



Meeting Date: 12/12/11  
Agenda Item: #6g

**Mission Statement**

Provide quality services in a modern, courteous and cost-efficient manner.

**VILLAGE BOARD MEETING STAFF REPORT**

**REPORT TO:** President Burt McIntyre and Village Board of Trustees

**REPORT FROM:** Chris Haltom, Executive Director of Administrative Services and Ed Janke, Director of Public Safety

**AGENDA ITEM:** Review and Take Action on Resolution 2011-26 Regarding Authoring the Issuance of Taxable General Obligation Promissory Notes through Brown County

**POLICY ISSUE**

Does the Village Board desire to adopt Resolution 2011-26 authorizing Brown County to issue debt for purchasing new interoperable two-way radios?

**RECOMMENDED ACTION BY VILLAGE BOARD**

Village staff recommends the Village Board approve Resolution 2011-26. If the Board decides to approve the Resolution, the following motion could be made:

*"I move to approve Resolution 2011-26 regarding issuing debt for radio purchases."*

**POLICY ALTERNATIVE(S)**

The Village Board could take the following action:

- Not approve the resolution.

**FINANCIAL INFORMATION**

**FISCAL IMPACT:**

1. Is There A Fiscal Impact? Yes
2. Is it Currently Budgeted? Yes
3. If Budgeted, Which Line? Capital Outlay

**FISCAL SYNOPSIS:**

The 2012 budget includes the purchase of new radios for public safety that meet the new requirements of FCC. Budget shows payments over five years.

**PRIOR ACTION/REVIEW**

On March 22, 2010, the board gave staff approval to continue to work on the radio purchase. On November 28, 2011, the board approved the budget that included five years of payments for the debt associated with purchasing the radios.

## **BACKGROUND INFORMATION**

On January 1, 2013, all public safety and business industrial land mobile radio systems operating in the 150-512 MHz radio bands must cease operating using 25 kHz efficiency technology, and begin operating using at least 12.5 kHz efficiency technology. This deadline is the result of an FCC effort that began almost two decades ago to ensure more efficient use of the spectrum and greater spectrum access for public safety and non-public safety users. Migration to 12.5 kHz efficiency technology (once referred to as Re-farming, but now referred to as Narrow banding) will allow the creation of additional channel capacity within the same radio spectrum, and support more users.

After January 1, 2013, licensees not operating at 12.5 KHz efficiency will be in violation of the Commission's rules and could be subject to FCC enforcement action, which may include admonishment, monetary fines, or loss of license. The current VHF system utilized by Brown County for Public Safety Communications was determined to be inadequate for narrow banding and trunking through several studies conducted by the agency.

To address the future need of Brown County Public Safety Communications, the agency created the SIREN project. The SIREN project is designed to secure a countywide public safety voice radio system that all public safety agencies in Brown County can operate on during emergency situations. SIREN will:

1. Improve **COVERAGE & RELIABILITY** throughout Brown County
2. Have **CAPACITY** and allow for future growth
3. Satisfy the **INTEROPERABILITY** need for all fire, police, sheriff and EMS agencies to communicate when needed during an emergency or special event
4. Provide an **AFFORDABLE** system that will meet all Brown County's voice radio needs now and into the future.

Brown County Public Safety Communications determined that the 700 radio spectrum met the requirements set forth in the SIREN project. The move to 700 MHz rendered all the current VHF radios utilized by the Fire Department as well as the Police Department in the Village of Howard incapable for use. These radios will be allocated to Howard Public Works to replace the mobiles and portables that are not able to be narrow banded. The Brown County 700 MHz radio system is a P25 open standards digital, simulcast, and trunked radio system.

The mobiles, portables, and desk-top radios, purchased will be TIA-102 P25 compliant as a trunked radio system. It will be tested and fully functional on a Motorola Solutions Astro P25 trunked radio system as well as an Astro Simulcast radio system. The system is fully P 25 compliant.

On several occasions in the past two years, staff has discussed the need to replace the current radios used by public safety due to the FCC rules as well as the need for interoperable communications. Staff has been working with Brown County to coordinate purchasing the radios in a consortium, standardizing the radio purchases and to obtain economies of scale in the acquisition.

This information was presented to the Village Board on several occasions beginning in 2008, with a study presented and approved by the Board on 3-22-2010. The best way to provide for the purchase of the radios and other large priced items included within the Fire Department budget is by utilizing available cash on hand. Cash will not be sufficient to make all future scheduled purchases so the borrowing option was reviewed.

Brown County has been working with all interested municipalities within the county on jointly purchasing radios. Several of the municipalities are also utilizing the county for the borrowing option.

The borrowing option will allow the village to make payments from the fire department capital outlay fund over the next five years to pay for the radio cost. Spreading out the cost will enable the fund to absorb the cost without increasing taxes. There is additional cost to the borrowing option as the interest rate obtained is 2.93% and bond issuance costs will be incurred, as is true with any borrowing. Utilizing the joint financing ability of the county and the other participating municipalities allow these costs to be shared, minimizing the village's share.

**ATTACHED INFORMATION**

- I. Resolution 2011-26
- II. Brown County Fire and EMS Radio Advisory Committee Final Report

VILLAGE OF HOWARD, WISCONSIN

RESOLUTION NO. 2011-26

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RESOLUTION AUTHORIZING THE ISSUANCE AND  
SALE OF NOT TO EXCEED \$191,133 TAXABLE GENERAL  
OBLIGATION PROMISSORY NOTES, SERIES 2012

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**WHEREAS**, the Village of Howard, Wisconsin (the "Village"), is in need of funds in an amount not to exceed \$191,133 for public purposes, including payment of all or a portion of the cost of acquisition of interoperable two-way radios for the emergency response system located within the Village which will enhance the public safety of the Village, and payment of legal, fiscal and other related expenses (collectively, the "Project"); and

**WHEREAS**, Brown County, Wisconsin (the "County"), subject to approval by the County Board, will issue its own Taxable General Obligation Promissory Notes in the amount of the Notes (defined below) (the "County Notes"), acting in effect as a co-borrower together with the Village, with the intention of the Village and the County that repayment of principal and interest on the Notes (defined below) and/or County Notes (the aggregate outstanding under the Notes and the County Notes will not exceed \$191,133) will be repaid by a levy upon all of the taxable property of the Village;

**WHEREAS**, the County issuing the County Notes and acting as a co-borrower with the Village, will allow the Village to achieve an interest savings that it would otherwise not be able to achieve;

**WHEREAS**, if the County is called on to repay the County Notes, the Village agrees that it will repay or reimburse the County for any and all amounts paid on the County Notes by the County;

**WHEREAS**, Section 67.12(12), Wisconsin Statutes, permits the Village to borrow money and issue municipal obligations as evidence of such indebtedness for any public purpose; and

**WHEREAS**, the Project constitutes a "public purpose" within the meaning of Section 67.04(1), Wisconsin Statutes; and

**WHEREAS**, the Village Board of the Village (the "Board") deems it desirable and in its best interest to issue its \$191,133 Taxable General Obligation Promissory Notes, Series 2012 as provided in this Resolution (the "Notes") for the purpose of paying the costs of the Project; and

**WHEREAS**, the Board has determined that it is in the best interest of the Village sell the Notes to Associated Bank, National Association, Manitowoc, Wisconsin (the "Initial Purchaser").

**NOW, THEREFORE, BE IT RESOLVED** by the Village Board of the Village as follows:

1. **Authorization of the Notes.** For the purpose of paying the costs of the Project (including legal, fiscal and other related expenses), there shall be borrowed a sum not to exceed One Hundred Ninety-One Thousand One Hundred Thirty-three and 00/100th Dollars (\$191,133.00). To evidence such indebtedness, the Village President and Village Clerk are hereby authorized, empowered and directed to make, execute, issue and sell for, on behalf of and in the name of the Village taxable general obligation promissory notes (the "Notes"). Issuance of the Notes is subject to approval and issuance of the County Notes.

2. **Sale of the Notes.** The sale of not to exceed \$191,133 Taxable General Obligation Promissory Notes, Series 2012, to the Initial Purchaser, at a price of not to exceed \$191,133 on the date of delivery is hereby ratified and confirmed.

3. **Terms of the Notes.** The Notes shall be designated "Taxable General Obligation Promissory Notes, Series 2012," shall be dated the Delivery Date, shall be issued in the denomination of 0.01 or any integral multiple thereof; shall be numbered one (1) and upward; shall bear interest at the rates set forth on Exhibit A and incorporated herein by reference; and shall mature on in the years and principal amounts as set forth in Exhibit A. Principal and interest on the Notes is payable commencing on July 1, 2012 and semi-annually thereafter on January 1 and July 1 of each year until paid or earlier redeemed. The Notes shall be payable in lawful money of the United States of America. The Notes shall be subject to optional redemption, in whole or in part, by the Village prior to maturity at par plus accrued interest.

4. **Form of the Notes.**

(a) The Notes shall be issued in substantially the form set forth in Exhibit A attached hereto.

(b) The Notes shall be executed on behalf of the Village by the President and Village Clerk of the Village sealed with the official or corporate seal, if any, and delivered to or on behalf of the Initial Purchaser upon payment to the Village of the purchase price thereof as provided in Section 2 of this resolution. A facsimile signature of either of the officers may be imprinted on the Notes in lieu of the manual signature of such officer, but unless the Board has contracted with a fiscal agent under Section 67.10(2), Wis. Stats., at least one of the signatures shall be manual. In the event that any of the officers whose signatures appear on the Notes shall cease to be such officer(s) before the delivery of the Notes, such signatures shall, nonetheless, be valid and sufficient for all purposes to the same extent as if they had remained in office until such delivery.

5. **Registration and Payment of the Notes; Persons Treated as Owners; Transfer of Notes.** The Notes shall be issued as registered obligations. The Notes shall be executed in the name of the Village by the manual signatures of the Village President and Village Clerk, and shall be sealed with its official or corporate seal, if any. The principal of, premium, if any, and interest on the Notes shall be paid by the Village Treasurer, who is hereby appointed as the Village's Note Registrar. Both the principal of and interest on the Notes shall be payable in lawful money of the United States of America by the Note Registrar. Payment of principal of the final maturity on the Note will be payable upon presentation and surrender of the Note to the Note Registrar. Payment of principal on the Note (except the final maturity) and each installment of interest shall be made to the registered owner of each Note who shall appear on the registration books of the Village, maintained by the Note Registrar, on the Record Date and shall be paid by check or draft of the

Village and mailed, to such registered owner at his or its address as it appears on such registration books or at such other address may be furnished in writing by such registered owner to the Note Registrar.

6. **Levy of Direct, Annual, Irrepealable Tax.** For the purpose of paying the principal of and interest on the Notes as the same becomes due, the full faith, credit, and resources of the Village are hereby irrevocably pledged, and there is hereby levied upon all of the taxable property of the Village a direct, annual, irrepealable tax sufficient to pay the interest when it falls due and also to pay and discharge the principal at maturity, and that the series of notes of which this note is one, together with all other indebtedness of the Village, is within every debt or other limit prescribed by law. The direct, annual, irrepealable tax hereby levied shall be carried onto the tax rolls and shall be collected in addition to all other taxes and in the manner and at the same time as other taxes of the Village for such years are collected. So long as any part of the principal or interest on the notes remains unpaid, the tax hereby levied shall be and continues irrepealable except that the amount of tax carried onto the tax roll may be reduced in any year by the amount of any surplus in the Debt Service Fund created under Section 7 of this Resolution; and except as otherwise provided for pursuant to Section 67.05(10), Wisconsin Statutes.

7. **Debt Service Fund.** There is hereby established in the Village treasury a fund account separate and distinct from all other funds and accounts of the Village designated "Debt Service Fund Account for Village of Howard, Wisconsin Taxable General Obligation Promissory Notes, Series 2012" (hereinafter the "Debt Service Fund") which Debt Service Fund shall be used solely for the purpose of paying the principal of and interest on the Notes. There shall be deposited in the Debt Service Fund:

- (a) all accrued interest (if any) paid on the Notes at the time the Notes are delivered to the Initial Purchaser;
- (b) the original issue premium (if any) received by the Village upon the sale of the Notes;
- (c) all money raised by taxation pursuant to Section 6 hereof; and
- (d) all other sums as may be necessary to pay principal of and interest on the Notes as the same becomes due.

The Debt Service Fund shall be used for the sole purpose of paying the principal of and interest on the Notes and shall be maintained for such purpose until such indebtedness is fully paid or otherwise extinguished. The funds to provide for each payment of principal of and interest on the Notes prior to the scheduled receipt of taxes from the next succeeding tax collection may be invested in direct obligations of the United States of America maturing in time to make such payments when they are due or in other investments permitted by law. Any amounts over and above the amount of such principal and interest payments on the Notes may be used to reduce the next succeeding tax levy or may, at the option of the Village, be invested by purchasing the Notes as permitted by and subject to Section 67.11(2)(a), Wisconsin Statutes, or may be invested in interest-bearing obligations of the United States of America, other obligations of the Village, or in other investments permitted by law, which investments shall continue to be a part of the Debt Service Fund.

8. **Borrowed Money Fund.** The principal proceeds from the sale of the Notes shall be paid into the Village treasury and entered in a fund separate and distinct from all other funds, which fund shall be designated "Taxable General Obligation Promissory Notes, Series 2012, Borrowed Money Fund." Money in said fund shall be used solely for the purposes for which the Notes were issued.

9. **Application and Investment of Note Proceeds.** Following the sale of the notes, the President and Village Clerk are hereby authorized and directed to cause the Notes to be printed, and to execute and deliver the Notes to the Initial Purchaser upon payment therefor; and the principal proceeds from the sale of the Notes shall be used only for the purposes and in the manner required by law and by this Resolution. The proceeds may be invested in the manner permitted by law.

10. **Resolution a Contract.** The provisions of this Resolution shall constitute a contract between the Village and the Initial Purchaser and any subsequent holder(s) of the Notes, which contract is made, in part, to secure and induce the Initial Purchaser to buy the Notes, and after issuance of any Note no change or alteration of any kind in the provisions of this Resolution may be made except as provided in Section 13 hereof, until all of the Notes have been paid in full as to both principal and interest. The Village shall take no action with respect to such contract which would be in contravention of any applicable law or constitutional provision which prohibits the passage of laws impairing contracts. In addition, the holder(s) of the Notes shall have the right, in addition to all other rights, by mandamus or other suit or action in any court of competent jurisdiction to enforce the rights of such holder(s) under such contract against the Village, the governing body thereof, and the officers thereof. When the Notes have been discharged, all pledges, covenants and other rights granted to the holder(s) of the Notes by this Resolution shall cease.

11. **Closing.** The appropriate officers and agents of the Village are hereby directed and authorized to do all acts and things as may be necessary and convenient to effectuate the closing of this issue as soon as practicable hereafter, in accordance with the terms of sale thereof; and said officers and agents are hereby authorized and directed to execute and deliver such documents, certificates and acknowledgments as may be necessary or convenient in accordance therewith.

12. **Discharge.** When all the Notes have been discharged, all pledges, covenants and other rights granted to the holders of the Notes by this Resolution shall cease. The Village may discharge all Notes due on any date by depositing with the Initial Purchaser on or before that date a sum sufficient to pay the same in full; or if any Note should not be paid when due it may nevertheless be discharged by depositing with the Initial Purchaser a sum sufficient to pay it in full with interest accrued from the due date to the date of such deposit. The Village may also discharge all Notes called for redemption on any date when they are redeemable according to their terms, by depositing with the Initial Purchaser on or before that date a sum sufficient to pay them in full, with accrued interest and the required redemption premium, if any, provided that notice of redemption has been duly given as required by this Resolution. Monies on deposit in the Debt Service Fund and the Borrowed Money Fund may be used for this purpose.

13. **Amendments to Resolution.** After the issuance of any Notes, no change or alteration of any kind in the provisions of this Resolution or any exhibit hereto may be made until all of the Notes have been paid in full as to both principal and interest, or discharged as herein

provided except: (a) the Village may, from time to time, amend this Resolution or any exhibit hereto without the consent of the holders of the Notes, but only to cure any ambiguity, administrative conflict, formal defect, or omission or procedural inconsistency of this Resolution; and (b) this Resolution may be amended, in any respect, with the written consent of the holders of not less than two-thirds (2/3s) of the principal amount of the Notes then outstanding, exclusive of Notes held by the Village; provided, however, that no amendment shall permit any change in the maturity of or interest payment date of any Notes issued hereunder, or a reduction in the rate of interest on any Notes, or in the amount of the principal obligation thereof, or change the terms upon which the Notes may be redeemed, or make any other modification in the terms of the payment of such principal or interest without the written consent of the holder of each such Notes to which the change is applicable.

14. **Records.** The Clerk shall provide and keep a separate record book and shall record a full and correct statement of every step or proceeding had or taken in the course of authorizing and issuing the Notes.

15. **Severability.** In the event that any one or more provisions hereof shall for any reason be held to be illegal or invalid, such illegality or invalidity shall not affect any other provisions hereof.

16. **Conflicting Resolutions.** All prior resolutions, rules or other actions of the Board or any parts thereof in conflict with the provisions hereof shall be, and the same are, hereby rescinded insofar as the same may so conflict.

17. **Effective Date.** The foregoing shall take effect immediately upon adoption and approval in the manner provided by law.

Adopted: December 12, 2011.

Approved by:

\_\_\_\_\_  
Burt R. McIntyre, Village President

ATTEST:

\_\_\_\_\_  
Christopher A. Haltom, Village Clerk

**CERTIFICATION BY VILLAGE CLERK**

I, Christopher A. Haltom, being first duly sworn, hereby certify that I am the duly qualified and acting Village Clerk of the Village of Howard, Wisconsin (the "Village"), and as such I have in my possession, or have access to, the complete corporate records of the Village and of its Village Board; that I have carefully compared the transcript attached hereto with the aforesaid records; and that said transcript attached hereto is a true, correct and complete copy of all of the records in relation to the adoption of Resolution No. \_\_\_\_\_ (the "Resolution") entitled:

RESOLUTION AUTHORIZING  
THE ISSUANCE AND SALE OF NOT TO EXCEED \$191,133  
TAXABLE GENERAL OBLIGATION PROMISSORY NOTES,  
SERIES 2012

I hereby further certify as follows:

1. Said Resolution was considered for adoption by the Village Board at a meeting held at Village Hall, 2456 Glendale Avenue, Howard, Wisconsin, at 6:30 p.m. on December 12, 2011. Said meeting was a regular meeting of the Village Board and was held in open session.

2. Said Resolution was on the agenda for said meeting and public notice thereof was given not less than twenty-four (24) hours prior to the commencement of said meeting in compliance with Section 19.84 of the Wisconsin Statutes, including, without limitation, by posting on the bulletin board in the Village Hall, by notice to those news media who have filed a written request for notice of meetings, and by notice to the official newspaper of the Village.

3. Said meeting was called to order by the Village President who chaired the meeting. Upon roll, I noted and recorded that the following trustees were present:

_____	_____
_____	_____
_____	_____
_____	_____

and that the following trustees were absent:

_____	_____
-------	-------

I noted and recorded that a quorum was present.

Various matters and business were taken up during the course of the meeting without intervention of any closed session. One of the matters taken up was said Resolution, which was introduced, and its adoption was moved by \_\_\_\_\_ and seconded by \_\_\_\_\_.

Following discussion and after all members of the Village Board who desired to do so had expressed their views for or against said Resolution, the question was called, and upon roll being called and the continued presence of a quorum being noted, the recorded vote was as follows:

AYE:

_____	_____
_____	_____
_____	_____
_____	_____

NAY:

_____	_____
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ABSTAINED:

_____	_____
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Whereupon the meeting chair declared said Resolution adopted, and I so recorded it.

IN WITNESS WHEREOF, I have signed my name and affixed the seal of the Village hereto as of the 12<sup>th</sup> day of December, 2011.

[SEAL]

\_\_\_\_\_  
Christopher A. Haltom, Village Clerk

**Exhibit A**

**(Form of Note)**

**UNITED STATES OF AMERICA**

**STATE OF WISCONSIN**

**VILLAGE OF HOWARD, WISCONSIN**

**TAXABLE GENERAL OBLIGATION PROMISSORY NOTE  
SERIES 2012**

REGISTERED  
NO. R-1

REGISTERED  
\$191,133.00

<b>DATED DATE</b>	<b>INTEREST RATE</b>	<b>MATURITY DATE</b>	<b>CUSIP</b>
_____, 2012	See Below	_____, 2017	N/A

REGISTERED OWNER: ASSOCIATED BANK, NATIONAL ASSOCIATION

PRINCIPAL AMOUNT: ONE HUNDRED NINETY-ONE THOUSAND ONE  
HUNDRED THIRTY-THREE AND NO/100 DOLLARS

VILLAGE OF HOWARD, WISCONSIN, acknowledges itself indebted and for value received hereby promises to pay to the registered owner identified above, or registered assigns, the principal amount specified above on the maturity date specified above, unless this Note shall be redeemable and shall have previously been called for redemption and payment of the redemption price made or provided for, and to pay interest on such principal amount from the dated date hereof at the Interest Rate (as defined below), payable in lawful money of the United States of America on July 1, 2012, and semiannually thereafter on the first day of each January and July. The principal balance hereunder shall be repaid in equal semi-annual payments over a five year period, payable on the first day of each January and July, commencing July 1, 2012. All payments of principal and interest shall be paid by check or draft mailed to the registered owner of record hereof as of the fifteenth day of the calendar month next preceding such interest payment date, at the address of such owner appearing on the registration books maintained by the Village at the address of such owner appearing on the registration books maintained by the Village Treasurer for such purpose (the "Note Registrar"). This note, as to principal and premium, if any, when due, will be payable in lawful money of the United States of America upon presentation and surrender of this Note at office of the Note Registrar. The full faith and credit of the Village are irrevocably pledged for the punctual payment of the principal of and interest on this Note according to its terms. Payment on this Note shall constitute payment on the Brown County, Wisconsin, Taxable General Obligation Promissory Note, Series 2012\_\_\_ issued by Brown County on the date hereof in the same principal amount as this Note and held by the Registered Owner of this Note.

As used herein:

“Business Day” means a day (a) other than a Saturday, Sunday or legal holiday on which banks located in the city in which the Initial Purchaser’s principal office is located are required or authorized to remain closed and (b) on which neither the New York Stock Exchange nor the Federal Reserve Bank is closed.

“Determination Date” means two (2) Business Days immediately preceding Dated Date.

“Five Year Cost of Funds” means the cost of funds established daily by the Initial Purchaser for obligations of an amount similar to the Notes and based on a five year term and amortization schedule, as shown on the Initial Purchaser’s daily pricing sheets as determined on the Determination Date.

“Initial Purchaser” means Associated Bank, N.A. and any successor holder of all of the Notes outstanding.

“Interest Rate” means a fixed rate of interest equal to the Five Year Cost of Funds as determined on the Determination Date plus one hundred fifty (150) basis points (1.5%).

The Notes are being issued for public purposes, including payment of all or a portion of the cost of acquisition of interoperable two-way radios for the emergency response system within the Village which will enhance the public safety of the Village, and payment of legal, fiscal and other related expenses.

The Notes are authorized and issued under and pursuant to Section 67.12(12) of the Wisconsin Statutes.

The Notes shall be subject to optional redemption, in whole or in part, by the Village prior to maturity at par plus accrued interest.

It is hereby certified, recited and declared that all acts, conditions and things required to be done, exist and be performed precedent to and in the issuance of this Note in order to make it a legal, valid and binding obligation of the Village have been done, exist and have been performed in regular and due time, form and manner as required by law, that a direct, annual, irrevocable tax has been levied by the Village sufficient to pay the interest when it falls due and also to pay and discharge the principal at maturity, and that the series of Notes of which this Note is one, together with all other indebtedness of the Village, is within every debt or other limit prescribed by law.

IN WITNESS WHEREOF, the VILLAGE OF HOWARD, WISCONSIN has caused this note to be executed in its name and on its behalf by the manual or facsimile signatures of its President and its Clerk, and its corporate seal, or a facsimile thereof, to be hereunto affixed or otherwise reproduced hereon.

VILLAGE OF HOWARD, WISCONSIN

[SEAL]

By: \_\_\_\_\_  
Burt R. McIntyre, Village President

Attest: \_\_\_\_\_  
Christopher A. Haltom, Village Clerk

**ASSIGNMENT**

For value received the undersigned sells, assigns and transfers unto \_\_\_\_\_ the within note and hereby irrevocably constitutes and appoints \_\_\_\_\_ attorney to transfer the said note on the books kept for registration thereof, with full power of substitution in the premises.

Dated \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
Signature Guarantee

BROWN COUNTY FIRE AND EMS RADIO ADVISORY COMMITTEE

Fire and EMS Radio Advisory Committee:

Final Report

Committee Members:

Robert Goplin, Chair, Green Bay Fire Department

Robert Van De Hey, Vice Chair, Hobart Fire Department

Mark Madigan, Vice Chair, County Rescue Services

Robert Kiser, De Pere Fire Department

Ed Balcer, De Pere Fire Department

Drew Spielman, Green Bay Fire Department

Chris Hohol, Bellevue Fire Department

Chris Gabryscek, Suamico Fire Department

John Brittnacher, Greenleaf Fire Department

Dan Kerkoff, Ledgeview Fire Department

Kris Vervaeren, Ashwaubenon Public Safety

Cullen Peltier, Brown County Emergency Management

Jim Nickel, Brown County Public Safety Communications

John Lampkin, Brown County Public Safety Communications

Abstract

Brown County is approximately 615 square miles located on the southern end of the Bay of Green Bay with the Fox River dividing the county approximately east and west. 87 square miles of the county's area is covered by water. The county population, according to 2008 U.S. Census Bureau estimates is 242,863. Multiple geographical, societal, political, and economic factors present unique challenges to the fire and emergency services throughout the county.

Within the county, 21 different agencies provide fire and/or emergency medical services to the county's residents. These agencies, operating at time independently and at other times as a whole, provide fire and injury prevention, fire suppression, technical rescue, and emergency medical services to the entire county and areas outside the county. Brown County is the largest county in Northeast Wisconsin, as well as the third largest in the State of Wisconsin. The county is home to the Port of Green Bay, which receives international and domestic shipments of goods by ship, rail, and Interstate highway. Austin Straubel International Airport also resides in the commercial, civil, county and receives domestic and international flights. The Canadian National Railroad operates rail lines into the county and a major switchyard is located on the Green Bay's west side. The major industry is paper-making; Proctor & Gamble, Georgia-Pacific, and Green Bay Packaging are the largest employers in that industry. Green Bay is also a health care center in Northeast Wisconsin, with four hospitals located throughout the City. The University of Wisconsin-Green Bay, with an enrollment of 6,300 students, is located on the east side. St Norbert College in De Pere is an international College with a student population of 2,500 residents and 480 staff members. The Northeast Wisconsin Technical College campus, with an enrollment of 9,800 program students and 32,000 continuing education students, is located on the west side.

The Wisconsin Public Service Corporation operates a 456 MW natural gas and coal-fired power plant at the mouth of the Fox River, which supplies electricity to all of Northeast Wisconsin as well as Upper Michigan. In addition, two nuclear power plants are within a fifty-mile radius of the center of Brown County. The power distribution grid is controlled in the corporate office complex located in downtown Green Bay. The county is a major petroleum distribution center, receiving fuels by pipeline and ship. Bulk storage and distribution terminals are located on both sides of the Fox River; tanker trucks move fuel throughout the county to outlying areas around the clock. WPSC is also responsible for distribution of natural gas for the entire northern section of the State. The gas is received by pipeline into Green Bay and distribution is controlled from that point. LP gas is received by rail and through terminals located on the east side is distributed throughout Northeast Wisconsin.

County fire departments and E.M.S. agencies provide fire and emergency medical services to Lambeau Field, home of the NFL's Green Bay Packers, and the area surrounding the stadium. In excess of 70,000 people gather at the stadium for the professional football games, thousands more visit the county to observe the Training Camp activities that take place from June to the beginning of the NFL season. The Resch Center is an 8,000-seat arena that lies in the Village of Ashwaubenon and hosts concerts and indoor sporting events throughout the year.

In addition to the fire and E.M.S. agencies in the county, the Brown County Hazardous Materials Response Team responds to all major incidents involving hazardous materials within the county

and in neighboring Kewaunee County. The Brown County Team is part of Wisconsin's Regional Hazardous Materials Response network, which serves 11 counties in Northeast Wisconsin.

The Green Bay Fire Department is also a partner in the Wisconsin Urban Search and Rescue Network, Task Force III. This cooperative effort with three other fire departments in the Fox River Valley (Appleton, Oshkosh, Neenah-Menasha) was initiated prior to Homeland Security funding becoming available. It is model project for the sharing of resources in an effort to provide a higher response capability to the Northeast region of the State of Wisconsin. The team is available upon request wherever needed within the State.

In February of 2009, all fire and E.M.S. agencies within the county entered in to the Mutual Aid Box Alarm System (MABAS). This pre-arranged mutual aid agreement allows all agencies in the county to respond to incidents that are beyond the abilities of the agency having jurisdiction. MABAS also incorporates resources from other counties and potentially other states coming to the aid of a stricken agency.



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Fire and EMS Radio Advisory Committee: Final Report

Introduction

In 1982 Brown County installed and placed in to service a VHF radio communications system for public safety agencies. This was followed shortly thereafter with the installation of an 800 MHz trunked public safety radio communications system to be used by the City of Green Bay and Village of Ashwaubenon. These systems have been in place since that time with little or no upgrade or change to the original equipment.

Like any technology based or electronics based equipment, there is a projected serviceable life expectancy associated with the hardware elements of a radio communications system. While this expected life span is difficult to predict and probably somewhat arguable, it is probably accurate to assume that any agency, business, or household would not be able to locate an electronics or technology based product approaching 30 years old that functions as intended when it was designed. Even if such a device was located, it is probable that the device would no longer be supported or repairable if it did fail to operate correctly. However, this is exactly the situation in which all public safety agencies within Brown County now find themselves.

Every day, these agencies rely on an antiquated radio system to transmit and receive critical communications essential to their safety and the safety of the citizens of Brown County. According to the Brown County Public Safety Communications Center, some components of the system are no longer repairable if they fail. Furthermore, the system that is currently in place was not built in a way that delivers acceptable levels of radio coverage to these agencies. Many areas of the county suffer from significant “dead spots” where there is no coverage at all or from weak spots where the coverage is marginal at best. In its current state, the system is not reliable for

relaying critical information that is imperative to successful emergency operations. The entire system is vulnerable to catastrophic failure based on the failure of a single, irreplaceable or irreparable component.

Federal mandates from the Federal Communications Commission (FCC) require that all radio channels be narrow banded to make more room in the available radio spectrum. (Federal Communications Commission, 2009) They have also made channels available in the 700 MHz range for public safety use; some of these channels have already been assigned to Brown County by the FCC. As a result of these mandates and other changes required by the FCC, it is not possible to continue operations on the radio system that is currently in place in Brown County. This is a problem faced by public safety agencies nation-wide; it is not specific to Brown County.

The ability for emergency responders to work seamlessly with other systems or products used by other agencies within the county without any special effort and share information via voice and data signals on demand, in real time, is referred to as communications *interoperability*. (United States Fire Administration, 2008) At present, the radio system in Brown County does not provide interoperable communications between responders. Many agencies within the county cannot communicate directly to each other without complicated technical operations that consume a large amount of the systems resources. The only other way communicate directly is to carry multiple types of radios which is not cost effective or efficient. Interoperability is a national and state wide initiative. The following statement from the State of Wisconsin interoperability web site defines the States position on interoperable communications.

Effective communication between law enforcement, firefighters, emergency medical services and other response organizations is a vital part of an effective emergency response. Yet in a number of high profile disasters, the efforts of responders were significantly hampered by communication breakdowns caused by a lack of *communications interoperability*.

### **Evacuation Orders Never Received**

On September 11, over 2,700 people perished at the World Trade Center, including 340 firefighters.

After the south tower collapsed, police command staff issued their own building evacuation order over the police emergency channel. Tragically, the radios used by firefighters in the north tower operated on a different channel and the message went unheard.

Meanwhile, civilians in the buildings were told by 911 operators to remain where they were even after an evacuation order had been given for both towers. The evacuation order was issued over a channel used only by officers on the Port Authority WTC system. It did not get communicated to users of other channels, including the 911 Operations Center.

### **Search and Rescue Hampered**

In August of 2005, Hurricane Katrina hit the gulf coast with sustained winds of more than 125 mph. Virtually every communication system failed: cell, internet, phone, radio,

television and even satellite communications were disrupted by broken lines, power outages and destruction of base stations. When limited communications were recovered, mutual aid channels available to responders were quickly overwhelmed and officials from different agencies and jurisdictions couldn't talk using proprietary radio systems. Rescue teams ended up searching the same area multiple times and missing other areas altogether. Over 1,400 are estimated to have died during the storm and its aftermath.

### **Emergency Responders Left in the Dark**

On February 6, 2008, two semitrailer trucks jack-knifed on an icy stretch of Interstate 90 just north of Janesville.

In normal circumstances, this would simply be an inconvenience to other motorists - a delay of maybe an hour while tow trucks removed the vehicle. But on this day, radio incompatibility between local, county and state emergency responders made the situation much worse. The State Patrol, responsible for making decisions regarding road closures and traffic rerouting, couldn't communicate with National Guard units or county highway departments. With limited on-scene confirmation of the extent to which traffic was backing up, decisions were delayed, resulting in a massive traffic jam with thousands of motorists stranded, some for 12 hours, in vehicles running out of gas and frigid temperatures.

### **Not Just for the Big Events**

While we can easily see the impact of failed communications during major events like terrorist attacks, severe weather and a very public traffic jam, any public safety agency can provide local examples of communication breakdowns that happen on a daily basis. From the mundane traffic stop to the more serious fire, bank robbery or domestic call - communication interoperability between responding agencies can be the difference between life and death. Creating a reliable statewide solution to enable on-demand, real-time interoperable public safety radio communications is the focus of the Wisconsin Interoperability Initiative. (Wisconsin Office of Justice Assistance, 2010)

In an effort to address these concerns, a committee sanctioned by the Brown County Fire Chiefs Association was convened to determine what needs fire and E.M.S. personnel have of a radio communications system. All fire departments and E.M.S. providers in the county were invited to participate as members of the committee. Similar committees were formed to address the needs of law enforcement personnel. On October 15, 2009 the Brown County Fire and EMS Radio Advisory Committee conducted its first meeting at De Pere Fire Station One. In attendance were 19 people representing 13 different Brown County fire and E.M.S. agencies. During the initial meeting, Fire Chief Robert Kiser, President of the Brown County Fire Chief Association, appointed Assistant Chief Robert Goplin of the Green Bay Fire Department as the committee chair. Chief Kiser also appointed Fire Chief Robert Van De Hey of Hobart Fire Department and Mark Madigan of County Rescue Services as vice chairs. (Fire and EMS Radio Advisory Committee, 2009a)

The committee also met on October 29, 2009 and determined that the final product of the committee would be a report outlining what Brown County fire and E.M.S. providers required

and wanted radio communications system to be able to do. (Fire and EMS Radio Advisory Committee, 2009b) The report would take in to consideration what is required and wanted from the system, what other counties adjacent to Brown County are doing with their systems and how this system would interact with those, expected standards of radio coverage, and what is needed in terms of equipment and personnel to properly implement a system that meets the needs of the county. The remainder of this report establishes the document requested by the committee and explains the process used to reach the conclusions and recommendations herein.

#### Decisional and Information Gathering Processes

An initial “brainstorming” session at the first meeting of the Brown County Fire and EMS Radio Advisory Committee yielded an initial list of needs and wants that a radio system will be expected to address. (Fire and EMS Radio Advisory Committee, 2009a) While not necessarily wholly comprehensive, this list served as the basis for further discussion and directed committee actions. The final recommendations within this report reflect the list of needs developed by the committee.

In addition to the list of needs, Jim Nickel, Director of the Brown County Public Safety Communications Center, outlined the history of the current system, mandates from the FCC, and changes in radio technology. (Fire and EMS Radio Advisory Committee, 2009a) The committee determined early in the process that the objective of the committee was to determine what the radio communication system should be able to do, not necessarily how to do it. Committee members were asked to concentrate on the capabilities the system should have to allow for effective communications and operations and let system engineers determine the best way to meet these requirements.

An Emergency Medical Services sub-committee was formed to address radio communication needs specific to EMS. (Fire and EMS Radio Advisory Committee, 2009b) State statutes dictate that certain frequencies be utilized by all EMS providers, though this does not preclude them from utilizing other frequencies as well. (Department of Health and Family Services, 2006) In addition, some EMS agencies in the county also operate extensively in other counties or transport patients throughout the state and will therefore have additional concerns with regard to interfacing with agencies in areas outside of Brown County. Mark Madigan of County Rescue Services was appointed by Chief Kiser as the chair of the EMS sub-committee.

A “SWOT” analysis was then conducted at the second committee meeting to further define the situation regarding the existing system and to refine the needs of end users. (Fire and EMS Radio Advisory Committee, 2009b) “SWOT” stands for Strengths, Weaknesses, Opportunities, and Threats. SWOT is a strategic planning tool used to assist with the evaluation of projects. The results of the SWOT analysis can be found in the Discussion section of this report.

Utilizing the results of the SWOT analysis and the list of needs and wants developed by the committee, several information gathering sessions occurred. In a joint meeting of the Brown County Fire and EMS Radio Advisory Committee and the Brown County Law Enforcement Radio Advisory Committee, John Lampkin presented information explaining radio “trunking” technology and benefit and drawbacks of using this process. Mr. Lampkin is a Communication Specialist with the Brown County Public Safety Communications Center. Members of the committees also traveled to Bloomington, Minnesota, just outside of Minneapolis to view and discuss the state-of-the-art radio system used by Hennepin County and the State of Minnesota.

Additionally, committee members discussed multiple situations in which the current radio system had failed to operate effectively and how these issues might be addressed.

Committee members then drafted a report and distributed it for review by the full committee. After several revisions and continued discussion, the report was prepared in final draft stage and submitted to Brown County Fire Chiefs Association for review and approval. After some minor revisions, the report was approved by the association and submitted to them as a final draft. The association will present the report in its entirety to the appropriate parties.

### Discussion

The committee convened meetings on several occasions to discuss issues related to the current radio system as well as to discuss needed capabilities of a new radio system. In order to develop a coherent analysis of the current system in conjunction with needs that should be addressed by a new system, a SWOT analysis was conducted. (Fire and EMS Radio Advisory Committee, 2009b) The following chart displays the results of the analysis. Generally, the strengths listed by committee members are representative of unified support of a new radio system. Overall, the opportunities present at this time are very positive and plausible given the state of the current system and the needs of a new system. The threats suggested can, for the most part, be overcome through educational efforts and development of financing options by a committee of finance personnel from affected jurisdictions and entities. The weaknesses presented by committee members clearly represent the concerns of each fire department and EMS agency in Brown County. In order to focus on the primary areas of concern and efforts to address them, discussion hereafter will focus on the defined weaknesses and opportunities.

The weaknesses of the current system are evident. One of the primary weaknesses is the age of the system. This weakness is evident enough that it is not listed in the weakness section of the SWOT Analysis. Due to the age of the system, there is a lack of available

<b>Table 1: SWOT Analysis Results</b>	
<b>STRENGTHS</b>	<b>WEAKNESSES</b>
Currently have an operable system Have good people operating the system Fire and EMS Departments are organized for a common goal Fire and EMS Departments are working together Known deadline is 2013 Advancement in technology	Training on the current or new radio system Inconsistent programming/labeling of radios and channels Ignorance of technology Channel availability Coverage/building penetration Frequency congestion Non-Repeated frequencies No standard paging frequency No Mayday frequency Dispatch can't monitor fire ground traffic Not enough dispatchers No redundancy/ Reliable Back-up system No multiple or backup towers No mobile command post
<b>OPPORTUNITIES</b>	<b>THREATS</b>
Deadline of 2013 Financing – quantity discount Permanent fixes – no band aids Ability to build an ideal system Ability to build full interoperability Ability to talk to other departments/agencies (Public Works, Parks, Water, etc.) Meeting county reps & talking to them Political involvement Ability to build a system to handle growth Communication with Police/Fire/EMS to discuss all needs	Deadline of 2013 State funding Users not thinking progressively enough Not understanding trunking and radio system Lawmakers/Politicians not understanding radio system Cost The unknown Incorrect information being passed on

replacement parts or components. As a result, component failures cause significant down time is much or potentially all of the system, leaving the communities of Brown County subject to inefficient or ineffective emergency services. In many cases, repairs are accomplished by

“scavenging” parts from failed components located by the vendor supplying the repairs. These parts are difficult to find and should not be considered reliable.

The difficulty in finding parts to make the current system reliable contributes to another downfall of the present system. Clearly, if parts are not readily available to maintain this system then parts are also not available to create redundancy. In the event of a complete system failure, there is no redundant system to provide communications. Public safety communications are an element of critical infrastructure that must remain useable at all times.

When the initial system was installed thorough training was not conducted. Even if it had been, those who would have received it are no longer involved with fire and emergency service organizations here or, in some cases, anywhere. The lack of training then translated in to an ignorance of the technology currently in use with the existing system. Many committee members also suggested that there is a lack of knowledge amongst end users of the system with regard to new technologies that are available. As a result, a training session was conducted by staff from Brown County Public Safety Communications to inform users of the current system technology and newly established technologies.

The original system was not used by the entire county and radio maintenance and programming were not conducted through a single source, inconsistencies in programming and labeling of radio channels developed over time. These inconsistencies make it difficult to accomplish interoperable communications because users are unable to determine what common channels are programmed in to their radios. Users can not simply turn on a radio from another agency if necessary and know what channel they are on because they may be labeled differently

than a radio they are accustomed to. The problems further exacerbated the training issues mentioned previously.

A major concern that became evident throughout the discussion held by the committee was the lack of channels that were available for fire ground communications and incident paging. Many departments stated that the single channel available to communicate with the dispatch center has caused significant problems while responding to incidents. This channel is used by firefighters to report that they are responding to an incident and for general communication between the department and the communications center. It is also used as the paging channel for all fire departments operating on the current VHF system. The problem created by a lack of channels is a significant safety concern. When several units are attempting to tell the communications center that they are responding, the channel becomes congested with these basic messages. When someone, usually either the communications center or the incident commander, is trying to relay critical information via this single channel it is often missed the many transmissions, covered by non-vital communications, or significantly delayed until there is "free air" to transmit on. Once this information reaches the intended recipient, it often requires additional transmissions to responding units thereby compounding the problem.

As incidents escalate, more units are often requested and must be paged out on the same frequency. If radio traffic is heavy during this time, and it usually is, there can be a significant delay in the time that it takes to page more resources. This delay occurs at the worst possible time, when the incident needs additional resources to bring it under control quickly. In many cases, it is not the incident currently taking place that experiences the delay. Because there is only one channel for paging and transmitting to the communications center, dispatchers must often wait to page out new incidents until radio traffic has cleared the channel.

Similar problems occur when multiple incidents take place at one time. All of the initial communications for incidents, including paging, take place on the same frequency. The multitude of communications taking place on this single channel leads to frequency congestion, again causing vital transmissions to be missed, covered by non-vital communications, or delayed.

Once emergency units arrive on scene, they generally change over to a channel that is specific to their department or a small group of departments so that they do not interfere with other radio traffic. The downfall of this is that these channels are not “repeated” and can not be monitored by the communications center. Repeated radio signals are those that are sent from a portable or mobile radio on one frequency and then received by a radio tower somewhere between the communications center and the incident scene. A repeater on the tower then “boosts” the signal and rebroadcasts the transmission on a different frequency. (United States Fire Administration, 2008) Repeated signals can be received by users anywhere in the county and in some cases outside of the county whereas those that are not repeated rarely travel more than a few miles.

In addition to the dispatch center not being able to monitor the radio traffic of an active incident, resources responding from outside the immediate area of the incident cannot monitor the situation or receive instructions as they travel to the incident. This is especially true for mutual or automatic aid units that are responding to the scene. Incidents that require automatic or mutual aid often require units to position in an area defined by the incident commander prior to being committed to the incident scene. This practice is referred to as “staging”; instructions for staging are often relayed to incoming units while they travel to the incident. The lack of repeated radio channels does not allow this to occur. Since these units have to be relatively close to the

incident scene before they can receive radio transmissions, staging becomes very difficult and can cause significant problems at the emergency scene.

The failure of radio transmissions to reach the dispatch center from the incident scene can be life threatening in the event of an emergency. If a firefighter was to transmit an emergency message that for some reason was not heard by units operating on a scene, they may not get the assistance they need. While this may seem like an improbable event, it has come very close to occurring already. On August 13, 2006, two firefighters transmitted emergency messages for assistance, referred to as a "MAYDAY", after falling through the floor of a burning residence. (Phillips, et al., 2007) They fell in to the basement, which was fully engulfed in flames. Two people heard the transmissions. One person was a firefighter on the scene of the incident; the other was a dispatcher at the Brown County Public Safety Communications Center. The fact that one firefighter heard the transmission is significant because it means that the other 17 people on the scene did not hear it. Had that one firefighter not heard the transmission, the dispatcher would have been the only one to have heard it. As it was, the dispatcher was able to take immediate action to provide assistance based on hearing the request. As a result, one of the firefighters was rescued, unfortunately the other firefighter died in the basement.

The lack of available channels within the current radio system presents additional concerns related to incident involving MAYDAY calls from firefighters. MAYDAY incidents become overwhelming almost instantaneously and they require a large volume of radio transmissions to coordinate rescue efforts. This is illustrated in the final report on the fatal incident of August 13, 2006. During that incident, there were 369 radio transmissions made in the first 49 minutes of the incident, or one every eight seconds. (Phillips, et al., 2007) Due to the volume of transmissions necessary to conduct MAYDAY operations, it may be necessary to

move MAYDAY operations to a different radio channel so that those transmissions do not interfere with continued efforts to suppress the fire or otherwise mitigate the incident. Rescue efforts and mitigation efforts must continue on the incident scene, but both require significant use of portable radios. Conducting both operations on one channel may become dangerous if the channel is so congested that critical messages can not be transmitted or received.

The labor intensive nature of MAYDAY incidents typically requires a significant increase in the number of personnel needed on the scene to successfully conduct operations. Due to the availability of resources, specifically personnel, several fire departments may be summoned to the incident scene to assist with a MAYDAY incident. Many of these firefighters will need to be on the same channel so that they can operate effectively. The current radio system does not provide enough channels that are common to all system users to allow for a dedicated MAYDAY channel to be assigned in the event that it is needed.

The lack of channel availability also results in the lack of a standard paging or alerting frequency. Currently, there is not a channel that can be used to alert all departments in the county of an incident. This type of alerting is necessary under the Mutual Aid Box Alarm System (MABAS) to alert departments that an incident is taking place and that movement of apparatus may be necessary to provide coverage throughout the affected area. County-wide alerting could also be used for notifications such as weather warnings, road closures, and general messages.

One of the most significant issues cited by all departments in the county is the lack of radio coverage under the current system. This lack of coverage also translates in to an inability for radio signals to penetrate buildings. Both issues are of significant concern to firefighters. First, many firefighters cannot receive pages on their radio pagers if they are in a building. There

is anecdotal evidence to show that firefighters in some areas of the county can receive the initial alert on their pagers (a series of beeps) but then hear nothing but static. These firefighters must then run out of the building they are in to get outside so that they can hear the voice message on the pager. As a result, departments have asked that all incidents be toned out twice so that firefighters have enough time to get to an area where they can receive the page. This dual paging leads to further congestion of an already congested radio system.

Under the current radio system, there is no ability to page firefighters using all of the tower sites within the county at the same time. At present, the dispatch center must manually select the tower site closest to the fire department being paged and send the page through that tower. This means firefighters from that department who are not in the immediate area of their fire station may never receive the page. This is particularly troublesome for paid-on-call or volunteer departments because their personnel are not necessarily in the immediate area when they are paged. The ability to use multiple towers to send transmissions at the same time is referred to as *simulcast*. (United States Fire Administration, 2008) A simulcast system would provide the ability for more firefighters to receive pages and hear radio transmissions at any given time or location. If properly designed and implemented, a simulcast system could solve many paging issues and coverage issues for incident radio transmissions.

Additionally, the failure of a radio signal to penetrate a building places the firefighters in a burning building in ultimate peril. An interior firefighting crew that needs assistance might not be able to request it because of radio signal problems. If a message requesting assistance never made it out of the building because of a lack of penetration, firefighters could be seriously injured or killed.

The lack of coverage for the county is an issue that affects firefighters whether they are in a building or not. Some departments are not able to communicate with the dispatch center, or the dispatch center cannot communicate with them. Crews responding to the fatal Mayday incident discussed previously experienced difficulty receiving radio transmissions from the dispatch center due to “dead spots” encountered as they responded to the scene. (Phillips, et al., 2007) As a result, they were not aware of the Mayday situation until after arriving on scene. The report further cites an inadequate number of radio towers as the cause of the “dead spots”. (Phillips, et al., 2007) Finally, the report states that “radio system failures contributed to the tragic events of the incident.” (Phillips, et al., 2007)

The inability to communicate with the dispatch center means that fire departments cannot request resources or communicate any other incident information to dispatch. In some cases, these departments are forced to rely on department or personal cellular phones to contact the dispatch center. Reliance on personal cell phones or department cell phones that are not intended for emergency communications places all personnel on scene in a dangerous situation. At a minimum, it delays communications because the caller must be routed through an operator at the dispatch center before being connected to their dispatcher.

Committee members also felt that there is a need for a mobile command post vehicle that would be able to respond to any incident and provide communications support. While these vehicles are routinely deployed on larger incidents, one does not exist within Brown County. The vehicle should be outfitted with a mobile repeater system that could be used to enhance radio communications by repeating radio signals directly from the incident scene using high-powered equipment. This would allow for signals to reach all incoming units and the dispatch center. Additional technologies may be able to provide for more radio channels or data service to the

incident commander. The vehicle could be deployed for any incident where communications issues become an issue, thereby providing for another level of redundancy in the new system.

With regard to redundancy, the committee also felt that the new system must also provide for additional radio towers and equipment. The towers and equipment would be strategically placed in the county to act as a backup system in the event of a partial or complete system failure. The placement of this equipment would be critical to ensure coverage over the majority of the county. The equipment used to create a backup system might include the use of both fixed and mobile equipment, possibly including the mobile command post.

Finally, no system will be effective without people to make it function. While equipment may be available for use, the ability to deploy and operate it is critical to the success of any system. At present, the committee feels that there are not enough dispatchers assigned to effectively operate during a heavy incident load. The current practice of moving staff from supervisory positions to dispatcher positions to augment dispatch capabilities during heavy incident loads may result in other inefficiencies. Generally, it is the opinion of the committee that in times of heavy incident load it is not appropriate to pull the most experienced and highly trained personnel in the center and place them in a position where their knowledge, skills, and abilities might not be best utilized.

While the multitude of weaknesses presented by the current system is severe, there are opportunities to address them. The primary opportunity is federally mandated compliance for radio system frequency usage by the end of the 2013 calendar year. While this deadline is viewed by the committee as both a threat and an opportunity, it is primarily viewed as an opportunity because it establishes a known timeframe for compliance. Similar to the realignment

of television signals required for the national transition to HDTV, radio spectrum users have no choice but to comply with the scheduled realignment of public safety radio frequencies. In the event that an agency doesn't comply with the mandate, the Federal Communications Commission (FCC) could decide to terminate an agencies right and ability to use the frequencies, effectively shutting them down. This approach was used by the FCC when television stations did not comply with the realignment of those signals. (Federal Communications Commission, 2009)

The complete replacement of an entire radio system also provides the opportunity to experience economies of scale with regard to equipment purchases. The replacement of the radio system would most likely result in the replacement of a significant number of mobile, base, and portable radios. As a result of this mass replacement, users would probably be able to buy radio equipment at a reduced rate due to bulk purchasing.

Replacement of the current system also allows system designers to seize the opportunity to address all issues presented by the system users in a single consolidated system. There would be no "band aid" fixes. All of the issues facing system users could be addressed by providing a permanent resolution that might also allow for future enhancements to take place that are impossible with the current system. Future enhancements to the system will most likely be needed as communities within the county continue to grow. The present system is not able to manage the radio traffic required of many communities now and certainly will not be able to manage more. The development of a new system also provides the opportunity to build the ideal radio system that allows for full public safety interoperability.

Full interoperability of public safety communications could also be extended to include agencies that routinely operate with universally recognized public safety entities to ensure

mitigation of emergency situations. A new system would provide the opportunity to include public works, water, parks, and highway departments in the system. These agencies are vital to ensuring public safety in the event of large scale incidents. Currently, many fire and E.M.S. agencies in the county do not have direct radio communications with these departments.

Other opportunities that have evolved from discussions regarding replacement of the current radio system are somewhat less tangible but clearly important. The discussions that many fire and E.M.S. officials have had with their elected officials has forged relationships that are invaluable. The involvement of fire and E.M.S. officials at a political level within their communities and at the county level has proven to be educational for career and elected officials. Finally, the cooperation and discussion resulting from the committees formed to address the radio system has helped to reinforce and strengthen relationships between police, fire and E.M.S. agencies throughout the county. Certainly all of the relationships discussed above are valuable and will no doubt serve to improve public safety countywide.

### Recommendations

It is the conclusion of the Brown County Fire and E.M.S. Radio Advisory Committee that the current radio system used by public safety agencies within Brown County should be replaced with a system that meets the current needs of all those agencies. Based on the work conducted by the committee, the committee makes the following recommendations:

1. Implementation of a new Public Safety radio communications system must be financed in such a way that it allows all agencies to immediately participate in the system with minimal financial impact, possibly by utilizing initial financing by one entity with a tiered payback from all involved agencies.

2. A new radio system that is capable of two way radio communications at 95% in-building coverage of all buildings, 95% of the time should be implemented as soon as possible before the 2013 FCC deadline.
3. A new radio system that is capable of radio paging communications at 95% in-building coverage of all buildings, 95% of the time should be implemented as soon as possible before the 2013 FCC deadline.
4. During acceptance testing for the new radio system, the tests suggested by the International Association of Fire Chiefs in their documents *Digital Project Working Group Interim Report, May 2008* and *Intelligibility of Selected Radio Systems in the Presence of Fireground Noise: Test Plan and Results* must be used. The system should not be considered acceptable if it does not meet the NFPA 1981-2007 intelligibility goals.
5. During design of the paging element of the new system, system designers must meet with the fire and E.M.S. agencies currently using radio pagers to explore new technologies available to address notification needs. These technologies might include reliable forms of alphanumeric paging or text messaging, ability for enhanced communications via pager or similar device, and the ability to monitor multiple radio channels through a pager.
6. The public safety radio system must allow for full interoperability between all fire, E.M.S., police, public works, parks, highway department, transit, and other agencies that affect public safety. This interoperability should be accomplished

with direct communications capability between agencies in the county, not through “patched” channels or similar circumstances.

7. The public safety radio system must allow for communications with agencies outside of Brown County, regardless of the type of radio system they use. This is especially critical for agencies that routinely travel outside the county for mutual aid, automatic aid, or E.M.S. transports.
8. The system must be able to provide high speed data coverage to all areas of the county, including Computer Aided Dispatch information and Automatic Vehicle Location capabilities.
9. The system must be capable of over-the-air reprogramming of all portable, mobile, and base radios. All portable, mobile, and base radios operating on the system must be capable of over-the-air reprogramming.
10. The public safety radio system must be capable of managing all radio traffic for a large scale incident while still managing normal system load for the day to day operations that will continue concurrently with a large incident.
11. The public safety radio system must provide enough channels that the paging or incident alerting radio traffic does not interfere with incident communications. Additionally, the system must be designed so that everyday administrative radio communications do not interfere with paging or incident alerting radio traffic.

12. The public safety radio system must provide enough channels to allow for water supply operations at a given incident to have a dedicated channel that does not interfere with incident communications.
13. The system must provide for a method to alert all fire and E.M.S. agencies in the county of an incident at the same time. This capability is necessary to meet the requirements of the Mutual Aid Box Alarm System, which all agencies are a party to.
14. The system must provide 95% repeater coverage countywide for all channels on which incident communications will take place. The purpose of this requirement is to enable communications to be monitored countywide by the Brown County Public Safety Communications Center or personnel from an agency that might be outside their normal response area.
15. The system must provide for immediately functional back up channels for incident communications in the event that a repeater site fails or if the repeater cannot be reached.
16. The system must provide for agencies to be able to have channels available for normal administrative communications that will not interfere with incident communications.
17. A dedicated channel for emergency radio traffic must also be developed. This channel would be utilized in the event of an "Emergency Button" activation via ruthless preemption.

18. A dedicated channel for radio communications in the event of a Rapid Intervention Team should also be in place. This channel would be used by personnel deployed to rescue a downed firefighter at an emergency scene and might be referred to as a “Mayday” channel.
19. The system must be designed with redundancies and back up equipment so that it meets or exceeds the 99.995% uptime requirement for public safety systems.
20. The system should include a self-contained mobile command post vehicle (not trailered equipment) that is capable of rapid deployment to the scene of an incident to enhance radio communications and incident management, or in the event of a failure, establish radio communications.
21. A new system must be designed and built with future expansion and technology upgrades in mind. The system should be able to expand with little additional infrastructure or systemic change. The system should be designed to manage the expected increases in radio and data communications over the life of the system.

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