

To:	Warden Hicks and Members of Grey County Council
Committee Date:	September 12, 2019
Subject / Report No:	CAOR-CW-12-19
Title:	Enhanced Fire Communications Report and Recommendations
Prepared by:	Kim Wingrove, CAO
Reviewed by:	
Lower Tier(s) Affected:	County-wide
Status:	Recommendation adopted by Committee as presented per Resolution CW177-19;

Recommendation

1. **That Council receive report CAOR-CW-12-19 Enhanced Fire Communications Report and Recommendations; and**
2. **That the project proceeds to the RFP phase for Solution 3 as recommended in consultant’s report; and**
3. **That staff be directed to extend the single-source contract with Dan Perlstein to support Phase Two of the project; and**
4. **That prior to any RFP award, staff bring back a report on project costing and resourcing for Council consideration.**

Executive Summary

Report [CAOR-CW-03-19](#) outlined safety and interoperability concerns with the current fire radio communications systems. Grey County initiated a project to examine these and the attached report, Grey County Fire Services Paging and Two-Way Radio Communications prepared by consultant Dan Perlstein, confirms significant shortcomings in the current system. The report provides options to address life safety concerns and operational inefficiencies. The recommended option, Solution 3, would provide significant enhancements including County-wide paging, separating paging from dispatch, additional dispatch channels, and allow for mobile radio coverage and

portable radio coverage with vehicle repeaters. It is estimated that the \$750,000 investment to bring all fire service radios up to a common, current standard and make infrastructure improvements would have a 10-year lifecycle. Moving the project to the next phase would include completing an RFP process to confirm the initial investment requirements as well as ongoing management and maintenance processes and costs.

Background and Discussion

“The life safety of firefighters and citizens depends on reliable, functional communication tools that work in the harshest and most hostile of environments. All firefighters, professional and volunteer, operate in extreme environments that are markedly different from those of any other radio users. The radio is the lifeline that connects the firefighters to command and outside assistance when in the most desperate of situations. To operate safely in these dynamic environments, it is imperative that firefighters have the ability to immediately communicate information accurately.”

- [Voice Radio Communications Guide for the Fire Service - FEMA 2016](#)

Fire Services in Grey County operate independently but are linked by Mutual Aid agreements and a common goal to service County residents. Each fire department is accountable to the municipalit(ies) that fund them. There is no direct oversight or formal link between the County and each fire service, however each fire and police department have a critical role to play in the County’s Emergency Management Plan. The Grey County Fire Chiefs Committee act as a coordinating body and it was through this group that Grey County was made aware of the communications challenges the fire services were experiencing.

Grey County was asked to assist with finding a solution to paging and radio communications shortcomings which were interfering with firefighter’s ability to communicate with dispatch and each other on scene, creating a life safety issue and hampering interoperability and coordinated incident management during mutual aid situations. Recognizing the benefits of a coordinated approach, the County commissioned a review of the paging and radio communications capabilities of the fire services in order to verify the issues and their root cause and propose ways to mitigate these.

Issue Identification

County staff, representatives from the fire departments, and Owen Sound Police and Owen Sound Police Dispatch met with consultant Dan Perlstein on numerous occasions to develop a clear understanding of the current communication environment. In addition, County staff met with a Bruce Power representative to confirm their requirements and expectations regarding interoperability and mutual aid. As a result of those discussions, the following issues have been identified:

- Multiple fire services are using existing radio frequencies for multiple functions, i.e. paging, dispatch and tactical. This results in overlapping communications, missed communications and interference among the frontline users. It also constrains the operational abilities of the fire services to deliver reliable and predictable performance.
- The fire services could use a radio paging infrastructure that does not impose loading and/or timing constraints on the radio communications infrastructure. They could also use the radio infrastructure in a manner that would separate between dispatch channels, i.e. those used for fire dispatch and interoperability, and tactical channels, i.e. those used by the fire services to communicate at the site of an incident and with each other.
- The radio coverage available from the present radio towers is not documented and is not, anecdotally, sufficient.
- Owen Sound Police Dispatch is currently responsible to dispatch seven fire services in Grey County on seven different radio configurations, with various degrees of radio coverage and technical limitations, using seven different dispatch procedures.
- Dispatching fire services in such a constraining environment also poses challenges in terms of proper and completed dispatch processes as well as the required follow up and, if necessary, audit. In the event of an inquest, it is critical to have know what was communicated out and the response back.
- Each fire service is focused in providing paging and radio communications to its respective firefighters. There is a need to interoperate but this functionality was not considered in the present systems' implementations. There is no established radio communications procedure for servicing large scale incidents either.
- Radio frequency licenses are under federal control and they are tightly rationed. The situation in Grey is made worse by the use of legacy analog technology for voice communications which does not support optimal use of the frequencies we have. This is a critical issue as radio licenses are limited and obtaining additional licenses from Innovation, Science and Economic Development (ISED) Canada is a very difficult, time consuming task with no guarantee of success.
- Most of the mobile and portable radios currently in use are capable of analog communications. The few that can operate in digital mode don't support the same mode. Digital technology is more advanced and makes better use of radio licenses. Making all radios digitally compatible will require a substantial initial investment.
- The fire services do not have an asset management plan for their communications infrastructure.

This disparate set of radio resources, communications operations and procedures pose real limitations to the fire services' operations and firefighters' safety as well as to the ability to manage a large scale, interoperable incident in the County.

Summary of Requirements for Fire Agencies

Based on the information presented above, the upgrade requirements of the fire services in Grey County are (in order of importance):

- Separation of paging and dispatch communications functions – this has been identified as the most important operational issue
- A County-wide paging infrastructure with interconnectivity to Owen Sound and Tillsonburg dispatch centres – this has also been identified as a very important operational issue that would allow volunteer firefighters to be paged anywhere in the County.
- Public safety standard radio coverage of 95% of the County for mobile radios with Vehicular Repeaters support for portable radio communications
- Ability to capture a permanent record of the radio communications for every incident.
- A County-wide dispatch and interoperability infrastructure with sufficient capacity to accommodate the expected radio traffic and provide future options for growth
- Ability to preserve, to the extent possible, the investment in subscriber infrastructure
- Consolidated tactical and interoperability channels
- 10 years minimum lifecycle for the communications infrastructure
- Reliable and predictable infrastructure service and support based on mutually accepted service level agreements.

Analysis and Options to Consider

Fire Only

Police and Fire

	Solution 1	Solution 2	Solution 3	Solution 4	Solution 5	Solution 6
Infrastructure Cost (CAPEX)	\$150,000.00	\$275,000.00	\$350,000.00	\$750,000.00	\$450,000.00	\$850,000.00
Subscriber Radios Cost (CAPEX)	No Cost	No Cost	\$400,000.00	\$400,000.00	\$400,000.00	\$400,000.00
Maintenance & Support/mo. (OPEX)	\$2,000.00	\$3,000.00	\$4,500.00	\$9,500.00	\$5,500.00	\$7,000.00
# of Radio Paging Sites	8	8	8	8	8	8
# of Radio Dispatch Sites	0	3	3	8	3	8
Paging Technology	Analog, Conventional, Simulcast	Analog, Conventional, Simulcast	Analog, Conventional, Simulcast	Analog, Conventional, Simulcast	Analog, Conventional, Simulcast	Analog, Conventional, Simulcast
Dispatch Technology	N/A	Analog, Conventional	Digital, Conventional, Simulcast Possible if DMR	Digital, Conventional, Simulcast Possible if DMR	Digital, Trunking, NXDN Multicast	Digital, Trunking, NXDN Multicast
Paging Separate From Dispatch	Yes	Yes	Yes	Yes	Yes	Yes
County Wide Paging	Yes	Yes	Yes	Yes	Yes	Yes
Mobile Radio Coverage	N/A	Yes (anecdotal)	Yes (anecdotal)	Yes	Yes	Yes
More Dispatch Channels	No	Yes	Yes	Yes	Yes	Yes
Interoperability Channels	No	No	Yes	Yes	Yes	Yes
Growth Potential	No	No	Yes	Yes	Yes	Yes
Portable Radio Coverage	No	No (via VRs)	No (via VRs)	Yes	No (via VRs)	Yes
Ability to Centralize Recording	No	No	Yes (Not Integrated)	Yes (Integrated)	Yes (Integrated)	Yes (Integrated)
ISED Coordination Required	Yes	Yes	Yes	Critical, not easy	Critical, not easy	Critical, not easy

Table 1 Solution Comparison

Note that CAPEX= capital expenditure. OPEX=operating expenditure

The consultant’s report outlines six possible options to meeting the fire departments’ requirements. They range from resolving the most critical issue, which is the separation of paging and dispatch radio infrastructure, to improving the overall radio fire coverage in the County, to a most comprehensive option of fully integrating fire and police radio infrastructure allowing the adoption of digital radio technologies that allows better use of the allocated radio licenses and provides County-wide interoperability and improved ability to deal with large scale incidents.

Costs for the solutions range from \$150,000 to \$850,000 reflecting the increasing scope and sophistication of the communications improvements that may be implemented. Some of them also require an upgrade of the subscriber radio equipment, mobile and portable radios and vehicular repeaters, to ensure compatibility with the newer digital radio technologies at an additional estimated cost of approximately \$400,000.

Of the six solutions, four are specific to a radio system for the Fire Departments (Solutions 1 to 4).

Options 1 and 2 maintain the present legacy, analog technology and do not facilitate reliable communications between services or remedy current radio coverage deficiencies.

Of Options 3 and 4, **Solution 3** is the preferred solution. The estimated costs of this solution are about \$750,000 (\$350,000 for the radio infrastructure and \$400,000 for the subscriber equipment). It is similar to Solution 2 but provides more capacity to allow for

fire services interoperability. The additional \$75,000 in infrastructure cost places the fire services in a good position to plan for future growth and a possible future integration of radio communications infrastructures in the County, including not only public safety (police and paramedic services) but also public works. It does provide the ability to centralize recording of all fire communications with dispatch but on a separate system than the one used by police.

Solution 3 is the preferred solution for the upgrade of the radio system for the fire departments.

Solutions 5 and 6 support an Integrated Police/Fire radio system. Owen Sound Police is in the midst of an initiative to extend its radio system coverage to Hanover Police and West Grey Police. This would require an upgrade of the police radio system to include the service areas of Hanover and West Grey. This could be an opportunity to consider consolidating the police and fire radio infrastructure as there may be some economies of scale in a joint implementation. All of this would be contingent on future operational and funding agreements with Owen Sound Police. **Solution 5** achieves all that Solution 3 does while providing the ability to integrate with the Police radio infrastructure now. The estimated costs of this solution are about \$850,000 (\$450,000 for the radio infrastructure and \$400,000 for the subscriber equipment).

Next Steps

With Council approval, the project would move to Phase 2 as outlined in [CAOR-CW-03-19](#). Consultant Dan Perlstein would assist with the development and assessment of an RFP to procure the hardware, software, and technical resources necessary to implement solution 3. Further consultation with fire department representatives, Owen Sound Police Dispatch and representatives from each municipality would be completed to develop requirements for on-going support, maintenance and administration of the system post implementation. An RFP award report would be prepared for Council consideration and if approved, a contract with the successful proponent would be negotiated.

Future Cost Sharing

The estimated capital costs budget for the recommended Solution 3 is \$750,000.

The above capital could be advanced entirely by the County or some portion recovered on a monthly basis from the participating fire agencies. A recommendation will be provided in the follow up report to be developed post RFP.

The manner in which any cost is shared needs to be agreed upon in a Memorandum of Agreement (MOA). A proposed framework for a MOA is presented in APPENDIX A of the consultant's report.

In addition to the capital cost, the operating cost of the radio system including internal staff required, contracts for maintenance and support and any other monthly costs should be considered and included in the MOA and the sharing model as part of the operating costs budget.

The ability to maintain and support the upgraded radio communications system is based on the lifecycle expectations and the mandatory requirements outlined in a Service Level Agreement (SLA) to be developed with the service provider. Some of the important considerations that should be included in any proposal to upgrade the system are:

- The service provider should demonstrate reasonable business stability so as to ensure that the system will be maintained in a continuous and predictable way
- The service provider should demonstrate sufficient technical knowledge so as to be able to support any necessary system upgrades, hardware or software, required throughout the expected lifecycle
- The service provider should demonstrate a close relationship with the equipment manufacturer so as to ensure fluid and continuous transfer of knowledge between them
- The service provider should demonstrate ability to respond to calls for service as per the SLA – typical response times would be 30 min. by phone and 4 hours on site.
- The service provider should demonstrate that it has sufficient staff to ensure that previous requirements are met 7 days/week, 24 hours/day and throughout the entire year.

System Management

Once implemented, any radio system requires ongoing management to ensure that:

- The system continues to perform at least at the same level at which it was implemented.
- The usage of channels and/or talkgroups conforms with the communications procedures agreed upon by the stakeholders.
- The demand for radio resources is being monitored and any deviations are analyzed and reacted to accordingly to ensure the integrity of the system is maintained.
- The service provider's performance conforms to the SLA.
- The radio sites are managed according to federal (ISED) regulations and equipment manufacturer's published specifications
- That reports are generated periodically to reflect the overall state of the system

This activity is usually assumed by the owner of the system or its contracted delegate. It is a critical function that ensures proper and predictable system performance and one

that is offer at the centre of any incident analysis, inquest or inquiry. The sharing cost model proposed in the consulting report has included such a line item. Oversight of the system management function is described in the MOA as being the responsibility of the Joint Management Team (JMT). This responsibility could be undertaken by a County Fire Communications Committee whose members would include the municipal representatives, Fire Chiefs, County CAO, Emergency Management and IT staff. If this path is chosen, each municipality would need to officially recognize the County Fire Communications Committee, agree on a mandate and finalize the terms of the Memorandum of Agreement.

Legal and Legislated Requirements

National Fire Protection Association (NFPA) 1802: Firefighter Radio Standards

NFPA 1221: Standard for installation, maintenance and use of Emergency Services Communications Systems

Emergency Management and Civil Protection Act, R.S.O. 1990

Financial and Resource Implications

The recommended solution to address the fire service communication issues is estimated to cost \$750,000 and offer an asset life of 10 years. Ongoing operational and system management costs will also need to be determined. With Council support to move forward, estimates can be refined and sources of funding identified upon completion of an RFP process.

Relevant Consultation

Internal: Emergency Management, Corporate Services (IT and Finance)

External:

Fire Departments: Inter-Township, Owen Sound, Meaford, Town of The Blue Mountains, Hanover, West Grey, Southgate, Grey Highlands, Chatsworth, Owen Sound Police Dispatch, Owen Sound Police, West Grey Police, Hanover Police and Bruce Power

Appendices and Attachments

[Report on Grey County Fire Services Paging and Two-Way Radio Communications](#)