



Central Island 9-1-1 Partnership

STUDY OF 9-1-1 CALL TAKING ALTERNATIVES



POMAX
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Table of Contents

1. EXECUTIVE SUMMARY	1
2. INTRODUCTION	6
2.1. PURPOSE OF THIS STUDY	6
2.2. SCOPE OF WORK	6
2.3. METHODOLOGY	7
3. 9-1-1 CALL HANDLING	8
3.1. BASELINE STATISTICAL REVIEW	8
3.1.1. <i>Call Determinations</i>	8
3.1.2. <i>Call Flow</i>	9
3.1.3. <i>Call Handling Times</i>	13
3.2. ABANDONED CALL HANDLING	15
3.3. STAFFING MODELS	16
3.4. ESTIMATING RESOURCES REQUIRED TO PERFORM 9-1-1 CALL TAKING	16
3.4.1. <i>Scenario 1 – Hypothetical Staffing Requirements</i>	17
3.4.2. <i>Scenario 2 – Hypothetical Staffing Requirements</i>	17
3.4.3. <i>Scenario 3 – Fractional Full Time Equivalents</i>	18
3.5. ACTUAL STAFF REQUIREMENTS	20
3.6. RECOMMENDED STAFFING LEVELS VS. CONTRACTUAL STAFFING LEVELS	22
3.7. ESTIMATED POPULATION INCREASE AND MINIMUM STAFFING	22
3.8. LIMITATIONS OF RECOMMENDED STAFFING LEVELS / FUTURE DEMANDS	25
4. POTENTIAL PARTNER PROPOSALS	26
4.1. CAPITAL REGIONAL DISTRICT PSAP CONSIDERATIONS	26
4.2. E-COMM PROPOSAL	27
4.2.1. <i>E-Comm Methodology</i>	27
4.2.2. <i>Backup Centre</i>	28
4.2.3. <i>9-1-1 Network</i>	28
4.2.4. <i>E-Comm Costs</i>	29
4.2.5. <i>E-Comm Pros and Cons</i>	31
4.3. NANAIMO FIRECOMM PROPOSAL	32
4.3.1. <i>Nanaimo FireComm Methodology</i>	32
4.3.2. <i>Backup Arrangements</i>	32
4.3.3. <i>Current Nanaimo FireComm Staffing Analysis</i>	33
4.3.5. <i>Nanaimo FireComm Costs</i>	36
4.3.6. <i>Nanaimo FireComm Pros and Cons</i>	39
4.4. NANAIMO DETACHMENT CALL ANSWER SERVICE	41
4.4.1. <i>Nanaimo Detachment Call Answer Service Methodology</i>	41
4.4.2. <i>Nanaimo Detachment Call Answer Service Costs</i>	41
4.4.3. <i>Nanaimo Detachment Pros and Cons</i>	43

4.5.	COURTENAY RCMP OCC PROPOSAL	44
4.5.1.	<i>Courtenay RCMP OCC Methodology</i>	44
4.5.2.	<i>Courtenay RCMP OCC Costs</i>	44
4.5.3.	<i>Courtenay RCMP OCC Pros and Cons</i>	45
4.6.	SUMMARY OF COST PROPOSALS.....	46
5.	PROPOSED SOLUTIONS ANALYSIS	48
6.	CONCLUSIONS	50

Appendices

Appendix A - Acronyms

Appendix B - Call Answer Providers

Appendix C - E-Comm 9-1-1 Proposal

Appendix D - Nanaimo FireComm Proposal

Tables

Table 1:	Proponent Pros and Cons.....	4
Table 2:	Various 9-1-1 call types	14
Table 3:	Minimum staffing based on average of ‘Regular’ & ‘Trouble Not Known’ call volumes	17
Table 4:	Minimum staffing levels based on average of total 9-1-1 calls	17
Table 5:	Average percentage of time dedicated to 9-1-1 call taking.....	19
Table 6:	Estimated FTEs based on Relief Factor	21
Table 7:	Estimated total FTEs based on Relief Factor for Nanaimo OCC.....	21
Table 8:	Minimum FTEs vs. Current Contractual FTEs	22
Table 9:	Estimated Total Population Increase based on Statistics Canada Census Data.....	22
Table 10:	Estimated Total Population Increase based on BC Stats Projections.....	23
Table 11:	Estimated Total 9-1-1 Calls in 2020.....	23
Table 12:	Estimated Minimum Staffing Level Based on 2020 Population Projections	24
Table 13:	9-1-1 Call Volume Averages by hour	24
Table 14:	Apportioned Costs by Partner.....	26
Table 15:	9-1-1 Network from Central Island to E-Comm	28
Table 16:	E-Comm One-Time costs by Agency	29
Table 17:	E-Comm Annualized Equipment Costs.....	29
Table 18:	E-Comm Annual Levies (<i>including Annualized Equipment Costs</i>)	29
Table 19:	Annual E-Comm costs by Partner.....	30
Table 20:	Projected Annual 9-1-1 Call Volume Increase.....	30
Table 21:	Average Fire calls per hour 00:00 to 12:00	33
Table 22:	Average Fire calls per hour 12:00 to 24:00	33
Table 23:	Average per hour workload for Nanaimo FireComm.....	35

Table 24: Nanaimo FireComm Minimum Staffing Level	36
Table 25: Nanaimo FireComm Staffing for Fire and 9-1-1 Calls.....	36
Table 26: Nanaimo FireComm One-Time Costs.....	37
Table 27: One-Time Costs for Nanaimo FireComm by Partner agency	37
Table 28: Nanaimo FireComm Annual Costs	37
Table 29: Annual Nanaimo FireComm Costs by Partner Agency.....	38
Table 30: Annual Increases in Nanaimo FireComm Costs.....	38
Table 31: Nanaimo Detachment O&M and Costs Per Square Foot.....	41
Table 32: Nanaimo Detachment Revised O&M Costs	42
Table 33: Total 911 Call taker and pro rata Switchboard costs	42
Table 34: Nanaimo Detachment Call Answer Costs Allocation to Partners.....	43
Table 35: RCMP Courtenay OCC Costs.....	44
Table 36: RCMP OCC Costs by Partner.....	44
Table 37: One Time costs by agency and partner.....	46
Table 38: Annual Costs by agency and partner.....	46
Table 39: Annual Costs including contingency.....	47
Table 40: Proponent Pros and Cons.....	48

Figures

Figure 1: Lengths of 9-1-1 Call Types	14
Figure 2: Baseline staffing curve	19
Figure 3: Estimated staff levels based on exponential graph	20

Exhibits

Exhibit 1: Regular 9-1-1 Call Flow Chart.....	10
Exhibit 2: Trouble Not Known Call Flow Chart.....	11
Exhibit 3: Unknown Call - Data Only Received.....	11

Executive Summary

The Central Island 9-1-1 Partnership (CI911) requested the service of professional, qualified consultants to “identify sustainable options for the provision of Public Safety Answering Point (PSAP) 9-1-1 call answer service delivery to the central Vancouver Island service area”.

Pomax worked with four agencies to obtain proposals for handling 9-1-1 calls; these were the RCMP for the Courtenay RCMP Operational Communication Centre (OCC), Nanaimo FireComm, E-Comm 9-1-1 in Vancouver, and the City of Nanaimo for the Nanaimo Detachment. There were two ways for agencies to approach taking on this work and determining costs. The first, which was done by all agencies except E-Comm, was to determine the staffing required and to identify all personnel related costs as well as any ongoing overhead costs which may include equipment maintenance, facility costs such as heating, electrical etc., and any other operating costs. The second approach is to determine a rate per call that the service agency determine covers all of their associated staffing and overhead costs for providing the PSAP function.

For the Courtenay OCC proposal, it is important to note that when evaluating minimum 9-1-1 staffing levels in the RCMP OCC's, the RCMP staffing proposal will handle the Nanaimo workload as “net new”. This means that the RCMP have determined the required staffing based on the workload being stand-alone work and not factored in the existing staffing in the OCC. Typically, when existing staffing levels are considered, the additional total number of full time equivalents (FTEs) are less than when considering the workload as net new. As a result, the Courtenay OCC proposal did not achieve any economies of scale and is therefore not a cost-effective option.

Similarly repositioning the Primary PSAP in the Nanaimo Detachment switchboard area had high associated costs since it was necessary to cover the full costs of 5.2 Full Time Equivalent Municipal Employees and a portion of the wages of the switchboard operator who would provide additional 9-1-1 call handling duties and break relief.

For the City of Nanaimo Fire Department (Nanaimo FireComm) proposal, in addition to evaluating 9-1-1 call volumes to determine minimum staffing, the current fire dispatch workload was analyzed by Pomax in order to determine if the Nanaimo FireComm can handle the addition of 9-1-1 call answer workload with the existing staffing while meeting the National Emergency Number Association guidelines for 9-1-1 call answer. Current Nanaimo FireComm staffing is two dispatchers on shift 24 hours a day, 7 days a week.

The existing Nanaimo FireComm fire dispatch workload was analyzed based on the average number of calls received per hour, considering emergency dispatch workload and other typical fire dispatcher activities. The workload analysis considered the staffing level required for the average busy hour for both fire dispatch work and the addition of new 9-1-1 call answer workload.

The resulting analysis reveals that the existing Nanaimo FireComm staffing is not sufficient to handle the addition of 9-1-1 calls and meet the National Emergency Number Association 9-1-1 call answer guidelines. Nanaimo FireComm requires a minimum 15% staffing increase in order to handle this workload.

In order to meet this additional workload, Nanaimo FireComm proposes to add a 10:00 AM to 10:00 PM “swing” shift seven days a week to cover the peak 9-1-1 periods. The additional position would require additional staff resources and would be scheduled to cover the average busy hours in order to handle the increased 9-1-1 call volumes ensuring that there would be three staff available to handle fire dispatch and 9-1-1 workloads with two staff handling the workload at all other times.

E-Comm 9-1-1 in Vancouver provided a proposal based on an annual cost per call. Their proposal does not detail additional staff required and is not typically part of E-Comm proposals. As part of their standard contract E-Comm includes a Service Level Agreement with guaranteed call handling times of 95% of 9-1-1 calls answered in five seconds or less. This exceeds the National Emergency Number Association (NENA) 9-1-1 call handling standard that 90% of 9-1-1 calls shall be answered within 10 seconds during the busy hour and 95% of calls answered within 20 seconds.

The E-Comm proposal has excellent failover and redundancy options as well as the ability to handle large peaks in call volume. They have a dedicated telephony department supporting the 9-1-1 switching equipment at E-Comm and they are actively involved in all CRTC operational and technical committees related to the next generation of 9-1-1 services which, when the standards are determined, will allow the transmission of multimedia messages including text, pictures, and video to the PSAP.

Based on the analysis completed in this study, Pomax has concluded that the Nanaimo Detachment and Courtenay Operational Communication Centre options are not economically viable, Nanaimo FireComm is moderately cost effective with E-Comm being the most cost effective solution as noted in Table 1.

It is Pomax’s opinion that E-Comm also has the best option technically and operationally. They have excellent redundancy and failover options, and work closely with Telus to provide the most robust 9-1-1 network. Based on the number of personnel, they are well equipped to handle the peaks in call volume that normally occur where a single incident can generate 20 – 30 9-1-1 calls or more. E-Comm is involved in the future evolution of the 9-1-1 network and was the pilot site for the provision of Text with 9-1-1 for the Deaf, Hard-of-Hearing and Speech Impaired (DHHSI) Community.

E-Comm has indicated that they can transition the service prior to November 30, 2015.

The Nanaimo FireComm proposal currently does not identify a centre for overflow calls and while they have a backup arrangement with Campbell River for Fire Dispatch they do not have a backup arrangement for 9-1-1. There is a possibility that the Victoria Police PSAP could provide overflow and backup capability in a reciprocal arrangement that would benefit both agencies, however this option is yet to be explored. There are some additional benefits such as the potential reallocation of existing Municipal Employees, and having the partners fund additional staff which will be of benefit to their Fire operations, which is supported by the same funding partners as the 9-1-1 PSAP.

Table 1: Proponent Pros and Cons

Agency	Pros	Cons	One Time Costs	Annual Costs	Annual Costs with Contingency *
E-Comm	<p>Significant depth of call queue</p> <p>Solid redundancy and backup provisions</p> <p>Dedicated telephony personnel maintain the 9-1-1 telephone system</p> <p>Currently capable of taking T9-1-1 calls for the deaf and hearing impaired community</p> <p>Good working relationship with Telus in supporting 9-1-1 service across the province</p> <p>Most cost effective option</p>	<p>Call taking is off island, while this does not have many tangible drawbacks there may be political concerns about the call handling being done remotely.</p> <p>E-Comm will not take any existing Municipal Employees</p>	\$16,000	\$250,920	\$276,012
Nanaimo FireComm	<p>Retains two FTE Municipal Employee positions with potential for others to fill part-time roles</p> <p>Facilities are already in place and some of the technology already exists or is in the process of being updated</p> <p>Retains local control over operational procedures</p> <p>Economies of scale are achieved by combining Primary PSAP and Secondary PSAP functions as it relates to Fire calls</p> <p>There is some additional benefit to Nanaimo FireComm in having additional resources</p>	<p>No overflow capability beyond the two or three positions</p> <p>Unions would have to agree to allow transfer of staff from CUPE to IAFF Review of the new position at FireComm may result in higher IAFF wages applying to the new personnel</p> <p>Starting as a new 9-1-1 Answering Point at a time when the rest of BC & Canada are moving to a consolidated model due the future uncertainties in terms of staffing and expenses to handle next generation 9-1-1</p>	\$174,266	\$281,310	\$309,441

Agency	Pros	Cons	One Time Costs	Annual Costs	Annual Costs with Contingency *
Nanaimo FireComm continued	Moderately cost effective	<p>This is a new line of business for Nanaimo FireComm that will need to be developed, compared to a transition to an existing PSAP</p> <p>FireComm needs to investigate potential overflow call handling with another Fire Dispatch Centre or 9-1-1 PSAP in the province</p> <p>Do not have personnel who are familiar with 9-1-1 technology and future direction of Nextgen 9-1-1</p>			
Nanaimo Detachment	<p>Retains all Municipal Employees who handle the police call taking currently</p> <p>Takes advantage of the local knowledge of staff</p>	<p>No overflow capability beyond the two positions</p> <p>Do not have personnel who are familiar with 9-1-1 technology and future direction of Nextgen 9-1-1</p> <p>Not cost effective</p>		\$604,800	\$665,279
Courtenay OCC	<p>Can handle abandoned calls directly as the police of jurisdiction</p> <p>Overflow to another OCC (to be determined which one)</p>	<p>The RCMP are moving away from acting as PSAP elsewhere in the province and across the country</p> <p>Courtenay OCC will not take any existing Municipal Employees</p> <p>Do not have personnel who are familiar with 9-1-1 technology and future direction of Nextgen 9-1-1</p> <p>Not cost effective</p>		\$719,900	\$791,900

* An annual contingency amount can account for any additional potential costs that may occur due to higher than anticipated call volumes, overtime costs or additional unforeseen operating costs.

Introduction

Purpose of this Study

Pomax was engaged to analyze the existing service delivery model along with other options in order to provide the Central Island 9-1-1 Partnership with the information necessary to develop recommendations for alternate service delivery models for the partnership.

The alternate delivery model would include the following as a minimum similar to what is currently received:

1. Provides an efficient and cost effective service;
2. Maintains the high level of professional service delivery;
3. Answers 9-1-1 calls within recognized industry standards;
4. Includes comprehensive business continuity plans;
5. Allows sufficient redundancy to ensure operations to the Central Island service area in the event of a catastrophe; and,
6. Contains sufficient industry expertise.

This report presents the findings of the 9-1-1 call taking alternatives review.

Scope of Work

The scope of work stated in the Request for Proposal requires the consultant to analyze options, and identify the benefits and challenges of each, for the delivery of PSAP (911 call answer) services in the Central Island 9-1-1 partnership area including but not limited to:

1. Continue with existing contract service delivery model in which the PSAP is managed by the RCMP's Island District OCC in the RCMP Comox Valley Detachment;
2. Contract the PSAP service to E-Comm (the Emergency Communications Centre for British Columbia Inc.) 9-1-1 located in Metro Vancouver;
3. Contract the PSAP service to a viable PSAP in the Capital Regional District i.e. Victoria Police or Saanich Police;
4. Amalgamate the PSAP function with Nanaimo FireComm (with or without the current police-based 9-1-1 staff moving over); and
5. Have the Partnership retain the Primary PSAP function in the RCMP detachment, with existing 91-1 staff but without the back-up of the RCMP. Determine if this is viable without an increase of staff.
6. Any other viable option identified during the study period (if applicable).

The consultant shall prepare a report that includes analysis of the options available, indicates best practices for implementation, considers financial and human resource implications and makes recommendations accordingly.

Methodology

The consulting team completed this review by:

1. Establishing baseline statistics for the existing 9-1-1 call answer service provided by the Nanaimo OCC. These statistics will be used to obtain proposals from the RCMP Courtenay OCC, E-Comm 9-1-1, and any potential Capital Regional District PSAP(s);
2. Determining minimum staffing levels for the present and five year projected call volume for the Central Island 9-1-1 catchment area, based on the industry standard Erlang formulae calculations for call handling / staffing demand;
3. Obtain proposals from any Capital Regional District PSAP(s) that may be interested in providing service;
4. Obtain a written proposal from E-Comm;
5. Review existing call volume and staffing of Nanaimo FireComm to determine if Nanaimo FireComm staff can handle the 911 call volume and meet NENA call answer guidelines. Determine the union implications of City of Nanaimo Municipal Employees who are currently performing 9-1-1 call answer moving to Nanaimo FireComm;
6. Review the 911 call volume and determine the staff required to handle the 911 call volume within NENA call answer guidelines, as a standalone operation remaining at the Nanaimo detachment. Work with the RCMP to determine if this is viable as they may have plans for the space vacated by the move of the OCC;
7. Obtain a written proposal from the RCMP Courtney OCC.

Note that CREST does not provide 9-1-1 call answer service. They provide a public safety radio network that is used by over 50 emergency response agencies in the Capital Regional District. As such they were not contacted regarding potential provision of this service.

9-1-1 Call Handling

Baseline Statistical Review

The existing Nanaimo Operational Communications Centre (OCC) operates with a combined 9-1-1 call taker/police complaint taker roles. For 9-1-1 calls that are determined to be a police emergency are not transferred via the telephone system; rather the role of 9-1-1 call taker ceases and the role of police complaint taker begins. Accordingly, there is no physical transfer of the 9-1-1 call to the police agency and therefore there is no statistical data benchmark that captures this transfer and therefore no true metric of 9-1-1 call lengths.

However, by comparison, in 2013 the Southeast District RCMP OCC had a dedicated 9-1-1 call taker function, where calls for police were always transferred and therefore there was a statistical benchmark capturing the transfer leading to a 9-1-1 call length metric. The previous analysis of the Southeast District RCMP OCC 9-1-1 call data from the TELUS Provincial 9-1-1 Service Call Answer Statistics (2010 to 2012) as well as the complete 2012 Genesis 9-1-1 calls by hour reports.

3.1.1. Call Determinations

For purposes of this report and the detailed 9-1-1 call data statistical analysis and recommendations offered, the amount of involvement reasonably required with respect to making a Call Transfer Determination as part of the 9-1-1 call taking function needed to be established.

In British Columbia, there is no provincial legislation with respect to 9-1-1 and, as such, a fundamental issue i.e. the responsibility for an appropriate Call Transfer Determination for Abandoned Calls is a matter that is negotiated between the 9-1-1 service provider and the Primary Public Safety Answering Point provider. As well, there is no standard business model for 9-1-1 call taking and as this matter ultimately impacts total 9-1-1 call handling times it has an effect on the staffing levels for which the 9-1-1 service providers are financially responsible.

When analysing how Call Transfer Determinations are made, the three basic 9-1-1 call types are:

Regular 9-1-1 Call

The caller is on the line and the ANI/ALI data (including Phase 2 location mapping data) is normally presented with the call. There are no issues with determining the location of the caller and the 9-1-1 call taker confirms the appropriate downstream emergency service and successfully transfers the call or terminates the call in the case of a duplicate or non-emergency.

Trouble Not Known Call

This is one type of abandoned call where there is no one on the line when the call is answered or nothing is said on an open voice call yet the ANI/ALI is presented. These calls are followed up by the 9-1-1 call taker i.e. at least one call back is attempted¹ in order to determine if there is an emergency; if a determination cannot be made (can't talk to anyone) these calls are normally transferred or handled by the police complaint taker for creation of a dispatch call or conclusion by them if they are able to make contact.

Unknown – Data Only Call

This refers to another type of abandoned call where there is no voice call presented (normally a very short duration call); only data from the real time printer showing a call has been received; however, there is insufficient ANI/ALI data presented in order to determine anything about the call (call back number, location, etc.). These calls cannot be followed up and are concluded at that point.

3.1.2. Call Flow

Exhibit 1 to Exhibit 3 details the steps involved in the three 9-1-1 call scenarios:

¹ In 2014, all the Regional Districts that contracted with E-Comm to provide initial 9-1-1 call answer also directed that E-Comm was not to attempt one call back (*industry standard in Canada and many places in the US*), instead all abandoned calls and the relevant information is verbally provided to the local police dispatch for immediate follow-up and final disposition. Handling abandoned calls this way also reduced the potential for lengthy call determinations which could have impacted staffing cost.

Exhibit 1: Regular 9-1-1 Call Flow Chart

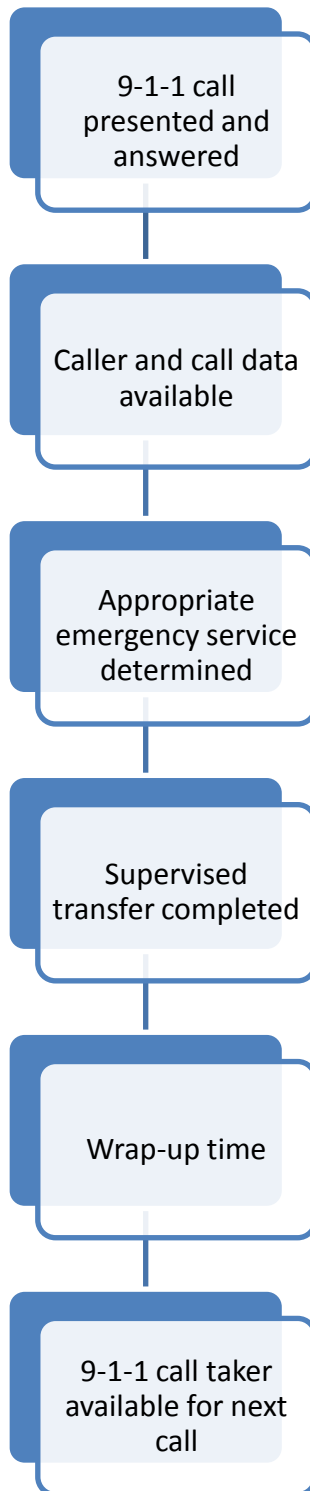


Exhibit 2: Trouble Not Known Call Flow Chart

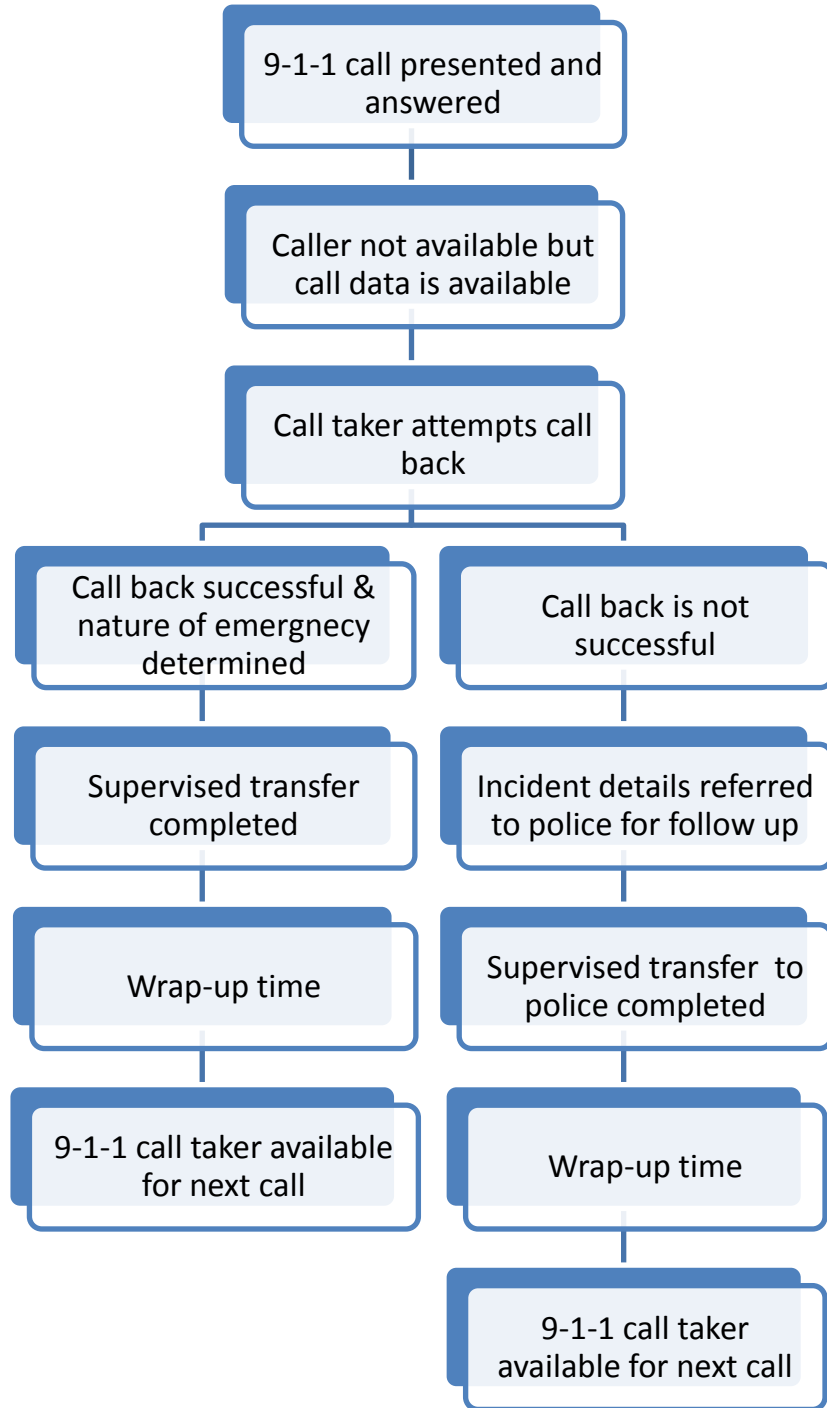
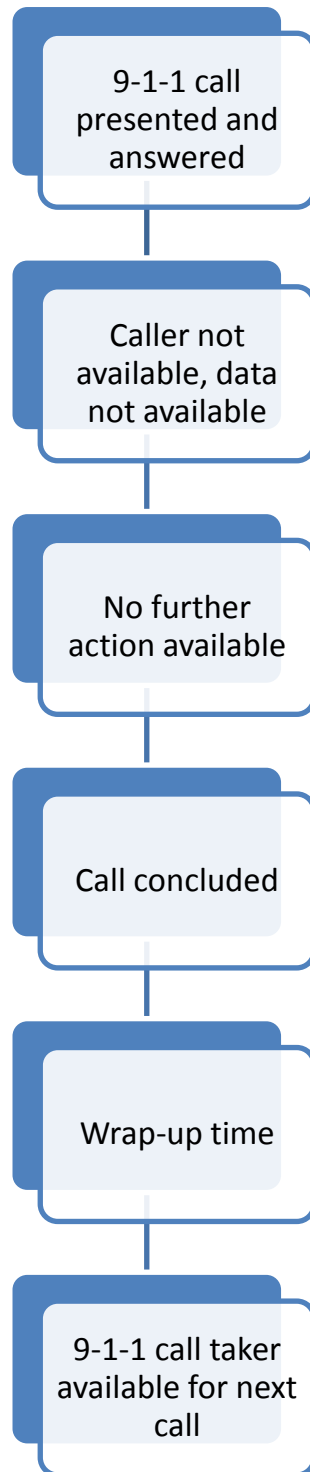


Exhibit 3: Unknown Call - Data Only Received



3.1.3. Call Handling Times

To determine minimum staffing levels, the average length of a 9-1-1 call was calculated using the statistical analysis described in this document. To capture the actual workload of a Primary Public Safety Answering Point, average calls lengths were determined for 9-1-1 calls in which the caller is available and the call data is presented to the call taker, allowing the call taker to determine the appropriate emergency service agency required. For those calls where the caller is not available but a proper call back number is (i.e. Trouble Not Known calls), an additional 30 seconds was added to this call type to account for the attempted call back and any associated activity related to emergency type determination and transfer.

Average 9-1-1 call times have been calculated from previous Pomax studies where data provided from the RCMP Southeast District OCC was used as they operated with dedicated 9-1-1 call takers and this specific telephone call handling data was available for analysis.

To determine the average length of time for regular 9-1-1 calls, as well as Trouble Not Known calls, we analyzed the TELUS 9-1-1 Call Duration reports for the years 2010, 2011, and 2012. TELUS benchmarks the time the 9-1-1 call was answered in the PSAP to the point of successful transfer to a downstream emergency service agency, which allowed us to calculate 9-1-1 call time directly from these reports. With respect to so-called Abandoned Calls, TELUS benchmarks and reports the time a 9-1-1 call was received until a 9-1-1 call taker terminates the call without transferring it.

We determined that the average time for a receiving and transferring a 9-1-1 call is 46 seconds. 36 seconds is directly attributable to handling the 9-1-1 call and 10 seconds is required for administrative wrap-up time.

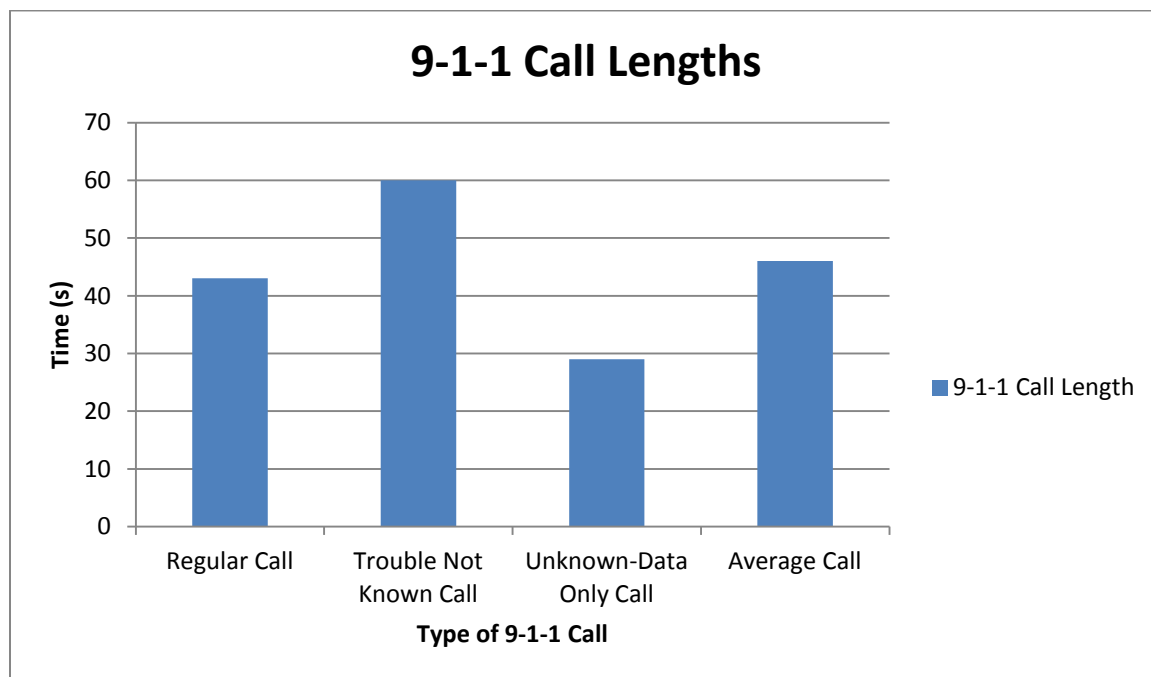
Wrap-up time is a standard consideration in call centre analysis and is defined as the time required for a call taker to complete any post-call activities and be fully available to take another call. While NENA does not prescribe wrap-up time standard, industry best practice is 10 seconds.

As identified in Section 3.1.2, there are different 9-1-1 call types and each type has a specific call length. Table 2, on the next page summarizes the various 9-1-1 call types and their respective call lengths:

Table 2: Various 9-1-1 call types

9-1-1 Call Type	Call Length	Decryption/Addition Information
Regular Call	43 seconds	This represents Regular Calls only. This includes 10 seconds for wrap-up time.
Trouble Not Known Call	60 seconds	This represents Trouble Not Known calls as well as the time required to make one call back attempt. This includes 10 seconds for wrap-up time.
Unknown - Data Only Call	29 seconds	This represents those calls where there is no voice caller as well as insufficient data in order to attempt a call back. This includes 10 seconds for wrap-up time.
Average Call	46 seconds	This represents a proportional combination of Regular 9-1-1 calls and Trouble Not Known calls and is representative of average typical 9-1-1 call lengths. This includes 10 seconds for wrap-up time.

Figure 1: Lengths of 9-1-1 Call Types



The 2013 analysis of TELUS statistical data for the RCMP OCCs shows that on average Regular 9-1-1 calls account for approximately 85% of the total calls, and Trouble Not Known / Unknown – Data Only calls account for the remaining 15% of the total. Of the 15% of Trouble Not Known / Unknown – Data Only calls received at the Southeast District RCMP OCC for 2012 (on average) 67% provided a call back number and 33% had no useable data for call back purposes.

Abandoned Call Handling

The responsibility for 9-1-1 Abandoned Call Handling has been a topic of considerable debate for a number of years as non-police PSAP's such as E-Comm are involved in providing PSAP service. E-Comm for example has advised that under the Greater Vancouver Regional District standard operating procedure for 9-1-1 Abandoned Calls, which they currently operate under, the process is to transfer all 9-1-1 Abandon Calls downstream to the police of jurisdiction, municipal or RCMP agencies, with no call backs i.e. the steps outlined below are the responsibility of the police, not the 9-1-1 primary call taker.

- Call backs to the number to re-establish communication with the caller if the call is terminated with insufficient information from the caller

Call backs can be made from either the Primary PSAP or the police of jurisdiction. What is important to note however is that police policy dictates that all abandoned wired and wireline 9-1-1 calls must be evaluated by the police of jurisdiction for risk assessment and dispatch (following their established policies). Placing a call back from the Primary PSAP and then transferring the caller to a police call taker if contact can be made and then manually and verbally providing the Automatic Number Identification/Automatic Location Information (ANI/ALI) information to the police call taker will provide very limited benefit while introducing redundant questioning of the caller and additional delay and therefore additional risk in handling the call.

- Contacting the Wireless Service Provider to obtain subscriber information

Due to privacy concerns, the Wireless Service Providers will only provide subscriber information if the police of jurisdiction provides the carrier with the nature of the emergency, the name of the police agency and call taker, and in some cases written approval. The Primary PSAP is not in a position to perform this police call evaluation work.

- Obtaining physical locations using latitude and longitude co-ordinates from the ANI/ALI

While this research can be performed and documented as in the first point above, the information which forms a part of the required police risk assessment still needs to be provided to the police of jurisdiction manually and verbally creating additional delay and therefore additional risk in handling the call.

- If warranted, send all the information to the police of jurisdiction

As the risk assessment is the responsibility of a trained police call taker at the police of jurisdiction, PSAP operators do not have the means or responsibility to properly select which situations "warrant" downstreaming other than transferring all calls.

Pomax feels that having a non-police PSAP directly handling call backs instead of transferring to the police of jurisdiction could also leave the partnership open to additional liability if the call

back process resulted in injury or other negative circumstance to a citizen due to a delay in police action. Therefore Pomax recommends that call backs only be handled by the police of jurisdiction, which means that all proponents except Courtenay OCC would transfer such calls to the Courtenay OCC for further call handling.

Staffing Models

Staffing levels were determined using the Erlang C telecommunications traffic formula. Erlang is the accepted calculation method, in the telecommunications industry, for determining traffic load, the number of telephone trunks for a call centre, and appropriate staffing levels. This non-linear equation takes into account the relationship between randomly arriving calls and staff levels, and predicts the resources required to keep caller waiting times within desired service parameters.

The formula considers the relationship among the average number of calls received per hour, the average length of calls, and the specified service level to calculate the minimum number of required call takers.

In public safety telecommunications modelling, strict performance standards, such as answering calls in minimal time, and random call arrival may have a significant effect on increasing staff requirements.

Estimating Resources Required to Perform 9-1-1 Call Taking

The specific NENA standard is that 90% of calls will be answered within 10 seconds during the busy hour and 95% of calls answered within 20 seconds.

Pomax calculated needed staff resources at various call volumes we examined three scenarios. They are:

1. **To determine the minimum hourly staffing levels at the Nanaimo RCMP OCC for the purpose of handling 9-1-1 calls.** The levels shown in column 5 of Table 4 are based on Erlang C calculations and represent the number of staff needed to answer calls *as calculated using Erlang C*, not the actual average workload. Actual average workload can be found in column 4 and is significantly less than what can be handled by each full-time equivalent position.
2. **Assessing the fractional FTE required** to accommodate incoming 9-1-1 call volume, assuming that a centre could staff on a fractional incremental basis.

We used the following parameters within each scenario to determine minimum staffing levels for the 9-1-1 call answer function:

- Average length of 46 seconds for all received 9-1-1 calls (Regular and Trouble Not Known)
- Service standard of 90% of calls answered in 10 seconds or less

Scenario 1 – Hypothetical Staffing Requirements

This hypothetical scenario, shown in Table 3, applies Erlang C calculations to a range of call volumes using the parameters stated above. This includes an average time commitment for both ‘Regular’ and ‘Trouble Not Known/Data Only’ calls. The results provides minimum staffing levels based on a general range of annualized 9-1-1 calls and provides results rounded to the nearest number.

Table 3: Minimum staffing based on average of ‘Regular’ & ‘Trouble Not Known’ call volumes

Average Annualized Calls	Average Calls per Hour	Percent Answered within 10 seconds	Percent Answered without Queuing	Average No. of Calls in the Queue	Max. Time in Queue (seconds)	Minimum Staffing Level Required
43,800	1-5	95%	94%	0	92	1
43,800	1-5	100%	100%	0	1	2
87,600	6-10	89%	87%	0	135	1
87,600	6-10	99%	99%	0	1	2
131,400	11-15	99%	98%	0	14	2
131,400	11-15	100%	100%	0	1	3

3.4.1. Scenario 2 – Hypothetical Staffing Requirements

Scenario 2 uses the hypothetical staffing requirements found in Table 3 above, applied to the average call volumes at the Nanaimo RCMP centre to determine minimum hourly staffing levels. As this method analyses calls per hour, the results are a more specific and provide fractional results.

The values shown in column 5 of Table 4 are based on Erlang C calculations and represent staff needed to answer calls, not the actual average workload. Actual average workload can be found in column 4 and is significantly less than what can be handled by each full-time equivalent position.

Table 4: Minimum staffing levels based on average of total 9-1-1 calls

1	2	3	4	5
RCMP OCC	Average Annual Call Volume	Equivalent Average Calls per Hour	Average Minutes Worked per Hour based on 46 Seconds per Call Column 3 x 46 Seconds	Minimum Staffing Level per hour
Nanaimo	57,438	6.6	5.06	1

This analysis indicates that Nanaimo requires a maximum of 1.0 FTE 24 hours a day.

Additionally, Erlang C analysis indicates that two 9-1-1 call takers can process over 300,000 annual calls, if the possible queue time is considered acceptable or if an alternative method of handling queued calls, such as call overflow, is implemented. Call overflow is a process whereby 9-1-1 calls, which would normally wait in queue to be answered, ring to another position (e.g. a supervisor or to another centre).

3.4.2. Scenario 3 – Fractional Full Time Equivalent

If staffing requirements were based on call load or actual work time, there may be hours where less than 1.0 FTE is required to answer 9-1-1 calls to the NENA standard. However, Erlang modelling does not calculate fractional staffing levels less than 1.0. Nevertheless, some general guidelines can be offered that provide a reasonable assumption of fractional FTE requirements. This includes actual workload as shown in Column 4 of Table 4 as well as the explanation outlined below.

Readers must remain aware that Erlang C staffing calculations are non-linear and that there is not a direct one-to-one correlation between call volumes and staffing levels. In fact, call volumes are exponentially related to staffing levels such that “X” number of call takers can process an increasing number of calls until a threshold is reached at which point another call taker is required.

With that understanding, based on the average percentage of time per hour a call taker is dedicated to handling 9-1-1 calls, an exponential graph can be used to determine the approximate fractional FTEs based on known FTE count for the Nanaimo OCC.

In order to determine fractional FTE requirements and create an exponential graph, two factors must first be determined:

1. The average amount of time for the Nanaimo centre spent on 9-1-1 call taking duties per hour (expressed as a percentage)

The average amount of time for each centre spent on 9-1-1 call taking is calculated as follows:

Avg. number of calls/hour x Avg. 9-1-1 call length = total time/hour for 9-1-1 call taking

then

Total time per hour for call taking ÷ total seconds in an hour x 100 = percent of time per hour for 9-1-1 call taking

To establish an exponential graph, we used information for average minutes worked per hour from a 2013 study in which we analyzed 9-1-1 staffing levels for five 9-1-1 call answer centres throughout British Columbia, operated by the RCMP. Specifically, the average percentage of time spent on 9-1-1 duties for the Southeast and North District OCC's was used as these were the only two centres that required 1.0 or more FTEs for 9-1-1 call answer duties.

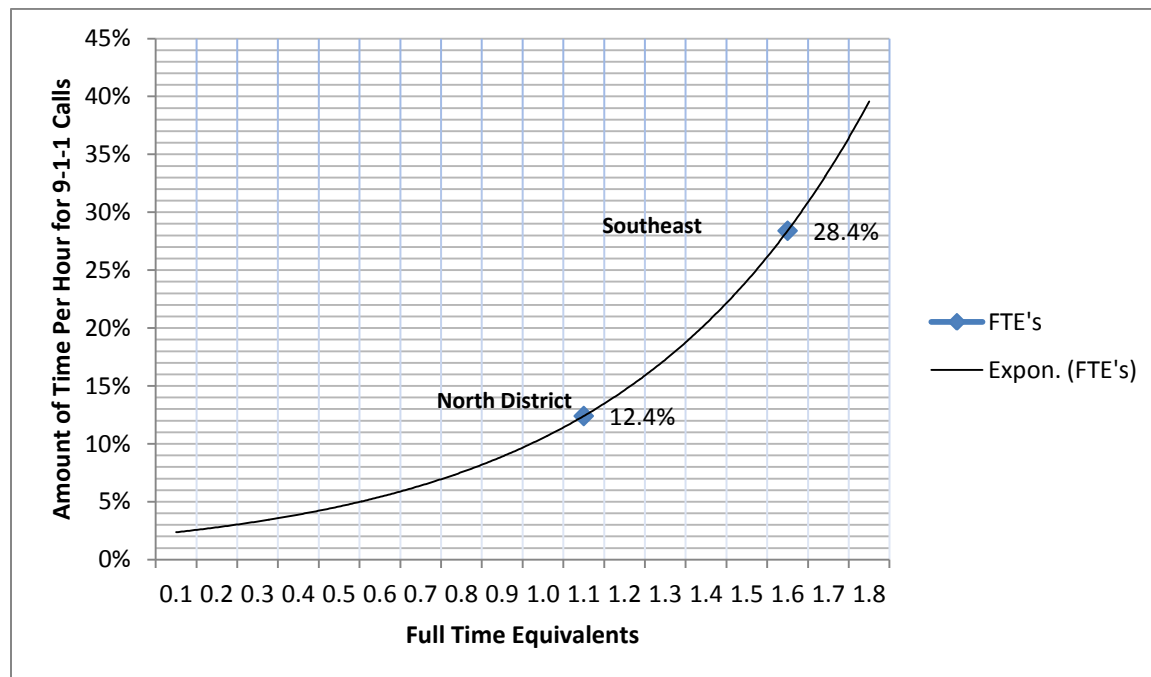
This baseline data is required to establish the exponentiation curve that is used to determine the fractional FTE count for Central Island 911 call volumes.

Based on this formula, the percentage of time spent on 9-1-1 call taking duties for Central Island 911 is calculated as follows:

Table 5: Average percentage of time dedicated to 9-1-1 call taking

RCMP OCC	Calculation of Percentage of Time Spent on 9-1-1 Call Taking Duties Per Hour
Nanaimo	$6.6 \text{ calls} \times 46 \text{ seconds} = 303.6 \text{ seconds}$ $\frac{303.6}{3600} \times 100 = 8.4\%$

Figure 2: Baseline staffing curve

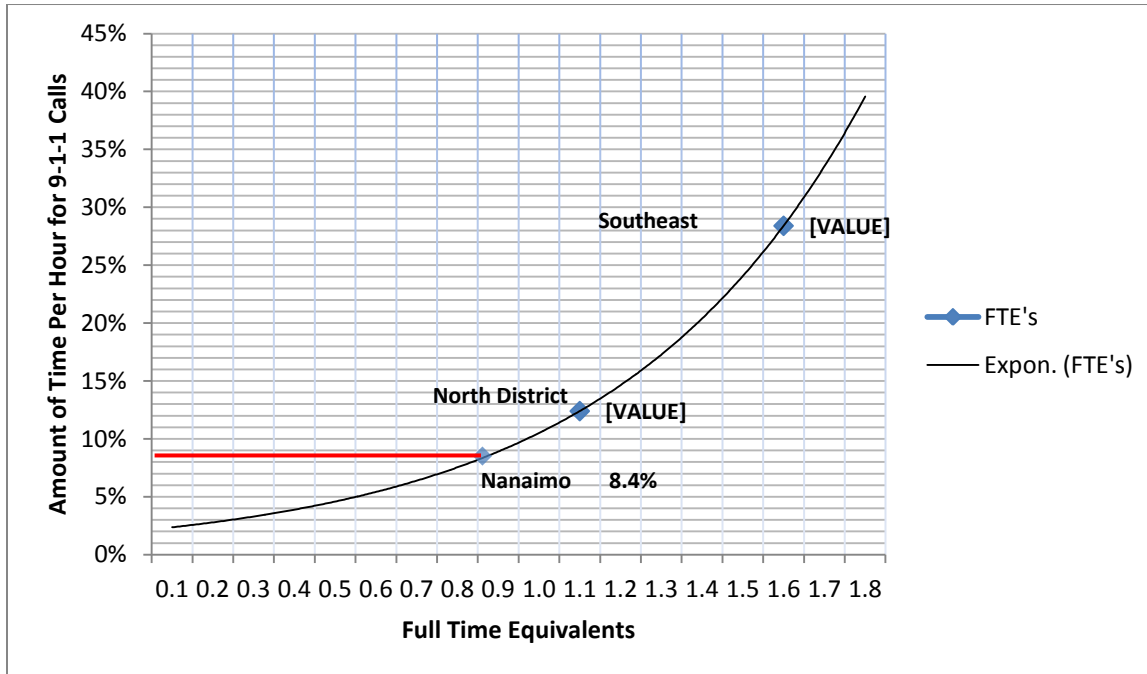


From the chart in Figure 2, approximate FTEs (rounded to the nearest 0.1) based on the percentage of time dedicated to 9-1-1 call taking functions for Nanaimo can be estimated as:

- Nanaimo: 0.8 FTE

The result is demonstrated in Figure 3.

Figure 3: Estimated staff levels based on exponential graph



Actual Staff Requirements

In addition to determining the minimum number of 9-1-1 call takers required based on various call volumes, this staffing level should also be expressed as the total number of staff required. Typically, this is calculated as how many staff members are required to staff one position on 24 hours a day/seven days a week. The net result is referred to as Full-Time Equivalents (FTE).

There is no industry standard for calculating the total number of FTEs required for a public safety answering point. There are a number of different methods and recommendations but the industry accepted method is called the Relief Factor. As part of NENAs PSAP Staffing Guidelines Report², a version of the Relief Factor calculation is provided. In order to estimate the total FTEs required, the following factors must be considered:

- Average number of days off per year for each call taker
- Total number of annual earned sick leave days for all call takers
- Total (or estimated) number of annual training days for each call taker
- Total number of annual days off for all call takers

² https://c.ymcdn.com/sites/www.nena.org/resource/collection/0ACCC545-208F-4185-BF27-FE2AF801B213/PSAP_Staffing_Report.pdf

To calculate the Relief Factor, the total number of days off is divided by the number of call takers to obtain the average number of days off for each call taker on an annual basis. This value is subtracted from the total number of days in a year (365) to obtain the total number of available work days. Lastly, the total number of days in a year (365) is divided by the calculated value of total available work days to obtain the Relief Factor. Typically, this value should be around 1.4 to 1.7 (maximum). In Pomax's experience and opinion a Relief Factor of 1.4 to 1.5 is reasonable in order to provide effective staffing coverage.

The following Table 6 provides a summary of the previously calculated FTEs based on average 9-1-1 calls per hour using a Relief Factor multiplier of 1.4:

Table 6: Estimated FTEs based on Relief Factor

RCMP OCC	Average Calls per Hour	Minimum Staffing Level	Minimum Staffing Level based on four shifts	Relief Factor	Total FTEs
Nanaimo	6.6	1	4	1.4	5.6

However, if we conduct the same calculation using the fractional FTEs shown in Section 3.4.2, the estimated FTEs would be fewer as shown in Table 7 below:

Table 7: Estimated total FTEs based on Relief Factor for Nanaimo OCC

RCMP OCC	Average Calls per Hour	Minimum Staffing Level	Minimum Staffing Level based on four shifts	Relief Factor	Total FTEs
Nanaimo	6.6	0.8	3.2	1.4	4.5

Recommended Staffing Levels vs. Contractual Staffing Levels

This section compares the recommended number of full time equivalents, using Table 7 values, to the contracted equivalents for which Central Island 911 is paying. Table 8 demonstrates the differential:

Table 8: Minimum FTEs vs. Current Contractual FTEs

RCMP OCC	Recommended Minimum FTEs	Current Contractual FTEs	Difference
Nanaimo	4.5	5.2	-0.5

It is important to note that when evaluating minimum 9-1-1 staffing levels in the RCMP OCC's, the RCMP staffing proposal will handle the Nanaimo workload as "net new". This means that the RCMP have determined the required staffing based on the workload being stand-alone work and not factored in the existing staffing in the OCC. Typically, when existing staffing levels are considered, the additional total number of FTEs is less than when considering the workload as net new.

Estimated Population Increase and Minimum Staffing

An estimate of potential population growth for the Central 9-1-1 region has been established. This information is necessary to predict the possible impact on 9-1-1 call answer staffing levels over the next five years.

Statistics Canada data for the 2001, 2006, and 2011 censuses was used to estimate a reasonable expectation of population increase and corresponding 9-1-1 call volumes for the 9-1-1 service area.³

Table 9: Estimated Total Population Increase based on Statistics Canada Census Data

Regional District	2001 Population	2006 Population	Percentage Change	2011 Population	Percentage Change	Average Percentage Change
Cowichan Valley ⁴	71,998	76,929	6.8%	80,332	4.4%	5.6%
Nanaimo ⁵	127,016	138,631	9.1%	146,574	5.7%	7.4%
Total Population	199,014	215,560		226,906		
Average Percentage			7.95%		5.05%	6.5%

The average population change across the Central Island 9-1-1 service area, calculated using the average change of the Cowichan Valley and Nanaimo Regional Districts from 2001 to 2011, was a 6.5% increase.

³ Census data for the Regional District of Nanaimo includes the City of Nanaimo

⁴ <http://www.cvrld.bc.ca/DocumentCenter/Home/View/8623>

⁵ <http://www.rdn.bc.ca/cms.asp?wpID=440>

To assist in population projections, BC Stats provides regional population projections using a statistically valid model. Based on BC Stats modelling⁶, population projections for the Central Island 9-1-1 service area from 2014 to 2020 are:

Table 10: Estimated Total Population Increase based on BC Stats Projections

Regional District	2014 Population	2015 Projected Population	2020 Projected Population
Cowichan Valley	82,690	83,488	88,076
Nanaimo	151,687	153,551	163,922
Total	234,377	237,039	251,998

The projected percentage increase from 2015 to 2020 is calculated as:

2020 Projected Population minus 2014 Projected Population equals Population Increase

Then

$$\frac{\text{Population Increase}}{\text{2015 Projected Population}} \times 100 \text{ equals Percentage Increase}$$

Therefore:

$$251,998 - 237,039 = 14,959$$

Then

$$\frac{14,959}{237,039} \times 100 = 6.3\% \text{ increase}$$

The 6.3% increase over a five year period works out to 1.26% annually. This estimated population increase is consistent with the historical population increases from 2001 to 2011 as per the historical Statistics Canada data.

Population is a major component of 9-1-1 call volumes. While there may be local factors that have some effect on call volumes, service area population is typically used to determine expected call volumes.

Therefore, using the total 9-1-1 calls received by the Nanaimo OCC in 2014 as a baseline, estimated 9-1-1 calls in 2020 is calculated as:

Table 11: Estimated Total 9-1-1 Calls in 2020

Year	9-1-1 Service Area Population	Total 9-1-1 Calls
2014	234,377	57,438 ⁷

⁶ <http://www.bcstats.gov.bc.ca/StatisticsBySubject/Demography/PopulationProjections.aspx>

⁷ Based on five year average of calls from 2010 to 2014

2020	252,096	61,057
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From this, we can calculate the staffing level required to handle the expected 9-1-1 calls based on average calls per hour.

Table 12: Estimated Minimum Staffing Level Based on 2020 Population Projections

1	2	3	4
Projected Average Annual Call Volume	Equivalent Average Calls per Hour	Average Minutes Worked per Hour based on 46 Seconds per Call Column 2 x 46 Seconds	Minimum Staffing Level per hour
61,057	7.0	5.37	1

The minimum staffing level required for 9-1-1 call answer based on the estimated call volumes in five years (2020) based the estimated total 9-1-1 calls indicates that no additional staffing should be required.

The average 9-1-1 call volume from May of 2013 to April of 2015 by hour and day of week is shown in Table 13.

Table 13: 9-1-1 Call Volume Averages by hour

Day	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Fri	5	4	4	3	2	2	3	4	6	7	8	9	9	9	10	10	9	11	10	9	9	9	8	8
Mon	4	3	3	3	2	2	3	4	6	7	8	7	8	8	8	9	10	9	9	8	7	8	6	5
Sat	8	7	5	5	3	3	3	4	5	6	8	8	10	9	9	9	10	10	9	9	9	9	8	8
Sun	7	7	5	4	3	3	3	4	5	6	7	8	8	8	9	9	10	9	9	9	8	8	6	6
Thu	5	4	3	2	2	2	3	4	5	7	9	8	9	9	8	10	10	9	9	8	8	7	6	5
Tue	4	3	2	2	2	2	3	4	6	7	8	9	8	9	9	9	10	9	9	8	7	7	7	5
Wed	4	4	3	2	3	2	3	4	6	6	7	8	7	8	9	8	9	9	9	9	9	7	7	6

Limitations of Recommended Staffing Levels / Future Demands

Section 0 - Actual Staff Requirements are based on the 9-1-1 call types of Regular, Trouble Not Known, and Unknown – Data Only (as detailed in Section 3.1.1). In 2014 and going forward, new types of 9-1-1 calls were added in Vancouver, and the technology will be coming to other PSAPs shortly, such as Text with 9-1-1 (T9-1-1) for the deaf, hard of hearing, and speech impaired (DHHSI) community. The impact and analysis in terms of call volumes and call length cannot be determined until at least twelve months of 'actual' T9-1-1 call processing data can be captured after full implementation in BC (expected by the end of 2015). What is known from the data captured during the trial leading to the spring 2014 service launch of T9-1-1 is that call processing times were at least three times longer than the average call processing time of 46 seconds for the calls received today.

The staffing model calculations in this study will need to be revisited as experience is gained with new access methods, such as Text with 9-1-1 for the deaf, hard of hearing, and speech impaired community to start, as well as the wider adoption of Text to 9-1-1 for the general public and the processing of rich media i.e. pictures and video (timelines are currently unknown). Depending on the call volumes, the complexity of processing, and the future configuration of 9-1-1 call answer positions funded by the partner agencies, the detailed staffing model calculations will need to be adapted to properly reflect the 'actual' impact on resource demand.

Potential Partner Proposals

There are two ways for a partner agency to charge for the 9-1-1 Call Answer Service. The first is to charge for incremental FTE’s required to handle the 9-1-1 call volume, plus Operating and Maintenance costs which may include an allocation of space, telephony system, recording equipment and any other associated costs. For this approach, the agencies may charge for a single additional position, or on the basis of additional personnel during peak periods with the call volume to be absorbed by regular staffing during off hours.

The second is to charge a levy on a per call basis, such that it may be a flat rate per call that may or may not include all associated overhead.

For each proposal the costs are apportioned to each partner as per the existing cost allocation which is as follows:

Table 14: Apportioned Costs by Partner

Jurisdiction	Percentage
City of Nanaimo	45%
Regional District of Nanaimo	10%
Cowichan Valley Regional District	45%

Capital Regional District PSAP Considerations

Although noted as a potential provider in the statement of work, CREST does not provide 9-1-1 call answer services they are only a provider of a digital trunked radio system for public safety agencies in the Capital Region.

PSAPs in the Capital Regional District include Victoria Police, Saanich Police, and the West Shore RCMP Operational Communications Centre (OCC).

Victoria Police reviewed this opportunity and decided not to provide a proposal.

Saanich Police currently handle call volumes less than 50% of the Nanaimo call volume and have never expressed an interest in providing service for other regions. As such they were not considered in this analysis as a potential provider.

The RCMP chose to provide a proposal from the Courtenay OCC, and as such the West Shore OCC was not provided as an option.

E-Comm Proposal

E-Comm has provided their comprehensive proposal as detailed in Appendix 'C', which is based on a cost per call model with some one-time implementation expenses.

4.2.1. E-Comm Methodology

E-Comm would handle CI 911 calls as part of their blended 9-1-1 calls, such that all 9-1-1 calls are presented to E-Comm 9-1-1 call takers in order of arrival. That is the 9-1-1 queue will include all calls for the 23 regional districts and other communities for which they handle 9-1-1 calls.

CI911 calls will be triaged according to their standard protocols and 'downstreamed' (transferred) to the appropriate agency which would be Courtenay OCC for Police calls, Nanaimo FireComm for fire calls, and the British Columbia Ambulance Service (BCAS) Victoria Dispatch for ambulance calls.

E-Comm was the pilot site for Text with 9-1-1 (T911) for the Deaf, Hard-of-Hearing and Speech Impaired (DHHSI) community and can handle these calls for registered users in the CI911 service area. E-Comm is currently able to downstream T911 calls to all of their Secondary Public Safety Answering Point (Secondary PSAP) police and fire agencies currently in the E-Comm facility and to police Secondary PSAPs in the Lower Mainland. Agent511 is the web based software that acts as the Text messaging platform, and the RCMP is ready to rollout Agent511 software and implement the related connectivity at all downstream OCCs. In the interim for all of their Regional Districts and Secondary PSAPs they connect with the DHHSI caller using Agent511 software and Relay the information to the downstream agency.

E-Comm provides 24 hour supervision with 9-1-1 technical resources on call.

Working with Telus, 9-1-1 calls to E-Comm may be queued at the Primary Tandem (a Tandem is the Telus 9-1-1 switch of which there are five across the province) so that an influx of a high volume of calls ensures that the calls are queued and presented to the operators sequentially as operators become available.

E-Comm duty managers can expand the size of the 9-1-1 queue by dynamically expanding the size of the call taking queue by adding available staff. This allows for the ability to easily add more staff to handle a high influx of calls.

E-Comm also operates the same computer aided dispatch as all police agencies across the province, meaning that E-Comm 9-1-1 call takers can communicate quickly with the RCMP call takers and dispatchers at Courtenay OCC.

E-Comm exceeds the NENA standards for 9-1-1 call answer service; their 9-1-1 PSAP service performance in each of the last three years is as follows:

- 2012 – 98% of 9-1-1 calls answered in 5 seconds or less
- 2013 – 98% of 9-1-1 calls answered in 5 seconds or less
- 2014 – 97% of 9-1-1 calls answered in 5 seconds or less

4.2.2. Backup Centre

A major feature of the E-Comm proposal is the hardened facility and the telephony infrastructure. E-Comm has partnered with the BCAS Dispatch Centre in Vancouver to operate a ‘warm’ backup centre with full functionality for 9-1-1 call taking, dispatch and radio management in the event that an evacuation of the building is required.

Their target time to have 9-1-1 PSAP service, Police and Fire call taking and dispatch restored on backup capabilities is five minutes or less. During transit from the E-Comm building to BCAS, 9-1-1 calls are handled by BCAS operators with call taking and dispatch maintained by E-Comm staff using portable devices to ensure there is an absolute minimum of down time or lack of service if a major event were to occur. The target time to be performing call taking and dispatch capability at the backup site in the event of a need to vacate the primary location is 30 minutes.

E-Comm fully exercises the backup site by operating completely at the BCAS Dispatch Centre twice a year. During those evacuations extensive maintenance routines are undertaken on all key telephony systems.

4.2.3. 9-1-1 Network

E-Comm worked with Telus to design the telephony network from the point of origin to Vancouver with multiple redundancies. The methodology is detailed in their report but is summarized in Table 15.

Table 15: 9-1-1 Network from Central Island to E-Comm

Configuration	Call handling
Normal operation	Calls are routed from the central island communities to the Telus Tandem switch located in Victoria and then to E-Comm and into the 9-1-1 queue at the primary Tandem switch in Vancouver
Telus Tandem Switch failure in Victoria	9-1-1 calls would be routed through the backup Tandem switch located in Surrey and to E-Comm via the BCAS backup centre
Service impairment, failure or evacuation required at E-Comm	The calls would be routed to the BCAS backup centre via the Surrey Tandem switch and BCAS staff will answer and downstream the 9-1-1 calls while E-Comm staff relocate to the BCAS facility which is located 5 kilometers from E-Comm.
Total loss of Telus network service to Vancouver from the Central Island	The 9-1-1 calls would be routed to the Victoria BCAS Dispatch Centre and they will provide the 9-1-1 call answer service until service can be restored by Telus

4.2.4. E-Comm Costs

E-Comm has provided a finance model based on a cost per call, with some one-time implementation costs and an option to include up front technology costs in the annual levy.

There are one-time costs for project management of \$16,000 resulting in the following costs for each agency:

Table 16: E-Comm One-Time costs by Agency

Jurisdiction	Percentage	Amount
City of Nanaimo	45%	\$ 7,200
Regional District of Nanaimo	10%	\$ 1,600
Cowichan Valley Regional District	45%	\$ 7,200

In addition, there are equipment and implementation costs totalling \$130,500 which E-Comm has included as an annualized cost in Table 17 below; E-Comm notes the advantage of this approach (versus an upfront one-time payment) is that if the contract is renewed beyond five years then some funding is built-in for future technology refresh costs.

Table 17: E-Comm Annualized Equipment Costs

Item	Description	Total
1	Equipment and Implementation Costs	\$ 117,220
2	Amortization rate	5 years
3	Interest	4%
	Annualized Cost - Levy Recovery	\$ 26,100

The five year levies are shown in Table 18.

Table 18: E-Comm Annual Levies (including Annualized Equipment Costs)

Item	Description	Cost
1	2015 Annual Levy	\$ 250,920
2	2016 Annual Levy	\$ 258,450
3	2017 Annual Levy	\$ 266,200
4	2018 Annual Levy	\$ 274,190
5	2019 Annual Levy	\$ 282,420

E-Comm also offers an alternative pricing option on page 11 of their proposal that reduces the Table 18 – Item 1: 2015 Annual Levy of \$250,920 to \$224,820 – if the one-time capital costs of \$117,220 are paid up-front. However, for the reason noted above by E-Comm, which we concur with, this approach is not recommended.

The annual costs, by partner, based on the 2015 Annual Levy are shown in Table 19.

Table 19: Annual E-Comm costs by Partner

Jurisdiction	Percentage	Amount
City of Nanaimo	45%	\$112,914
Regional District of Nanaimo	10%	\$ 25,092
Cowichan Valley Regional District	45%	\$112,914

The following Table 20 is the estimated annual 9-1-1 call volume increase based on a 9-1-1 service area population increase as calculated in Section 3.6. For purposes of this analysis, the 2014 total 9-1-1 calls is 51,000 as identified in the E-Comm proposal:

Table 20: Projected Annual 9-1-1 Call Volume Increase

Year	9-1-1 Service Area Population	Total 9-1-1 Calls Based on E-Comm Proposal	Annual Total 9-1-1 Call Increase
2014	234,377	51,000	N/A
2015	237,330	51,643	1.26%
2016	240,283	52,294	1.26%
2017	243,236	52,953	1.26%
2018	246,189	53,620	1.26%
2019	249,142	54,297	1.26%
2020	252,095	54,981	1.26%

It is important to note that E-Comm's proposal is not a fixed price contract; it is based on the estimated call volumes as detailed at Note 'b' on page 11 of their proposal; Note 'b' also provides an important caveat with respect to the Processing of Abandoned Calls. E-Comm has reasonable growth estimates included, and only new legislation could result in possible changes to how Abandoned Calls are processed in the future. As such, the annual costs detailed in Table 18 for 2015 to 2019 can be used as stated for financial planning.

4.2.5. E-Comm Pros and Cons

The advantages of the E-Comm proposal are outlined below:

1. Significant depth of call queue – additional 9-1-1 operators can be added to the call taking queue to handle call peaks
2. Solid redundancy and backup provisions – these include technology redundancy as well as off-site backup centre in Vancouver and an alternate call taking arrangement on Vancouver Island with the BC Ambulance Service Dispatch Centre
3. Dedicated personnel maintain the 9-1-1 telephone system – the team is available on call 24x7
4. Currently capable of taking T9-1-1 calls for the deaf and hearing impaired community
5. Good working relationship with Telus in supporting 9-1-1 service across the province
6. Most cost effective option

The disadvantages of the E-Comm proposal are:

1. Call taking is off island, while this does not have many tangible drawbacks there may be political concerns about the call handling being done remotely.
2. E-Comm will not take any existing Municipal Employees

Nanaimo FireComm Proposal

The Central Island 9-1-1 partnership utilizes the fire dispatch centre operated by the City of Nanaimo, known as Nanaimo FireComm, to provide communication and dispatch services to the 27 fire departments within the partners' regions. As such, Nanaimo FireComm is defined as a Secondary Public Safety Answering Point (Secondary PSAP). Nanaimo FireComm was originally built with the capacity of integrating the Primary Public Safety Answering Point (PSAP), so the centre has sufficient workspace to accommodate the additional position for 9-1-1 call taking and the majority of equipment. Nanaimo FireComm presently operates with two dispatchers on duty 24 hours per day, 7 days per week.

4.3.1. Nanaimo FireComm Methodology

Nanaimo FireComm has proposed to include the Primary PSAP function by adding two new full time equivalent positions assigned to a new “swing shift” to cover peak periods. The swing shift would augment the two dispatchers with a third dispatcher from 10:00 AM to 10:00 PM, seven days a week to cover the average busy hour 9-1-1 periods. The additional position would be added to cover these hours in order to handle the increased call volume for 9-1-1 calls such that during average busy hours there would be three available personnel to handle 9-1-1 calls, and two personnel at all other times. This represents an increase in personnel, or what is referred to by the City of Nanaimo as a higher service level, and this may be met by transferring some of the existing Municipal Employees who are currently acting as Nanaimo RCMP 9-1-1 operators.

The staffing option put forward by Nanaimo FireComm is to relocate two current municipal employees (not federal RCMP staff) from the Nanaimo RCMP Operational Communications Centre (OCC) to Nanaimo FireComm into the two new FTE positions. This staffing option may be subject to labour relation/collective agreement issues, and the potential issues of transferring personnel from CUPE to IAFF and these must be resolved prior to the staff being relocated.

With Nanaimo FireComm acting as the Primary PSAP, the 9-1-1 calls would be received by any of the on duty dispatchers and then transferred to police, ambulance or dealt with directly if the call is fire related.

Nanaimo FireComm has on-site supervision during normal business hours and after hours a supervisor is always available on call.

4.3.2. Backup Arrangements

FireComm presently has a no fee reciprocal back-up agreement for fire dispatch services with the Campbell River Fire Dispatch Centre. If the PSAP function were to transition to Nanaimo FireComm, then a similar agreement would need to be negotiated with another 9-1-1 Centre for back-up, such as the Victoria Police PSAP. Nanaimo Fire has not entered into negotiations for such an arrangement so a cost has not been quantified but they have indicated that it is possible that a no fee reciprocal agreement could be reached with another 911 provider.

4.3.3. Current Nanaimo FireComm Staffing Analysis

As part of the study, Pomax is to review the existing call volume of Nanaimo FireComm to determine if their existing staff can handle the 9-1-1 call volume and meet NENA call answer guidelines.

In order to make this determination, the workload analysis must consider two components:

1. Nanaimo FireComm dispatcher workload based existing call volume
2. Staffing levels required to handle 9-1-1 call volume

Each component requires a unique workload analysis in order to determine the minimum number of staff required. For existing Nanaimo FireComm workload, the minimum number of staff is determined based on the analysis of the total number of minutes spent on typical fire dispatch related duties per hour. For 9-1-1 call answer, Erlang C analysis is used to determine the minimum number of staff required.

To calculate existing Nanaimo FireComm fire dispatch related workload, Pomax analyzed as provided call data for the years 2013 and 2014. From this, we have determined that the average number of fire dispatch related calls per hour/per day of the week:

Table 21: Average Fire calls per hour 00:00 to 12:00

Day of Week	Hour of Day (00:00 to 12:00)											
	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
Sunday	1.2	1.4	1.1	1.1	0.6	0.7	0.8	0.9	1.3	1.5	1.7	1.7
Monday	0.7	0.9	0.9	0.79	0.7	0.9	0.9	1.0	1.7	1.9	1.8	1.6
Tuesday	0.9	0.7	0.5	0.7	0.5	0.4	0.7	1.0	2.0	1.9	1.8	2.1
Wednesday	1.0	0.6	0.5	0.5	0.6	0.5	0.8	0.9	1.7	1.5	1.5	1.7
Thursday	0.9	0.5	0.8	0.5	0.6	0.7	0.7	1.1	1.3	1.7	2.5	2.1
Friday	0.8	0.6	0.7	0.5	0.6	0.5	0.9	0.8	1.5	1.0	2.0	2.5
Saturday	1.0	1.0	0.8	0.9	0.6	0.7	0.6	1.3	1.5	1.6	1.9	2.0

Table 22: Average Fire calls per hour 12:00 to 24:00

Day of Week	Hour of Day (12:00 to 24:00)											
	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24
Sunday	1.7	2.0	1.8	2.2	2.0	2.60	2.4	2.1	1.6	1.7	1.3	1.0
Monday	1.9	1.7	2.1	1.9	2.2	1.9	2.2	1.7	2.0	1.8	1.4	1.0
Tuesday	1.9	1.8	2.4	1.9	2.0	2.0	2.0	1.8	1.7	1.2	1.2	0.9
Wednesday	1.9	1.8	2.1	2.0	2.1	2.2	1.8	1.9	1.9	1.6	0.3	1.3
Thursday	2.6	2.2	2.2	2.1	2.0	2.0	2.4	1.9	1.9	1.6	1.3	1.1
Friday	2.0	2.2	2.1	2.3	2.0	2.3	2.2	1.9	1.9	1.6	1.5	1.3
Saturday	1.9	1.7	2.0	1.8	1.7	2.0	2.0	1.9	1.7	2.0	1.7	1.4

From this evaluation we determine that the average per hour fire dispatch workload range from a low of 0.5 calls to a maximum of 2.6 calls. Based on Pomax's statistically validated workload analyses from previous dispatch centre workload analysis projects, the following parameters are used to calculate total average dispatcher workload per hour:

- average of 12 minutes per call (combined fire dispatch and other workload tasks)
- dispatcher available 43 minutes per hour

The additional 17 minutes of the hour account for such things as breaks and other activities where the dispatcher is not available for dispatch activities.

The calculation to determine dispatcher workload per hour is:

number of calls per hour times average minutes per call equals dispatcher workload

The calculation to determine total available dispatcher time per hour is

available dispatcher minutes per hour minus dispatcher workload equals total dispatcher workload per hour

Therefore, the average per hour workload range for Nanaimo FireComm dispatch staff is shown in Table 23:

Table 23: Average per hour workload for Nanaimo FireComm

Avg. No. of Calls/Hour	Avg. Minutes/Call	Dispatcher Workload/Hour (mins.)	Available Dispatcher Time/Hour (mins.)	Balance of Available Dispatcher Time/Hour (mins.)
0.5	12	6.0	43.0	36.0
1.0	12	12.0	43.0	31.0
1.5	12	18.0	43.0	25.0
2.0	12	24.0	43.0	19.0
2.5	12	30.0	43.0	13.0
2.6	12	31.2	43.0	11.8

Therefore, based on the average number of calls for 2013 and 2014 handled by Nanaimo FireComm, the maximum workload for a fire dispatcher is 31.2 minutes per hour and when considered against the average dispatcher availability of 43 minutes per hour, 1.0 FTE can handle the average busy hour workload.

If the fire dispatch workload is considered from a fractional perspective, 0.73 FTE is required.

Nanaimo FireComm’s current staffing is two dispatchers on shift 24 hours per day, 7 days a week. This model allows for unpredictable incidents such as mass calling events, large fire events, significant weather storms, and others situations that can have a significant workload impact on operations.

With respect to the minimum staffing level required to handle 9-1-1 calls, Section 0 provides the analysis and staffing levels required and determined that a minimum of 0.8 FTE is required, if the staffing is considered on a fractional basis.

We evaluated total 9-1-1 calls between May 2013 and April 2015 and the 9-1-1 calls per hour range from a minimum of three calls to a maximum of nine calls, with the average calls per hours being seven. Based on Erlang C calculations, 1.0 FTE can handle up to, and including, nine 9-1-1 calls per hour while meeting the NENA guideline of 90% of calls answered within 10 seconds. As such, 1.0 FTE can handle nearly 30% more 9-1-1 calls than the expected average per hour 9-1-1 calls.

We further considered the 9-1-1 workload by analyzing the average calls per hour per/day of the week. This analysis provides an accurate representation of expected workload throughout the day and identifies those times where there will be calls per hour that average. This analysis reveals that between the hours of 10:00 AM and 10:00 PM the number of 9-1-1 calls is higher than the per hour average, with the highest calls per hour reaching 11 in one hour as well as a number of hours where the calls are 10.

As per our analysis, we have determined that 1.0 FTE can handle nine calls per hour. In order to handle the maximum average busy hour workload of 11 calls, 1.3 FTE are required.

When considering the average workload per hour, if both the average per hour fire dispatch and 9-1-1 workloads are considered together, the minimum required staffing level is shown in Table 24:

Table 24: Nanaimo FireComm Minimum Staffing Level

Workload Activity	FTE required	Fractional FTE Required
Average Fire Dispatch	1.0	0.73
Average 9-1-1	1.0	0.8
Total	2.0	1.53

If both the average per hour fire dispatch and the maximum per hour 9-1-1 call workloads are considered together, the minimum required staffing level is shown in Table 25:

Table 25: Nanaimo FireComm Staffing for Fire and 9-1-1 Calls

Workload Activity	FTE required	Fractional FTE Required
Average Fire Dispatch	1.0	0.73
Maximum 9-1-1	2.0	1.3
Total	3.3	2.03

Based on our analysis of the average busy hour fire dispatch workload and the average busy hour 9-1-1 call workload, the existing Nanaimo FireComm staffing level is not sufficient to handle the addition of 9-1-1 calls while meeting the NENA guidelines. Nanaimo FireComm would require a minimum of a 15% increase in FTEs on order to handle the additional workload.

4.3.5. Nanaimo FireComm Costs

There are one-time costs to upgrade the dispatch workstation so that it matches all other workstations at the centre, which includes a Zetron paging console, upgrading the other consoles to match. Also upgrading the telephone switch to include the additional phone and the changes to support Text to 9-1-1 for the DHHSI community, as well as in call location updates for cellular calls (for moving cell phones such as a caller in a car). It also includes a new CAD licence, computer and chair. This work can be done in time for a transition by the end of November 2015.

The existing Nanaimo FireComm eight FTE's and three relief dispatchers can be trained to handle the 9-1-1 calls as part of their standard shifts as they can be trained at their desks. New employees take four to six blocks of training at 32 hours a block, therefore assuming the rate of \$37.15 per hour the cost per block would be \$1,188.80 for a maximum of \$7,132.80 per new employee. Since the existing Municipal Employees are being transferred, the training would likely be minimized due to their experience, however it has been calculated at six weeks per employee and has been included in the One-Time costs in Table 26. This training would allow

them to act as 9-1-1 call takers and fire call takers and dispatchers. The training would be coordinated by Nanaimo FireComm's Captain of Informatics and Communications, and existing fire dispatchers who are qualified as trainers.

Table 26: Nanaimo FireComm One-Time Costs

Item	Description	Cost	Qty	Total
1	Training for 2 Municipal Employees as Fire Dispatchers	\$7,133	2	\$ 14,266
2	Zetron Paging Console (equipment, licensing and installation)		1	\$ 35,000
3	Upgrade existing Zetron equipment (3 terminals)		3	\$ 40,000
4	Upgrade 911 equipment. Includes T9-1-1 and rebid of mobile devices		4	\$ 40,000
5	FDM CAD License		1	\$ 35,000
6	New computer terminal and equipment to activate fourth workstation		1	\$ 10,000
	Total One Time Start Up Costs			\$174,266

The breakdown of one-time costs by partnership is shown in Table 27 and the annual costs including salaries, O&M and CAD licence maintenance is shown in Table 28.

Table 27: One-Time Costs for Nanaimo FireComm by Partner agency

Jurisdiction	Percentage	Amount
City of Nanaimo	45%	\$78,420
Regional District of Nanaimo	10%	\$17,426
Cowichan Valley Regional District	45%	\$78,420

Table 28: Nanaimo FireComm Annual Costs

Item	Description	Rate	Qty	Total
1	Annual salary per FTE Dispatcher (wages and benefits at 10 year rate)	\$101,580	2	\$203,160
2	FDM License fee for additional CAD terminal	\$ 7,000	1	\$ 7,000
3	O&M (Telephone costs, rent, misc. staff costs)			\$ 71,150
	Total Annual			\$281,310

The annual costs for each proposal by partner agency are shown in Table 29.

Table 29: Annual Nanaimo FireComm Costs by Partner Agency

Item	Description	Jurisdiction	Percentage	Amount
1	Staffing plus O&M	City of Nanaimo	45%	\$126,590
2	Staffing plus O&M	Regional District of Nanaimo	10%	\$ 28,131
3	Staffing plus O&M	Cowichan Valley Regional District	45%	\$126,590

Nanaimo FireComm has identified annual increases based on 2.5% wage increases per the IAFF contract, plus contingency as identified in the following Table 30.

Table 30: Annual Increases in Nanaimo FireComm Costs

Item	Description	Total
2016	Annual Operating Costs	\$281,310
2017	Annual Operating Costs plus 3% increase from previous year	\$289,749
2018	Annual Operating Costs plus 3% increase from previous year	\$298,442
2019	Annual Operating Costs plus 3% increase from previous year	\$307,395
2020	Annual Operating Costs plus 3% increase from previous year	\$316,617

4.3.6. Nanaimo FireComm Pros and Cons

The following advantages and challenges were identified by Nanaimo FireComm in their proposal attached in Appendix 'D'.

“Advantages:

1. Retains two FTE positions from the present Nanaimo OCC with potential for others to fill part-time roles.
2. Facilities are already in place and some of the technology already exists.
3. Allows for flexibility to handle current unknowns related to Provincial CAL initiative and NextGen 9-1-1 service requirements.
4. Provides greater flexibility for future service enhancements and retains local control over operational procedures.
5. Economies of scale are achieved by combining Primary PSAP and Secondary PSAP functions.

Challenges:

1. Staffing and Union contract implications to be reviewed which would likely result in the higher IAFF wages coming into effect.
2. Will require additional cross-training for existing fire dispatchers and 911 call takers.
3. Abandoned calls need to be followed up before forwarding to police.
4. Additional computer aided dispatch equipment.
5. NextGen 911 specifications, timelines and costs remain unknown.
6. A back-up agreement must be reached with another 911 call centre.”⁸

Note that the telephone equipment is currently being upgraded. Given the unknowns about the Nextgen 9-1-1 there may be additional upgrades required in the future.

The economies of scale for combining Primary PSAP and Secondary PSAP functions would be related to the handling of fire calls only.

Note that under this proposal the cross trained staff will handle both 9-1-1 calls and fire call taking and dispatch functions.

The partnership may decide that abandoned calls will all be forwarded to the Courtenay OCC as recommended in Section 0.

In relation to item 5 above, the Nanaimo FireComm proposal noted that “consolidation into Nanaimo FireComm will incur future costs as NextGen 911 technology upgrades will be required in future years. Many of these upgrades will already be required in Nanaimo FireComm as a fire dispatch centre because it must be able to receive NextGen 911 calls transferred from the 911 PSAP regardless of its location. The Nanaimo FireComm telephone systems are in the process of being upgraded as part of an existing asset management program. This upgrade makes the centre ready to receive “Text-To-911” equipment which is one of the first elements of NextGen 911. As such, costs for adding Text-To-911 are not yet quantified. Future NextGen 911 elements may include video and other media to connect with 911 however neither the

⁸ City of Nanaimo Fire Rescue Department. Estimated cost for Integrating PSAP into Nanaimo FireComm. May 8, 2015

system specifications or timelines for implementation are established, therefore associated costs cannot be fully quantified anywhere in the province”.⁹

It should be noted that any proponent is in the same situation. Although some fundamentals are known, such as the requirement for internet protocol telephony and recording, many of the more advanced feature requirements such as multimedia have not been defined. Some providers, such as E-Comm, may have a larger client base upon which to amortize the costs, meaning each client may bear a smaller amount of the increased costs to enhance the technology; however, as noted these enhancements will still be required for the Secondary PSAPs as well and thus these costs will still be incurred. Also by comparison, E-Comm personnel are actively involved in the preparation and planning for the next generation 9-1-1 platforms and are more familiar with the future direction of the technology.

⁹ City of Nanaimo Fire Rescue Department. Estimated cost for Integrating PSAP into Nanaimo FireComm. May 8, 2015

Nanaimo Detachment Call Answer Service

This proposal involves allocating existing police call answer staff in a 9-1-1 call answer capacity only and operated by the City of Nanaimo.

4.4.1. Nanaimo Detachment Call Answer Service Methodology

The existing police call answer staff could remain in their current roles in repositioned space but handling only the 9-1-1 call answer portion, and transferring the calls to either the RCMP in Courtenay, FireComm, or BCAS dispatch in Victoria.

The existing switchboard space could be utilized with the addition of another desk for the 9-1-1 call answer work. No physical renovations are anticipated for this solution.

The switchboard position would handle call overflow and break relief, although providing break relief to the 9-1-1 call taker means that only one person is handling both switchboard and 9-1-1 calls.

4.4.2. Nanaimo Detachment Call Answer Service Costs

To calculate the costs we first determined the appropriate Overhead and Maintenance (O&M) based on a pro-rata of the current communication area space, which is 1180 square feet, against the space for the switchboard area of 180 square feet.

The 2015 rate for O&M is \$192,388, which includes an annual allowance for equipment maintenance, which would remain, and the RCMP allowance, which would no longer be paid; with these adjustments, a cost of \$116,388 for the space or \$99 per square foot per annum. The switchboard space would therefore be \$17,754 as shown in Table 31.

Table 31: Nanaimo Detachment O&M and Costs Per Square Foot

Item	Description	Cost
1	Operating and Maintenance 2015	\$192,388
2	Less equipment maintenance	\$ 50,000
3	RCMP allowance	\$ 26,000
4	Net cost for space	\$116,388
5	Cost per sq. ft. based on 1180 sq. ft.	\$ 99
6	Cost for switchboard space based on 180 sq. ft.	\$ 17,754

Adding back the equipment maintenance costs results in the following revised O&M costs as shown in Table 32.

Table 32: Nanaimo Detachment Revised O&M Costs

Item	Description	Cost
1	Cost for switchboard space based on 180 sq. ft.	\$ 17,754
2	Equipment maintenance	\$ 50,000
	Total O&M	\$ 67,754

The projected costs are outlined in Table 33. Nanaimo based their FTE count on 5.2 and 2088 hours per FTE. The benefit rates are shown for the Full Time and Part time FTEs and the revised O&M total.

The Switchboard operator totals based on 4.75 FTE are shown. These costs are allocated at 25% to the partnership for handling break relief and overflow. This gives a total of \$604,800 for the annual costs of providing the call answer service to the CI Partnership.

Table 33: Total 911 Call taker and pro rata Switchboard costs

Item	Description	Rate per hour	FTE Count	Total hours (2088 per FTE)	Total
1	Police Call Taker Salary	\$ 32.21	5.2	10858	\$ 349,737
2	Benefits Full Time	\$ 8.05	4	8352	\$ 67,255
3	Benefits Part Time	\$ 10.63	1.2	2506	\$ 26,638
4	Revised O&M				\$ 67,754
5	Sub-Total				\$ 511,384
6	Switchboard Salary	\$ 30.14	4.75	9918	\$ 298,929
7	Benefits Full Time	\$ 7.54	4.75	9918	\$ 74,733
8	Sub-Total				\$ 373,662
9	Allocation to CI Partnership at 25%				\$ 93,416
10	Total 911 plus pro-rata Switchboard				\$ 604,800

The costs are apportioned to the members of the partnership in Table 34.

Table 34: Nanaimo Detachment Call Answer Costs Allocation to Partners

Jurisdiction	Percentage	Amount
City of Nanaimo	45%	\$ 272,160
Regional District of Nanaimo	10%	\$ 60,480
Cowichan Valley Regional District	45%	\$ 272,160

4.4.3. Nanaimo Detachment Pros and Cons

The following are advantages of the Nanaimo Detachment proposal:

1. Retains all Municipal Employees who handle the police call taking currently
2. Takes advantage of the local knowledge of staff

The following are disadvantages of the proposal:

1. No overflow capability beyond the two positions unless alternate arrangements are made
2. Do not have personnel who are familiar with 9-1-1 technology and future direction of Nextgen 9-1-1
3. Not cost effective in relation to other proposals

Courtenay RCMP OCC Proposal

The 9-1-1 Call Answer service would be assumed by the Courtenay RCMP OCC. Since the Courtenay OCC recently handled 9-1-1 service there are no one-time setup costs involved with this proposal.

4.5.1. Courtenay RCMP OCC Methodology

The Courtenay RCMP OCC PSAP call answer service would operate similar to how it currently operates in Nanaimo. A blend of call taking and dispatch staff would be responsible for handling the 9-1-1 calls, and transferring Fire and Ambulance calls to Nanaimo FireComm and BCAS Victoria Dispatch.

Overflow calls would be handled by another OCC, which would be determined prior to the switch from Nanaimo to Courtenay.

Courtenay OCC can handle abandoned calls directly as outlined in Section 0.

Supervision would be provided by the on-duty supervisor during business hours and on call outside of those hours.

4.5.2. Courtenay RCMP OCC Costs

The RCMP has provided costing based on the addition of a single position 24 hours a day, using an FTE count of 5.6. O&M costs and Accommodation costs are provided on an FTE basis as shown in Table 35.

Table 35: RCMP Courtenay OCC Costs

Item	Description	Per Capita	FTE Count	Total
1	Pay and Benefits Per Capita	\$115,714	5.6	\$ 647,999
2	O&M Per Capita	\$ 5,438	5.6	\$ 30,453
3	Accommodation	\$ 7,403	5.6	\$ 41,457
	Total			\$ 719,909

The costs for each partner are shown in Table 36.

Table 36: RCMP OCC Costs by Partner

Jurisdiction	Percentage	Amount
City of Nanaimo	45%	\$ 323,959
Regional District of Nanaimo	10%	\$ 71,991
Cowichan Valley Regional District	45%	\$ 323,959

4.5.3. Courtenay RCMP OCC Pros and Cons

The following are advantages of the Courtenay OCC proposal:

1. Can handle abandoned calls directly as the police of jurisdiction as is the current practice for the Nanaimo OCC
2. Overflow to another OCC (to be determined which one). This has worked well to handle large influxes of calls

The following are disadvantages of the Courtenay proposal:

1. Not cost effective in relation to the other proposals
2. The RCMP are moving away from acting as PSAP elsewhere in the province and across the country
3. Courtney OCC will not take any existing Municipal Employees
4. Do not have personnel who are familiar with 9-1-1 technology and future direction of Nextgen 9-1-1

Summary of Cost Proposals

One-time costs are shown for each agency for each partner in Table 37. There were no one-time costs for setup of either Nanaimo Detachment call taking or Courtenay OCC. Note that most E-Comm start-up costs are built into the annual levy as an option, although these can optionally be paid directly as one time up-front costs.

Table 37: One Time costs by agency and partner

Item	Agency	Total	City of Nanaimo	Regional District of Nanaimo	Cowichan Valley Regional District
1	E-Comm 9-1-1	\$ 16,000	\$ 7,200	\$ 1,600	\$ 7,200
2	Nanaimo FireComm	\$174,266	\$78,420	\$17,427	\$78,420
3	Nanaimo Detachment	\$ -	\$ -	\$ -	\$ -
4	Courtenay OCC	\$ -	\$ -	\$ -	\$ -

The annual costs by agency for each partner are shown in Table 38.

Table 38: Annual Costs by agency and partner

Item	Agency	Total	City of Nanaimo	Regional District of Nanaimo	Cowichan Valley Regional District
1	E-Comm 9-1-1	\$250,920	\$112,914	\$25,092	\$112,914
2	Nanaimo FireComm	\$281,310	\$126,590	\$28,131	\$126,590
3	Nanaimo Detachment	\$604,800	\$272,160	\$60,480	\$272,160
4	Courtenay OCC	\$719,909	\$323,959	\$71,991	\$323,959

In addition, the partners may want to consider a contingency of 10% per year for unanticipated costs; this is shown in Table 39.

Table 39: Annual Costs including contingency

Item	Agency	Total	Total with Contingency	City of Nanaimo	Regional District of Nanaimo	Cowichan Valley Regional District
1	E-Comm 9-1-1	\$250,920	\$276,012	\$124,205	\$27,601	\$124,205
2	Nanaimo FireComm	\$281,310	\$309,441	\$139,249	\$30,944	\$139,249
3	Nanaimo Detachment	\$604,800	\$665,279	\$299,376	\$66,528	\$299,376
4	Courtenay OCC	\$719,909	\$791,900	\$356,355	\$79,190	\$356,355

Proposed Solutions Analysis

The pros and cons of each proponent are shown in Table 40:

Table 40: Proponent Pros and Cons

Agency	Pros	Cons	One Time Costs	Annual Costs	Annual Costs with Contingency *
E-Comm	<p>Significant depth of call queue</p> <p>Solid redundancy and backup provisions</p> <p>Dedicated telephony personnel maintain the 9-1-1 telephone system</p> <p>Currently capable of taking T9-1-1 calls for the deaf and hearing impaired community</p> <p>Good working relationship with Telus in supporting 9-1-1 service across the province</p> <p>Most cost effective option</p>	<p>Call taking is off island, while this does not have many tangible drawbacks there may be political concerns about the call handling being done remotely.</p> <p>E-Comm will not take any existing Municipal Employees</p>	\$16,000	\$250,920	\$276,012
Nanaimo FireComm	<p>Retains two FTE Municipal Employee positions with potential for others to fill part-time roles</p> <p>Facilities are already in place and some of the technology already exists or is in the process of being updated</p> <p>Retains local control over operational procedures</p> <p>Economies of scale are achieved by combining Primary PSAP and Secondary PSAP functions as it relates to Fire calls</p> <p>There is some additional benefit to Nanaimo FireComm in having additional resources</p>	<p>No overflow capability beyond the two or three positions</p> <p>Unions would have to agree to allow transfer of staff from CUPE to IAFF Review of the new position at FireComm may result in higher IAFF wages applying to the new personnel</p> <p>Starting as a new 9-1-1 Answering Point at a time when the rest of BC & Canada are moving to a consolidated model due the future uncertainties in terms of staffing and expenses to handle next generation 9-1-1</p>	\$174,266	\$281,310	\$309,441

Agency	Pros	Cons	One Time Costs	Annual Costs	Annual Costs with Contingency *
Nanaimo FireComm continued	Moderately cost effective	<p>This is a new line of business for Nanaimo FireComm that will need to be developed, compared to a transition to an existing PSAP</p> <p>FireComm needs to investigate potential overflow call handling with another Fire Dispatch Centre or 9-1-1 PSAP in the province</p> <p>Do not have personnel who are familiar with 9-1-1 technology and future direction of Nextgen 9-1-1</p>			
Nanaimo Detachment	<p>Retains all Municipal Employees who handle the police call taking currently</p> <p>Takes advantage of the local knowledge of staff</p>	<p>No overflow capability beyond the two positions</p> <p>Do not have personnel who are familiar with 9-1-1 technology and future direction of Nextgen 9-1-1</p> <p>Not cost effective</p>		\$604,800	\$665,279
Courtenay OCC	<p>Can handle abandoned calls directly as the police of jurisdiction</p> <p>Overflow to another OCC (to be determined which one)</p>	<p>The RCMP are moving away from acting as PSAP elsewhere in the province and across the country</p> <p>Courtenay OCC will not take any existing Municipal Employees</p> <p>Do not have personnel who are familiar with 9-1-1 technology and future direction of Nextgen 9-1-1</p> <p>Not cost effective</p>		\$719,900	\$791,900

* An annual contingency amount can account for any additional potential costs that may occur due to higher than anticipated call volumes, overtime costs or additional unforeseen operating costs.

Conclusions

As a result of the detailed review, data analysis, and evaluations the following conclusions are offered by the consulting team:

1. The Nanaimo Detachment Call Taking proposal is not cost effective. It does retain the existing Municipal Employees and takes advantage of their local knowledge.
2. The Courtenay RCMP OCC Call Taking proposal is also not cost effective. The OCC can handle abandoned calls directly as the police of jurisdiction.
3. The E-Comm proposal provides the most cost effective solution with deep call taking queues, strong technical and operational support and excellent redundancy and backup options. E-Comm has a dedicated telephony department and is involved in all aspects of operational and technical planning for the next generation of 9-1-1 systems.
4. The Nanaimo FireComm proposal is moderately cost effective and offers the potential benefit of reallocating existing Municipal Employees who would be displaced if the service was assumed by an outside agency. The addition of an additional position during busy hour periods will also be a benefit to their fire dispatch operation and thus the service that is provided to the partner agencies. There are economies of scale in combining Primary and Secondary PSAP operations for calls that are for Fire service.

Appendix A – Acronyms

Acronyms used in this report are presented below for reference purposes.

ALI	Automatic Location Identification
ANI	Automatic Number Identification
APCO	Association of Public-Safety Communications Officials
BCAS	British Columbia Ambulance Service
CRTC	Canadian Radio-television Telecommunications Commission
DHHSI	Deaf, Hard-of-Hearing and Speech Impaired
ESWG	Emergency Services Working Group (which reports to the CRTC)
FTE	Full Time Equivalent
ME	Municipal Employee
NENA	National Emergency Number Association
OCC	Operational Communication Centre
PSAP	Public Safety Answering Point
RCMP	Royal Canadian Mounted Police
Secondary PSAP	Secondary Public Safety Answer Point
T911	Text with 9-1-1 for the Deaf, Hard-of-Hearing and Speech Impaired community

Appendix B - Call Answer Providers

9-1-1 Service Providers	Call Answer Providers	Providers 9-1-1 Call Answer To:
Victoria Police Department	Victoria Police Department	<ul style="list-style-type: none"> • Victoria
E-Comm 911	E-Comm 911 Various Police Agencies	<ul style="list-style-type: none"> • Metro Vancouver • 23 Regional Districts and communities covering 80% of the population of BC
E-Comm 911	Courtenay OCC	<ul style="list-style-type: none"> • North Island 9-1-1
Nanaimo OCC	Nanaimo FireComm	<ul style="list-style-type: none"> • City of Nanaimo • District of Nanaimo • Cowichan Valley Regional District



Appendix C - E-Comm 9-1-1 Proposal

April 14, 2015

proposal for

9-1-1 Public Safety Point Services for:

- The Central Island 9-1-1 Partnership



E-Comm 9-1-1

Helping to Save Lives and Protect Property

Contents

I.	PROPOSAL SUMMARY.....	3
II.	OVERVIEW OF E-COMM	3
III.	ABOUT OUR 9-1-1 PUBLIC SAFETY ANSWER POINT SERVICES.....	4
IV.	CURRENT E-COMM 9-1-1 PSAP PARTNERS	5
V.	THE E-COMM APPROACH	6
VI.	SERVICE DELIVERY AND BACK-UP	6
	BACKUP CENTRE 7	
	NETWORK ENHANCEMENTS TO HANDLE 9-1-1 CALLS FROM CENTRAL ISLAND COMMUNITIES 7	
VII.	FUTURE 9-1-1 SERVICES.....	8
VIII.	PERSONNEL	9
	KEY COMPANY PERSONNEL 9	
	OTHER KEY PERSONNEL WHO WOULD SUPPORT YOUR 9-1-1 SERVICE: 10	
IX.	PRICING.....	10
X.	PRICING APPENDIX.....	12
XI.	CONFIGURATION DRAWINGS FOR NETWORK ENHANCEMENTS.....	14

E-Comm 9-1-1

Helping to Save Lives and Protect Property

Proposal Summary

E-Comm (Emergency Communications for BC Inc.) has provided 9-1-1 call answer services to communities for over 15 years and can expand to also provide 9-1-1 Public Safety Answer Point (PSAP) services to the communities within your Regional Districts professionally, reliably and cost effectively as demonstrated by our extensive experience. Our consistently high service level provided to the Greater Vancouver Regional District, and now 22 other regional districts and other communities demonstrates that E-Comm is well-positioned to provide this critical service to the Central Island 9-1-1 Partnership.

Changes in 9-1-1 service delivery policy by TELUS in the last few years have now made the technical ability for cities and regional districts throughout the province to leverage the service capabilities and cost efficiencies of E-Comm.

Contained in this proposal is a summary of our organizations capabilities and our proposed approach to provide 9-1-1 Public Safety Answer Point services to the Central Island 9-1-1 Partnership.

Overview of E-Comm

E-Comm is the largest emergency communications centre in British Columbia. Through a 9-1-1 PSAP call centre, dispatch operations and radio system, E-Comm currently provides emergency communication services and support systems to emergency responders and the 2.5 million residents of the Lower Mainland they serve in addition to 9-1-1 PSAP services to approximately 1.1 million residents in the Northern, Southern and Central Interiors of B.C., and North Vancouver Island.

E-Comm is now responsible for an anticipated annual 9-1-1 call volume of approximately 1.2 million for 23 regional districts and other communities across British Columbia. This represents 80% of all 9-1-1 calls in the province. E-Comm also provides emergency and non-emergency call-taking and dispatch services for 33 police and fire departments.

E-Comm was created to improve emergency communications in the Lower Mainland following the 1994 Stanley Cup Riot and became operational in 1999. As an essential-service provider, E-Comm is constituted under the British Columbia Emergency Communications Corporations Act. E-Comm operates under a not-for-profit cost-recovery model and is also governed by the E-Comm Members' Agreement and the BC Business Corporations Act.

E-Comm has provided 9-1-1 call-answer and police call-taking and dispatch services to communities as a core function for more than 15 years and is well-positioned to expand 9-1-1 PSAP services to the communities in Central Vancouver Island.

Our Vision:

Safer communities in British Columbia through excellence in public-safety communication.

Our Mission:

To deliver exceptional emergency communication services that help save lives and protect property, and to advance public-safety partnerships.

Our Values:

Respect, accountability, collaboration, integrity, and service.



Helping to Save Lives and Protect Property

About our 9-1-1 Public Safety Answer Point Services

E-Comm's 9-1-1 PSAP service provides a highly-reliable, life-saving emergency service with built-in redundancies.

E-Comm provides the public with a single point-of-contact for police, fire and ambulance when immediate action is required. Today, as the 9-1-1 PSAP provider for 23 regional districts and other communities, with a combined population base of more than 3.6 million, E-Comm is able to receive 9-1-1 calls from landlines, cellular and Voice-over Internet Protocol (VoIP) phones and to also communicate with the speech and hearing impaired through a specialized Text with 9-1-1 system.

E-Comm has operated a 9-1-1 primary PSAP and a secondary PSAP for more than 15 years and has earned a reputation as a leading emergency communications centre in North America, enjoying an 89% confidence rating among residents of Metro Vancouver.

E-Comm is contractually required to answer 95% of the approximately 1.2 million 9-1-1 calls we are now responsible for annually in five-seconds or less. This is a very rigorous call-answer standard and one that past experience shows we can consistently meet or exceed.

In our more than 15 years as a primary and secondary PSAP, E-Comm has been recognized as a leader in emergency communications. Recent examples include:

- First PSAP in Canada to implement Text with 9-1-1 for the Deaf, Hard-of-Hearing and Speech Impaired.
- First multi-agency, multi-jurisdictional PSAP in Canada to implement Wireless Phase 2 – location information from mobile devices.
- Recipient of the first Association of Public-Safety Communication Officials (APCO Canada) Trainer of the Year Award presented to one of our trainers in 2014.

Current E-Comm 9-1-1 PSAP Partners

LOWER MAINLAND	Metro Vancouver (Greater Vancouver Regional District) District of Squamish Resort Municipality of Whistler Sunshine Coast Regional District Squamish Lillooet Regional District (South)
NORTHERN INTERIOR	Fraser-Fort George Regional District Bulkley-Nechako Regional District Kitimat-Stikine Regional District Cariboo Regional District
CENTRAL AND SOUTHEASTERN INTERIOR	Regional District of Central Okanagan Regional District of Okanagan-Similkameen Regional District of North Okanagan Regional District of Kootenay Boundary Regional District of Central Kootenay Regional District of East Kootenay Columbia-Shuswap Regional District Thompson-Nicola Regional District Squamish Lillooet Regional District (North)
NORTH VANCOUVER ISLAND	Comox Valley Regional District Strathcona Regional District Regional District of Mount Waddington Regional District of Alberni-Clayoquot Regional District of Nanaimo (School District 69) Powell River Regional District

E-Comm 9-1-1

Helping to Save Lives and Protect Property

The E-Comm Approach

The concept of consolidating emergency communications began in the early 1990s with events such as the earthquake in San Francisco and the 1994 Stanley Cup riot in Vancouver. These events drew attention to the importance of communications during a natural disaster or major event and helped build a momentum which contributed to the creation of E-Comm.

Since its inception, E-Comm has worked diligently to connect emergency services in British Columbia—be it through our radio network, 9-1-1 call-answer service or the integration of our police dispatch and fire dispatch services. We share the same goals as our partners in regional government, police, fire and ambulance and are proud to work shoulder-to-shoulder with them in creating a safer, more resilient and secure B.C.

The advantages and benefits include:

- 9-1-1, Police and Fire call-taking and dispatch are core service functions
- Experience of answering more than 15 million 9-1-1 calls since 1999
- Knowledge and ability to forecast and implement staffing levels for anticipated call volumes
- 24-hour onsite supervision and oversight
- Large consolidated team enabling staffing and support efficiencies to all participating agencies
- Ability to increase staffing resources to manage significant events
- Professional in-house training program
- Standard Operating Procedures
- Robust call taking and dispatch technology
- Purpose-built facility and operational back-up processes and redundancies
- Bi-annual partner satisfaction survey
- In-house voice records and professional standards
- In-house quality assurance department
- 24/7 Technology Service Desk, with support resources on call at all times

Service Delivery and Back-Up

E-Comm uses a variety of technologies to support 9-1-1 call-answer and has worked very closely with TELUS over the past 15 years to optimize the 9-1-1 call-handling system to ensure that our emergency dispatch centre provides 9-1-1 call answering with the highest levels of service and reliability. E-Comm maintains an ongoing maintenance and upgrade strategy for all critical systems to ensure they are all kept up-to-date.

We have also identified a number of other critical requirements of providing 9-1-1 service.

- E-Comm's primary infrastructure asset is a 60,000 square-foot purpose-built reinforced concrete facility complete with multiple power sources: Hydro power, UPS and diesel generators, and multiple communication redundancies from TELUS to ensure continuous service for its mission-critical operations.
- Off-site back-up capability for all PSAP, call-taking and dispatch operations.
- E-Comm is connected to the TELUS 9-1-1 network through primary 9-1-1 trunks with the ability to queue additional callers at the Primary Tandem serving the specific regional district. There are also additional back-up 9-1-1 trunks provisioned from an alternate Secondary Tandem to ensure continuity of service. With the addition of your PSAP, TELUS will reassess the number of trunks required to ensure the Grade of Service standard is maintained.

E-Comm 9-1-1

Helping to Save Lives and Protect Property

- E-Comm also leverages Automatic Call Distribution (ACD) to improve service levels, and utilizes a variety of functions:
 - “Call Force,” which eliminates ringing for incoming 9-1-1 calls to increase the speed at which calls are answered.
 - Automatic queuing and prioritization of incoming 9-1-1 calls during periods of high traffic.
 - An integrated contact centre management application (Avaya Aura Contact Centre), to enable on-duty managers to optimize the assignment of call agents to queues.
 - Continuous exporting of call-related data to a variety of other systems in order to track, analyze and optimize service levels.

E-Comm has worked very closely with TELUS to optimize the 9-1-1 call handling system. For example, we have the ability to communicate call answer information (position identifier) seamlessly from our Avaya CS-1000E PBX to the TELUS 9-1-1 network. This is a key benefit of using the Avaya AACC7 telephony and contact centre management system in a 9-1-1 environment. TELUS has established this architecture as the baseline for its 9-1-1 network evolution and E-Comm is the first PSAP in B.C. to implement this industry leading practice. E-Comm also utilizes the Versaterm Computer-Aided Dispatch (CAD) application, provided by PRIME-BC, within its 9-1-1 Primary PSAP and police Secondary PSAP operations. In addition, E-Comm operates an Intergraph CAD system for its fire Secondary PSAP operations which is also used for 9-1-1 Primary PSAP services. Both systems utilize the same mapping database, which is developed and maintained by E-Comm GIS staff.

Backup Centre

In addition to the redundancies of the infrastructure in place at our building serving our communication centre, E-Comm has a complete, warm backup centre at the British Columbia Ambulance Service (BCAS) Dispatch Centre in Vancouver with functionality for 9-1-1; call taking, dispatch and radio management in the unlikely event that an evacuation of the building is required.

Our target time to have 9-1-1 PSAP service, Police and Fire call taking and dispatch restored on backup capabilities is 5 minutes or less.

During transit from the E-Comm building to BCAS, 9-1-1 calls are handled by BCAS operators with Call Taking and Dispatch maintained by E-Comm staff using portable devices to ensure there is an absolute minimum of down time or lack of service if a major event were to occur.

The target time to be performing call taking and dispatch capability at the backup site in the event of a need to vacate our primary location is 30 minutes.

Network Enhancements to handle 9-1-1 Calls from Central Island Communities

In preparation of this proposal to provide your 9-1-1 PSAP service, E-Comm worked closely with TELUS to develop an optimum network design. The network design needs to enable routing of 9-1-1 calls from the City of Nanaimo, Regional Districts of Nanaimo and the Cowichan Valley to our emergency communication centre in Vancouver safely, reliably and cost effectively. The network design developed has considered both normal situations as well as reliable back up provisions for multiple possible network impairment or failure possibilities. A short description of each of the network configurations are provided below for your information. A drawing of each is also attached for reference.

E-Comm 9-1-1

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- **Configuration 1 – Normal Operation (Figure 1)**

9-1-1 calls will continue to route from the central island communities into the TELUS Tandem switch in Victoria but instead of routing the calls to the RCMP dispatch centre in Nanaimo as they do today, the calls will be routed to the E-Comm emergency communication centre in Vancouver through the TELUS transport network.

- **Configuration 2 – Service Impairment or Failure of the TELUS Tandem Switch in Victoria (Figure 2)**

If there ever was an impairment or failure of the TELUS Tandem Switch in Victoria or the TELUS network facilities connecting the central island central offices to Victoria or Victoria to the E-Comm emergency communication centre in Vancouver resulting in a service interruption to 9-1-1, calls would be routed automatically to a second, independent TELUS Tandem switch located in Vancouver. The 9-1-1 calls would then be routed automatically from the back-up tandem switch in Vancouver to the E-Comm emergency communication centre through the E-Comm backup centre facility located at BC Ambulance Service in Vancouver on fully diversified TELUS network facilities from the central island communities.

- **Configuration 3 – Service Impairment or Failure at E-Comm (Figure 3)**

If there ever was an impairment or failure at E-Comm causing a service interruption to 9-1-1, the calls would be rerouted to the E-Comm backup facility located at the BCAS dispatch centre in Vancouver. Arrangements are in place with BCAS to answer and handle the incoming 9-1-1 calls until E-Comm staff can relocate to the BCAS centre. The target to activate the transfer of 9-1-1 calls and arrange for the temporary answer of the calls by BCAS staff is 5 minutes and the target time to relocate E-Comm staff to BCAS is 30 minutes or less.

- **Configuration 4 – “Fail Safe” provision for a total loss of TELUS network service to the Lower Mainland from the Central Island (Figure 4)**

The final configuration is a “fail-safe” provision for the very unlikely event that there is a total loss of network connectivity from Vancouver Island to the Lower Mainland. In this case the 9-1-1 calls would be rerouted to an alternate dispatch centre on Vancouver Island. Arrangements with BCAS are in place to perform the 9-1-1 PSAP service from their centre in Victoria if this event were to occur.

Future 9-1-1 Services

Work is currently underway to develop and implement new 9-1-1 service capabilities. Next Generation 9-1-1 or NG9-1-1 is the name given to this North America wide initiative aimed to modernize the 9-1-1 network. While the NG9-1-1 initiative will take years to evolve, work is currently underway to establish the policy, technology and operational process requirements.

E-Comm is an active participant in both the technology and operations forums to help determine and guide how these new NG9-1-1 services should be defined. The first of these new services is Text with 9-1-1 for the Deaf Hard of Hearing and Speech Impaired Community. E-Comm was the first PSAP in Canada to launch this NG9-1-1 service to the DHHSI Community on March 15,

E-Comm 9-1-1

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2014. If E-Comm was providing PSAP services to the Central Island 9-1-1 Partnership this service would be available to your DHHSI Community.

Other new services such as Text to 9-1-1 and Video to 9-1-1 are also in the planning stages however, there will be many implications to be considered and resolved. For example how will an operator in a 9-1-1 Centre receive, analyze and manage a live incoming video.

Implementation of these NG9-1-1 services are anticipated to have a significant positive impact on public safety. However, it is important to recognize that a substantial investment in technology to replace, upgrade and add to existing equipment will be required as well as the development of the standards and operational processes to handle and transfer the incoming, text or video in each 9-1-1 centre. It is also expected that an increase in staffing will also be required to handle the incoming calls by video or text.

Due to the involvement by E-Comm in the planning and development of NG9-1-1 services in Canada we anticipate that we will be one of the first centres to be equipped to handle and provide these new 9-1-1 services to the communities of all of our PSAP partners. Smaller centres may have difficulty making these investments.

Personnel

Our staff and management are the foundation that ensures 9-1-1 calls are answered swiftly and effectively:

- E-Comm offers one of the most comprehensive training programs in the industry, resulting in more than 309 highly-trained, professional staff available to support emergency services 24/7. As the largest PSAP in British Columbia, our primary advantage is the size and scope of our centre:
 - 229 regular full-time (RFT) 9-1-1, call-taking and dispatch staff
 - 80 auxiliary 9-1-1, call-taking and dispatch staff
 - 37 support staff working in departments such as Workforce Management, Training, Voice Records, Standards, Policy and Implementation
 - 12 technology specialists support the communication centre
- The combination of our cross-trained workforce and unique ability to quickly shift resources to effectively manage sudden and substantial influxes of 9-1-1 calls helps us to minimize and often eliminate wait times, not always possible in smaller centres.

Key Company Personnel

David Guscott, President & CEO

- Joined E-Comm in 2010
- Former VANOC executive vice-president in charge of partnerships with government bodies
- Former deputy minister of Transportation, Ontario Provincial Government

Doug Watson, Vice-President of Operations

- Joined E-Comm in 2008
- Former vice-president of Field Operations - TELUS

Mike Webb, Vice-President of Technology Services

- Joined E-Comm in 2011 for the second time (Mike was also part of E-Comm from 1998-2000 and was responsible for the implementation of the current regional radio network)

E-Comm 9-1-1

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- Former manager, Telecommunications and Specialty Systems, Emergency Management BC

Other key personnel who would support your 9-1-1 Service:

Kim Singh, 9-1-1 Emergency Communication Centre Manager

- Joined E-Comm in 1999
- Former 9-1-1 call-taker and police dispatcher
- Former auxiliary RCMP officer

Kim is in charge of the 9-1-1 emergency communication centre, working closely with another senior Operations manager responsible for standards, policies, practices, staff training and development and data collection/management.

There are four teams drawing from more than 309 RFT and auxiliary 9-1-1 call-taking and dispatch employees within the Operations structure that staff the communication centre 24/7.

Each team has a manager, a team supervisor and a staffing coordinator.

- The team manager is responsible for creating a cohesive and effective team overall, with a significant focus on staff relations
- The team supervisor is primarily focused on the day-to-day operation of the team; and
- The staffing coordinator called an Intraday Analyst, is primarily focused on proactive queue management and call distribution and adjusting staffing requirements in real time, providing for optimal shift coverage 24/7

In addition to the strong frontline operational oversight team on duty 24/7, the communication centre is also supported by managers responsible for staffing, quality assurance, and training. These managers have a combined total of more than 50 years of 9-1-1 call-taking and dispatch experience.

Naomi Arita, our manager of Technology Service Delivery for 9-1-1, has been with E-Comm since 1999 and is an experienced 9-1-1 telephony manager who currently represents Metro Vancouver on the CRTC's Emergency Services Working Group. Naomi and her team of four technical specialists are responsible for ensuring our 9-1-1 systems are in a continued ready state-of-response.

Pricing

E-Comm's pricing model is based upon being a consolidated dispatch centre (the advantages of which have been outlined in the previous pages of this document) and recovering incremental capital and operating costs in a "*Not For Profit Cost Recovery*" model.

E-Comm worked closely with TELUS to develop an optimum network design to route 9-1-1 calls from the City of Nanaimo, the Regional Districts of Nanaimo and the Cowichan Valley to our emergency communication centre in Vancouver safely, reliably and cost effectively. The network design developed has considered both normal situations as well as reliable back up provisions for multiple possible network impairment or failure possibilities. TELUS has confirmed that there will be no additional recurring costs billed for the delivery of 9-1-1 calls to our emergency communication centre rather than to the current Nanaimo RCMP OCC.

E-Comm 9-1-1

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To establish the new network routing, back-up and service delivery capabilities there will be initial “make ready” one-time costs required by both TELUS and E-Comm. These total costs have been included in this proposal and bundled into the Levies.

For comparative purposes we have provided a 2015 total annual levy below as well as the anticipated levies for the following four years in the attached appendix.

2015 total annual levy for PSAP Services is \$250,920

Note:

1. Further pricing details and the related assumptions are documented in the attached appendix
2. Pricing is based on the written proposal received from TELUS
3. Based on a 5 year agreement

E-Comm 9-1-1

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Pricing Appendix

E-Comm 9-1-1

Emergency Communications for
British Columbia Incorporated

Preliminary Estimate for 9-1-1 Public Safety Answer Point Services

April 13, 2015

Agency: Nanaimo 9-1-1	Estimated	Estimated
	Annual Levy	One Time Transition
		<i>note (d)</i>
2015 Total Annual Levy	\$ 250,920	\$ 16,000

	% Increase	
2016 Total Annual Levy Estimates	3.00%	\$ 258,450
2017 Total Annual Levy Estimates	3.00%	\$ 266,200
2018 Total Annual Levy Estimates	3.00%	\$ 274,190
2019 Total Annual Levy Estimates	3.00%	\$ 282,420

Notes:

- a) - Based on the 2015 Budget Approved by the E-Comm Board of Directors.
- % targeted average service 95%/5 seconds for 9-1-1 Call Answer.
- 2016 - 2019 Estimates expected to be 3.0% increase annually.

The above levies assumes a minimum 5 year contract term in order to account for capital recovery. A shorter contract term would result in an increase to the annual estimates noted above, and will be provided upon request.

Capital - Equipment and implementation costs	Total	
One time capital costs	\$ 117,220	includes net taxes
Amortization Rate	5.00	yrs
	4.0%	interest
Annualized Cost (Levy Recovery)	\$ 26,100	

The above capital costs are based on quotes as provided by Telus and other vendors. Should these costs change, the actual costs will be billed to the agencies.

The advantage of including the capital and related costs in the annual levy is that assuming the contract is renewed, technology refresh costs (assuming similar replacements costs) are included as part of the ongoing levy and additional funding would not be required. However, should replacement/refresh costs be less than the original investment, there would be a corresponding reduction in the annual cost and if the replacement/refresh cost is higher there would be an incremental corresponding increase in the annual cost.

The above costs are incremental and required in order to provide the increased capacity to accommodate Nanaimo 9-1-1 at both E-Comm and our Backup facility at BCAS. If additional agencies were to also transition to E-Comm, some of these costs may be further reduced due to the sharing of the infrastructure (effective when others requiring the same infrastructure were to join).

E-Comm 9-1-1

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E-Comm 9-1-1

Emergency Communications for
British Columbia Incorporated

Preliminary Estimate for 9-1-1 Public Safety Answer Point Services

April 13, 2015

Alternative Option

The agencies (the regional district partners) could choose to pay for the above capital equipment and implementation costs up front, in which case the ongoing annual levy would be reduced as follows:

	Total
Annual cost (including capital recovery)	\$ 250,920
Less: annualized capital recovery	\$ 26,100
Adjusted Annual Cost (1st year)	\$ 224,820

Capital - Equipment and implementation costs (1st year only) \$ 117,220

However, in this option, at the end of the contract term, the agencies would have to consider technology life cycle refresh costs and either (1) pay up front again or (2) add to the annual levy

- b) The above estimated rates are based on the 9-1-1 call volume of 51,000 inbound 9-1-1 calls per year, the volume provided to us, and an average service level of 95 per cent of calls answered in 5 seconds or less. This 9-1-1 call volume is inclusive of abandoned calls which are down-streamed to the Police of Jurisdiction. Should agency metrics increase by 3% or more, the 9-1-1 Call Answer Levy may be subject to increases higher than the preliminary estimated rates for 2016 to 2019 noted above.

The above assumes that all abandoned 9-1-1 calls will be down-streamed to the Police of Jurisdiction for call-back, investigation and any additional further action, consistent with the standard practice established for the 23 regional districts and other communities that we currently provide PSAP services to. If some alternate model or process is desired, please advise and we will review and provide an updated cost estimate accordingly.

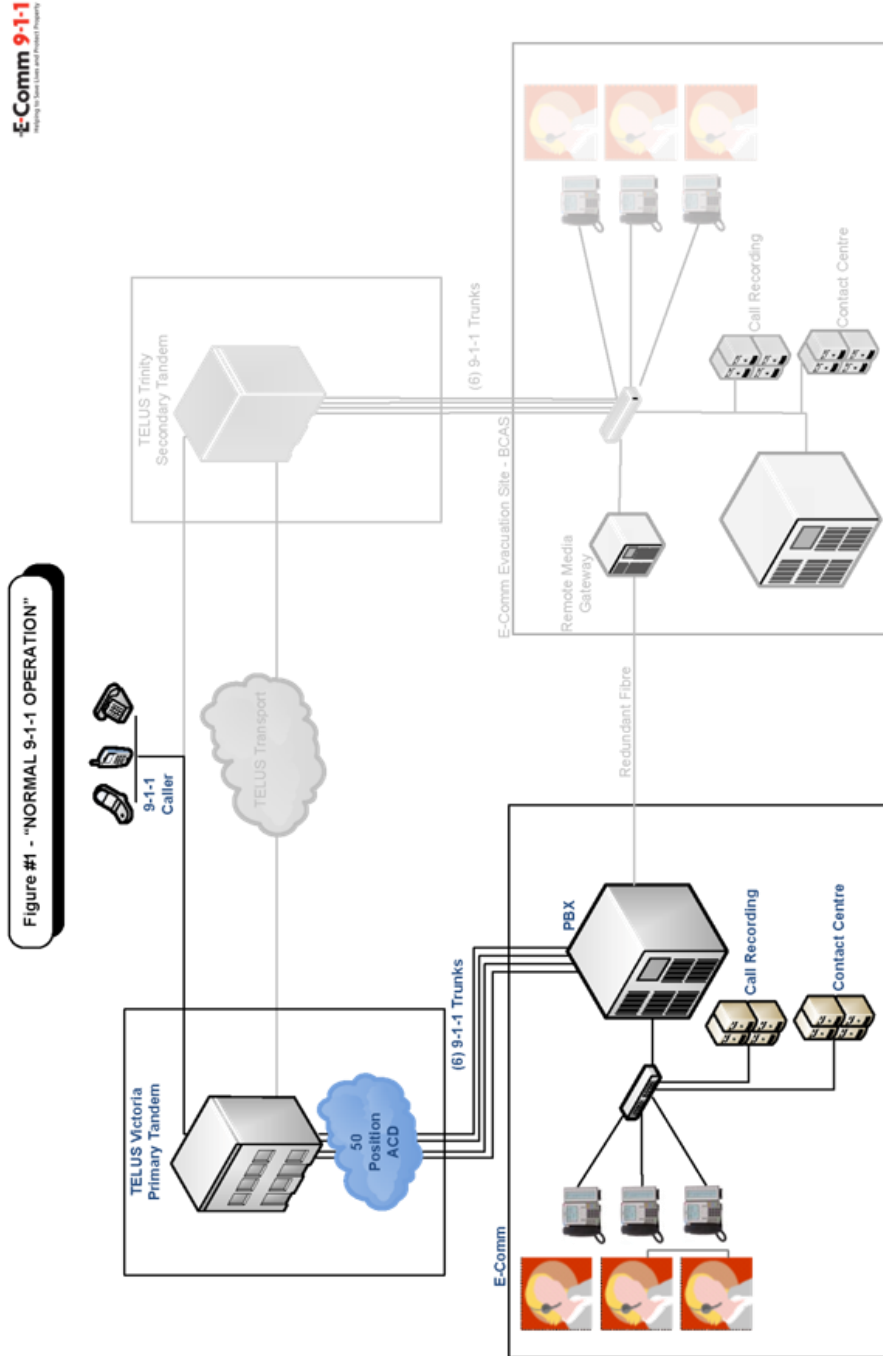
- c) Allocation of Net Corporate and Overhead is factored into the levies.
Corporate & overhead refer to direct operations management and support costs, and company wide corporate, staffing and system support costs.
- d) Specific items related to transition that may require funding will be determined during project planning.
The estimate below relates to one time project management costs.

	Total
One - Time Project Management (Operating) Costs (1st year only)	16,000

If any of the above facts and assumptions are incorrect or incomplete, please advise as soon as possible as the attached estimate may change accordingly. This quote is valid for 90 days from date of issue.

Configuration Drawings for Network Enhancements

Figure #1



E-Comm 9-1-1
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Figure #1 - "NORMAL 9-1-1 OPERATION"

Proposed E-Comm 9-1-1 Solution

For the Communities of the City of Nanaimo, Regional District of Nanaimo and Cowichan Valley Regional District

- 9-1-1 calls will continue to route from the communities in the RDN and CVRD into the TELUS Tandem switch in Victoria but instead of routing the calls to the Nanaimo RCMP dispatch centre as they do today, the calls will be routed to the E-Comm emergency communication centre in Vancouver through the TELUS transport network.

E-Comm 9-1-1

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Figure #2

E-Comm 9-1-1
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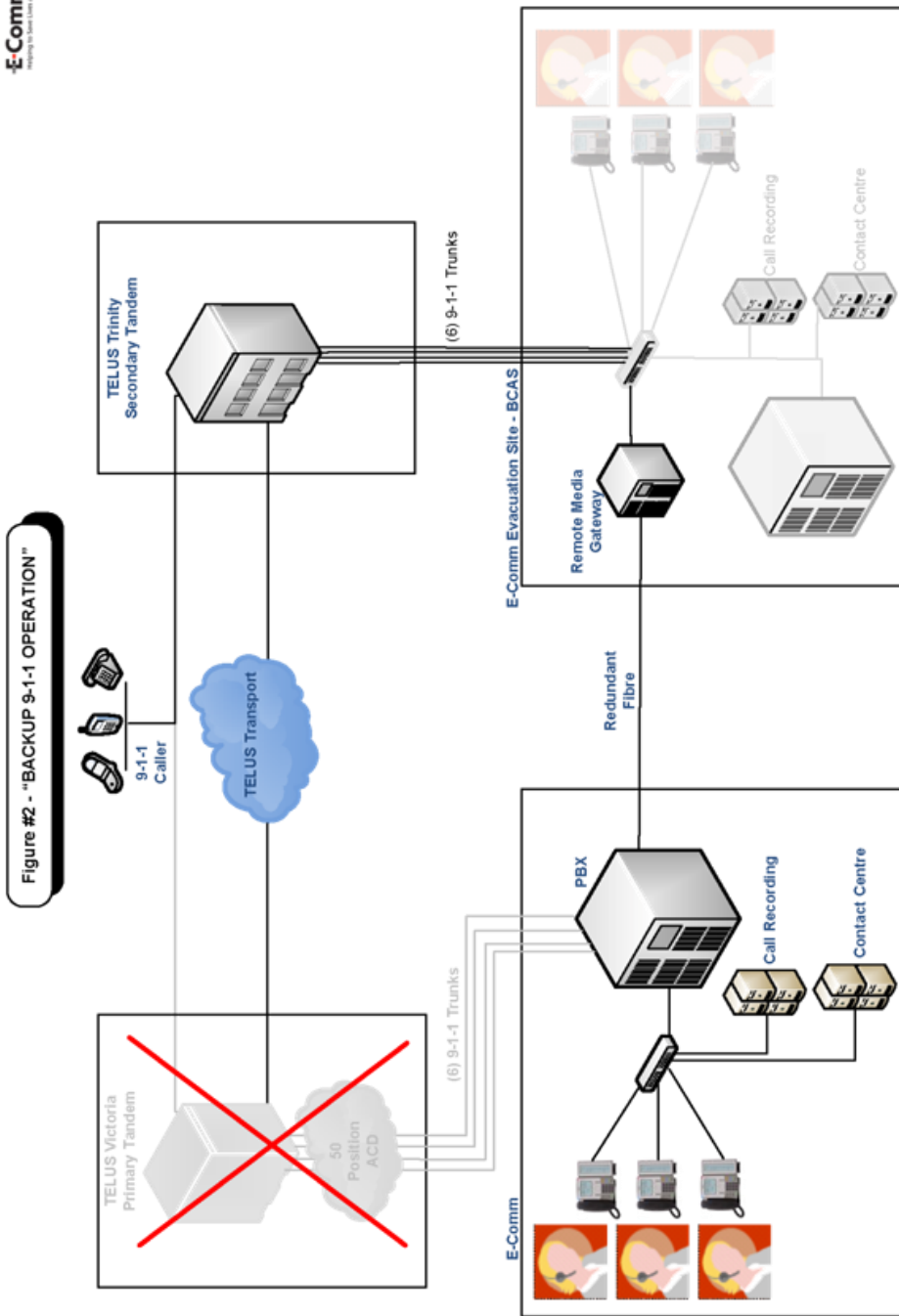


Figure #2 - "BACKUP 9-1-1 OPERATION"

Proposed E-Comm 9-1-1 Solution

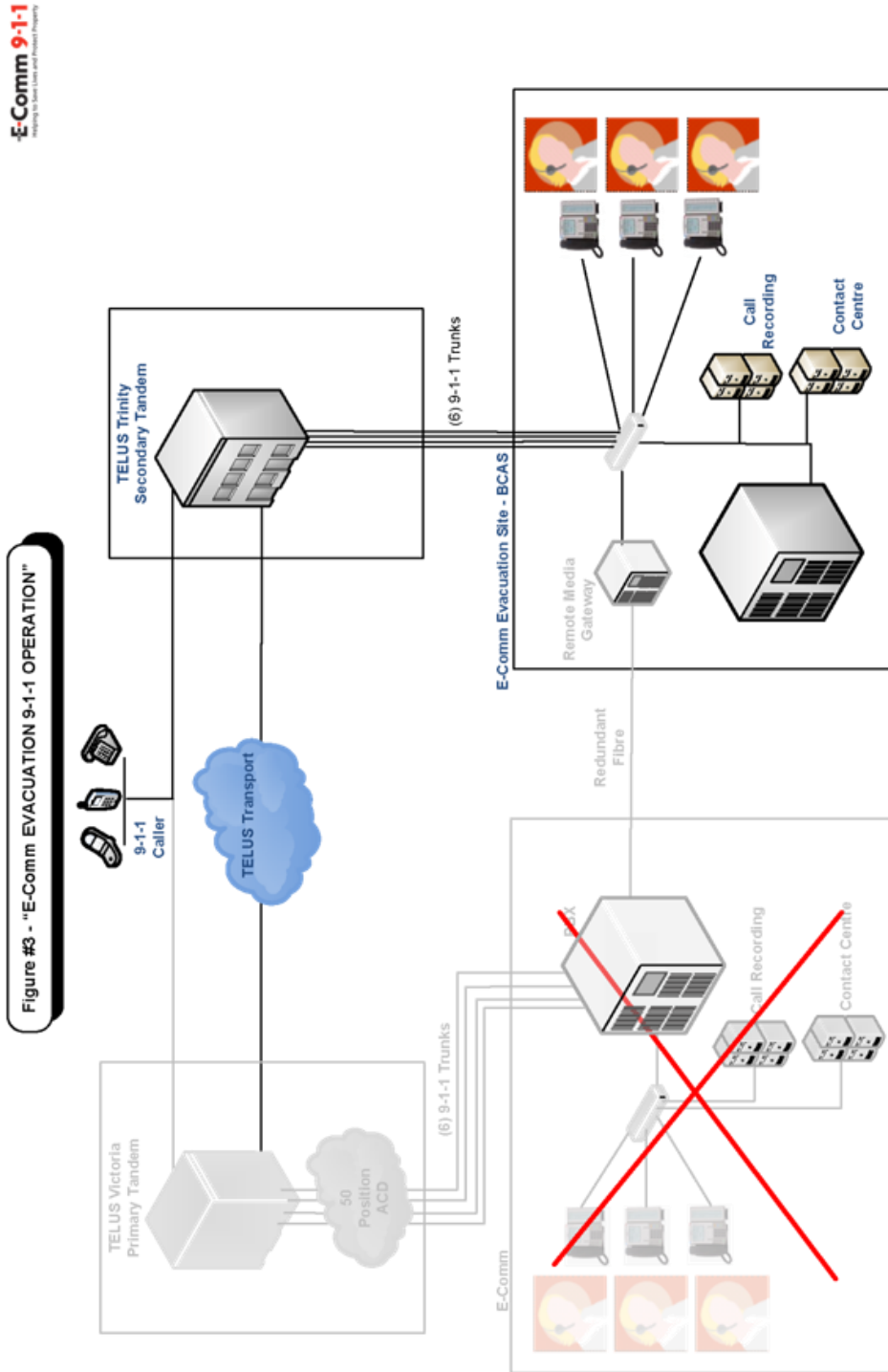
For the Communities of the City of Nanaimo, Regional District of Nanaimo and Cowichan Valley Regional District

- If there ever was an impairment or failure of the TELUS Tandem Switch in Victoria or the TELUS network facilities connecting Victoria to the E-Comm emergency communication centre in Vancouver resulting in a service interruption to 9-1-1, calls would be routed automatically or manually (by logging out of the ACD Trunks) to a second, independent TELUS Tandem switch located in Vancouver (as is the situation today). The 9-1-1 calls would then be routed automatically from Vancouver to the E-Comm emergency communication centre through the E-Comm backup centre facility located at BC Ambulance Service in Vancouver on fully diversified TELUS network facilities.

E-Comm 9-1-1

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Figure #3



Proposed E-Comm 9-1-1 Solution

For the Communities of the City of Nanaimo, Regional District of Nanaimo and Cowichan Valley Regional District

- If there ever was an impairment or failure at E-Comm causing a service interruption to 9-1-1, the calls would be routed to the E-Comm backup facility located at the BCAS dispatch centre in Vancouver. Arrangements are in place with BCAS to answer and handle the incoming 9-1-1 calls until E-Comm staff can relocate to the BCAS centre which is typically 30 minutes or less. The target to activate the transfer of 9-1-1 calls and arrange for the temporary answer of the calls by BCAS staff is 5 minutes and the target time to relocate E-Comm staff to BCAS is 30 minutes or less.

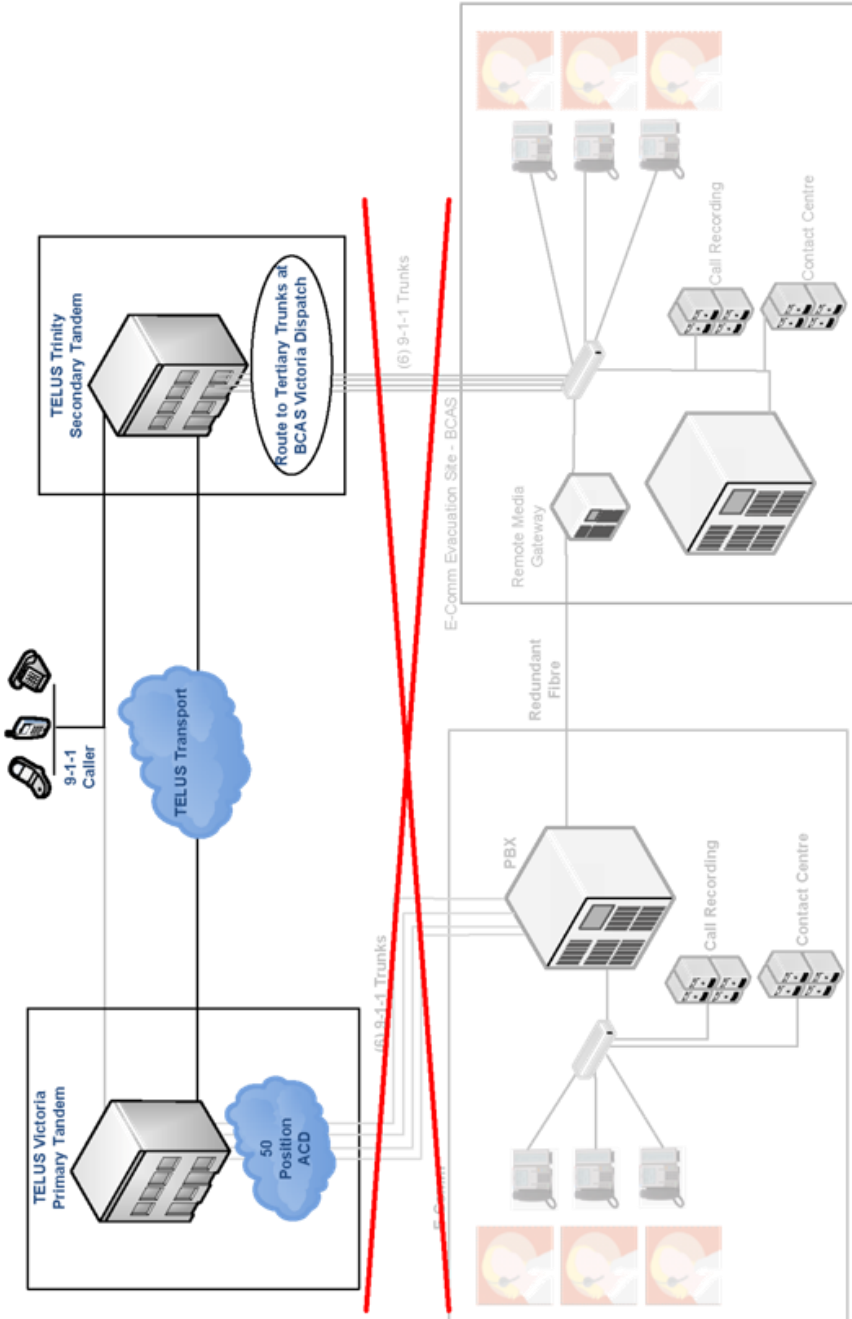
E-Comm 9-1-1

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Figure #4



Figure #4 - "ALTERNATE Secondary PSAP 9-1-1 OPERATION"



Proposed E-Comm 9-1-1 Solution

For the Communities of the City of Nanaimo, Regional District of Nanaimo and Cowichan Valley Regional District

- The final configuration is a "fail-safe" provision for the very unlikely event that there is a total loss of network connectivity to the Lower Mainland. In this case the 9-1-1 calls would be rerouted to an alternate dispatch centre on Vancouver Island. Arrangements with BCAS are in place to perform the 9-1-1 PSAP service from their centre in Victoria.

Appendix D - Nanaimo FireComm Proposal

Estimated Cost for Integrating PSAP into Nanaimo FireComm

May 2015

Operational Overview:

Central Island 911 is a partnership of the Cowichan Valley Regional District (CVRD) (45%), Regional District of Nanaimo (RDN) (10%), and the City of Nanaimo (45%). The partnership utilizes Nanaimo FireComm, a fire dispatch centre operated by the City of Nanaimo, serving the 27 fire departments within the partners' regions. As such, Nanaimo FireComm is defined as a Secondary Safety Answering Point (SSAP). In its inception, Nanaimo FireComm was built with the capacity of integrating 911 Public Safety Answering Point (PSAP), so the centre has sufficient workspace to accommodate the additional position for 911 call taking and the majority of equipment. Nanaimo FireComm presently operates with two dispatchers on duty 24 hours per day, 7 days per week.

It is possible to include the 911 PSAP function within Nanaimo FireComm by adding two new full time equivalent (FTE) positions assigned to a new “swing shift”. This follows a “busy time” staffing model whereby a minimum of two dispatchers are on duty at all times augmented by a third dispatcher from 10:00 am to 10:00 pm when call volume is highest. Relocating two current municipal staff from the Nanaimo RCMP Operational Communications Centre (OCC) to Nanaimo FireComm into new FTE positions will have implications on staffing and Union agreements that will have to be resolved. There may be additional capacity for Nanaimo FireComm to employ remaining municipal OCC staff in a part-time relief role. Under this scenario, the 911 calls would be received by the fire dispatchers and then transferred to Police, Ambulance or dealt with directly.

There are no technical issues preventing the 911 PSAP function from being moved to the Nanaimo FireComm centre from the Nanaimo RCMP OCC however, there are some start-up costs for hardware and cross training of staff. Present municipal OCC staff would need to be trained as Fire Dispatchers but the training would be minimized due to their experience as RCMP Dispatchers. This training is estimated at up to six weeks with additional on the job training. Existing Nanaimo FireComm dispatchers would require training to handle 911 calls which could take place on duty prior to the transition. All training would be facilitated and coordinated by the Nanaimo FireComm’s Captain of Infomatics and Communications, and existing fire dispatchers who are qualified as trainers.

Consolidation into Nanaimo FireComm will incur future costs as NexGen 911 technology upgrades will be required in future years. Many of these upgrades will already be required in Nanaimo FireComm as a fire dispatch centre because it must be able to receive NexGen 911 calls transferred from the 911 PSAP regardless of its location. The Nanaimo FireComm telephone systems are in the process of being upgraded as part of an existing asset management program. This upgrade makes the centre ready to receive “Text-To-911” equipment which is one of the first elements of NexGen 911. As such, costs for adding Text-To-911 are not yet quantified. Future NexGen 911 elements may include video and other media to connect with 911 however neither the system specifications or timelines for implementation are established, therefore associated costs cannot be fully quantified anywhere in the province.

All costs would be distributed in accordance with the Central Island 911 partnership agreement. Wages, operational, maintenance, licensing and space use costs for the integration of the 911 PSAP into Nanaimo FireComm would add \$281k to the current Nanaimo FireComm annual operating expenses. A

3% contingency is included in future years to reflect wage increases under the IAFF collective agreement. In addition, one time start-up costs of \$174k for equipment, training and licensing would be incurred.

FireComm presently has a back-up agreement for fire dispatch services with the Campbell River Fire Dispatch Centre. This agreement is reciprocal in nature with no associated fees. If the 911 PSAP function were to transition to Nanaimo FireComm, then a similar agreement would need to be negotiated with another 911 Centre for back-up. A cost has not been quantified for this back-up but it is possible that a no fee reciprocal agreement could be reached with another 911 provider.

Advantages:

1. Retains two FTE positions from the present Nanaimo OCC with potential for others to fill part-time roles.
2. Facilities are already in place and much of the technology already exists.
3. Allows for flexibility to handle current unknowns related to Provincial CAL initiative and NexGen 911 service requirements.
4. Provides greater flexibility for future service enhancements and retains local control over operational procedures.
5. Economies of scale are achieved by combining PSAP and SSAP functions.

Challenges:

1. Staffing and Union contract implications to be reviewed which would likely result in the higher IAFF wages coming into effect.
2. Will require additional cross-training for existing fire dispatchers and 911 call takers.
3. Abandoned calls need to be followed up before forwarding to police.
4. Additional computer aided dispatch equipment.
5. NexGen 911 specifications, timelines and costs remain unknown.
6. A back-up agreement must be reached with another 911 call centre.

Financial Overview:

One-time Start-up Costs

Item	Description	Cost	Qty.	Total
1	Training - Two new FTEs for swing shift	\$7,133	2	\$14,266
2	Zetron paging console (equipment, licensing and installation)		1	\$35,000
3	Upgrade 3 existing Zetron terminals		3	\$40,000
4	Upgrade Telus equipment (NexGen 911 costs, Text-To 911, rebid of mobile devices)		4	\$40,000
5	FDM CAD license		1	\$35,000
6	New computer terminal and equipment to activate fourth workstation		1	\$10,000
	Total One Time Start-up Costs			\$174,266

Annual Costs - 2016

Item	Description	Cost	Qty.	Total
1	Annual Salary per FTE Dispatcher (Inc. wages and benefits at IAFF 10-year rate)	\$101,580	2	\$203,160
2	Additional FDM annual license (CAD terminal)		1	\$7,000
3	Operating and Maintenance (equipment R&M, rent, support)		1	\$71,150
	Total Annual Operating Costs - 2016			\$281,310

Annual Cost Projections - 5 Years

Item	Description	Cost	Qty.	Total
2016	Annual Operating Costs (IAFF wages known at 2.5% plus contingency)		3%	\$281,310
2017	Annual Operating Costs (IAFF wages known at 2.5% plus contingency)		3%	\$289,749
2018	Annual Operating Costs (IAFF wages known at 2.5% plus contingency)		3%	\$298,442
2019	Annual Operating Costs (IAFF wages known at 2.5% plus contingency)		3%	\$307,395
2020	Annual Operating Costs (IAFF wages estimated at 2.5% plus contingency)		3%	\$316,617

NexGen 911 Costs

Item	Description	Cost	Qty.	Total
	Text To 911 (hardware, software and training)			unknown
	Video To 911 (hardware, software and training)			unknown
	Other media to 911			unknown

911 Back-up Agreement Costs

Item	Description	Cost	Qty.	Total
	back-up agreement with another 911 PSAP			unknown*

*Costs could range from 'no fee' reciprocal agreement up to an unknown contract fee