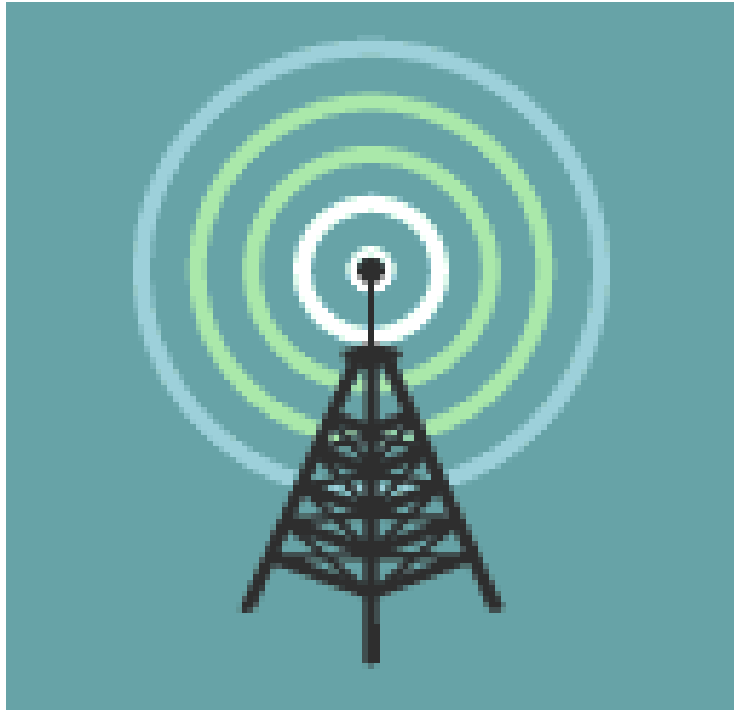


# **WASHTENAW COUNTY**

## **800 MHz CONSORTIUM**

### **BUSINESS PLAN**



**Amended October 1, 2005**

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## 1. EXECUTIVE SUMMARY

### Public Safety Emergency Responders

Washtenaw County has 29 emergency response agencies – 15 fire departments, 12 police agencies, 1 primary ambulance agency, and 1 countywide Hazardous Materials team. Together, these agencies provide emergency response services to the 341,625 County residents and an estimated 70,042 non-residents who commute to Washtenaw County for employment. These agencies are dispatched to emergencies through one of the nine 9-1-1 Public Safety Answering Points (PSAPs) located in Washtenaw County.

It is in the best interest of citizens if these agencies are able to support one another in times of emergency. But currently, the 29 agencies have communications equipment that is not always compatible, essentially preventing agencies from direct communication during emergencies. In addition, radio equipment does not function in certain areas of the County thereby preventing any emergency communication. A change in federal equipment standards will also require much of the equipment to be replaced in the near future.

### Recommendations

After thorough analysis of nine options to improve the communication capacity of emergency responders in Washtenaw County, the 800 MHz Consortium recommends that:

- The Michigan Public Safety Communication System (MPSCS) become the standard platform for all emergency response equipment for Washtenaw County police, fire, and EMS agencies;
- All public safety agencies migrate their communications equipment to this common platform;
- The site towers already operated by the MPSCS (both in Washtenaw and surrounding counties) be used to transmit radio signals and additional towers (four estimated) be constructed to ensure 93% geographic coverage for portable radios across Washtenaw County;
- This equipment and infrastructure be funded by revenues generated through a county-wide dedicated millage in an amount and for a period to be determined by the Board of Commissioners;
- The recommended millage be subject to a vote of the residents of Washtenaw County in May 2006, as proscribed by Michigan law.

### Migration Plan

If the majority of county voters agree to this dedicated millage, the addition of equipment, and the migration to the MPSCS would guarantee:

- At least 97% geographic coverage with mobile radios, 93% portable in-building coverage in medium buildings in the cities of Ann Arbor and Ypsilanti, and 93% portable in-building coverage in light buildings in the remainder of Washtenaw County;
- All public safety agencies would operate on a common communications platform, thereby allowing for interagency communications to occur;
- Compliance with changes in federal communications guidelines that would require the majority of our existing equipment to be replaced by 2015;
- The capacity for digital transfer of data between radios across the county in the near future.

As an aid to the reader, there is a glossary of commonly used terms in Appendix A.

## 2. STATEMENT OF THE PROBLEM

Local units of government should have authority and discretion over the level of service that is appropriate for their constituencies. However, in times of emergency response, it is frequently necessary for police, fire, and ambulance agencies to work across jurisdictional boundaries. To do so requires that agencies have communication equipment that operates on the same frequency and has similar capacity. Washtenaw County's public safety agencies currently have four different communications systems, hindering inter-agency collaboration in the time of greatest need, thereby needlessly increasing the level of danger that is faced by officers, firemen, paramedics, and the people they are trying to help.

### What is the Need for Common/Updated Equipment?

In April 2005, a Michigan State Police trooper spotted a vehicle traveling eastbound on I-94 in the Jackson area that had just been described as having been involved in a bank robbery in Jackson. A chase began. As the robbery suspect and trooper continued eastbound, phone calls were made to Washtenaw County dispatch to alert area police agencies that the chase was headed our way. Once the chase entered Washtenaw County, troopers from the Ypsilanti post got involved, and the chase could now heard by all subscribers to the Washtenaw County 800 MHz Radio Consortium as those locally stationed troopers began broadcasting over our radio system. The chase traversed the County, and as local officers approached the eastern boundary, their commanders called them back. Radio contact was lost as troopers switched back to their own frequencies.

In downtown Ann Arbor in 2003, a large fire developed in an old factory at the corner of W. Huron and Fifth Streets. Fire personnel from the City of Ann Arbor, the City of Ypsilanti, Ann Arbor Township, and Pittsfield Township, Ann Arbor Police officers, and EMS personnel from HVA responded to deal with the fire emergency, as traffic was re-routed and firefighters fought the blaze. Although emergency personnel were within sight of each other, at times communications between them were difficult, because some of the departments did not operate on the same radio system as others. Coordinating the operation meant relaying messages through each agency's dispatch center, instead of being able to use direct on-site communications. Any time that messages are relayed through another person, instead of directly, there is the risk of error. The cost of that error is very high in public safety, and can result in loss of life or property for victims and public safety officers.

In another situation in March of 2005, an Eastern Michigan University Public Safety officer encountered a man with a gun. He heard shots being fired in a carport and exited his car to locate the source. He then tried to call in on his portable radio as he worked his way between vehicles to locate the shooter. All he got was an out of range signal, and he could not use his portable radio to communicate. At that point, he was on his own trying to locate the gunman. He found him and took him into custody alone, and, luckily, without incident or injury to anyone. Several Ypsilanti cars had also heard the shots being fired, and came to his assistance as the EMU officer was placing the suspect in his vehicle. The problem turned out to be that his radio was out of tune because of "frequency drift" caused by the age of the equipment. It took some time to discover the nature of the problem, and once it was properly diagnosed, it was discovered that radios from the Ypsilanti Police Department, and Washtenaw County Sheriff's office were also in need of the same repair.

There have been other instances of late of the radio system failing because of the age and condition of the equipment that has now been in use since 1986. A number of these failures have caused a loss of communications countywide until they were corrected. Luckily, none have yet resulted in a disaster when county police, fire, or ambulance personnel suddenly lost radio communications.

In all of these instances, however, there has been undue risk for police, fire, EMS personnel, and the public. Large-scale emergency scenes are becoming more and more common. We are all facing a changing reality in the world in which we live. Events like the terrorist strikes of September 11, 2001, and the blackout of August 2003 show that emergency workers are tasked with a greater responsibility for dealing with large-scale emergencies. Additionally, with necessary budget cuts causing a reduction in staff and equipment, many agencies find that they frequently have to rely on assistance from other agencies, as we can no longer staff or equip our agencies to the same extent as before.

Washtenaw County has 15 fire departments, 12 police agencies, 1 primary ambulance company, and 1 Hazardous Materials team. At a large emergency event, many of these agencies would supply equipment and personnel to assist. Coordinating the response of the public safety community to such an event is a monumental task, the foundation of which is good communications. If communications fail, response times could be delayed, services could be duplicated or ineffective, and most importantly, the lives of the rescuers as well as the public could be placed at great risk.

## How Does Public Safety Radio Equipment Work?

In general, police, fire and ambulance radios are similar to cell phones. They only work as long as the radio signal can reach a nearby radio tower/antenna. As illustrated above, failure of the radio places people at risk of injury or death. Additionally, not all of the public service agencies in Washtenaw County operate on the same radio system. Some of the agencies use radios that can't talk to other agencies' radios because of differences in technology. Being able to talk directly with another rescue worker at a scene is key to an effective and timely response.

Also similar to cell phones, radio communication can become difficult indoors, underground, and in remote locations where it is difficult for a radio tower and a portable radio to establish a signal with one another. Certain emergencies require communications within buildings. This is especially true for fire and police emergencies in heavily urbanized settings. See the diagram in Appendix B for a graphic representation of how emergency responders are notified of emergencies. It shows that communication is effective provided that emergency responders are operating with equipment that is compatible. Incompatible equipment creates a barrier that prevents direct communication among agencies that are not on the same system. In times of significant emergency, this failure to communicate directly (that is, effectively and efficiently) can place responders and the public in unnecessary danger.

Another concern with the current system is the lack of signal coverage. Currently, there are many places across Washtenaw County where emergency responders cannot receive a radio signal at all, or one so poor, it affects the audio quality of the radio conversation. This creates a great concern for the safety of emergency responders and the public in these areas.

The impact of poor audio quality, or no signal at all, has the potential for catastrophic events for those in the field who rely on communications equipment as their lifeline. Police officers on a traffic stop that are suddenly confronted with an armed suspect, firefighters who are in a building and need to get out due to a dangerous situation, paramedics who encounter an unruly patient - all of these scenarios are very real and possible within Washtenaw County. In order to reduce the possibility of one of these scenarios being played out in our community to a disastrous end, Washtenaw County needs to significantly upgrade their communications network to cover the county adequately.

### 3. RESPONSE TO THE PROBLEM

In response to this problem, the 800 MHz Consortium has been meeting to research the issue, develop this plan, and recommend strategies to overcome this issue. The Consortium established three criteria for evaluating any plan: 1) interoperability allowing all Police, Fire, and EMS agencies to directly communicate with one another; 2) at least 97% geographic coverage with mobile radios, 93% portable in-building coverage in medium buildings in the cities of Ann Arbor and Ypsilanti, and 93% portable in-building coverage in light buildings in the remainder of Washtenaw County; 3) sustainability from a funding perspective.

#### History of 800 MHz in Washtenaw County

Prior to the inception of the 800 MHz Radio Consortium, each police and fire agency licensed their own radio channels, and communicated on their own frequencies. In some cases, if an agency's radios were equipped with the frequencies of the neighboring jurisdiction, they could monitor the radio traffic of that jurisdiction, but could not broadcast on it. Thus, if an Ann Arbor officer were monitoring on their police radio a chase by a Washtenaw County Sheriff's deputy that had come into Ann Arbor, and wanted to communicate with that deputy, it required having the Ann Arbor officer radio the Ann Arbor dispatcher, having the Ann Arbor dispatcher call the County dispatcher on the telephone to relay the message, then having the County dispatcher radio the County car with the message. It was time consuming, frustrating, confusing, and sometimes created a dangerous situation.

With the advent of the 800 MHz radio system in 1986, Ann Arbor Police, Washtenaw County Sheriff's Department, Saline Police, and Milan Police combined to form the 800 MHz Communications Coordinating Council. Because the four agencies shared a computer-controlled radio system that employed multiple radio frequencies that were dynamically assigned as the radio calls came in, they could talk directly to one another by simply changing the talk-group switch on the radio. It was a tremendous boon to the way police business could be conducted on the street. The costs of purchasing the system were paid by a special assessment imposed on each of the original four participating agencies – Ann Arbor, Milan, Saline, and the Washtenaw County Sheriff – and paid from their General Fund money.

As word of the ability to talk among various agencies with one radio system got around (interoperability), and officers lauded the effectiveness it created in the work environment, other agencies came on the system. As new agencies came on board, they each paid a buy-in fee to offset the costs of the infrastructure that the original four police agencies had invested in.

In 1986, the State of Michigan passed legislation that allowed for the imposition of a 4% surcharge on the base phone bill of all wire-line telephones in the county. The legislation allowed up to a 4% surcharge without a vote of the public, and up to a 20% surcharge if the public approved of it in an election. The minimal surcharge was imposed, and the first of the proceeds were used to purchase E911 telephone equipment in the Primary Service Answering Points (PSAPs) located in the County. After those purchases were made, the money began to accumulate in an account held by the County.

By 1997, it became necessary to upgrade the system to meet the growing demand for service in other geographic areas of the county that weren't adequately served by the one radio antenna that had originally been erected in the City of Ann Arbor (lack of coverage). The County built a new tower on Jackson Road west of Ann Arbor, and a second tower site was co-located north of Ypsilanti on the WEMU radio tower. Pittsfield Township Police and Fire, and Ypsilanti Police and Fire came on board shortly after completion of the tower sites in 1998.

The 4% surcharge money that had been accumulating supported the upgrade. Now, however, a demand came for the 4% surcharge money to be distributed to all the PSAPs (the dispatch centers that actually answer 911 phone calls), to assist in paying operational costs of various dispatch centers. This was, after all, the primary purpose the legislation allowing for the surcharge was intended to support. Therefore, the money was

sent out quarterly to the PSAPs using a formula based on the number of telephone lines serviced by each of the dispatch centers.

The 800 MHz system, as cited above, is a computer-controlled system, integrating multiple radio frequencies onto one radio system. It is quite complex, and employs hardware and software that is occasionally upgraded as advances in technology occur. Because of this complexity, systems like ours must be upgraded as the vendor moves forward in order to stay viable.

If allowed to become too far outdated, it goes unsupported, and parts become unavailable to repair it as it breaks down. With no revenue stream to allow for these upgrades, money must be found in the individual budgets of the participating entities to pay for them. Such was the case in 2000 when the consoles on the system needed upgrading, and the Central Electronics Bank (CEB) that controls the system needed upgrading. After much consternation among the participants, it was agreed that each would pay according to the number of consoles that they had on the system.

During that same time frame, a subcommittee had been charged to generate a Strategic Plan that would address the future of the system - what was needed to provide for adequate public safety communication into the future, and how it could be achieved. The Plan was completed in 2000. It pointed out three key goals: Adequate Coverage (getting the radio signal out to all geographic areas of the County); Interoperability (allowing all public safety to communicate on one system so they could talk to one another in an emergency situation); and Sustainability (how we pay to purchase this system, maintain it, and have sufficient money saved to upgrade when dictated). These three key goals had appeared repeatedly over time as agenda items to be addressed in meetings of what is now called the 800 MHz Consortium Board.

There were other issues raised by the Strategic Plan: appointing a paid manager; updating the Consortium Agreement to reflect the reality of the growth of the system; and altering the maintenance fee structure. These last three items have been addressed, with little or nothing done on the long-range goals mentioned above.

It is painfully obvious that the near future is going to bring to the fore the need to once again upgrade the system. It is currently an analog radio system. The future calls for digital voice transmission. Some agencies are now beginning to use in-car computer terminals, creating a growing need to communicate data over radio waves. We have poor coverage in the SE, NW and SW corners of the County. In Manchester it's so bad, it required that a re-transmitter be placed there so Deputies or Troopers working there can communicate back to County Dispatch. We are using old operating software that will soon require updating. The CEB is at capacity, and will need to be expanded. Emergencies like the fire in downtown Ann Arbor in 2003, the fire in York Township in 1999, and other situations that require disparate agencies to work together at one scene all cry for the interoperability that is not complete. There is no funding stream outside tapping into the General Funds of the several jurisdictions involved to pay for these needed large-ticket maintenance and upgrade projects. With all this in mind, the 800 MHz Business Plan Committee was formed to consider how to achieve Coverage, Interoperability, and Sustainability, and then how to locate the financial resources necessary to pay for them.

### **Subcommittee Membership**

This subcommittee began meeting in May 2003 to identify the current gaps in emergency communication, examine solutions to those gaps, and strategies to reach those solutions. Its membership included police, fire, and EMS leaders and others to lend expertise in specific areas. This subcommittee developed this plan on behalf of the 800 MHz Consortium and with the endorsement of other public safety committees. Members of this subcommittee are acknowledged in Appendix C.

## 4. CURRENT COMMUNICATION TECHNOLOGY

There are fifteen communications systems in current operation within Washtenaw County. Each system has geographic areas in which communication equipment becomes less effective, thereby lowering sound quality and heightening the probability of miscommunication. In emergency situations, the quality of communication can be the difference between life and death.

### Analog and Digital Signals

The current communications systems operated in Washtenaw County for use by Public Safety (Police, Fire & EMS) all operate on a variety of analog systems. For the person in the field, this impacts how their radios work. As one gets further away from a tower, the quality of the audio transmission declines. The differences between analog and digital radio signals are similar to the differences between AM radio and FM radio:

- Analog, like AM radio, has a lower sound quality the further the receiver moves away from the transmitter.
- Digital, like FM radio, has a higher sound quality at all distances from transmitter.

For these reasons many agencies outside of Washtenaw County have upgraded to digital systems.

### Interagency Communication

Currently, not all Public Safety agencies operate on the same system or type of system. Systems in use by agencies include:

- Washtenaw County 800 MHz Trunked System – This system serves approximately 1700 units, 9 police agencies, 2 fire departments, EMS, the City of Ann Arbor, Washtenaw County government, the Road Commission, Ann Arbor public schools and a variety of smaller agencies;
- University of Michigan 800 MHz – This provides service to Department of Public Safety, security, and many campus facilities and services;
- Michigan Public Safety Communication System (MPSCS) 800 MHz – This system is used by State Police across the state and it is also used by a number of other public safety/service agencies in Michigan counties and municipalities;
- Washtenaw County Fire VHF – the majority of fire departments uses this across the County.

This is not a case where more is better. Only radios supported by each individual system can be used on those systems. That means that an individual would need four radios to be able to communicate on all the public safety communications systems in Washtenaw County.

### APCO 25 Standard

Since August of 1995, Public Safety Communicators have advocated for a standard that is called APCO 25. The APCO Project 25 standard was developed by the Association of Public-Safety Communications Officials for interoperable digital two-way communications products and systems. One of the key objectives is to get equipment from different manufacturers to work together. Prior to the implementation of APCO 25 an EF Johnson system needed to have EF Johnson equipment (mobiles & portables) in order to work. Alternatively, a Motorola system needed Motorola equipment and would not work on EF Johnson equipment. This caused communities to be locked into one vendor for an extended period of time and usually resulted in a systemic monopoly at the local level. With the implementation of the APCO 25 standard, equipment that complies with the standard can be used on other manufacturers' systems. EF Johnson radios will work on a Motorola infrastructure. The standard has created pricing competition in an area that was previously sole source for many communities.



Additional benefits of the APCO 25 standards are:

- Radio spectrum is becoming more congested making it more difficult for public safety users to communicate with their dispatch, and standards based systems promote spectral efficiency;
- The demand for data transmission is more pronounced, as many agencies are attempting to have data available on the scene of an emergency;
- Systems need increased functionality;
- Secure communication is a growing necessity;
- Improved voice quality is essential over more of the coverage area.

Although APCO 25 compliance was not a criteria used by the Subcommittee to make recommendations, the costs of becoming APCO 25 compliant were.

Additionally, based on an FCC ruling, current VHF and UHF equipment operating in the frequency range below 512 MHz will become completely obsolete because of frequency refarming and the move to narrowband technology, requiring new equipment. This will primarily impact fire agencies using base stations. This includes: Saline, Ann Arbor Township, Dexter, Scio, Manchester, Augusta, Salem, Northfield, Superior, Ypsilanti Township, and Chelsea, as well as all hospital medical communications. Implementation of this FCC ruling has already begun.

There is a chart in Appendix D that indicates the current state of affairs with our present radio systems, what will happen in five years if this plan does not go forward, and what will occur if this plan is adopted. It should help the reader focus more directly on the problems indicated above.

## 5. ANALYSIS OF OPTIONS

A total of nine options were examined as possibilities for a future communication standard for Washtenaw County public safety agencies. The three criteria (at least 97% geographic coverage with mobile radios, 93% portable in-building coverage in medium buildings in cities of Ann Arbor and Ypsilanti, and 93% portable in-building coverage in light buildings in the remainder of Washtenaw County; interoperability; and funding sustainability) were used to evaluate each of these options. The option that provides the greatest enhancement at the lowest total cost is for all county agencies to migrate onto the Michigan Public Safety Communication System. Radio towers already constructed, including those located in adjacent counties, would be used for radio transmissions, although an additional four towers would need to be constructed, and one additional transmitter would need to be located on an existing tower site in the Ann Arbor area.

### Options Considered

During the evaluation of this project, the committee examined a total of 9 different options for consideration. The 9 options included:

**1. Status Quo**

Do nothing and maintain the status quo for the foreseeable future. This option did not meet any of the criteria that were listed. In addition, many agencies would be required to purchase new equipment anyway in order to become FCC compliant with frequency range compliance.

**2. Washtenaw Plus**

Maintain the current Washtenaw system while adding additional towers and capacity to include the fire services. It would allow for all agencies within Washtenaw to communicate using the same equipment. This would require the addition of many as six new towers, and additional frequencies throughout the county to achieve the coverage objective. While local control of the system would be maintained, this is a temporary and costly solution, as it is not APCO 25 compliant.

**3. Migrate to University of Michigan Standard**

Merge the Washtenaw system with the U of M system. This would allow for coverage and interoperability but at a high cost, as several additional towers would need to be constructed. This also is a temporary solution, as it is not APCO 25 compliant. It is an analog system, not a digital system. Probably the most important issue, though, is that the U of M system is very near capacity, and it is doubtful that they would have sufficient capacity to accommodate all the users of the current Washtenaw County system.

**4. Michigan Public Safety Communication System**

Merge the Washtenaw system with the Michigan Public Safety Communication System (MPSCS). The result would be interoperability not just within the County but also within the entire state. This option would build on infrastructure that already exists, making it the lowest cost option. It is also one of just three options that is APCO 25 compliant. For these reasons, it is the option that most other counties have been selecting and is the one recommended for the future of Washtenaw County.

**5. MPSCS/ Washtenaw Hybrid**

Utilize MPSCS towers to enhance the Washtenaw system and Washtenaw remains on the current technology and/or platform. The MPSCS system has only one tower located in Washtenaw County and that tower is less than 3 miles from our current site – thereby yielding little benefit from a coverage standpoint. It would still necessitate the construction of as many as six additional towers.

**6. Lease from Private Vendor**

Have Motorola or another communications vendor build and own the system with the users “leasing” back from them. A contract could guarantee coverage, interoperability and APCO 25 compliance but

in the end, it would result in construction of many towers and be duplicative of the current MPSCS system, thereby making it cost prohibitive.

#### **7. VoIP Technology (Voice over Internet Protocol)**

This option has been marketed as a "state of the art" technology but it has not yet been successful in other jurisdictions. This technology is currently being installed in Oakland County. It is unclear how much coverage this option would create in a county like ours that does not yet have Internet coverage in all the rural areas. Due to the fact that it is a new, not yet fully proven technology, this option is not recommended.

#### **8. Simulcast VHF**

This option would utilize the existing VHF coverage provided by the existing fire department towers and locations. By using computer controllers, each tower would broadcast/ repeat the transmission. This is similar technology to what is utilized with the current Washtenaw County 800 MHz system. While provision of coverage is theoretically met, the issue of interoperability, future FCC compliance and APCO 25 are not met.

#### **9. UHF Trunked or Digital**

A UHF trunked simulcast system would work in much the same manner as the Simulcast VHF trunked system, as this would require a complete installation of infrastructure and new end user equipment. The same shortcomings also exist as with the Simulcast VHF system. The determination of adequate coverage is only possible in this option through a propagation study and analysis.

### **Recommendation: MPSCS**

The recommendation of the PSAP/800 Business Plan Subcommittee, and ratified by the 800 MHz Consortium is to implement the MPSCS system. It was felt that due to the coverage already provided by the base system (97% mobile statewide) and the implementation of the MPSCS system in surrounding counties, Washtenaw County would be well served by this option. Currently, Livingston County is using the MPSCS system as their means of communications for all Livingston Public Safety agencies. Monroe County has finished the design phase and is constructing towers there to facilitate additional coverage in Monroe County, creating a situation that will benefit Washtenaw County.

The benefit of utilizing other towers in surrounding counties means fewer towers dotting the landscape here, and builds on the economies of scale. As an example, Washtenaw County currently has one MPSCS tower located at Baker Road near I-94. Radios talking on the MPSCS system operating in Washtenaw County talk through or contact that tower. They also talk to or contact the Northville tower in Salem, the Livingston County tower in Brighton (from the northern part of Washtenaw County) and either the current Jackson County tower, located in Stockbridge from the western part of Washtenaw County or the Adrian/Irish Hills tower from the southwest part of Washtenaw County. The Washtenaw County system will be a simulcast subsystem on the MPSCS.

The financial benefit of having to erect fewer towers equates to as much as 2 million dollars saved in construction and infrastructure costs. It has also been demonstrated that the acquisition, zoning, and development of tower sites is a difficult and sometimes contentious process. The implementation of the MPSCS system in Washtenaw County is projected to require the addition of five new antenna sites to meet the coverage specifications of the users.

### **Approval Plan**

The following steps need to be completed for approval of the move to the MPSCS system.

- Complete a detailed analysis of potential tower locations that are needed to provide adequate coverage;
- Secure agreement with MPSCS on how the systems would be merged – including the number of channels, frequency coordination, number of radios, number of consoles, maintenance costs and governance of the system;
- Finalize the end-user equipment counts;
- Preliminary system design in conjunction with MPSCS;

- Obtain recommendation from the Building Authority Board to the County Board of Commissioners;
- Obtain County Commissioners' approval for a ballot proposal for May 2005.

The cost of this project is estimated to be approximately \$32.1 million (see cost estimates in Appendix E). This figure is for budgetary purposes only and may decrease or increase based on the final tower and end-user radio count. Included in this cost estimate is the replacement of all Police, Fire and EMS radios in Washtenaw County, the addition of five antenna sites to provide the required coverage and additional operational funds for PSAPs.

## Migration Plan

If a ballot proposal of the electorate were approved, the system would not become operational until late 2008, as the following steps would need to be taken to implement this plan:

- Bid proposal goes out. Select a vendor (approximately 3 months).
- Final system design, including representatives from Washtenaw County, MPSCS, and the vendor (approximately 3 months).
- Bonding would be completed to finance the system. The bond would be repaid over a ten-year period with the proceeds from the countywide millage.
- Work would then be completed on site acquisition for erection of the necessary additional towers (approximately 3 months).
- Erection of the towers, update of existing towers, installation of necessary equipment to link Washtenaw County and MPSCS, and acquisition and installation of new digital radios. User training would be conducted during this time by the MPSCS (approximately 1 year).
- Cut over and full functionality of the system would probably occur sometime late in 2008.

## Non-Public Safety Users

If the ballot proposal is approved, and the millage becomes the primary funding source for the radio system in Washtenaw County, the current non-public safety users cannot be funded using that money. In order to accommodate the current non-public safety users of the system, a part of the existing system would be segregated as a stand-alone, single tower trunked radio system using the antenna on Jackson Road. This system would still be considered as a back up to the MPSCS radio system for the public safety radio users in this county. The system would remain analog and provide support to the approximately 800 radios currently in use by the non-public safety subscribers to the Washtenaw County 800 MHz radio consortium.

It should be noted that because of the finite life expectancy of that equipment, those non-public safety users should start making plans now for what sort of future radio system they will have to migrate to in the five to seven year time frame. Most of the current non-public users could migrate to the MPSCS if they were to pay to convert their radios from analog to digital communications, and then pay the initiation and user fees associated with the MPSCS.

## Future Integrated Public Safety Dispatch

To provide for optimal command, control, communications and computer usage at emergency incidents involving multiple agencies, several public safety agencies in Washtenaw County have expressed a desire to have a unified public safety communications (dispatch) center. In recognition of that desire, and with the support of the 800 MHz Consortium, there will be a committee appointed in the latter part of this 10-year plan to evaluate the feasibility of such a center and, if feasible, to begin the work necessary to formulate how a central dispatch could be constituted. This committee would include an appropriate number of representatives from a cross section of Washtenaw County police, fire and EMS agencies.

## The Future Beyond this Plan

If the electorate does vote in a dedicated millage and allow this project to move forward, it will be the intent of the 800 MHz Consortium to seek renewal of some portion of this millage at the end of the authorized period to pay for future maintenance costs, and further enhancements to the system.

## 6. COMMUNITY IMPACT

If the recommended migration occurs, it will substantially impact public safety agencies by allowing them to work together not just in times of emergency, but also during routine investigations and crime prevention efforts.

### Impact on Public Safety Providers

Fire agencies will for the first time have interoperability and a common radio channel. Currently incident commanders (IC's) that are utilizing mutual aid resources have several different radios to monitor and communicate on. This is ineffective and dangerous. Communications are sometimes lost due to the volume of radio traffic.

At incidents where both law enforcement and fire are involved, interoperable communications would be established for coordination of actions. The table below provides a broad overview of current communication capabilities, and future capabilities if this plan is implemented.

Radio Capability	Existing System	New System
Fire can talk directly to each other	N	Y
Police can talk directly to each other	Y	Y
Police can talk directly to Fire	N	Y
Fire can talk directly to Ambulance	N	Y
Police can talk directly to Ambulance	Y	Y
Digital Communication	N	Y
Statewide Communications	N	Y

### Impact on Citizens

If citizens are asked to fund this, what will be their direct benefit? What does a system like this mean to them?

In an emergency, seconds count. When someone has suffered a heart attack, oxygen deprivation to vital organs causes damage to those systems, and eventual death. When a house is on fire, the fire spreads geometrically in the time it is allowed to burn.

Often the police are the first persons on the scene of any emergency call for service. The faster and more efficiently our emergency services are able to provide meaningful information to one another and assist one another, the more effectively they can deal with these matters. At the heart of their effectiveness is the ability to quickly and clearly communicate information to one another. The proposed new radio system would provide effective radio coverage throughout the County, and allow all emergency responders to talk together efficiently over one radio system. Seconds can be saved, and ultimately minutes can be shaved off response times as responders are guided in to a scene by the most direct route from those already on the scene. EMS personnel

can arrive already equipped with vital information about the nature of the injuries, or the type of equipment they should carry in to deal with the type of situation they face.

The key is that for the first time, all the different public safety agencies that might arrive at the scene of an emergency in Washtenaw County will have the level of interoperable communications necessary to efficiently handle what they may face. By being able to communicate effectively across one radio system, emergency responders from differing agencies can perform more effectively, saving time, property, and lives, while reducing the inherent risks to themselves.

## Community Benefits

The implementation of the proposed radio system directly benefits the citizens of Washtenaw County as well as the public safety agencies that serve them. The benefits to the community include:

**More efficient communications between agencies:** The proposed radio system would enable public safety agencies from different jurisdictions to communicate directly with each other in the field instead of relaying information between each agency's dispatch centers. Relaying information is inefficient and increases the possibility for mistakes. With the new system, an incident commander utilizing personnel from another jurisdiction at a large scale incident (like the fire in June 2003 on West Main Street in Ann Arbor) can direct them more efficiently by communicating directly with all public safety personnel on the scene. A more efficient response by public safety agencies to emergency situations could reduce loss of life and property.

**Greater radio signal coverage and strength:** By providing more towers, the proposed radio system will offer greater signal coverage to outlying jurisdictions that currently experience difficulty receiving and transmitting clear radio signals. The system will also provide a stronger signal so that public safety personnel are more likely to receive and transmit radio signals inside buildings such as schools, businesses, homes and apartments.

**APCO 25 compliant platform:** The proposed radio system is compliant with APCO standards. APCO has established universal compatibility standards for vendors serving the communications industry. As a result, each vendor's equipment must operate with other vendors in the industry. The standard has placed buyers in a stronger bargaining position with competing vendors.

**Replacement of aging and outdated equipment:** As the current system ages and degrades, the risk of costly repairs is greater because outdated equipment is difficult to maintain and in some cases may not be supported. Replacing worn and outdated equipment with new technology makes the system less costly to maintain.

**The solution is compliant with federal guidelines:** The proposed radio system is in compliance with federal communications guidelines that call for refarming of frequencies.

**Positions agencies for mobile data technology:** The proposed radio system puts in place the infrastructure to enable public safety agencies to use mobile data terminals at a later date.

**County wide common communications platform:** The proposed radio system places all public safety agencies on a common communications platform. At the scene of an emergency involving police, fire, and EMS personnel, all can talk directly to one another, aiding in the efficient and effective response to the situation. Additionally, economies can be achieved in personnel training, equipment procurement and radio system maintenance.

## 7. FINANCING RECOMMENDATIONS

There are three options on how to finance these recommendations. The first is a “pay as you use” option through which each agency’s governing board would be charged for costs for construction and use. The second is to raise revenues through a telephone surcharge, which would require a voter referendum. The third is a dedicated millage, which would also require a voter referendum. A combination of any of the three is also possible.

### Option 1: Pay as You Use

Under this option, a local municipality would pay for its own “share” of the upgraded radio system. Expenses would be paid for by the local unit’s general funds – or by special local millages, which would be unlikely to receive support in the current economic climate. In addition, apportioning “costs” between municipalities would be difficult, controversial and divisive. The likely indecision or outright opposition at the local level makes this option unworkable.

### Option 2: Increase Telephone Surcharge

The Michigan Telecommunications Act (PA 179 of 1991) allows for counties to enact a surcharge of \$.80 per landline per month within the county to fund 9-1-1 operations. Upon voter approval, this amount can be increased to up to \$4.00 for a period of five years, after which time it would require renewal. This legislation now has a sunset date of December 2006. We have seen declining revenues from this surcharge as an ever-increasing number of phone subscribers adopt alternative methods of communicating via cell phones and Internet service providers. We have not yet begun to see the real impact of Voice over Internet Protocol (VoIP) on the number of traditional landline telephones. There is no legislation in place at this time that requires VoIP providers to impose a surcharge, and there is no revenue for 911 service coming from them. It is expected that this, too, will further cause a decline in potential surcharge revenues. This option was previously given serious consideration by the subcommittee, as it is the method used by 31 other counties to enhance emergency communication services. Some of those same communities, however, are now clamoring for legislative relief as these revenues decline in the face of the cited technology. Given the uncertain level of funding, and the uncertain future of the legislation at this time, it has been decided not to opt for this sort of funding.

### Option 3: Dedicated Millage

A dedicated countywide millage is an option for raising the needed revenue, and would provide a constant source of income during the voted ten-year collection period. This sort of funding source will also be independent of any legislative action governing a telephone surcharge, and will not be impacted by expected changes in user tastes as technology changes and alternatives for phone subscribers are developed as new options for voice communication become available. This would be the most stable method of funding, and the one recommended by the committee at this time.

### Additional Funding Opportunities

Despite the fact that planning is being done to pay for the upgrade and operation of the system entirely from a dedicated millage, the Consortium will be vigilant for future additional funding opportunities from other sources, such as Homeland Security Interoperability grants, etc. If these additional sources were secured with a promise of non-supplanting of existing funds, they could be used to augment the system with other features, like Automatic Vehicle Locators, or In-vehicle Terminals equipped for data transmission. If they are secured in a timely manner, they could offset some of the costs of this plan, resulting in a lower millage.

## 8. ISSUES NOT ADDRESSED IN PLAN

This plan seeks to enable interagency communication in order to minimize the effects of emergencies and make disaster recovery seamless. The subcommittee also wishes to explain the assumptions made in this plan, and the other important issues that are not addressed in this plan. It is felt by the subcommittee that while it is true that these issues should be talked about, none are of a nature that should cause the abandonment of this proposal.

### State Infrastructure Control

The proposal would have us join with the MPSCS to provide complete radio coverage throughout Washtenaw County. The MPSCS is controlled by a representative Board of Directors appointed at the State level. No county government agency would have direct membership on this Board. We would be relinquishing the kind of direct control we now have over what is done with our radio system, and how costs are assigned to individuals. Right now, the State is fairly competitive in the arena of communications service. If State budget problems continue to grow, and fees and costs must be raised to offset existing subsidies, we could face increasing costs to participate. Again, we know that the costs of not going on the system will also increase costs locally. We feel that this is a calculated risk shared by many across the State who have also joined MPSCS that is worth taking to accomplish our goals in communications service.

### Opportunities with Technology

Just like with any other technology, there are many additional facets to this radio system that can be added to enhance its capability, but that are not funded in this proposal. The first of these issues will likely be wireless data transmittal. Many pieces of Police and Fire equipment now are equipped with computers capable of displaying mug-shots, maps of fire hydrants, driving records of persons on the street, and providing report-writing services. The utility of these in-vehicle computing platforms is tremendously enhanced by allowing them to communicate directly/remotely with some central information repository or network server. This can be done over the radio network in the future with the proper application software and necessary hardware.

Other opportunities include:

- Automatic Vehicle Locators that continuously communicate over the radio to the dispatch centers the location of the various emergency vehicles;
- Telemetry units of various types to communicate vehicle operation, activation of various forms of equipment in a vehicle, and vehicle crashes;
- Paging capability (voice and messaging) for various types of paging units;
- Repeaters for deployment throughout the county for emergencies occurring in a particular location, or for large-scale, special events requiring enhanced communication ability.

Finally, as is the case with any technology, new technology might well be on the horizon that would make this plan obsolete. We need to build a reasonable financial base to pay not only for the immediate needs, but also for the obviously required replacement parts of the future - both hardware and software that may be dictated by the vendors of whatever might be purchased.



## APPENDIX A GLOSSARY OF TERMS

**800 MHz (Megahertz):** A band of radio frequencies in the 800 Megahertz range that is dedicated to high frequency radio communication. At this time police radios, cellular telephones, and television stations on channels 69 through 83 have been located in this frequency band by the Federal Communications Commission.

**800 MHz Consortium:** A group of agencies in Washtenaw County that all use the same Motorola 800 MHz trunked, simulcast radio system. Originally, the group was called the 800 MHz Coordinating Council, and was composed of the Ann Arbor Police Department, Washtenaw County Sheriff's Department, Milan Police Department and Saline Police Department. In addition, Eastern Michigan University Police, Ypsilanti Police, Ypsilanti Fire, Pittsfield Township Police, Pittsfield Township Fire, Ann Arbor Township Fire, Northfield Township Fire, Ann Arbor Utilities, Washtenaw County Road Commission, Washtenaw County Facilities Management, Ann Arbor Public Schools, Michigan Department of Corrections, US Marshall, Northfield Township Police, the Michigan State Police Ypsilanti Post, Huron Valley Ambulance, and Chelsea Police have all joined the system.

**Analog Communications:** A method of communication that broadcasts voice transmissions over a frequency modulated radio signal. As users move further from the radio transmission site (tower), the signal weakens, and the radio signal that is received by the user becomes more difficult to hear, as it is distorted by static and other interference. Analog radio signals require a larger bandwidth than digital signals for interference-free communication.

**ALI (Automatic Location Information)** The information that is directed to a PSAP when a subscriber dials 9-1-1 over their landline telephone that contains the location (address) information where the 9-1-1 call originates.

**ANI (Automatic Number Information)** The information that is directed to a PSAP when a subscriber dials 9-1-1 over their landline telephone that contains the telephone number where the 9-1-1 call originates.

**APCO (Association of Public-Safety Communications Officials):** An organization formed to bring together all Public Safety Communications persons to discuss matters of mutual interest, and to promulgate standards for the Public Safety Communications industry.

**APCO 25:** A standard proposed by APCO to provide for the interoperability of digital radio equipment from differing manufacturers. Thus, a radio built by Motorola, and one built by EF Johnson (or any other manufacturer claiming that their equipment was APCO 25 compliant) would be required to communicate directly with another if they were on the same frequency. It is a similar situation to a standard that would make an Apple computer and an IBM computer compatible with one another.

**CDPD (Cellular Digital Packet Data):** A format for transmitting digital data over cellular phone circuits. This type of digital data transmission will soon become obsolete, and no longer will be used.

**CEB (Central Electronics Bank):** That part of the 800 MHz radio system comprised of a number of printed circuit boards that functions as the central processor for the system consoles, and the interface to the 800 MHz radio system.

**dB (decibel) density building:** dB density building is a measure used to describe the thickness (or opacity to radio signals) of a building's walls. The larger the dB number, the greater the thickness/density. The measure is used to determine the radio signal strength needed to penetrate the building. Generally, a 15 dB density building is medium sized commercial building, and a 6 dB density building is a residential building.

**Digital Communications:** A method of communication that broadcasts voice transmissions over a digital radio signal. As users move further from the radio transmission site (tower), the signal remains the same, due

to error correction coding that eliminates static and other noise, until it is totally lost. There is no distortion of the weaker signal further from the tower. It is either on or off. Digital radio signals require a narrower bandwidth than analog signals for interference-free communication. Thus, more licenses can be granted in the same frequency range than for analog. With the demand for increasing radio licenses, the FCC is requiring users to move to digital signal broadcasting to make better use of the finite frequency range for radio signals. Digital signaling also provides for additional features that are not readily available with an analog system, such as data transmission.

**E 911 (Enhanced 911):** The feature on wireline telephones in Michigan that allows Public Safety Answering Points equipped with the proper equipment to read the subscriber name and address for telephones that have dialed 9-1-1 to request emergency assistance.

**FCC (Federal Communications Commission):** The federal commission that controls communications signals in the United States. Licenses to operate radio stations are granted by the FCC.

**IC (Incident Commander):** The person at the scene of an emergency involving multiple agencies that is in charge of the entire operation. There is specific training that many public safety agencies require for their personnel on how to operate effectively as an Incident Commander at the scene of a large-scale emergency.

**Interoperability:** Interoperable devices are ones that are integrated and are able to operate together. Interoperability is a concept that has come to the forefront since the terrorist attacks at the World Trade Center dramatically pointed out the need for many different emergency services to be able to work together at the scene of an emergency, and to be able to communicate effectively with one another.

**MPSCS (Michigan Public Safety Communications System):** A statewide communications system that was begun by the Michigan State Police to provide 800 MHz radio communications for public safety agencies in the State of Michigan. Construction of the system began in 1995, and was completed in 2001. The State of Michigan Department of Information Technology now runs the MPSCS. It provides communication service to the Michigan State Police, and other public safety agencies in counties throughout the state. Currently, our neighbors in Monroe County, Livingston County and Macomb County are users of the MPSCS, and the City of Detroit will be joining shortly.

**PSAP (Public Safety Answering Point):** An office, usually at a police department or central dispatch center, where the telephone company directs all 9-1-1 calls for a particular geographic area. The PSAP is equipped with a small video screen that displays the subscriber name and address associated with the phone number that was used to dial 9-1-1. As PSAPs become equipped with the technology necessary, they will also be able to determine the physical location (latitude and longitude) where a cellular 9-1-1 phone call originated.

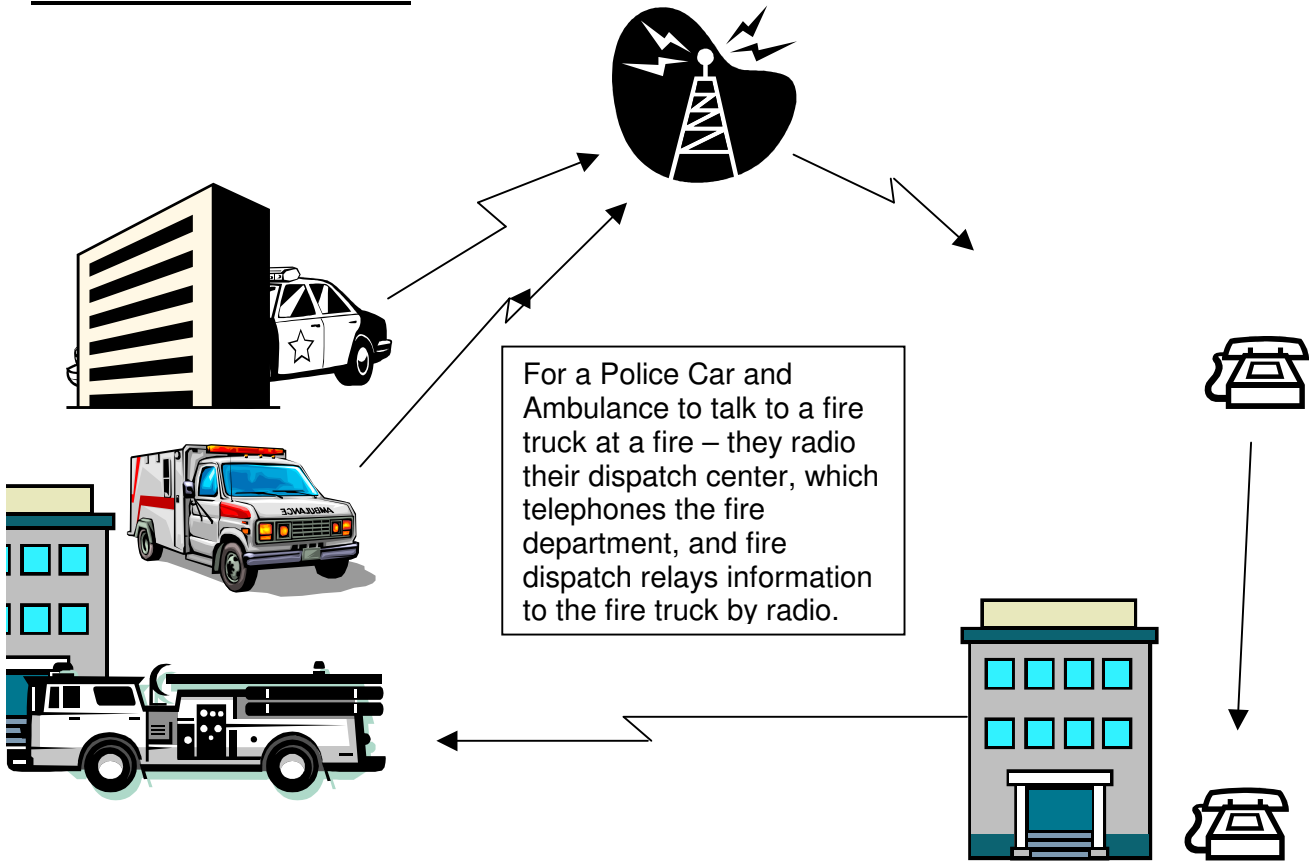
**Simulcast:** A feature of the 800 MHz trunked radio system that allows a radio signal to be simultaneously broadcast from multiple radio towers. The radios on the system then receive the strongest signal that reaches them without creating distortion from the other like signals being broadcast from other towers on the same system. This resolves the problem of the limited range of a single radio tower (transmitter).

**Trunked:** A feature of the 800 MHz radio system that uses multiple radio frequencies controlled by a computer to select a different radio frequency for use every time a radio on the system is used to transmit. This allows multiple radios to talk at the same time on the same system on different channels. It also allows users to switch channels so differing agencies can all communicate on one channel.

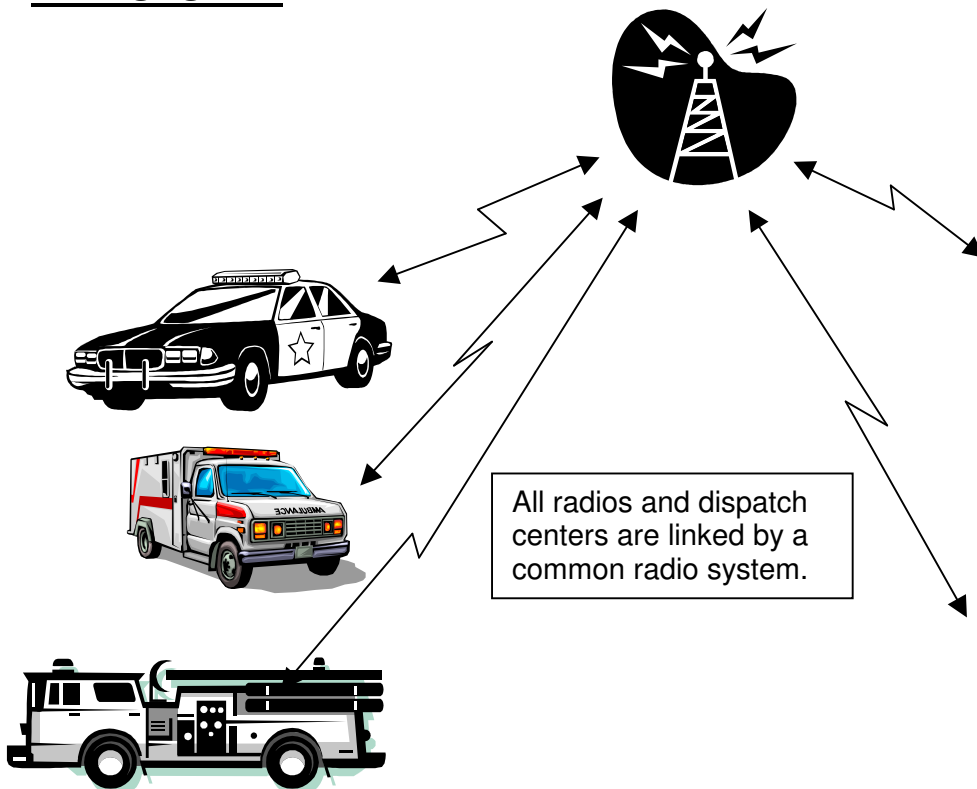
**VoIP (Voice over Internet Protocol):** This is a service now being offered by Internet service providers that provides telephone service over the same cable used for cable television and high-speed Internet access. Not all VoIP providers route 9-1-1 calls over traditional 9-1-1 telephone circuits to the proper PSAP. Not all VoIP providers send ANI and ALI to the PSAP receiving the 9-1-1 call that originated on their circuits. There is no governing legislation at this time that requires VoIP providers to impose a surcharge to provide these services, either, like there is with telephone companies that utilize traditional telephone lines.

# APPENDIX B RADIO SYSTEM GRAPHIC

## CURRENT PROBLEM



## NEW SYSTEM



**APPENDIX C**  
**800 MHz BUSINESS PLAN SUBCOMMITTEE MEMBERSHIP**

Tim Andrews, Scio Township Fire Department

Mark Angott, Ypsilanti Police Department

Ken Ascher, Salem Township Fire Department

Greg Bazick, Ann Arbor Police Department

Dennis Betz, Citizen

Paul Bunten, Saline Police Department

Jack Ceo, Saline Police Department

Tony Coppa, Motorola, Inc.

Don Dettling, Dexter Area Fire Department

Dave Ebel, 800 MHz Consortium

Dave Eischens, Motorola

Jeff Fulton, Washtenaw County Sheriff's Office

Dave Halteman, Washtenaw County Office of Emergency Operations

Herb Mahony, Washtenaw County Sheriff's Office

Elizabeth McGuire, Pittsfield Township Police Department

Jeff Nesmith, Eastern Michigan University Police

Mark Nicholai, Pittsfield Township Fire Department

Dan Oates, Ann Arbor Police Department

Scott Patton, Washtenaw County Special Projects Office

Craig Swenson, Huron Valley Ambulance

Spring Tremaine, Ann Arbor Police Department

Matt Tuttle, Chelsea Area Fire Department

Dale Vanderford, Washtenaw County Information Technology

Jerry Zapolnik, Huron Valley Ambulance

**The Business Plan was unanimously approved by the voting members of the  
800 MHz Consortium**

Dan Oates-Chief of Police Ann Arbor

Brad Mallor-Transportation Director Ann Arbor Public Schools

Mike Bergren-Department of Public Works City of Ann Arbor

Rick Ericson-Fire Chief Ann Arbor Twp

Walter Esch-Barton Hills Chief of Police

Riley Sumner-Chief of Police Chelsea

Matt Tuttle-Lt. Chelsea Fire Authority

Cindy Hall-Director of Public Safety Eastern Michigan University

Mark Bartow- Forensic Center Washtenaw County

Harley Rider-Chief Ranger Huron Clinton Metro Parks

Dale Barry-Huron Valley Ambulance

Suzanne Cape-Department of Natural Resources Law Enforcement

Greg Decamp-Michigan State Police

Mike Stuck-Chief of Police Milan

Carl Watkins-Chief of Police Northfield Twp

John Phillips-Deputy Director Pittsfield Twp

Judy Kettenstock-Director St. Joseph Med-Flight

Paul Bunten-Chief of Police Saline

Dan Minzey-Sheriff Washtenaw County

Dave Shirley-Facilities Management Washtenaw County Sheriff's Department

Ken Nixon-Road Commission Washtenaw County Sheriff's Department

George Baser-Chief of Police Ypsilanti

Dan Crane-Captain Ypsilanti Fire Department



APPENDIX D  
State of System

	Today	5 Years With No Changes	Upgraded System - MPSCS
Fire communication	15 depts/8 radio systems  Congestion/confusion Radios have limited range  Aging infrastructure	15 depts/8 radio systems  More congestion/confusion Radios have limited range  Collapsing infrastructure	All on MPSCS  Trunking eliminates congestion/confusion Can talk statewide  Updated infrastructure/upgrades included
Police communication	11 depts/5 radio systems Radios have limited range	11 depts/5 radio systems Limited lifecycle/lifespan  Support may be discontinued	All on MPSCS Can talk statewide  Updated infrastructure/upgrades included
Ambulance communication	1 agency/4 radios systems Radios have limited range	1 agency/4 radio systems Limited lifecycle/lifespan  Support may be discontinued	All communication on MPSCS Can talk statewide  Updated infrastructure/upgrades included
Technology of system	Analog Outdated operating system Multiple systems Multiple frequencies/bands  No planned upgrades	Analog Obsolete operating system Multiple systems Multiple frequencies/bands  Upgrades unavailable Support will be discontinued	Digital Updated oper.sys/automatic upgrades One system - interoperable One band/one integrated system Up-to-date platform provides for future upgrades On-going support
Cost	No revenue for updates  General fund must pay	Need for massive cash infusion  by local govts via tax increases	Revenue steam established with millage Adequate funding for future upgrades/additions
Coverage	Poor mobile coverage outcounty Poor portable coverage	Worse mobile coverage Worse portable coverage	97% mobile coverage countywide 95% portable coverage countywide
Interoperability	Radios don't talk together	Radios still don't talk together	All on one system - true interoperability
Total system	Disparate equipment  Lacking interagency comm  Aging infrastructure	Disparate equipment  Lacking interagency comm  Will go unsupported	Same radio system throughout all agencies Everybody can communicate on one system  Up-to-date, current equip and technology

## APPENDIX E SYSTEM COST ESTIMATE

Capital/Equipment		
4 new towers	\$ 2,943,840.	
2 upgraded towers	\$ 1,151,920.	
Prime site upgrades	\$ 1,269,378.	
Microwave system	\$ 1,920,000.	
Northville site upgrade	\$ 280,149.	
MOSCAD alarm equip, dispatch		
Channel banks and console upgrades	\$ 1,062,695.	
Test equip/Interop switch	\$ 107,000.	
Fire portable radios and accessories	\$ 1,596,988.	
Police portables and accessories	\$ 2,067,352.	
Fire mobiles and base stations	\$ 718,928.	
Police mobiles and base stations	\$ 1,093,708.	
Upgrade 4 button/LED consoles:		
2 – PTPD, 2 – YPD	\$ 240,000.	
Programming and installation	\$ 196,860.	
Site acquisition, 4 new sites	\$ 300,000.	
System integration, engineering, program management, staging, construction, 24x7 response	<u>\$ 6,952,118.</u>	
Total Capital/Equipment	\$21,900,936.	\$21,900,936.
Maintenance		
Infrastructure	\$ 75,000.	(6 towers @ \$12,500 each)
User fees	\$ 292,600.	(1,463 microphones @ \$200 each)
User initiation fees	<u>\$ 36,575.</u>	(1,463 microphones @ \$25 each)
First year	\$ 404,175.	
Next nine years	\$ 3,308,400.	(at \$367,600 per year)
Console maint/SSC support 10yrs. & site maint during warranty (1 <sup>st</sup> yr)	<u>\$ 913,340.</u>	
Ten year totals	\$ 4,625,915.	\$ 4,625,915.
15% Contingency of \$21,900,936.	\$ 3,285,140.	(See notes below for contingency)
Bonding Costs	<u>\$ 2,300,000.</u>	
Total Contingency and Bond	\$ 5,585,140.	\$ 5,585,140.

TOTAL COSTS **\$32,111,991.**

### Information:

1. Does not include any inflationary increase in prices of equipment.
2. Does not include lease payments for co-location on UMDPS tower in Ann Arbor area.
3. Does not include money for legal fees for land acquisition activities.

### Contingency notes:

1. This cost estimate is a snapshot of police, fire and EMS radio needs as of the date of this report.
2. Normal construction and purchase contracts of this size require a minimum of a 10% contingency.



3. Due to the uncertainty surrounding the number of police officers in the county during the five-year period encompassed by this proposal, an additional 5% contingency is being added to accommodate any necessary additional requests for radios or equipment.

## **System Budgetary Pricing**

Motorola has worked closely with Washtenaw County representatives to identify key requirements of a new communications system for public safety use. This budgetary estimate has been developed for a system that meets those requirements, and to assist Washtenaw County officials in assessing the funding required to implement the system. Some assumptions have been made in regard to system design, subscriber quantities and feature sets. Upon approval of project funding, Motorola will work closely with representatives of Washtenaw County and the Michigan Public Safety Communications System (MPSCS) to complete a final system design with firm pricing.

## **System Description**

Motorola is pleased to present the following system description for Washtenaw County. This system, and the associated digital technology behind it, has been designed specifically for Public Safety users like the various Fire Departments, Police Departments, and other service agencies in Washtenaw County. This system will provide an extremely reliable, easy to use, integrated radio communications network that supports the following key features:

- Direct Countywide Unit-to-Unit Inter-agency Communications
- Direct Countywide Unit-to-Unit Intra-agency Communications
- Direct State Unit to County Unit Inter-agency Communications
- Easy to use, frequency efficient simulcast coverage
- Increased coverage beyond the Washtenaw County borders – subscribers can communicate throughout the entire State of Michigan

Motorola is proposing a complete solution consisting of a number of major system elements, including the system's integration into the MPSCS. In summary, the major elements that make up our total solution for Washtenaw County includes:

- ❖ An 800 MHz Simulcast system design that provides 93% reliability coverage throughout the County. This Simulcast system utilizes 12 channels at seven RF sites to provide portable coverage in 15dB density buildings within the City of Ann Arbor and Ypsilanti, and 6dB density buildings throughout the rest of Washtenaw County to support the estimated traffic loading in the County.
- ❖ Upgrade of existing Centracom Gold Elite Console Dispatch system, located at various PSAPs throughout Washtenaw County.
- ❖ Addition of network router equipment located at State of Michigan Master Zone 2 site (2504) in Northville, MI, necessary to support the additional network traffic load.
- ❖ Upgrade of existing State of Michigan Master Zone 2 site (2504) Ambassador Audio Switch cards necessary to support Washtenaw County's Gold Elite Consoles.
- ❖ New Alcatel digital microwave site link network for the interconnection of Washtenaw's seven RF sites and the capacity expansion of the two links from Ann Arbor back to the Northville Master site.

- ❖ System and Site Management and alarm monitoring terminals.
- ❖ Large selection of digital mobile and portable radios and fixed control stations.

The system, as configured, will allow for radio users to operate in the County or communicate anywhere in the State of Michigan while maintaining communications with dispatch and other members of their talk group.

## **System Overview**

Washtenaw County's planned migration to 800 MHz trunked digital communications will commence in 2005 with the construction of a seven-site simulcast radio system. The new Motorola radio system will provide countywide communications for approximately 1450 mobile and portable radios, and continue to support MPSCS traffic load for Washtenaw County. The 800 MHz trunked system will replace Washtenaw County's present analog trunked radio system, providing interoperability between State, County, City and Township Public Safety users. Non-public safety users will have a migration path to the new digital system through reuse of the existing Mercywood site. This plan eases the burden of replacing all radios at one time, and still allows for interoperability with public safety users.

The scope of the project requires the expansion/replacement of the MPSCS radio equipment at the MPSCS site (2602) located in Washtenaw County, build out of four new RF sites, upgrading existing sites at Eastern Michigan University (EMU) and a site to be determined in Ann Arbor, as well as integration of the simulcast sites with the MPSCS Zone control and management elements at the Zone 2 Master Site at Northville (2504) and the Network Command Center (NCC) at Lansing (1102). Audio originating from Washtenaw County Gold Elite console system will be routed via the MPSCS microwave to the Northville Master Site's audio switch equipment. With its inclusion into the MPSCS 800 MHz system, Washtenaw County will be able to provide support of Mutual Aid operation on the TAC-1 NPSPAC Interoperability channel. The Washtenaw County sites will be equipped with site alarms that will be tied into the MPSCS Alarm Monitoring Subsystem centrally monitored at the NCC site.

The four new system sites will be constructed with a tower, shelter and backup power generation. The tower, shelter, microwave and power systems from the MPSCS 2602 site will be reused in this design. The EMU and Ann Arbor sites will be upgraded to MPSCS site standards, and may include replacement of shelter, tower and backup power systems.