVP-XL
Encryption Algorithm Capacity	8
Encryption Keys per Radio	Module capable of storing 1024 keys. Programmable for 64 Common Key Reference (CKR) or 16 Physical Identifier (PID)
Encryption Frame Re-sync Interval	P25 CAI 300 mSec
Encryption Keying	Key Loader
Synchronization	XL – Counter Addressing OFB – Output Feedback
Vector Generator	National Institute of Standards and Technology (NIST) approved random number generator
Encryption Type	Digital
Key Storage	Tamper protected volatile or non-volatile memory
Key Erasure	Keyboard command and tamper detection
Standards	FIPS 140-2 Level 3 FIPS 197

GPS SPECIFICATIONS	
Channels	12
Tracking Sensitivity	-159 dBm
Accuracy ¹	<10 meters (95%)
Cold Start	<60 seconds (95%)
Hot Start	<10 seconds (95%)
Mode of Operation	Autonomous (Non-Assisted) GPS

RUGGED OPTION SPECIFICATIONS	
Leakage (immersion)	MIL-STD-810 C,D,E,F and G Method 512.X Procedure I
Housing Availability	Black (Standard), Public Safety Yellow and High Impact Green

ENVIRONMENTAL SPECIFICATIONS	
Operating Temperature ²	-30°C / +60°C
Storage Temperature ³	-40°C / +85°C
Humidity	Per MIL-STD
ESD	IEC 801-2 KV
Water and Dust Intrusion	IP67, MIL-STD
Immersion	MIL-STD 512.X/I

¹ Measured in the analog mode per TIA / EIA 603 under nominal conditions
² When used with an FM approved intrinsically safe radio
³ Measured conductively in analog mode per TIA / EIA 603 under nominal conditions.
⁴ Measured conductively in digital mode per TIA / EIA IS 102.CAAA under nominal conditions.
⁵ Accuracy spec is for long-term tracking (95th percentile values >5 satellites visible at a nominal -130 dBm signal strength).
⁶ Temperatures listed are for radio specifications. Battery storage is recommended at 25°C, ±5°C to ensure best performance.

Specifications subject to change without notice. All specifications shown are typical. Radio meets applicable regulatory requirements.

Motorola Solutions, Inc. 1301 East Algonquin Road Schaumburg, Illinois 60196, U.S.A. 800-367-2346
motorolasolutions.com

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R3-4-2035H



KENWOOD



VIKING



P25 Mission Critical

VP6230/6330/6430

700/800 MHz • VHF • UHF Lo • UHF Hi (T-Band)
P25 PHASE 1 & 2 • FM ANALOG • SmartNet®/SmartZone®

New KENWOOD Viking 6000 series portable radio specifically designed for today's public safety agencies with advanced features and ergonomics to meet the first responder's mission critical operational needs.

MAIN FEATURES

- Public safety ergonomics: flare grip for total control, large glove friendly knobs, large emergency button
- Intrinsically safe
- Top display maximizes viewing while in a pouch or sling
- Fully ruggedized - IP67 & MIL-STD-810 C/D/E/F/G
- Large, color 1.74" (240 x 180 pixels) transfective TFT display for better use in direct sunlight & with use of polarized sunglasses
- Full key models (w/numeric keypad) & standard key models (w/o numeric keypad)
- Multi-line text
- Programmable A/B/C/D switch for intuitive control
- Built-In GPS receiver/antenna for enhanced situational awareness
- P25 Authentication
- Multi-key DES encryption
- 256-bit AES encryption
- ARC4™ encryption; compatible with ADP™
- OTAR (Over-The-Air Rekeying)
- Future option: Bluetooth®
- Future option: Man Down

SUPERIOR AUDIO QUALITY

- TrueVoice™ noise cancellation works in analog or digital, eliminates the need for programming noise profiles, and works with any accessory
- AMBE+2 version 1.6 vocoder using TIA's latest standards
- 1 Watt radio speaker for high noise environments
- Voice annunciation and custom voice announcement creation

ACCESSORIES

- Complete line of accessories including speaker mics, cases, batteries, antennas & chargers. Download the accessory catalog at www.efjohnson.com/products/accessories.

MULTI-PROTOCOL

- Trunked & conventional system protocols
- P25 Phase 1 & Phase 2
- Compatible with Motorola® System v7.x, Motorola Astro® & SMARTNET® II/SmartZone®
- MDC-1200 & GE-Star signaling
- Mixed protocol zones (each channel in a zone can be from a different system)

SMARTER ARMADA® FLEET MANAGEMENT

- Program from same template as other Viking radios (one template for ALL radios)
- P25 OTAP (Over-The-Air-Programming)
- Kiosk Mode remote programming
- Elite (wireless) battery management & centralized battery reports



April 20, 2018 DRAFT

**INTERGOVERNMENTAL AGREEMENT
CREATING THE
CCE 911 CENTRAL DISPATCH AUTHORITY**

THIS INTERLOCAL AGREEMENT is among Charlevoix County, a Michigan political subdivision, whose address is 203 Antrim St., Charlevoix, Michigan 49720 (Charlevoix), Cheboygan Cheboygan, a Michigan political subdivision, whose address is 870 South Main Street, Cheboygan, Michigan 49721 (Cheboygan), and Emmet County, a Michigan political subdivision, whose address is 200 Division Street, Petoskey, Michigan 49770 (Emmet), (collectively the Counties or the Incorporating Municipalities).

Recitals

- A. The Counties created the 911 Central Dispatch Authority of Lower Michigan (911 C.A.L.M.) under the Urban Cooperation Act, MCL 124.501, *et seq*, in 1993.
- B. The purpose of 911 C.A.L.M. was to centralize dispatch of emergency service responders within the Counties.
- C. In 2004, 2005, 2010, and 2012 purported amendments to the 1993 Agreement were adopted by Resolutions of the Emmet County Board of Commissioners.
- D. These Resolutions, however, were not found in the records of Charlevoix County and Cheboygan County.
- E. As a result, questions have arisen when the original 1993 Agreement was actually amended by actions of all three Counties.
- F. In addition, the records of the Michigan Office of the Great Seal do not show that the 1993 Agreement was every filed with that office.
- G. The Counties, therefore, desire to enter into this Agreement, incorporating an authority under the Emergency Services to Municipalities Act, Act 57 of the Public Acts of 1988, as amended, being MCL 124.601, *et seq*, (the

Act) to continuing providing centralize dispatch of emergency service responders within the Counties.

Agreement

NOW, THEREFORE, in consideration of the mutual promises contained herein, the Incorporating Municipalities hereby agree to incorporate the following Authority, under the terms and conditions provided herein, pursuant to the provisions of the Act:

ARTICLES OF INCORPORATION

I. NAME

The name of the Authority shall be the “CCE 911 Central Dispatch Authority”.

II. PURPOSE

The purpose of the Authority shall be to provide emergency health or safety services, specifically to provide a primary public safety answering point (PSAP) within the meaning of the Emergency 9-1-1 Service Enabling Act, Act 32 of the Public Acts of 1986, as amended, being MCL 484.1101, *et seq*, within the total territory of the Incorporating Municipalities

III. LEGAL ENTITY

As provided in Section 6 of the Act, the Authority shall be a separate, non-profit body corporate, with power to sue or be sued in any court of this state. The Authority shall possess all the powers necessary to carry out the purpose of its incorporation, and those incident to those purposes. The enumeration of the powers in these Articles of Incorporation shall not be construed as a limitation upon the Authority’s general powers.

IV. POWERS

Except as provided in Article V below, the Authority shall have the following powers, which shall be liberally construed in its favor:

- A. All powers provided in the Act, now or in the future, in connection with the delivery of the emergency health or safety services specified in these Articles.
- B. To acquire real and personal property by purchase, lease, gift, devise, or condemnation, either within or without its corporate limits.
- C. To hold, manage, control, sell, exchange, or lease the real and personal property it has acquired.
- D. To condemn private property under Act No. 149 of the Public Acts of 1911, being sections 213.1 to 213.25 of the Michigan Compiled Laws, and the uniform condemnation procedures act, Act No. 87 of the Public Acts of 1980, being sections 213.1 to 213.77 of the Michigan Compiled Laws.
- E. Subject to Section 10 of the Act, to hire and discharge employees, attorneys, accountants, a fiscal agent, clerical staff, and consultants as the Authority Board considers necessary to carry out the purpose of the Authority.
- F. To adopt bylaws and rules of administration to accomplish the purposes of the Act, including but not limited to establishing rules and regulations for the governance of the Authority's employees and for the care and management of the Authority's equipment and property.
- G. To apply for and accept grants, loans, or contributions from the federal government or any of its agencies, the state, or other public or private agencies to be used to carry out the purpose of the Authority.
- H. To enter into any contracts with other entities not prohibited by law.
- I. To investigate emergency services requirements, needs, and programs and engage, by contract, consultants as may be necessary and cooperate with the federal government, state, political subdivisions, and other authorities in those investigations.
- J. To levy a tax on all of the taxable property within the limits of the Authority (within the territory of the Incorporating Municipalities) to be used to carry out the purpose of the Authority.

- K. To carry over fund balances from year to year consistent with sound financial management for capital improvements , equipment purchases, contingencies and other similar purposes for which contingency fund balances are customary.
- L. To take any additional action or make any policy necessary to implement these powers or carry out the purpose of the Authority.

V. LIMITATIONS

Notwithstanding the powers enumerated and conferred in Article IV above, any of the following activities must be approved by the legislative bodies of all of the then current Incorporating Municipalities before the Authority Board may exercise its authority:

- A. The placing on a ballot of a proposal seeking electoral approval for a tax levy.
- B. The issuance of any bonds.
- C. The addition of any Incorporating Municipalities to the Authority.
- D. The provision of any emergency services beyond 911 call answering and dispatching services.
- E. The implementation of any capital improvement project that exceeds \$50,000 for each such project.

VI. BOARD OF DIRECTORS

The Authority shall be governed by a Board of Directors (the Authority Board). The Authority Board shall exercise final authority regarding the powers of the Authority. The Authority Board may delegate to its staff and committees such powers as it deems appropriate, as long as such delegation does not create a conflict of interest or is otherwise unlawful.

- A. The Authority Board shall be comprised of nine (9) members to be composed as follows:

1. Three county commissioners, one appointed from each County Board of Commissioners. Each County Board of Commissioners may appoint one alternate board member.
 2. Three city or village representatives, one selected from each County. The local government representative and an alternate shall be selected by majority vote of all of the mayors and village presidents in the county, and may be a mayor, village president, village trustee, city council member or city manager.
 3. Three township representatives, one selected from each County. This representative and an alternate shall be selected by a majority vote of the Michigan Township Association chapter in each County. and may be an elected township official,
- B. Each alternate shall be entitled to participate and vote at Authority Board meetings in the absence of the regular Board member for which that alternate serves.
- C. A quorum of the Authority Board necessary to conduct business shall be a majority of the entire Authority Board (i.e., five (5) board members). All decisions of the Authority Board shall be made by the vote of a majority of the entire board members (i.e., a vote of five (5) board members) and not simply by a majority of those board members present.
- D. Except for the standing committees established under these Articles of Incorporation, the Authority Board may create and discharge such committees as it deems appropriate.
- E. The Authority Board shall set its schedule for meetings, but at a minimum shall meet at least quarterly each year.
- F. The Authority Board may reimburse its members, officers, and employees for authorized expenses which have been incurred on behalf of the Authority.

- G. The Authority Board shall adopt its own rules of procedure. The Authority Board shall also comply with the Open Meetings Act, as amended, and the Freedom of Information Act, as amended.

VII. OFFICERS

The Authority Board shall annually select from its members a Chairperson, Vice Chairperson, and Secretary. Each officer shall serve for a term of one (1) year, or until his or her successor is appointed and assumes office. The Chairperson shall be the presiding officer of the Authority Board. In the absence of the Chairperson, the Vice Chairperson shall perform the duties of the Chairperson. The Secretary shall be the recording officer of the Authority. In addition to the officers specified herein, the Authority Board shall select a fiscal agent, who is not required to be a member of the Authority Board and who shall serve at the pleasure of the Authority Board. The fiscal agent shall maintain all financial records of the Authority and shall report to the Authority Board at its regular meetings. At the request of the Authority Board, the fiscal agent shall give the Authority a bond in an amount determined by the Authority Board for the faithful performance of his or her duties. No Authority funds shall be expended, except by a check or other bank draft signed by the fiscal agent and one Authority officer as determined by the Authority Board.

VIII. STANDING COMMITTEES

The following standing committees are hereby established:

- A. Executive Committee. An Executive Committee of the Authority Board is hereby established and shall be composed of the Chairperson, Vice Chairperson, and Secretary during the times they hold their respective offices. The Executive Committee shall be empowered to transact Authority business between Authority Board meetings, as necessary, except that the Executive Committee shall not be authorized to approve an annual operating budget, amend the Articles of Incorporation, or amend or repeal any resolution of the Authority Board. The Executive Committee shall meet as needed at the call of the Chairperson or upon the written request of two (2) of the committee members filed with the Authority's Executive Director. The Executive Director shall mail or deliver, either personally or by electronic means, a notice of the

meeting to the Executive Committee members no less than three (3) day before the meeting. A quorum of the Executive Committee shall be a majority of its members present in person, and all business transacted by the Executive Committee shall be by a majority vote of the members present in person. The Executive Committee shall keep minutes of its proceedings, which minutes shall be filed with the minutes of the Authority Board, and any action taken by the Executive Committee shall be presented to the Authority Board for ratification at its next regular meeting.

- B. Technical Advisory Committee. A Technical Advisory Committee (TAC) is hereby established as an advisory committee to the Authority Board. The members of the TAC shall serve without compensation from the Authority.
1. Membership. The members of the TAC shall be all of the following. Alternate members may participate and vote at TAC meetings when the regular member is not present.
 - a. The Executive Director of the Authority, or his or her designated alternate.
 - b. The County Sheriff of each County, or the Sheriff's designated alternate.
 - c. One (1) Chief of Police or Director of Public Safety from each County appointed by the Authority Board, or the designated alternate appointed by the Authority Board.
 - d. One (1) representative of the Michigan State Police, or alternate, designated by the Michigan State Police.
 - e. One (1) Fire Chief or representative from the County Fire Association from each County appointed by the Authority Board, or the designated alternate appointed by the Authority Board.

- f. One (1) Emergency Medical Services representative appointed by the medical authority of each County, or the designated alternate appointed by the medical authority of each County.
 - g. A Prosecuting Attorney from one of the Counties appointed by the Authority Board, or the designated alternate appointed by the Prosecuting Attorney.
 - h. The Chief of Police of the Little Traverse Bay Bands of Odawa Indians, or the designated alternate appointed by the Bands.
- 2. Officers of the TAC. The TAC shall select from its members a Chairperson, Vice Chairperson, and Secretary, who shall each serve a term of one (1) year, or until their successors are appointed and assume office. The Chairperson shall be the presiding officer of the TAC. In the absence of the Chairperson, the Vice Chairperson shall perform the duties of the Chairperson. The Secretary shall be the recording officer of the TAC.
 - 3. Responsibilities of the TAC. The TAC shall advise and make recommendations to the Authority Board concerning technological and other issues related to the Authority's ability to provide quality centralized dispatch services to emergency service responders within the Counties.
 - 4. Meetings. The TAC shall meet as needed at the call of the Chairperson or upon the written request of five (5) of the TAC members filed with the Executive Director. The Executive Director shall mail or deliver, either personally or by electronic means, a notice of the meeting to the executive committee members no less than three (3) day before the meeting. A quorum of the TAC shall be a majority of its members present in person, and all business transacted by the TAC shall be by a majority vote of the members present in person. The TAC shall keep minutes of its proceedings,

which minutes shall be filed with the minutes of the Authority Board.

IX. DURATION

The Authority shall continue indefinitely unless it is dissolved as provided by these Articles of Incorporation.

X. FINANCES

- A. Except as provided herein, the Authority Board shall have budgetary and financial control over the Authority. The Authority Board, however, shall adopt a line item budget. A copy of the Authority's proposed budget must be given to each Incorporating Municipality at least sixty (60) days before the budget is adopted by the Authority Board. Any increase in the Authority's budget, excluding capital improvement projects, that exceeds the annual Midwest Consumer Price Index for All Urban Consumers (not seasonally adjusted) calculated for September (hereafter the CPI-U) times the prior year's originally approved budget shall be approved by the legislative bodies of all of the then current Incorporating Municipalities before the Authority Board may adopt that budget. In addition, any budget amendment(s), either individually or collectively, that requires additional contributions from the Incorporating Municipalities shall be approved by the legislative bodies of all of the then current Incorporating Municipalities before the Authority Board may adopt the budget amendment(s).
- B. Each County shall have the responsibility to fund the Authority based on the following: Charlevoix County – 32.77%; Cheboygan County – 30.77%; and Emmet County – 36.46%, which allocation percentages are the same as currently exist.
- C. Each County shall, in the sole exercise of its discretion, determine the funding mechanism desired to meet its responsibility to fund the Authority. These funding mechanisms may include one (1) or more of the following methods:
 - 1. Each County may assess a county 9-1-1 charge, as authorized under the Emergency 9-1-1 Service Enabling Act, Act 32 of the Public Acts of 1986, as amended, being MCL 484.1101, *et seq.*,

either with or without approval of the voters, as provided in the statute. Each County shall then distribute the county 9-1-1 charge collected to the Authority pursuant to this Interlocal Agreement, since the Authority is providing primary PSAP services for each County.

2. By extra-voted millage requested by each County individually and approved by the electorate within that County.
 3. By general fund appropriations from each County, as determined by the Board of Commissioners of that County.
 4. By extra-voted millage requested by the Authority under Section 12 of the Act, approved by the electorate within the territorial limits of the Authority (i.e., the results of the total votes cast in all three counties), and levied by the Authority Board.
 5. By supplemental payments by one or more of the Incorporating Municipalities, which in its/their sole discretion it/they may elect.
- D. Each County shall pay the Authority its share of the Authority's funding in two equal installments, on or before January 15 and on or before July 15 each year.

XI. FISCAL YEAR

The fiscal year of the Authority shall begin on January 1 and end on December 31 each year.

XII. TRANSFER OF ASSETS AND LIABILITIES

Because the Counties created the 911 Central Dispatch Authority of Lower Michigan (911 C.A.L.M.) under the Urban Cooperation Act, MCL 124.501, *et seq.*, in 1993, all assets owned by 911 C.A.L.M. and all liabilities of 911 C.A.L.M. are hereby deemed transferred to the CCE 911 Central Dispatch Authority incorporated by these Article of Incorporation.

XIII. WITHDRAWAL

- A. An Incorporating Municipality may not elect to withdraw as an Incorporating Municipality from the Authority unless and until all of the following conditions are satisfied:
1. Any bonded indebtedness of the Authority is discharged, or the Incorporating Municipality desiring to withdraw pays all of its share of such bonded indebtedness prior to the withdrawal; and,
 2. All outstanding obligations the Incorporating Municipality desiring to withdraw has to the Authority are discharged and all outstanding obligations the Authority has to the Incorporating Municipality desiring to withdraw are discharged.
- B. After the conditions of paragraph A, above, have been satisfied, an Incorporating Municipality may withdraw from the Authority following the procedures of this paragraph.
1. Before an Incorporating Municipality may vote on a resolution concerning withdrawal from the Authority, it must publish in a newspaper of general circulation within such Municipality, a public notice that the Municipality is considering withdrawing from the Authority. The notice shall be published at least ten (10) days before the meeting.
 2. The effective date of the resolution to withdraw as an Incorporating Municipality shall be no less than two (2) months after the meeting at which the resolution was adopted.
 3. A certified copy of the resolution to withdraw as an Incorporating Municipality shall be sent by certified mail to the Chairperson of the Authority Board and the clerks of the remaining Incorporating Municipalities. The resolution must be mailed no less than two (2) months before the effective date of the resolution.
- C. An Incorporating Municipality that withdraws from the Authority shall continue to be subject to pay to the Authority any tax levied in its jurisdiction by the Authority for the duration of the period of that tax.

- D. An Incorporating Municipality that withdraws from the Authority shall remain liable for its proportion of the normal debts and liabilities of the Authority up to the effective date of the withdrawal, but shall not be liable for any capital expenditures incurred by the Authority between the date the resolution to withdraw was adopted and the effective date of the withdrawal. The proportion of the Authority's normal debts and liabilities for which an Incorporating Municipality remains liable under this provision shall be determined by dividing the taxable value of the real property in the Incorporating Municipality by the taxable value of all real property in the Authority at the time of the withdrawal.

XIV. DISSOLUTION

The Authority may be dissolved by a two-thirds (2/3) vote of the entire Authority Board after all of the conditions and procedures for withdrawal specified in Article XII above have been met. Upon dissolution, the debts of the Authority shall be paid and the net assets shall be divided equally among or between the Incorporating Municipalities in existence at the time of the dissolution. Each Incorporating Municipality in existence at the time of the dissolution shall also be subject to the obligations imposed by the Act. If the Authority's assets are insufficient to pay all of the Authority's debts, then each Incorporating Municipality in existence at the time of the dissolution shall remain liable for those debts. The proportion of the Authority's debt for which an Incorporating Municipality remains liable shall be determined by dividing the taxable value of the real property in the Incorporating Municipality by the taxable value of all real property in the Authority at the time of the dissolution.

XV. PUBLICATION/FILING

The Charlevoix County Clerk shall be responsible for publishing these Articles of Incorporation in the *Petoskey News Review* and for filing a certified copy of these articles with the Secretary of State as required by the Act.

XVI. EFFECTIVE DATE

The Authority shall become effective _____, 2018, provided that all Incorporating Municipalities have approved these Articles of

Incorporation prior to that date. Otherwise, the Authority shall become effective the day after final approval by all of the Incorporating Municipalities.

The foregoing Articles of Incorporation were adopted by the Charlevoix County Board of Commissioners at a meeting duly held on the _____ day of _____, 2018.

By: _____
Joel Evens

Its: Board Chair

By: _____
Cheryl Potter Browe

Its: Clerk

The foregoing Articles of Incorporation were adopted by the Cheboygan County Board of Commissioners at a meeting duly held on the _____ day of _____, 2018.

By: _____
John B. Wallace

Its: Board Chair

By: _____
Karen L. Brewster

Its: Clerk

The foregoing Articles of Incorporation were adopted by the Emmet County Board of Commissioners at a meeting duly held on the _____ day of _____, 2018.

By: _____
William Shorter

Its: Board Chair

By: _____
Juli Wallin

Its: Clerk



CHEBOYGAN

AREA CHAMBER OF COMMERCE

Leadership • Engagement • Advocacy • Development • Support

Cheboygan Area Chamber of Commerce

Cheboygan Area Visitors Bureau

April 19, 2018

Cheboygan County Board of Commissioners
Cheboygan County
870 S. Main St.
Cheboygan, MI 49721

Dear Board of Commissioners,

Cheboygan County is hungry for economic development opportunities. As the largest business organization in the area, representing over 330 member businesses and organizations throughout Cheboygan County, this is a statement we hear often. We know that you have probably heard it too. In recent conversations with County Administrator Lawson and Commissioner Sangster, we understand that the economic development desires of the county will most likely be a topic of consideration at your upcoming Commissioners Planning Session.

The Cheboygan Area Chamber of Commerce Board of Directors is excited at the prospects, opportunities and potential that Cheboygan County has for economic development. Over the years, Cheboygan County has enjoyed some great partnerships with multiple entities that have handled the facilitation of economic development on our behalf. Our Board of Directors believes that those established relationships should continue. But, we also believe that an aggressive coordinated, multi-layer approach of active recruitment of new business entities, married with strong retention support for current businesses, is the best strategy to realize our full economic potential. We would encourage you to consider adding a layer to our current resources for economic development. Our Board of Directors would specifically endorse the hiring of an Economic Development Specialist on staff with Cheboygan County with a local knowledge and focus.

To help bring Cheboygan County toward its full economic potential, The Cheboygan Area Chamber of Commerce would also like to assure you that we are ready to help in any way that we can. We believe that your goal of Collaboration Service fits with our organization's goals as well. Please let us know how we might both use collaboration to advance the economic development opportunities of Cheboygan County and add an additional layer in the form of an Economic Development Specialist.

Sincerely,

Dede Anderson
Mullett Lake and Anchor In Marinas
2018 Chamber Board President

Scott A. Herceg, CAE
Cheboygan Area Chamber of Commerce
Executive Director



CHEBOYGAN COUNTY COMMUNITY DEVELOPMENT DEPARTMENT

CHEBOYGAN COUNTY BUILDING ■ 870 S. MAIN STREET, PO BOX 70 ■ CHEBOYGAN, MI 49721
PHONE: (231)627-8489 ■ FAX: (231)627-3646
www.cheboygancounty.net/planning/

Cheboygan County Solid Waste Management Plan (SWMP)

Upon recent review of the Solid Waste Management Plan it has become clear that some limited updates could be made. This requires an amendment process should the county choose to make changes to the plan.

At the next County Board of Commissioners meeting we will outline the process for a plan amendment and discuss the proposed amendments.

We provide you now with the list of proposed amendment topics, a Frequently Asked Questions document on the SWMP amendment process, flow chart, and draft Notice of Intent document that would be filed with the state should the County choose to amend the plan.

Although the last plan amendment was coordinated by NEMCOG, the County can undertake the amendment process and would keep NEMCOG involved and would have to appoint someone from NEMCOG on the SWMP committee. We'll discuss this more on Tuesday.

Proposed amendment topics

1. Decide how to treat Type B Transfer Stations
2. Make correction to list of criterion that disposal area must comply with (p. 85), possibly make different review processes for transfer stations. Existing criteria appear to be more appropriate for landfills.
3. Clarify the "two-part" siting review process (p. 72, A. and B.). There doesn't seem to be a two-part process in the plan.
4. Review *Processing Facilities* and choose how they are to be reviewed. They are not currently listed.
5. Updates
 - a. Verify locations of existing transfer stations approved in the 2000 plan.
 - b. Possible siting review fee update
 - c. Verify the list of responsible parties (p. 93-94)
6. Enforcement

**FREQUENTLY ASKED QUESTIONS:
COUNTY SOLID WASTE MANAGEMENT PLAN AMENDMENTS**

1. Is there a limit to the number of changes I can make to the Plan in an amendment?

Answer: No, you may make as many changes as needed. However, if you are amending the Plan close to a five-year update, the amendment will not serve as a substitute for a full Plan update.

2. Does the amendment approval process differ from the Plan update approval process?

Answer: No, an amendment follows the same approval process and steps as a full Plan update (see attached flowchart).

3. How long does it take for a DEQ decision to be made on an amendment?

Answer: In most cases a decision will be made within 6 months of the submittal date.

4. Does a 14 member Solid Waste Management Planning Committee (SWMPC) need to be appointed in order to develop an amendment?

Answer: Yes, unless a Solid Waste Management Planning Committee is already established.

5. Who are the 14 members of the SWMPC?

Answer: The 14 member SWMPC consists of the following: 4 shall represent the solid waste management industry, 2 shall represent environmental interest groups, 1 shall represent county government, 1 shall represent city government, 1 shall represent township government, 1 shall represent the regional solid waste planning agency, 1 shall represent industrial waste generators, and 3 shall represent the general public.

(Please note that Part 115 does not provide definitions for each of the SWMPC member positions. Therefore, the county must be able to demonstrate how each member meets the position it holds, if challenged.)

6. How is the public notified of the Public Hearing that is required during the 90-day public comment period? Is there a timeframe required for the notice?

Answer: The Public Hearing shall be published in a newspaper having a majority circulation within the county. The notice shall indicate a location where copies of the plan are available for public inspection and shall indicate the time and place of the public hearing. Yes, a notice shall be published not less than 30 days before a hearing.

7. How long does a Designated Planning Agency have to revise the amendment once the 90-day public comment period has ended?

**FREQUENTLY ASKED QUESTIONS:
COUNTY SOLID WASTE MANAGEMENT PLAN AMENDMENTS**

Answer: The Designated Planning Agency has 30 days to revise the amendment, get SWMPC approval, and recommend the amendment to the County Board of Commissioners (BOC).

- 8. Does the BOC have to approve or disapprove the amendment in a specified timeframe?**

Answer: No.

- 9. If the BOC disapproves the amendment, how long does the SWMPC have to revise it and send it back to the BOC for approval?**

Answer: 30 days.

- 10. Does a BOC have to provide objections when disapproving the amendment?**

Answer: Yes, the BOC must provide objections when disapproving the amendment. The DEQ prefers to have written objections. However, if verbal objections were provided and contained in the meeting minutes, that is acceptable.

- 11. Is there a statutory time frame in which the BOC has to make a decision on the amendment?**

Answer: No.

- 12. What happens if the BOC does not take formal action on the amendment?**

Answer: The amendment process is stopped until the BOC either approves or disapproves the amendment with objections.

- 13. If the BOC disapproves the amendment a second time, what happens to the amendment?**

Answer: If the amendment was required by the DEQ and is not approved by the BOC a second time, the BOC may prepare its own amendment. If the BOC chooses not to prepare its own amendment, the DEQ will prepare the amendment for the County.

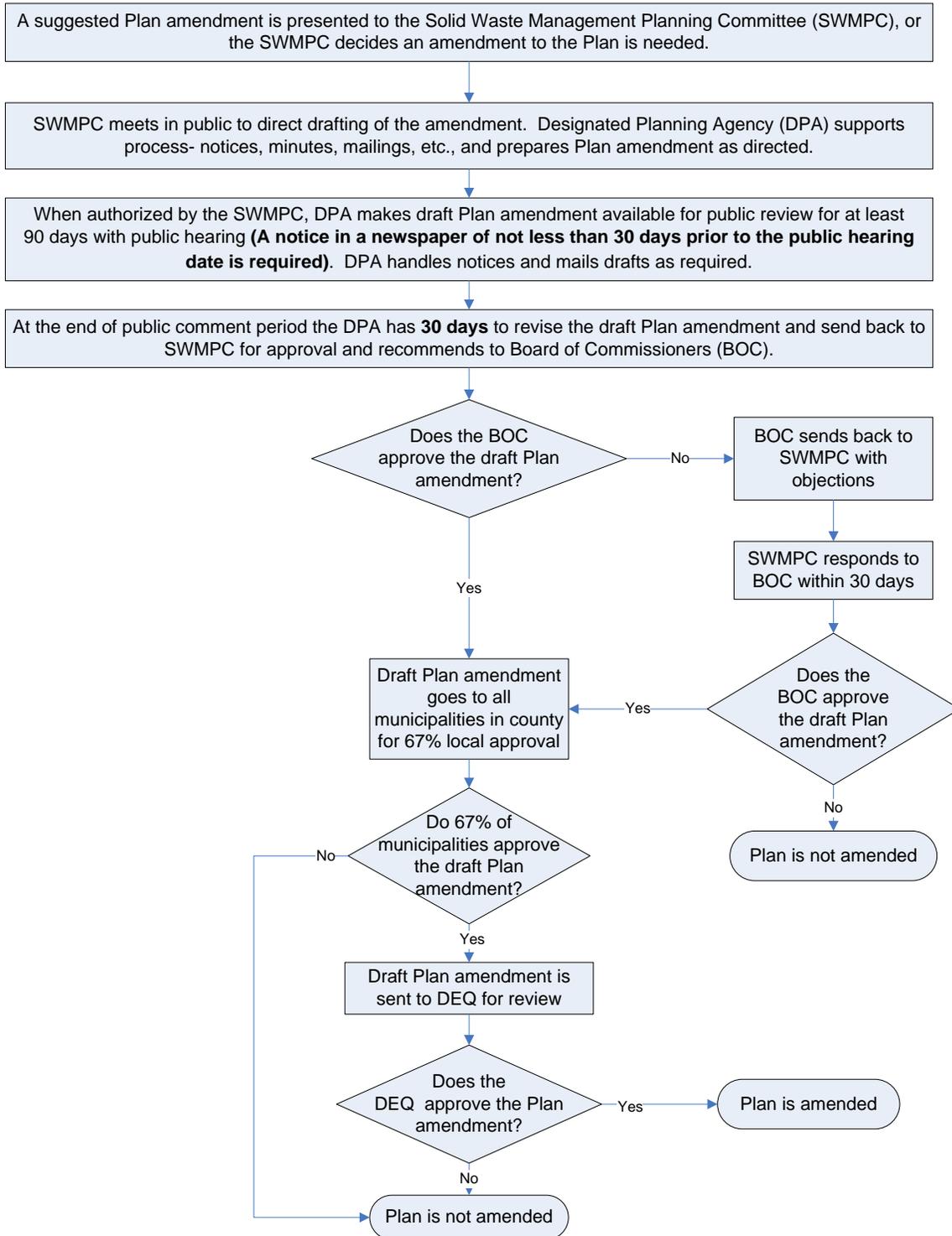
If the amendment that is being pursued was not required by the DEQ and is not approved by the BOC a second time. The amendment pursued will not be completed and the process will be done. Any new amendment must start at the beginning of the process.

- 14. Will the DEQ assume responsibility for and prepare the amendment if it has been disapproved by the BOC or municipalities?**

Answer: The DEQ only assumes responsibility for and prepares Plan updates that were initiated by the DEQ Director; unless the amendment was required by the DEQ, then it would prepare the amendment.

FREQUENTLY ASKED QUESTIONS: COUNTY SOLID WASTE MANAGEMENT PLAN AMENDMENTS

Amendment Approval Process





Michigan Department of Environmental Quality,
Office of Waste Management and Radiological Protection

**COUNTY'S NOTICE OF INTENT TO PREPARE
COUNTY SOLID WASTE MANAGEMENT PLAN AMENDMENT**

Authorized by Section 11533, Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Section 11533 indicates that the County, Municipalities, or Regional Planning Agency (as appropriate) shall notify the State as to their intent with regard to preparation of a County Solid Waste Management Plan Amendment.

The County of Cheboygan does hereby serve notice that it:

will

prepare and file with the State of Michigan, Department of Environmental Quality, Office of Waste Management and Radiological Protection an amendment of its County Solid Waste Management Plan as provided by Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Such amendment plan shall fulfill all the requirements of Part 115, as well as all applicable administrative rules.

Signed by: _____
Anthony Matelski, Chairperson, Board of Commissioners

Complete the following only if preparing plan amendment:

The Northeast Michigan Council of Governments (NEMCOG) is designated by the above named County as the agency responsible for preparation of the Solid Waste Management Plan Amendment. The address, contact person, and phone number for the County's designated planning agency is:		
Name of Contact Person: Diane Rekowski		
Name of Designated Planning Agency: Northeast Michigan Council of Governments		
Address of Agency: 80 Livingston Blvd, Suite U-108		
City: Gaylord	State: MI	Zip Code: 49734
Telephone: 989-705-3734	Fax: 989-732-5578	
E-mail Address: drekowski@nemcog.org		

Please attach a copy of the Resolution or meeting minutes of the Board of Commissioners agreeing to prepare a plan amendment.

When completed, submit this form to: SUSTAINABLE MATERIALS MANAGEMENT UNIT
SOLID WASTE SECTION
OFFICE OF WASTE MANAGEMENT AND RADIOLOGICAL PROTECTION
DEPARTMENT OF ENVIRONMENTAL QUALITY
PO BOX 30241
LANSING MI 48909-7741

County Notice of Intent received by Department of Environmental Quality, Office of Waste Management and Radiological Protection	
By: _____	Date: _____