A Review of Fire and Police Communications and Dispatch in Waterloo Region

November 26th, 2021
Contents

Executive Summary ................................................................. i

1. Introduction ................................................................................. 1
   a. Purpose of the Review .......................................................... 1
   b. Project Focus ...................................................................... 1
   c. Operational Models Under Consideration .............................. 1
   d. Assessment Criteria ............................................................. 2
   e. Understanding the Timing of Operational Models in Relation to the Assessment Criteria ................................................................. 3

2. The Current Operational and Organizational Environment ........ 5
   a. Fire Communications Centre Operational Configuration .......... 5
   b. Waterloo Regional Police Communications Centre Operational Configuration ................................................................. 5
   c. Fire Communications Centre Organizational Environment .......... 6
   d. 911 and Waterloo Regional Police Organizational Environment .... 6
   e. Scheduling ........................................................................... 6

3. Emergency Services Call Taking and Dispatch Process and Statistics ................................................................................. 7
   a. 911 Call Taking Process ........................................................... 7
   b. WRPS Communications Centre Call Volumes ........................... 7
   c. Fire Communications and Dispatch .......................................... 8

4. Technology and Next Generation 911 ....................................... 10
   a. Progress of the Communications Centres Relative to Earlier Studies ................................................................. 10
   b. Radio Communications .......................................................... 10
   c. Next Generation - NG911 ......................................................... 11
   d. Reasons for Moving to Next Generation 9-1-1 .......................... 12
   e. Critical components of NG911 for WRPS and PRIDE Agencies ................................................................. 12
      i. Connection to the ESInet ....................................................... 12
      ii. CAD System .................................................................... 13
      iii. Telephony Platform ............................................................ 14
      iv. GIS Spatial Database ........................................................... 15
      v. Voice Logging ................................................................... 16
   f. Backup Site Implications and Options ...................................... 16
b. Operational Considerations ........................................................................................................ 38

c. Public and Responder Safety ...................................................................................................... 39

d. Impact on Medical Emergency Response Times ....................................................................... 39

e. Operation of a Combined or Consolidated Communication Centre ........................................... 40

f. Other Considerations Within a Combined or Consolidated Operating Model ............................. 41

g. Resources Required ................................................................................................................... 41

13. Governance ................................................................................................................................ 43

14. Strategic Innovation and Opportunities ........................................................................................ 44

a. Technology road map .................................................................................................................... 44

b. P25 radio network ......................................................................................................................... 44

c. Paramedic Services ....................................................................................................................... 45

d. Future Technology That’s Available Now .................................................................................... 45

i. Attend Anywhere .......................................................................................................................... 45

ii. Video Calls ................................................................................................................................ 45

iii. GoodSAM .................................................................................................................................. 46

e. NG911 ......................................................................................................................................... 46

15. Summary Assessment .................................................................................................................. 48

16. Next Steps .................................................................................................................................. 62

a. Short Term ................................................................................................................................... 62

b. Mid-Term ..................................................................................................................................... 62

c. Long-Term ................................................................................................................................... 62

Appendix A: Project Scope ................................................................................................................ 63

Appendix B: Operational Configuration .......................................................................................... 66

Appendix C Organizational Configuration ....................................................................................... 69

Appendix D Call Volume Activity Charts ......................................................................................... 72

Appendix E: Next Generation 911 (NG911) .................................................................................... 82

Appendix F: NG911 Estimated Cost FAQ ......................................................................................... 106

Appendix G: Recruitment Selection and Intake ................................................................................ 115

Appendix H: Intake Training .............................................................................................................. 119

Appendix I: Communication Centre Operational Model Staffing ................................................ 123

Appendix J: Technical Cost Analysis ................................................................................................. 131

Appendix K: Building Requirements and Cost ................................................................................ 143
This project was funded by the Province of Ontario through its Audit and Accountability Fund, and the views expressed do not necessarily reflect those of the Province.
Executive Summary
The purpose of this review is to explore and analyze options, and make recommendations, on the future provision of fire and police communications/dispatch in Waterloo region, within the broader context of the Public Safety Access Point (PSAP) and the future impact of Next Generation 911 (NG911).

Currently, the Waterloo Regional Police Service operates the 911 call taking centre for the region and accepts emergency calls via 911 and non-emergency calls, some of which are still serious in nature. The Kitchener Fire Department provides call taking and dispatch service for all fire departments in the region. The Waterloo Regional Police Service communications and 911, and the Kitchener Fire Department, operate independently from different locations, although a common, region-wide technology platform is shared.

We determined that because emergency service partners in Waterloo Region have acted on previous recommendations for technological changes resulting in a shared technology platform,

- computer aided dispatch,
- incoming Next Generation 911,
- radio systems, and
- communications and other technology

will have no significant impact on any of the operational options under consideration.

We assessed five operational possibilities:

1. Independent – essentially the existing operational model – status quo.

2. Common call taking with separate dispatch – in this model, the 911 call taker would
   - answer incoming 911 or non-emergency telephone calls;
   - elicit information from the caller on behalf of police or fire, then
   - transfer the information to a police dispatcher or fire dispatcher, or both.

   The police and fire dispatchers would remain in separate locations, and call information transfer would take place via computer aided dispatch as it is done now. This is similar to the current operational model, except all call takers would be located at the 911 centre.

3. Co-located communications centres – the police service and fire service would be located in the same building but operate separately. Technical and building infrastructure would be shared, but operations and governance would remain distinct.

4. Combined or integrated communications centres – police and fire communicators would work for the same organization but distinct work streams would remain in place. Some staff would be police call takers, fire call takers, police dispatchers, or fire dispatchers. Some staff would be able to accomplish all duties, but there would not be an expectation that all employees would be able to call take or dispatch seamlessly for either service.
5. Consolidated centre – a consolidated centre is one where all staff work for the same organization and, upon being fully trained, would be able to call take for police or fire and dispatch for police and fire. If paramedic services communications became part of a consolidated model, staff would be able to call take and dispatch for all three agencies after successful training.

Our detailed evaluation included process-mapping recruitment, selection, and training processes for both police and fire communicators, and assessing the current procedures against expected recruitment, selection, and training processes within the models being evaluated.

The evaluation we undertook included, for each model

- seeking legal advice with respect to how the Police Services Act and Fire Prevention and Protection Act, and other legislation, regulation, or agreements might affect decisions about, or operation of, any of the models under consideration;
- deep analysis of call volumes for fire, police, and 911, the patterns of those calls by hour and day, the time it takes to handle each call type, and the staff that would be required to adequately serve the public;
- examining the impact of technology, the implementation of Next Generation 911, and how that might affect call volume or time spent on each call;
- assessing the potential cost of operation of each model to determine if there is a monetary advantage, and the positive or negative impact;
- reviewing the reasonableness of communications staff being able to fulfill the job requirements of each model; for example, is it possible for well-trained communicators to call take and dispatch for all agencies considering the variation in policy, procedure, operating guidelines, call taking and dispatch methods?
- examining the possibility of the paramedic services dispatch service, currently operated by the Ministry of Health and Long Term Care, either co-locating or consolidating with a regional police-fire dispatch service in the future;
- impact on staff within each option to see how they may be affected;
- reviewing spatial requirements and costs of new communications centres and backup communications centres to house some of the operating models.

Here is what we discovered:

- Since a common technology platform has already been implemented in the region, the technology equally supports all models being considered.
- There are sufficient staff at both the fire and police communications centres but staffing distribution based on call volume demand, rather than maintaining similar staff levels ‘round the clock’\(^1\) would make better use of the staff available.

\(^1\) Keeping in mind the requirement for reasonable shift patterns.
None of the models decrease public safety or the safety of responders. But none of the models has a measurable advantage over others with respect to increased safety.

None of the models has a statistical advantage in ‘time from call taking to dispatch’ although the current model (status quo) incurs about 180 hours of extra call taking time annually than two other models (the combined or integrated model, and the consolidated model would reduce call transfer time by about 30 – 36 seconds on some calls). This is not significant since it is distributed over approximately 30,000 incidents annually and, while the call taking time is slightly increased over some of the other models, the public does not experience an increase in response time.

The cost of a facility, which is a requirement for the co-location, integrated, and consolidated models, will range from $31,000,000 to $42,000,000 depending on the operational model, but it is likely the police services will have to invest in a renovated or new facility in the near future. We understand that WRPS is budgeting capital funds to invest in a significantly renovated or new Public Safety Communication Centre, and an appropriate back-up centre. The cost of a new communications centre ($31,000,000 to $42,000,000) should be netted against the amount the police service will have to spend on a new or renovated facility (e.g., the cost of a new facility to enable the co-location, integrated, or consolidated model minus the cost of a police only communications facility = net cost of a building to enable a co-location, integrated, or consolidated model).

Since building a new communications facility is a multi-year process, it is reasonable to say that the police service has an immediate need for a new location considering that it will take four years or more to accomplish.

Staff savings that may occur in some models will be set off by the need for two additional trainers to bring the current training complement to four. That represents $220,000 a year. The police service has two trainers; training at the fire department is accomplished by supervisors and on-the-job training.

Possible staff savings, expected in some of the models, due to more effective scheduling commensurate with workload patterns and call volume, may not come to fruition if the current static scheduling pattern is maintained.

The status quo is the baseline for measuring the models. As noted, the police service will have to build or renovate a communications centre at a cost of $31,000,000 or more for a new build. The following table indicates the capital, maintenance, and staff cost changes (reduction achieved or cost incurred) in relation to the status quo.

The consolidated model has the greatest potential for staff savings but the model is assuming that staff scheduling would be based on call volume rather than a static schedule as it is now.
Review of Fire and Police Communications and Dispatch
in Waterloo Region

The changes in technology costs are primarily related to reduction of seat counts (number of operating positions) which affords the opportunity to reduce annual licensing costs ‘per seat’ for various components (such as the CAD system). Since the reduction of ‘seats’ in these models is minimal, they would not have an impact on infrastructure costs such as servers and related applications.

**Conclusion and Principal Recommendation**
We recommend a consolidated emergency services communications model because it offers the greatest potential for cost savings, makes best use of staff resources, and strategically positions the region and municipalities to provide service to other municipalities and entities.

**Comments**
There are several impediments to this model coming to fruition:
- The fire and police associations’ collective agreements would have to be reconciled for this model to take place;
- the aforementioned staff scheduling would have to be resolved;
- significant preparation is required over the next four or five years to build a new communications centre;
- recruiting, selecting, and training staff to be capable of accomplishing fire and police call taking and dispatch is estimated to span 67 weeks per candidate;
- over the last several years, Waterloo Regional Police Service has had only between 38% and 58% of its staff cross-trained to do both call taking and dispatching for the police service. We estimate 80% or more of staff must be cross-trained as a baseline to move towards a consolidated model.
Strategically, a consolidated model best positions the region, WRPS, and the municipalities to respond to future opportunities, including the possibility of being able to bring the paramedic services communications centre into a regional communications model, assuming the province permits that to occur. However, we don’t want to underestimate the challenges of consolidation since it will not be an easy goal to accomplish. And, once accomplished continued competent execution will require ongoing quality assurance and improvement.
1. Introduction

a. Purpose of the Review

The purpose of this review involving the Region of Waterloo, Waterloo Regional Police Service, City of Kitchener, City of Waterloo, and the City of Cambridge is to explore and analyze options for the future provision of fire and police communications and dispatch in the Region of Waterloo within the broader context of the Public Safety Access Point (PSAP) and the future impact of Next Generation 911 (NG911). Further, to make recommendations as to the options and governance. The findings of the review will also benefit the 4 rural municipalities in the Region: The Townships of North Dumfries, Wellesley, Wilmot, and Woolwich as they are served by, and fund, the existing shared fire dispatch centre.

The Scope of the project is detailed in Appendix A.

b. Project Focus

One of the project tasks was to review the progress of the communications centres relative to earlier studies that had been completed, specifically, the Kimball report of 2014 and the APEXPRO Rubenstein report of 2017.

While the focus of previous reports was technology, other infrastructure, associated costs, and high level staffing requirements, this report – in addition to reviewing the alignment of the communications centres to the previous recommendations – examines the human factors of the options.

c. Operational Models Under Consideration

We determined that there are five operational models (options) to be considered:

1. Independent – essentially the existing operational model – status quo;
2. Common call taking with separate dispatch – in this model, the 911 call taker would
   - answer incoming 911 or non-emergency telephone calls;
   - elicit information from the caller on behalf of police or fire, then
   - transfer the information to a police dispatcher or fire dispatcher – or both – depending on the incident type.
   The police and fire dispatchers would remain in separate locations, and call information transfer would take place via the computer aided dispatch as it is done now. This is similar to the current operational model, except call takers would be located at the 911 centre.
3. Co-located communications centres – the police service and fire service would be located in the same building but operate separately. Technical and building infrastructure would be shared, but operations and governance would remain distinct.
4. Combined or integrated communications centres – police and fire communicators would work for the same organization but distinct work streams would remain in place. Some staff would be police call takers, fire call takers, police dispatchers, or fire dispatchers. Some staff would be able to accomplish all duties, but there would not be an expectation that all employees would be able to call take or dispatch seamlessly for either service.

5. Consolidated centre – a consolidated centre is one where all staff work for the same organization and, upon being fully trained, would be able to call take for police or fire and dispatch for police and fire. If paramedic services communications became part of a consolidated model, staff would be able to call take and dispatch for all three agencies after successful training.

d. Assessment Criteria

The assessment criteria for this review and options analysis are captured in eight major categories, each with several considerations. They are

1. Technology
   a) Communications interoperability
   b) CAD/Telephony
   c) Radio system
   d) Impact on NG911
   e) Strategic innovation

2. Operations
   a) Operational interoperability
   b) Standardized call handling
   c) Operational efficiency
   d) Operational effectiveness
   e) Policy, procedures

3. Staffing and Labour
   a) Staffing Requirements
   b) Impact on recruitment, selection, training
   c) Scheduling and roster impact
   d) Staff retention

4. Facility Options
   a) Physical space requirements
   b) Location considerations
   c) Location options

5. Financial Summary and Assessment
   a) Capital cost to implement
   b) Future capital costs
c) Operating costs – initial

d) Operating cost – ongoing

e) Cost contributions from agencies

6. Governance Options

a) Governance assessment

7. Service Levels

a) Service levels in the broadest sense including consistency and quality

b) Community safety

c) First responder safety

d) Impact on all emergency response times including impact on medical emergency response times involving the tiered response agreement

e) Potential for service delivery to other municipalities or agencies outside Waterloo Region

f) Future growth potential

8. Overall Assessment

a) Summary assessment table

e. Understanding the Timing of Operational Models in Relation to the Assessment Criteria

The operational models were defined earlier in Section 1c and the assessment criteria were presented in Section 1d.

- The first operational model, the independent - status quo, is in place now and will be considered, during its assessment, to be the model that continues into the future.

- The second operational model, common call taking with separate dispatch, can be accomplished within the current facility footprint of the 911 Public Safety Answering Centre. So, with minimal technological planning and full staff training, it could take place within a year or less.

- The third, fourth, and fifth models, specifically co-located communications centres; combined or integrated communications centre; and consolidated centre will require more call taker and dispatcher positions than are available in either the fire communications centre or the 911-police communications centre. That means that a new or renovated communications facility will be needed before any of these three models could be implemented.

Theoretically, an integrated or consolidated communications centre could be achieved within the footprint and number of consoles at the existing 911-police communications centre since there are 17 communications desk positions, plus a supervisor position. Usually only 13 or 14 positions are staffed plus a supervisor. This means that the remainder of the positions could be staffed, thereby accomplishing an integrated or consolidated model.
However, the existing 911–police centre is already crowded, an older design, noisy to those who aren’t used to a 911 – dispatch environment, and for those reasons, would increase the risk of an integrated or consolidated model failure. We would not recommend the implementation of either model in the current environment.

This means that a new\(^2\) or renovated facility would be needed in the case of
- co-located communications centres;
- combined or integrated communications centre; or
- a consolidated centre.

We estimate that if a new facility is approved, whether as an outcome of this study or separate approval by the Waterloo Regional Police Service Board\(^3\), it will take four years or more to approve, design, build, and commission. Therefore, the three models under discussion are not likely to occur before late 2025, and since Next Generation 911 is scheduled to be in place by March 4\(^{th}\), 2025\(^4\), that means the evaluation of these three models assumes a start date several months after NG911 is fully implemented. Since part of the purpose of this review “\textit{is to explore and analyze options for the future provision of fire and police communications and dispatch in Waterloo region within the broader context of the Public Safety Access Point (PSAP) and the future impact of Next Generation 911 (NG911)}”, the initial impact of NG911 will have taken place before these models can be implemented, if implementing one of the models is the final decision.

\(^2\) Hereon, when the term ‘new’ is used in relation to a facility, it can also mean a renovated facility.

\(^3\) Waterloo Regional Police Service is exploring the replacement of the existing 911 – police communications centre as part of its budgeting process.

\(^4\) \url{https://crtc.gc.ca/eng/archive/2021/2021-199.htm}
2. The Current Operational and Organizational Environment

The current operating model for fire and police communications and dispatch in Waterloo Region consists of two independently operated services, in different locations, but with a common Computer Aided Dispatch (CAD) platform. WRPS operates the Primary PSAP on behalf of the Region and accepts calls via the 911 and the non-emergency line. Through the WRPS Communications Centre, located on Maple Grove Road, WRPS staff also dispatch calls for municipal by-law officers. Additionally, WRPS operates both the CAD and Records Management Systems (RMS) for four other police services in the PRIDE network (Police Regionalized Information Data Entry). The Kitchener Fire Department provides call taking and dispatch service for all fire departments in the Region through Kitchener’s dispatch centre on Strasburg Road using the same CAD platform.

a. Fire Communications Centre Operational Configuration

The Kitchener Fire Department provides, under agreement, call taking and dispatch services to the City of Waterloo, the City of Cambridge, the Townships of North Dumfries, Wellesley, Wilmot, and Woolwich. We understand that the agreements have an expiry date of December 31st, 2022, and automatic one year renewal terms. Those municipalities share in the funding of the fire dispatch services.

Fire dispatch has five communicator desks, four of which are Communications Operators positions and one Communications Officer (supervisory). All are fully equipped to handle incoming and outgoing telephone calls and radio communications. Please see Appendix B.

The Fire Communications Centre is a Secondary Public Safety Answering Point that receives 911 calls routed from the Regional Primary Public Safety Answering Point. Any emergency service that receives calls routed from the primary public safety answering point is considered to be a secondary Public Safety Answering Point. The Paramedic Services Communications Centre – which is not a principal topic of this study – is also a Secondary Public Safety Answering Point.

b. Waterloo Regional Police Communications Centre Operational Configuration

This is the Primary Public Safety Answering Point for Waterloo Region and the regional police communications centre.

The Waterloo Regional Police Service (WRPS) Communications Centre has one supervisory and 17 communicator desks in the main communications room and two communicator desks in the training room, adjacent to the main communications room. Please see Table 1.
Table 1: WRPS Communication Centre Capability Configuration

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Number of Desks</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dispatch – position can be logged into telephone</td>
<td>1</td>
<td>Supervisory. The desk has 911 and non-urgent call taking capability but it is rarely used for that purpose.</td>
</tr>
<tr>
<td>Call taking – no radio capability</td>
<td>9</td>
<td>Receives 911 and non-urgent calls.</td>
</tr>
<tr>
<td>Dispatching – no 911 or non-urgent incoming call capability</td>
<td>3</td>
<td>Dispatching (radio) only.</td>
</tr>
<tr>
<td>Call taking and radio capability</td>
<td>4</td>
<td>Can receive 911 and non-urgent calls; full dispatch (radio) capability.</td>
</tr>
<tr>
<td>Dispatching – no 911 or non-urgent incoming call capability</td>
<td>1</td>
<td>Primary dispatch backup that assists any of the dispatch zones as required.</td>
</tr>
<tr>
<td>Training Room</td>
<td>2</td>
<td>One desk can receive 911 and non-urgent calls and has full dispatch (radio) capability.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The other desk can receive 911 and non-urgent calls.</td>
</tr>
</tbody>
</table>

c. Fire Communications Centre Organizational Environment

The fire communication centre is comprised of 12 Communications Operators (call takers – dispatchers) and 4 Communications Officers (supervisors) working in four platoons on a rotational basis. The Communications Officers report to a Chief of Communications who reports to a Deputy Chief. Please see Appendix C for an organization chart.

Minimum staffing at the fire communications centre is three, which means that one member of a platoon can be on approved time off or training, or other absence.

d. 911 and Waterloo Regional Police Organizational Environment

The 911 PSAP and police communications center also operates on a platoon system with 16 to 20 communicators per platoon reporting to a supervisor. There are five switchboard operators (one per shift) who field administrative telephone calls. Additionally, there are two Communications Trainers/Analysts who are responsible for training and quality assurance. In turn, a Staff Sergeant is responsible for the operation of the PSAP and police communications. Please see Appendix C for an organization chart. There are total of 83 approved complement at the communication centre (two dispatcher – call taker vacancies currently) plus the Staff Sergeant.

e. Scheduling

Both communications centres operate on a static staffing model. That is, as part of the individual collective agreements that the Waterloo Regional Police Association has with the Waterloo Regional Police Service Board and the Kitchener Professional Fire Fighters Association has with the City of Kitchener, the same number of staff are on duty around the clock even though the call taking and dispatch activity varies by time of day and day. Communicators sometimes use the quieter periods for online or other training, and refreshing their knowledge of policies, procedures, and other operating guidelines.
3. Emergency Services Call Taking and Dispatch Process and Statistics

a. 911 Call Taking Process

The emergency call taking process includes several steps. Sometimes the 911 call answering and police call taking are considered part of the same activity, but they aren’t.

911 answering is the process of answering the phone and asking the caller if they need police, fire, or ambulance. In 911 centres where the only role is to answer 911 calls and route the caller to the correct emergency service, the process of asking the initial question, transferring the caller to one of the three emergency services, staying on the call to ensure the transfer has taken place, and disconnecting averages between 30 and 45 seconds depending if call back to silent calls and collisional dialing is taken into account. This model of 911 call taking, separate from the three responding agencies (police, fire, EMS) is unusual in Ontario but more prevalent in the western provinces and Northwest Territories where the RCMP provide policing.

In Waterloo Region, the Waterloo Regional Police Service (WRPS) answers 911 calls and, if the call is for police rather than fire or paramedic services, continue to take the call details. There are police services in other provinces that provide 911 services and even if the call is for the police service, transfer the call to another police call taker. The purpose is twofold: to differentiate between the roles of the police communicator (911 call taker activity separate from that of a police call taker’s activity), and to measure the actual 911 time versus police call taking time.

In Waterloo Region, upon receiving a 911 call that is for a service other than WRPS, the 911 call taker will transfer the call, remain on the line long enough to ensure the other agency’s call taker has received critical information, and to determine if WRPS police services are also required. That call answering and ‘wait on the line’ process takes about 30 seconds as estimated by WRPS call takers; the ‘wait on the line’ portion absorbs about 20 seconds of the 30 seconds. We will address time impact later in the report but there are about 80,000 incidents a year that require 20 seconds of the 911 call taker’s engagement which works out to about 333 hours of ‘wait’ time per year or 0.16 of a full time equivalent at 2085 hours per year.

The 911 call taker transfers approximately 31,000 calls a year to the fire department communications centre, and about 50,000 to the paramedic services communications centre.

Once transferred to fire or paramedic services’ communication centres the police service has no further interaction unless the incident requires police presence.

b. WRPS Communications Centre Call Volumes

In 2018, the WRPS communication centre answered 122,576 – 911 calls and a further 211,335 non-emergency calls. However, non-emergency calls may still be serious in nature, with people
reporting thefts, assaults, seeking personal assistance, and other reasons. Both 911 and non-emergency calls are handled by police call takers and must be included in the overall call load.

In 2019, WRPS communicators answered over 145,000 – 911 calls and 229,385 non-emergency calls. 273,135 events were recorded in the computer aided dispatch system resulting in 293,445 police responses, including officer-initiated incidents (for example, traffic stops). The average call patterns by the hour of day are shown in Appendix D.

Additionally, WRPS dispatches for municipal by-law providers, and handles and dispatches to hold-up, panic, and duress alarms and verified alarms. In January 2020, WRPS adopted a Verified Alarm Response Program to reduce the number of false alarms to which WRPS responds.

Although the volume of calls was higher in 2019 than 2018 the distribution of incidents is similar. And, although these charts represent annual average distribution, when call volumes are assessed on a day by day and hour by hour basis (information has been assessed but not presented here), we find that peak call loads occur on Fridays and Saturdays in the hours around midnight.

c. Fire Communications and Dispatch

The City of Kitchener Fire Dispatch received just over 31,000 – 911 calls in 2019. That dropped to 18,927 incidents in 2020 because of COVID considerations.

It’s important to note that the fire communications also administer and handle calls from Direct Detect, either as an alarm or administratively for alarm maintenance and repair. Direct Detect has been a Division of Kitchener Fire Department since 1998 and directly monitors smoke alarms at approximately 4,200 subscriber locations. There are some periods when a fire communicator receives frequent calls from alarm company technicians about Direct Detect and other alarm company maintenance and testing. This notification helps to avoid unnecessary response to an alarm that is being tested.

The 31,102 fire call incidents in 2019 resulted in over 57,000 vehicle dispatches which followed a similar distribution as other incidents shown in Appendix D.

The charts in Appendix D indicate the distribution of several call types: 911, non-emergency, fire related; and the distribution of dispatch activity which essentially follows the 911 and non-emergency call receiving activity.

Although the annual pattern of calls varies depending on whether they are incoming telephone calls, dispatches, and police or fire, they all generally follow a wave pattern showing most activity from approximately 0800 hours (8:00 AM) to 2100 hours (9:00 PM) and the lowest activity periods from midnight to 0600. That varies on weekends with peaks on Friday and Saturdays around the midnight hours.
Appendix D shows the relationship of 911 call volume to police CAD activity (dispatch) to population change. The intent of this chart is to demonstrate whether there has been an association between population change and incident activity. We have not taken 2020 into account for either police or fire because of call volume changes relating to COVID.

We don’t consider that population change is directly consistent with call taking and dispatch activity.

The information in Appendix D is instrumental in determining staffing requirements in the dispatch services models under consideration.
4. **Technology and Next Generation 911**

   a. **Progress of the Communications Centres Relative to Earlier Studies**

   Following the 2014 Kimball report, Waterloo Regional Police Service and the municipal fire services in Waterloo Region set out to implement the technology recommendations contained therein in support of a possible future communications consolidation. Most of the work involved moving the fire dispatch, operated by the Kitchener Fire Department, to the Hexagon CAD system used by WRPS and migrating to a Motorola P25 radio network.

   As a result of following this roadmap, WRPS and Kitchener Fire are positioned well to continue the current organizational and operational model or move to one of the other models under consideration. The implementation of Next Generation 9-1-1 could facilitate other operating models that will be discussed in the NG911 section that follows.

   To support the combined CAD platform and the P25 radio system, WRPS committed to:
   - manage the shared system server equipment and software
   - manage the network and security services
   - implement and manage the radio system
   - manage emergency backup systems
   - centrally coordinate and ensure up-to-date and consistent mapping & information databases.

   Appendix E references the technology recommendations in the Kimball report and the status regarding implementations.

   b. **Radio Communications**

   The region migrated to a Motorola P25 Digital Trunked Radio system, with Phase 1 completed in July of 2020. Work is continuing on the second phase of the implementation, which improves on system redundancy and failover and integration with the CAD platform.

   There are three main components of the radio system: Core (voice), Firehall Alerting, Voice recording.

   We heard comments that a move to a new communication centre – either one specifically for the Waterloo Regional Police Service or as part of a co-location or consolidation – may be an opportunity to address some known issues with lack of redundancy. While it may be an

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5 Common Technology Platform for Police and Fire Dispatch in Waterloo Region, CAO Presentation 04-18-2017
6 Excerpt from Technology Report authored by, Cathy Marks, Program Manager, Fire Systems and Projects, Fire Dept. City of Kitchener
opportunity, it is not a requirement to support a new communication centre. A new site can be connected to the radio core via a separate satellite link and wireline connections, and a radio tower does not need to be erected at a new communication centre. However, a new communication centre site will necessitate the design and implementation of wireline and microwave connections to the radio system and various components, including voice logging and firehall alerting.

Voice and radio logging is on a NICE logging system, and playback of radio transmissions uses NICE Inform module. ANI/ALI\textsuperscript{7} data from the Bell 9-1-1 network and the radio transmissions are recorded on NICE equipment at WRPS headquarters.

The Motorola radio consoles provide a dedicated paging system for the township fire departments, and station alerting is either OTA (Over the Air) or via a dedicated network to the municipal firehalls.

c. Next Generation - NG911

Next Generation 9-1-1, also known as NG911, is the mandatory replacement of the current Enhanced 9-1-1 service in Canada. Rather than a series of separate legacy proprietary telephone systems, NG911 is a nationwide structure of integrated standards-based systems.

NG911 in Canada follows standards developed by NENA (National Emergency Number Association), which forms the basis for deploying this new service in Canada, the US, and around the world.

The change to NG911 will modernize public safety communications services with new broadband network capabilities supporting multimodal communication methodologies. It will be a national interoperable network that allows sharing of real-time information between communication centres and callers using different message methods.

Currently, the public can primarily make only emergency voice calls and text over voice calls for the deaf or hearing impaired. When available, only minimal data is delivered with these calls, such as automatic number identification (ANI), subscriber name, and Automatic Location Identification (ALI).

With the NG911 environment, the public will be able to make voice, text, or video emergency "calls" from any communications device via Internet Protocol-based networks. In the future, PSAPs will also be able to receive data from personal safety devices such as Advanced Automatic Collision Notification systems, medical alert systems, and sensors of various types. The NG911 network called Emergency Services IP Network (ESInet) will support networking of 9-1-1 services, and transfer emergency calls to other PSAPs - including any accompanying data.

\begin{itemize}
\item \textsuperscript{7} Automatic Number Identification / Automatic Location Identification
\end{itemize}
Appendix E highlights the benefits of NG911 as stated by the Canadian Interconnect Steering Committee (CISC)\(^8\).

**d. Reasons for Moving to Next Generation 9-1-1**

The primary reason for moving to Next-Generation 911 is because it is a mandatory replacement of the current Enhanced 911 infrastructure, systems, processes, and procedures across Canada. The current 911 system has reached end of life, and as such, it cannot keep up with evolving technologies and current expectations of a modern 911 system, such as the ability to text to 9-1-1 (separate from the existing Text with 9-1-1 (T9-1-1)).

An NG911 compliant Call Handling Solution (CHS) is required for all public safety answering points (PSAP) in Canada, including (primary, secondary, and backup sites). This means that PSAPs move from physical desk phones to computer-based telephone applications (also known as softphones). This is currently in the planning stages by WRPS for all PRIDE (Police Regionalized Information Data Entry) partner agencies, including Kitchener Fire.

The existing 9-1-1 system is mandated to be decommissioned on March 4, 2025, and current Public Safety Answering Points (PSAPs) must transition to be capable of receiving and processing 9-1-1 calls from the public after this date. This multi-year migration will require the execution of a new NG911 Service Agreement with Bell with new interface requirements, plus future changes for addressing and mapping data from all municipalities.

**e. Critical components of NG911 for WRPS and PRIDE Agencies**

The implementation of NG911 will impact the following technology components at WRPS and associated agencies and downstream partners. The following list of PSAP systems will need to be NG911 capable before the implementation of Stage 2 – Onboarding to the Bell NG911 network:

**i. Connection to the ESInet**

As of March 1\(^{st}\), 2022, all dispatch centres and backup centres will be required to have dedicated, secure connections to the Bell NG911 network. These will use existing Bell IPVPN (Internet Protocol Virtual Private Network) 9-1-1 connections already in place or new links at a consolidated site which are completely separated from other network traffic.

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\(^8\) CISC Emergency Services Working Group
The NG911 network provider, Bell Canada, is responsible for regulated ESI.net costs to the point of demarcation\(^9\) at primary, secondary, and backup locations. PSAPs are responsible for everything after that point and for non-regulated services.

The number of dispatch centres will affect the number of connections required. Although a co-located or consolidated communications centre model would reduce the number of connections, any operational model changes that may be considered are unlikely to occur in the time frame required to install NG911. Therefore, WRPS has planned the connections required based on the current dispatch architecture of WRPS and Kitchener Fire. A fully redundant secondary 9-1-1 centre requires dual circuits at each location.

The move to IP (Internet Protocol) connectivity introduces additional cybersecurity issues. Any network that facilitates the transport of a public safety application, and all other networks that are physically connected to it, should be considered within scope. Some Canadian public safety agencies have recently experienced ransomware attacks which crippled significant public safety architecture, including computer aided dispatch and record management systems. It is possible that future ransomware attacks could also impact NG911 components, such as the call handling system.

### ii. CAD System

The Hexagon CAD system has been upgraded to support NG911 features. WRPS is targeting the Hexagon CAD to be 98% NG911 compliant in November of 2021. A remaining future upgrade will be required so I/CAD (I/CAD is what Hexagon names their CAD product) can support the receipt and transmission of EIDO (Emergency Incident Data Object) call data when a call is received or transferred from the PSAP using the new NG911 Call Handling Solution that will be implemented in the following years.

NOTE: When the system is fully upgraded and WRPS is ready to include or receive CAD related data in-line with the call transfer, the NG911 Call Handling Solutions noted above will be able to handle EIDO by March 1, 2022.

**Hexagon Mobile CAD**: NG911 will not directly impact Mobile CAD in 2021 or 2022; however, future changes (2023 and beyond) to provide more data about the location, the call, and/or the caller may require changes regarding what and how information is provided to mobile devices.

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\(^9\) The point at which the public switched telephone network ends and connects with the customer’s on-premises wiring.
NICHE Record Management System: NG911 will not directly impact RMS; however, as more information becomes available at the new NG911 Call Handling Solution and Hexagon CAD, WRPS may consider updating these interfaces to retain the additional location, call, and caller data in the RMS system. Additional information including photos and videos may become part of the evidentiary record of the RMS.

Radio Consoles and Alerting Systems: NG911 will not directly impact these systems.

iii. Telephony Platform

Every PSAP must be NG911 enabled and capable of managing and monitoring all NG911 call processing functions before March 4, 2025. (NOTE: In NG911, a “call” refers to more than just the traditional voice communication. It also includes NG911 text messaging and future forms of multimedia e.g., streaming video, etc., used to contact the PSAP to identify an emergency.)

There are 3 possible options available in the Canadian NG911 marketplace currently:

- Customer-premised Turnkey Solution (3 proven vendors with numerous installations across Canada)
  - Intrado Viper
  - Motorola Solutions Vesta
  - Solacom Guardian (Comtech)
- Upgrade Solution (multi-staged upgrade process with numerous installations across Canada)
  - Avaya partnered with Komutel Communications
    [NOTE: Upgrade path is possible for Avaya CS1000 customers – the system used by WRPS and Kitchener Fire.]
- Hosted Solution (no installed customers to date)
  - TELUS partnered with Motorola Solutions Vesta (offered across Canada)
    [NOTE: This solution is currently subject of a CRTC proceeding to determine if/how it can be deployed by TELUS, plus any other vendor that may enter the marketplace (if any).]  

WRPS conducted an RFP in 2019 for a softphone solution to handle NG911 calls. The original intention was to replace all phones (dispatch and administrative) with the new solution, which turned out to be prohibitively expensive.

WRPS intends to conduct another RFP focused on the requirements for the call taking and dispatch positions for all agencies in time to meet the deadline outlined above. At this point

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10 TIF85 – PSAP NG911 Cost Considerations v3 – 2021 Aug 10
WRPS is planning for a self-hosted solution, although they will essentially be providing a hosted solution for PRIDE agencies including Kitchener Fire.

For PRIDE agencies WRPS will be project lead and each agencies’ local IT will assist (i.e., for local hardware support). The local IT departments are a resource for onsite assistance however they will not be authorized to change the phone configuration. The Telecom administrator is/will be a PRIDE employee.

Moving from the current Avaya desktop phone sets to a NG911 Call Handling Solution will require that call taking, incident handling, and dispatching processes and procedures are reviewed. Additional options can be considered including routing calls to alternate PSAPs or managing a primary and secondary centre configuration. New local and network-based call handling options will be available.

iv. GIS Spatial Database

The future migration to geo-routing 9-1-1 calls will require a comprehensive spatial database. Once implemented, Bell will need more frequent updates regarding changes such as new road segments, change of street names, address updates etc.

WRPS has put in place processes with all PRIDE partner agencies to receive regular updates which are merged into the master database, then tested by the partner agency. The data is subsequently moved into the production CAD environment.

WRPS collects GIS data from municipal sources and PRIDE agencies once a month via FTP server or email. WRPS maintains different layers – zones for police, hydrants for fire, for example. They have a test platform that they put up for 2 – 3 weeks and ask the agencies to test and ensure their components (layers – changes etc.). Changes are then moved to the production environment.

As noted above, when Bell is mandated by 2025 to implement geo-routing of 9-1-1 calls (2025 or later), they will require much more frequent updates. However, the goal for WRPS is to have the GIS update completed quarterly. The NG specifications for GIS will be finalized and published by late 2022. New NG911 processes are expected to simplify this complex process by provisioning a Bell provided map with the 9-1-1, police, fire, and EMS layers included.

Currently, when updates are ready to be uploaded, WRPS IT stops the service on server, and the help desk pushes it out (they leave the old maps for backup). When the vehicles log in with MDTs, it will update the map from the installation file. Fire IT manages the updates for Fire.
v. Voice Logging

**NICE Short and Long-term Recording/Logging System:** The voice logging system must be capable of recording NG911 format audio as well as additional data that is sent with the call including location coordinates as well as recording meta data of the communication session (such as time, duration etc.), and radio channels. The current voice logging system, NICE, is already NG911 capable, however an upgrade to software/hardware may be necessary in the future to support the interface to the Call Handling Solution that is procured.

f. Backup Site Implications and Options

The move to NG911 also impacts how back-up sites are configured and utilized. Planning for a new NG911 Call Handling Solution must include provisioning the same hardware/software at the primary, secondary, and backup sites. The alternate locations must have the full features of the primary site.

g. Potential Impact on Call Handling and Dispatch

The implementation of NG911 will have a potential impact on call taking and dispatch modalities in moving from just voice to text, streaming video, telematics information, and additional potential IoT (Internet of Things) sensors, alerts, and data.

Over next 2-5 years, additional 9-1-1 functionality may be introduced including:

- Ability for 3rd party operators such as private 9-1-111 (VoIP call transfers) to provide phone number, location, and call details in-line with a call transfer to the PSAP
- Vehicle telematics information e.g., number of occupants, speed, impact severity, etc. may be available with the call details, rather than having, for example an OnStar operator relay the information verbally.
- Customer provided information on emergency contacts, medical data, etc. available with the call is planned.

The CISC Emergency Services Working Group is coordinating with all 9-1-1 stakeholders to ensure the receipt and use of this information is standardized for all PSAPs across Canada (similar to the delivery of Phase II location information).

h. Transition from Text with 9-1-1 to NG911 Text Messaging (RTT)

Real-time Text (RTT) will eventually replace the current Text with 9-1-1 (T9-1-1) that is delivered in parallel with the voice network, however the current proposed timing to introduce it

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11 An example is Northern 911, a company based out of Sudbury, Ontario, Canada that provides 9-1-1 call centre services for VOIP & POTS providers such as Rogers Telecom, Primus Canada, SaskTel, etc. as a Public Safety Answering Point. In addition, the company provides fire dispatch, alarm monitoring, and telematics services.
has been pushed out to Q2-2024. This was done to ensure PSAPs have ample opportunity to ensure that a new NG911 Call Handling Solution can properly support RTT per the current NENA NG911 standards (external link). Some vendors already indicate they support RTT, however the Canadian configuration is still being built, so until it can be properly tested end to end, vendors will not be able to fully implement and support RTT. It is important to note that all primary and secondary PSAPs must have an NG911 system that supports RTT.

Text to 9-1-1 (T9-1-1) is the current subscription-based service for the deaf, hard of hearing, and speech-impaired (DHHSI) community. It is being replaced by NG911 Text Messaging using Real-time Text) for use by all 9-1-1 callers. However, T9-1-1 might be used by PSAPs for a period after NG911 implementation occurs to address some very specific operational scenarios such as abandoned call management. During the transition period, PSAPs should plan for use of T9-1-1 in parallel with NG911 Real-time text messaging.

Handling RTT will have an impact on the communication centre both in how the calls are handled and how they are down streamed to secondary agencies. Anecdotally it has been indicated that text calls can take up to 6 minutes versus average of 2 minutes for a voice call. However – also anecdotally – at one time some NG911 advocates were forecasting that as much as 40% of all ‘calls’ to 911 may be text. Information thus far has shown that in the United States in 2019 the highest use of text messaging was in Texas at 2% and other states, such as California, were at 0.2%. 2019 is the latest data year available through https://www.911.gov/.

i. Streaming Video (not video and picture files)

One of the common highlights with the move to NG911 is the ability to handle pictures and videos. Due to cybersecurity concerns, there are no current plans to facilitate the delivery of picture or video files directly from 9-1-1 callers. Many police PSAPs across Canada already have procedures in place to safely receive and handle picture and video files from the public; that is expected to continue. WRPS will need to have a local solution to receive and securely handle picture and video files. That includes determining who will have access to the video files and then controlling access (how is that managed on a call that involves police and fire response for example), where they will be stored and the retention period.

Live streaming video 9-1-1 (but not user submitted picture and video files) calls are expected to eventually be introduced; however, this requires extensive work by 9-1-1 stakeholders to ensure that the benefits outweigh the risks to PSAP staff who must process these calls. A coordinated national approach is planned to move forward with streaming video for emergency calls

WRPS is one of only a few agencies piloting a Digital Evidence Management System (DEMS) on behalf of the province and is currently working through policies and procedures for handling digital files.

12 CISC Emergency Services Working Group has provided source material for this report.
j. Call Management Options/Considerations

NG911 will allow the opportunity to manage and handle calls between primary and secondary PSAPs to accommodate call surges that are typical with major events. For example, with the implementation of the PRIDE partner agencies call handling solution, call overflow could be managed between centres such that when Stratford Police receive an influx of calls for a collision, the excess calls are automatically routed to WRPS or another PRIDE member. This would of course require changes to the CAD to allow WRPS to take a Stratford call which is then entered into the Stratford call queue.

Alternately call overflow situations could be managed within WRPS such that overflow calls are routed to non-emergency call takers (in an operational model that has call takers dedicated to non-emergency calls). This would of course require installation of CHS and CAD for additional agents. Another option could be to staff a primary and backup centre so that there is always a ‘hot’ backup arrangement – this is known as a ‘Live/Live’ state – receiving calls at the Primary and Backup site simultaneously. This could be done with the existing telephony solution; however, NG911 would make the configuration and handling of incoming 9-1-1 calls in this manner more efficient.

In NG911 the ability to handle this is determined by Policy Routing Rules (PRRs). The PRRs will be determined at two different levels:
- the Network Level (by NG911 network providers - Bell)
- the PSAP level, within the Call Handling Solution (CHS) i.e., local policy rules

Policy Routing Rules would include current PSAP state as well as real-time thresholds that can be established for overflow scenarios, such as:
- number of calls in queue is greater than ‘x’
- if the number of calls is greater than a specific % of call takers (logged on agents)
- specific time of day/day of week – to compensate for decreased staffing levels

Policy Routing Rules in NG911 will provide more options for PSAPs to create new rules based on multiple conditions and to adjust or initiate these PRRs in real-time for surge capacity and/or for contingency purposes.

It is important to recognize that even though technology will offer many options for call handling and call flow, the ability of communications centres to put them into operation, which may require agreements with other public safety answering points, may be the more difficult part of accomplishing the NG911 vision.

Bell will be responsible to work with WRPS to create individual PRRs and will continue to provide manual intervention during situations that may not be covered by existing rules.
5. **Future Paramedic Services Considerations**

This report explores and analyzes options for the future provision of fire and police communications and dispatch in the Waterloo region. However, earlier reports addressed the possibility of ambulance communications becoming part of the Waterloo Region dispatch system or platform.

Paramedic services operate differently to police and fire and are partially funded by the province. Communication system use and type is established in provincial regulation, and the communication centre, which takes calls and dispatches the Waterloo Region Paramedic Service, is operated by the Ministry of Health and dispatches paramedics in a much wider area than Waterloo Region, including Wellington and Dufferin Counties.

Ambulances in the province also operate on a borderless, seamless basis. That means an ambulance from any area can be dispatched to another area of the province (also established in legislation), and an ambulance travelling through an area – for example, a Waterloo region ambulance in the Hamilton or London, or Windsor area – can be sent to any call in that locality. These practices, often ensconced in legislation and regulation, add complexity to the concept of consolidating a paramedic communication centre in Waterloo Region. For example, would the Ministry of Health be willing to let Waterloo Region call-take and dispatch paramedic incidents in Waterloo Region and leave Cambridge Central Ambulance Communication Centre (CACC or ambulance communication centre) with Wellington and Dufferin Counties? That may be a possible scenario if Wellington and Dufferin County calls could be distributed to other ambulance communication centres such as London or Georgian CACC in Barrie.

Another consideration is if the Ministry of Health agrees to allow Waterloo Region to dispatch Waterloo Region ambulances, but part of the arrangement would be to call-take and dispatch for Wellington and Dufferin Counties. Would Waterloo Region be amenable to that idea? Then there is the issue of communication frequencies established in regulation, meaning Waterloo Region would have to try to gain an exemption to use its regional communication system to dispatch ambulances. And what of Wellington and Dufferin Counties in that circumstance?

All these impediments can be resolved but the issues are not simple.

To enable the seamless, borderless operation the Ministry of Health and Long Term Care Central Ambulance Communication Centres operate on a common technology platform that is designed to facilitate the transfer of calls and ambulances between ambulance communication centers, as outlined below.

There are seven main components that are fundamental to that technology platform and would have to be established in Hexagon CAD if Waterloo was granted the right to self-dispatch ambulances. Items a to g follow below.
a. Double Dispatch:
This feature allows either the transfer of a call to another CACC, or the ability to share a call between CACCs for mutual response.

For example, a call may come into London CACC that is under the jurisdiction of Cambridge CACC. That may occur when an individual calls a relative in another community; for example, London or Belleville, rather than dialing 911 locally, and that individual calls their local 911 on behalf of the person who called them.

In that case, the call would be initiated in the CACC serving Belleville or London and transferred and duplicated in Cambridge CACC, and the Cambridge CACC would dispatch an ambulance to the call. There would be an originating call record at Belleville or London and the final call record in Cambridge. This is similar to how the Hexagon CAD replicates a call for Kitchener Fire dispatch.

Another example is when two or more CACCs would share a call, for example, a collision on Highway 401 where Cambridge CACC and Mississauga CACC respond to the call and send ambulances from each of their jurisdictions. The final call record would show the details of the response from both CACCs.

b. Vehicle/call transfer:
The ability to transfer a vehicle and call details from one center to another is analogous to a plane travelling across the country. As the plane leaves the jurisdiction of one air traffic control (ATC) they are passed over to the next ATC. The plane details and manifest are transferred to the next ATC.

Similarly, if an ambulance takes a patient from Stratford General Hospital where that ambulance is dispatched by London CACC, to Cambridge Memorial Hospital the originating call details plus the ambulance details are replicated at Cambridge CACC. Cambridge will track the ambulance and change its status from arriving at the hospital to returning to the London CACC catchment area. The call details at London CACC will have the information that was tracked at Cambridge (arrival times etc.) and Cambridge CACC will also maintain a record of the call that is included in their call statistics.

c. Provincial Database:
Call and response information from all CACCs is uploaded to a provincial database and that is used for compiling provincial call and response statistics. The MOHLTC maintains the CIP (Central Information Platform) and distributes this information to all stakeholders electronically, which includes the paramedic services, CACCs, base hospitals and ambulance regional offices. The WRPS Hexagon CAD would need a real-time feed of the data to the CIP with the required fields adjusted to the CIP format.
d. Mobile Workstations:

The predominant mobile workstation is Interdev’s CADLink. This mobile data terminal application provides call details to the crews and populates the electronic patient care record (ePCR) with available data.

During the call, the CADLink application is in contact with the Central Information Platform to receive updates of all call related data, which it presents to the paramedics for use during the call. These updates are real-time and must be reliable as they support the in-field operations. Once the electronic patient care record is complete, mobile CAD can send updates back to the CIP after the ePCR is complete. This is commonly used to complete and sign off the call at the dispatch level.

In order to communicate with EMS mobile workstations via CADLink, the Hexagon CAD would have to connect to the CIP using a CIP connector (that would have to be written to convert all the field names from Hexagon to MOH CIP and then have a reverse path for updates). Once Hexagon connects to the CIP then the CADLink interface would be complete. Alternately, a more efficient method would be if the CAD communicated with CADLink directly and removed the CIP step. That would be more efficient and less prone to problems that would be dependent on MOHLTC fixing them.

Ambulances transferring into the Waterloo Region dispatch jurisdiction would need to have connectivity to dispatch via CADLink for the scenario outlined in Item b Vehicle/Call Transfer above. Note that Waterloo EMS does not currently use CADLink, but this would be required for ambulances transferring into the dispatch jurisdiction. A separate interface would be required in the future if Waterloo EMS adopts a different mobile CAD solution.

e. Integration to electronic Patient Care Record (ePCR) system:

Plans are in place at the Ministry of Health to integrate CAD information and electronic patient care records using the same mobile data terminal feed described in ‘Mobile Workstations’ above. In Ontario, the most common ePCR product is Interdev’s iMedic. Waterloo uses Zoll ePCR – in either case Zoll and/or iMedic would accept the data from the Central Information Platform and update the ePCR in real time via the mobile data terminal. Rules will determine which fields can be overridden by the crews or CAD. As an example, a patient’s name is often received more accurately by the crews than by the CACCs, and this information is updated back to the CACC.

Electronic patient care record integration is expected to enhance the efficient operation of the crews, reduce documentation workload on paramedics, and improve the data quality of the completed ambulance call report. The WRPS Hexagon CAD would need to have this functionality for both iMedic (for out of jurisdiction ambulances), Zoll, and potentially others.
f. Medical Triage system:

MOHLTC will be moving to a triage application called Medical Priority Dispatch System (MPDS) that follows a prescribed call taking algorithm to triage, categorize, and prioritize calls. Hexagon CAD currently has a standard interface to MPDS but the Hexagon CAD would have to achieve integration with the EMS CAD platform that maintains these features.

g. Radio System

The provincial ambulance service also operates a standard P25 radio system called Fleet Net and, to facilitate the call and ambulance transfers between CACCs, it would be necessary to maintain use of Fleet Net with an integration to the Waterloo Region Motorola consoles.
6. Recruitment, Selection, and Intake

Kitchener Fire Department and Waterloo Regional Police Service have similar hiring processes which can be seen in the process maps in Appendix G.

The recruitment, selection, and intake process are similar for police and fire except for psychological testing at the police service. Both services utilize testing tools such as Perfex or Criticall (tools which test a candidate’s ability to gather, record and utilize information), typing speed tests. Fire communicator candidates are provided a mental resiliency test whereas police communicator candidates receive a behavioural interview. Mental resiliency tests and behavioural interviews are similar in that they assess an individual’s aptitude and attitude. There are several different tests available which require professional interpretation to determine those aptitudes and attitudes considered desirable for the position.

The variance in these respective fire and police processes is that police communicator candidates participate in a psychological assessment and undergo a background check.

The fire communicator process, from the time a vacancy occurs until a candidate is hired is estimated at 16 to 18 weeks. The elapsed time at WRPS is estimated at approximately 24 weeks but our calculations suggested closer to 28 presently but some of that is due to process management in that applications have to be screened manually. WRPS Human Resources estimates that recent competitions received as many as 1,000 applications. We expect that timeline to be reduced upon WRPS implementing a human resources system that will include screening tools. Our understanding is that late 2022 or 2023 is a reasonable time frame.

The selection, recruitment, and hiring process is, for all purposes, the same for police and fire communicators up to the point of the police communicator psychological interview. The purpose of the selection activity, to that point, is to ascertain if a candidate has the aptitude and attitude to be trained as a communicator. We have not been made aware of, nor have we seen anything that suggests that candidates are being screened for activities or tasks that require an ability unique to either department. However, past this point, the police communicator candidates undergo more rigor in the form of a psychological evaluation and background check.

We conclude that any candidate that successfully achieves all the criteria to receive a job offer would be considered capable of being trained as either a fire or police communicator.
7. Intake Training

Appendix H offers detail about the communicator intake training for fire and police services. Because both services use the same technology platform, some aspects of the training process are similar. However, where fire communicator training is estimated to take 16 to 20 weeks, depending on remedial training requirements, WRPS communicator training takes 42 to 45 weeks. The process mapping indicates that while some of the training content is similar, there is a greater volume of information to learn in a police dispatching environment than in a fire dispatching environment, thus the extended duration for police dispatcher training.
8. Communications and Dispatch Options in Waterloo Region

a. Definitions of Dispatch Operational Models

For the purpose of discussing operational options within this report, we established the following definitions. Paramedic services are included for explanation purposes only.

**Independent Communications Centre**: This is the current configuration – the status quo. Each emergency service communications centre is separately operated and administered and is in distinct buildings. Telecommunications infrastructure may be shared.

WRPS operates the primary PSAP on behalf of Waterloo Region and accepts calls via the 911 and the non-emergency line. Through the WRPS Communications Centre, located on Maple Grove Road, WRPS staff also dispatch calls for municipal by-law officers. Additionally, WRPS operates both the CAD and Records Management Systems (RMS) for four other police services in the PRIDE network (Police Regionalized Information Data Entry). The Kitchener Fire Department provides call taking and dispatch service for all fire departments in the Region through Kitchener’s dispatch centre on Strasburg Road using the same CAD platform.

**Co-located Communications Centre**: One where communications activities take place in the same building thereby sharing accommodation infrastructure and physical services, but the 911, police, fire, and paramedic communications departments operate separately. The departments may or may not be in the same room.

Telecommunications infrastructure may be shared by all agencies or may not. An example of this is if the regional Central Ambulance Communications Centre was housed in the same building as police and/or fire communications but

- continued to use CAD Enterprise (CentralSquare) computer aided dispatch instead of Hexagon and
- continued to use the provincial radio system rather than the Waterloo Region radio system and
- continued to be administered and operated by the Ontario Ministry of Health.

The emergency service communicators would report to administrators responsible for individual department communications (police, fire, EMS). The facility could be overseen by a board, municipal or regional physical service department, or some other structure agreed to by the parties.

**Combined or Integrated Communications Centre**: One where staff can perform specific functions for the agencies being served, and some staff may be capable of performing all
functions. For example, staff may be capable of some or all the following activities, but the goal of the communications centre is not to make all staff capable of all activities.

- 911 call taking
- police call taking
- fire call taking
- paramedic services call taking
- police dispatching
- fire dispatching
- paramedic services dispatching

The communication centre may be designed so that police call takers and dispatchers work in clusters as do fire call takers and dispatchers, and paramedic call takers and dispatchers.

Telecommunications infrastructure is shared between all agencies although on different talk groups.

The centre is operated by a single administrative structure and staff work for a single entity.

**Consolidated Communications Centre**: One where all staff, upon being fully trained, can receive 911 calls, and be capable of secondary screening and dispatching calls for all agencies being served (police, fire, and paramedic services).

Telecommunications infrastructure is shared between all agencies although on different talk groups.

The centre is operated by a single administrative structure and staff work for a single entity.

**b. A Discussion of Each Model**

We make the assumption that any models discussed below are capably operated.

**i. Independent Communications Centre**

A major advantage of an independent (status quo) communication centre is the opportunity for the department that it serves to have direct control of the quality and level of service. So, in Waterloo Region, the police have direct control of police related activity at a communication centre and fire has direct control of fire related activity at the fire communications centre. This merit assumes that the individual communications centres are capably operated and quality of service is satisfactory. We have not encountered anything that suggests otherwise.

In the fire service ‘direct operation’ is tempered somewhat because six municipalities in Waterloo Region have contracted with the seventh, the City of Kitchener, to provide fire call
taking and dispatch services to their municipalities. Therefore, that part of the fire protection service is already contracted for all municipalities except Kitchener. Interviews with the fire chiefs indicate that they are pleased with the quality of service provided by the City of Kitchener Fire Department and receive quick response to any concerns.

Nevertheless, while there are operational advantages to a well-operated independent dispatch centre, there are monetary disadvantages in that independent centres require a greater number of staff (full time equivalents) than consolidated or combined (integrated) centres. This is due to what can be called ‘available capacity’; that is, periods of time that staff are not actively engaged in providing communications services because of quiet periods. These quiet periods happen in any communications centre, but – as a very simple example – if communications centre A has four staff on duty but the activity level is such that only one person is busy, then there is an available capacity of three people. And if communications centre B has four staff on duty but the activity level is such that only one person is busy, then there is an available capacity of three people for a total of six between centres A and B.

If those two centres were combined, the available capacity could be reduced to three rather than six. It’s possible that some may respond that the capacity is available because activity may suddenly increase and the capacity will quickly be absorbed. That’s possible but call pattern analysis (please see the activity patterns in Appendix D) tells us that staffing forecasts combined with local operational knowledge could be effective in determining staffing requirements, based on day and hour, that would cautiously reconcile the available capacity.

We are also aware that collective agreements include communication centre staffing levels that are mostly consistent 24 hours a day even though call volume varies.

ii. Co-located Communications Centre

A co-located communications centre may achieve some efficiencies by reducing the overall capital infrastructure, and possibly operating cost, requirements compared to separate communications centres: Meeting rooms, lunchrooms, climate control, parking, reserve power and backup power, etc., but major ongoing costs for staffing would be incurred at a similar rate to independent communication centres. Additionally, each ‘tenant’ in the facility would operate separately meaning duplication of supervision, management, and oversight.

Co-locating may have a benefit of separate communications supervisors having the opportunity to exchange ideas and working more closely, thus achieving improved efficiency and effectiveness, although that would be somewhat dependent on personalities and individual sense of cooperation.

iii. Combined or Integrated Communications Centre

In addition to the capital and facility operating benefits realized by a co-located model, a combined or integrated communications centre achieves a greater level of efficiency and
effectiveness than a co-located model because some staff are capable providing communications services to police and fire, or police, fire, and EMS thereby reducing available capacity to a more acceptable level.

iv. Consolidated model

A consolidated model is, in theory, the most effective and efficient communication centre operational and organizational design. It offers the best utilization of staff resources in reducing available capacity, and a similar or better use of capital and operational resources as the co-located model.

A significant challenge in a consolidated model is attracting candidates that have the potential to be trained to call take and dispatch for police, fire, and possibly paramedic services. Other challenges include an operating design that is responsive to the questions and concerns of the clients it dispatches. As an aside, just because a fire department dispatches several fire departments, or a police service dispatches several police service clients doesn’t mean that the dispatching agency is necessarily responsive. Quality and responsiveness are elements of management and governance, not organizational design.
9. **Communication Centre Operational Model Staffing**

This section examines staffing in two of the four models in Section 8; the Independent (status quo) and the consolidated model. The co-located model, explained in Section 8 is identical to the status quo from a staffing perspective, and it is difficult to calculate staff levels for the integrated model without making a lot of assumptions because there is an unknown as to the distribution of fully trained staff – those that can call take and dispatch for all emergency services vs. those who can accommodate a limited scope of duties.

The staffing requirements were based on a set of emergency services workload patterns using 2019 as a representative year. Please see Appendix D.

Appendix I provides greater detail about the staffing models.

The calculations in Appendix I are averages and do not allow for surges such as receiving 30 or more 911 calls in a few minutes due to a major incident. Because they are averages, any model that may be implemented would have to make allowances for surge, and determining those allowances depends on local knowledge. The models shown in Appendix I can also be calculated on a day of week, seasonal, or other basis but scheduling and rostering has to be taken into account in setting staff levels.

**a. Staff Requirement Parameters**

The parameters we used to determine the levels were

- A 911 call (police, fire, EMS), which is then transferred to fire or paramedic services, and the 911 call taker listens to determine if police are also required, is calculated to take 36 seconds or 0.6 of a minute
- A 911 call (police, fire, EMS), and a determination that the call is for police services, and the 911 call taker then continues to take the call details is calculated to take 2.5 minutes
- In 2019 there were 145,383 9-1-1 calls; 31,103 were for fire; an estimated 50,000 were for paramedic services; for a total of 81,103
- Estimated 50%, or 40,500, also required police presence
- Therefore, 64,280 911 calls required call taker engagement for 2.5 minutes; 30,002 (or 21%) required call taker engagement for 0.6 minutes
- In 2019 there were 229,385 non-emergency calls
- In 2019 there were 38,349 internal calls although internal call volume is on a downward trend. In 2018 there were 47,532 internal calls. Internal calls are not included in the staffing calculations
- In 2019 there were 293,445 police dispatches related to the approximately 345,216 9-1-1 and non-emergency calls received for police services
• Kitchener Fire Department received 31,103 calls transferred from 9-1-1 plus an unknown number of others due to multiple calls for a single incident
• 57,610 fire trucks were dispatched in 2019

Communicators at the fire and police communications centres were assumed to be able to work – during a constantly active period – 42.5 minutes of an hour, on average, taking into account vacation, training, scheduled breaks, unscheduled breaks, and other approved time off.

b. Fire Dispatch Staffing Calculations

The Kitchener Fire Communications Centre requires two communicators an hour to handle the average calculated workload. But, as noted, surge capacity isn’t included which may require an additional person each hour. We must also recognize that some hours, particularly overnight, indicate a requirement for less than 0.4 call takers and 0.5 dispatchers meaning there is workload for 1 FTE. Incidents don’t occur on an average though and there will be some periods where two or three communicators could be busy.

The fire communications centre schedules three communicators and a supervisory position 24 hours with minimum staffing of three communicators which may include the supervisor. Considerations with respect to staff schedules are included in the collective agreement between the Corporation of the City of Kitchener and the Kitchener Professional Firefighters’ Association.

c. Waterloo Regional Police Communications Staffing Calculations

The WRPS 911 and dispatch staffing calculations indicate that the staff required to meet the average call load varies by time of day but with a relatively consistent pattern where the greatest number of staff are required during daytime and evening hours and the fewest staff during overnight hours. There are variances on this pattern such as the call peaks experienced on Fridays and Saturdays during the period around midnight.

As with the fire department communicator calculations, these averages don’t account for volume surges or day of week and hour staffing requirements; for example, Friday and Saturday nights. Adequate staffing is dependent on local knowledge.

The WRPS communications centre schedules 18 communicators and one supervisor although with time off and training, 13 or 14 staff and a supervisor is the usual staffing.

As with fire communications, considerations with respect to staff schedules are included in the collective agreement between the Waterloo Region Police Services Board and the Waterloo Regional Police Association.
10. Cost Analysis

Please note that this section addresses the technical costs of the models.

This cost comparison is unlike those found in most options analyses. Often, when co-location, integration, or consolidation are some of the options to be cost assessed, technology changes such as dispatch consoles, radio system configuration, telephone, paging, and 911 services have to be reconciled.

That isn’t the case in this options analysis. The fire services participate in a centralized fire dispatch using technology within a regional system which is the same as the Waterloo Regional Police Service. So technology platform changes are already in place as planned by the region and municipalities.

This technology cost analysis assesses whether any operational or organizational models require additional capital costs such as servers, buildings, communications consoles, computers, etc., or if one model has greater benefit in the form of lower maintenance and support costs or staff levels.

This cost analysis was conducted on a ‘per seat’ basis. It was assumed that since the incremental positions required in different models were small, they would not require additional server capacity for the CAD and future Call Handling Solution; and furthermore that the CAD and CHS platforms do not need to be expanded for the backup centre(s). We also assumed that the existing WRPS communication centre would become the backup for a new stand-alone police communication centre, a co-located centre, or consolidated centre.

The technology items and associated costs in Table 2 were used in conducting the cost analysis.

<table>
<thead>
<tr>
<th>Item</th>
<th>Capital Cost</th>
<th>Annual Fees and Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>i/dispatcher workstation licenses (computer aided dispatch)</td>
<td>$32,400</td>
<td>22.252% ($7,298)</td>
</tr>
<tr>
<td>CAD terminals (computers and monitors)</td>
<td>$5,000</td>
<td></td>
</tr>
<tr>
<td>i/page (paging)</td>
<td>$38,900</td>
<td>22.252% ($8,762)</td>
</tr>
<tr>
<td>Softphone (computer-based phones to assist NG911) (per position)</td>
<td>$5,000</td>
<td>25% ($1,250)</td>
</tr>
<tr>
<td>Workstations (communicators)</td>
<td>$45,000</td>
<td></td>
</tr>
<tr>
<td>Motorola dispatch console (each) – based on original bulk purchase costs. Recent single console purchase was $150,000</td>
<td>$50,000</td>
<td>$12,500</td>
</tr>
<tr>
<td>Motorola firehall alerting console</td>
<td>$300,000</td>
<td>$66,000</td>
</tr>
<tr>
<td>Bell lines to primary and backup facilities</td>
<td></td>
<td>$12,600</td>
</tr>
</tbody>
</table>

Costs determined with the assistance of Bob Hilhorst, IT Director, Waterloo Regional Police Service
The five operational models within which technology was assessed are shown in Table 3.

Table 3: Operational Model and Description

<table>
<thead>
<tr>
<th>Operational Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent - Status Quo</td>
<td>The existing operational model</td>
</tr>
</tbody>
</table>
| Common call taking; separate dispatch    | The 911 call taker  
• answers incoming 911 or non-emergency telephone calls;  
• elicits information from the caller on behalf of police or fire, then  
• transfers the information to a police dispatcher or fire dispatcher – or both – depending on the incident type.  
Police and fire dispatchers would remain in separate locations and call information transfer would take place via the computer aided dispatch as it is done now. This is like the current operational model except call takers would be located at the 911 centre. |
| Co-located                                | The police service and fire service would be in the same building but operate separately. Technical and building infrastructure would be shared but operations and governance would remain distinct. |
| Combined (integrated)                     | Police and fire communicators would work for the same organization but distinct work streams would remain in place. Some staff would be police call takers, or fire call takers, or police dispatchers, or fire dispatchers. Some staff would be able to accomplish all duties but there would not be an expectation that all employees would be able to call take or dispatch seamlessly for either service. |
| Consolidated                              | All staff work for the same organization and, upon being fully trained, would be able to call take for police or fire and dispatch for police and fire. If paramedic services communications became part of a consolidated model, staff would be able to call take and dispatch for all three agencies after successful training. |

The status quo means nothing changes, including expected costs\(^{13}\), and is the benchmark against which the other models are compared.

Theoretically, the common call taking – separate dispatch model can be implemented in a relatively short period once police and fire call takers are cross trained as call takers. We estimate that is a one-year process from a decision date. Locating call takers at the 911 centre would achieve the lowest technology costs. Again in theory, there is space at the 911 centre because police communications usually staff 13 or 14 communicators and a supervisor which means that three consoles would be available for one, and during some hours, two call takers. The other consideration is that the 911 – police communications is considered crowded, and the WRPS may not be receptive to adding staff.

\(^{13}\) Waterloo Regional Police Service is budgeting for the construction or major renovation of a communications centre.
Information found in Appendix J indicates

- The central call taking – separate dispatch model, shows a small decrease of $59,192 annually in maintenance costs if call taking is centrally located at the primary public safety answering centre.

- If, in the next several years, the police service will move to a new communication centre due to limitations at the existing centre, and the existing centre will become the backup. The fire communications centre will remain separate. This model estimates the cost of communications equipment only. New facility costs are addressed in Appendix K. A capital cost of $1.085 million would be incurred due to new dispatcher desks and computer aided dispatch computers and monitors.

- The co-location of police and fire communication centres assumes that police and fire would be located in a new communications centre (building cost estimates addressed in Appendix K) but that police and fire would operate independently. Capital costs of $1.1 million would be incurred due to new dispatcher desks and CAD computers and monitors, and there would be a slight decline of $12,600 annually due to fewer Bell line connections required. These costs are the same as for an integrated centre. This model assumes that existing desks and computers would be moved from the fire communications centre to the new location. Fire backup would remain as is.

- A consolidated model assumes that police and fire would be located in a new communications centre (building cost estimates addressed in Appendix K) and that one department would call take and dispatch fire and police. Capital costs of $1.1 million would be incurred due to new dispatcher desks and CAD computers and monitors, and there would be a slight decline of $59,932 in annual maintenance costs. The existing PSAP would become the backup location.

- A summary of the costs and offsets for each model examined. A 15-year maintenance cost column is shown since the useable life of new communications consoles should be at least 15 years.
To summarize, with respect to technology only

- Continuing the status quo means no change in expected costs.
- Centralizing the call taking process while maintaining separate fire and police dispatch functions results in a savings of just over $59,000 a year due to technology efficiency.
- A move by the police service to a new facility, due to the need to replace the existing PSAP and communications centre, would incur a capital cost of $1.085 million. The existing communications centre would become the backup center.
- Co-locating fire and police communications at a new building would incur capital costs of $1.1 million and a reduction of $12,600 in maintenance costs.
- Consolidating fire and police communications centres at one new building would incur capital costs of $1.1 million for technology and an annual reduction of $59,900 in annual maintenance. The existing communications centre would become the backup center.
- Status quo represents no economic advantage annually or over a 15-year period.
- Central call taking results in $59,192 annual cost reduction, or $887,000 over 15 years assuming that central call taking can be accommodated within the existing PSAP.
- Moving the PSAP and police communications to a new facility, and the existing communications centre becoming the backup represents no immediate or ongoing technology economic advantages although there may be several operational improvements.
- Consolidating police and fire dispatch at a new location incurs capital costs of $1.1 million and an annual decrease of $59,932 annually or over $890,000 15 years.

Central call taking represents the greatest overall cost reduction, if it can be accomplished within the current PSAP, without incurring capital cost outside the planned technology replacement cycle.
11. **Building Requirements and Cost**

This section estimates floor space requirements to 2041.

A PSAP, police services, and co-located fire communications centres would require a total building area of 38,795 square feet to accommodate requirements until 2041.

If the status quo continued and WRPS builds a stand-alone communications centre, an estimated 31,170 square foot facility would be required. The fire service would require 7,625 square feet by 2041. Co-locating the paramedic service communications adds another 5,152 square feet with a total space requirement of 43,947 square feet. The per foot cost of a building, dependent on whether it is a post disaster\(^\text{14}\) standard, and the extent to which it is sustainable and built to standards such as LEED (Leadership in Energy and Environmental Design) can range between $800 to $1,100 a square foot or $31,000,000 to $42,000,000 for a 38,795 square foot building, and up to $44,000,000 if space for paramedic communications is included.

It is important to note that if WRPS builds a stand-alone communications centre due to the status quo continuing, that cost is estimated to be over $31,000,000 therefore the differential between a stand-alone communications centre and a co-located centre would be approximately $10,000,000.

If the fire communications centre has to expand within the next 20 years, the cost of a stand-alone fire communications centre would start at approximately $6,000,000 in 2021 dollars. Therefore, the cost difference between a co-located communications centre and individual police and fire communications centres is estimated to be between zero and $5,000,000 depending on several factors noted above.

A consolidated communications centre would require a total building area of 37,778 square feet to accommodate requirements until 2041. An additional 5,152 square feet would be required if paramedic services communications is co-located with a consolidated fire and police dispatch. If the paramedic service communications centre is also consolidated, the space required for paramedic services communications may reduce by up to 25%.

The cost for a police – fire consolidated communications centre is estimated to range from $30,222,000 to $41,555,800. The estimate for a centre that includes paramedic communications

\(^{14}\) A post-disaster building is defined as one that is essential to the provision of services in the event of a disaster and must maintain full functionality after a disaster.
co-location is between $34,300,000 and $47,223,000, and for consolidation is $33,422,000 and $45,960,000.

As noted earlier, if WRPS builds an independent stand-alone communications centre due to the status quo continuing, that cost is estimated to be over $31,000,000. Therefore, the differential between a stand-alone communications centre and a consolidated centre could range up to approximately $10,000,000.

If the fire communications centre has to expand within the next 20 years the cost of a stand-alone fire communications centre would start at approximately $6,000,000 in 2021 dollars. Therefore, the cost difference between a co-located communications centre and individual police and fire communications centres is estimated to be between zero and $5,000,000 depending on several factors noted above (LEED, other sustainability considerations).

There are multiple considerations that could influence the cost of a building, or the timing or need for a new communications centre for the fire service, which makes it difficult to ascertain the cost differential between the status quo and co-location or consolidation.
12. Communication Operational Model Discussion

a. Assessing the Operating Models

i. Five Operational Models

We determined that there are five operational models (options) to be considered:

1. Independent – essentially the existing operational model – status quo
2. Common call taking with separate dispatch
3. Co-located communications centres
4. Combined or integrated communications centres
5. Consolidated centre

ii. Technology Assessment Summary

Please refer to Appendix J for the technology assessment.

- The status quo represents no economic advantage annually or over a 15-year period.
- Central call taking results in $59,192 annual cost reduction, or $887,000 over 15 years assuming that central call taking can be accommodated within the existing PSAP.
- Moving the PSAP and police communications to a new facility, and the existing communications centre becoming the backup represents no immediate or ongoing technology economic advantages although there may be several operational improvements.
- Consolidating police and fire dispatch at a new location incurs capital costs of $1.1 million and an annual decrease of $59,932 annually or over $890,000 15 years.

iii. Staffing Summary

- there is no economic advantage to the status quo – current costs will continue
- There is a potential economic advantage in a central call taking – separate dispatch model in that existing surplus capacity, within the 911 and police call taking centre, during some hours, means that it would not be necessary to increase staff during those hours. Economically, this represents approximately 40 hours a week or a reduction of $85,000 a year in staff costs. However, there are some considerations because this model assumes
  - a dynamic staffing model can be achieved to match staff levels with workload
  - staff can be trained to receive police and fire calls.
- There is no economic advantage to a co-located communications centre from a staffing perspective because both police and fire would maintain the current staffing levels.
• There is no staffing advantage in moving the PSAP and police communications to a new facility and continuing the current operational model although there are facility improvement advantages for the Waterloo Regional Police Service.

• There may be economic advantages in a combined or integrated communications centre
  ▪ within the assumption that a dynamic staffing model can be achieved to match staff levels with workload, and dependent on the number of staff that are able to call take and dispatch for both police and fire services.
  ▪ A conservative estimate is that two full time equivalents, or more, could be saved in this model. Two full time equivalents represent $170,000 annually.

• There are staffing economic advantages to a consolidated communications centre. A dynamic shift schedule in a consolidated communications centre could offset as much as $933,000 in staff costs annually assuming that a staffing model can be negotiated to match staff levels with workload. It is possible that shift pattern smoothing may reduce some of the identified possible saving.

b. Operational Considerations

• The status quo means that the current operational model continues. Fire and police communications continue to operate separately, there is surplus capacity in both departments resulting in a more pronounced surplus when the requirements of both departments are added together.

• The common call taking but separate dispatch model might reduce some of the surplus capacity found in the current model15 and it will also reduce the 30 to 36 seconds of monitoring time by 911 call takers when transferring calls to fire department call taker16. It wouldn’t reduce the monitoring time when transferring a call to paramedic services since paramedic services communications is expected to continue operating a separate communications centre.
  ▪ This monitoring time equates to less than 400 hours of staff time a year

• A co-located centre offers no quantitative operational advantages since each communications department would operate separately although housed in the same facility. There may be qualitative advantages in enhanced operational relationships and interaction since staff may be able to use common amenities.

• There may be operational advantages in a combined or integrated communications centre if a significant number of staff members are capable of call taking and dispatching for both services. In that case, some of the benefits of a common call taking model or the consolidated model may be achieved. However, since we are defining a combined or integrated communications as one where the duties and tasks of a 911 – fire – police

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15 Assuming that a dynamic staffing model can be achieved to match staff levels with workload.
16 A 911 call (police, fire, EMS), which is then transferred to fire or paramedic services, and the 911 call taker listens to determine if police are also required, is calculated to take 36 seconds or 0.6 of a minute.
communications centre are achieved, but the intent is not necessarily to cross-train all staff, it is difficult to identify advantages.

- A consolidated model, like the common call taking model, will reduce some of the call transfer and monitoring time currently experienced. However, in most cases, this averages 30 to 36 seconds per call, and totals less than 400 hours of staff time per year.

Currently, when a police services dispatcher determines that fire or paramedic services are required at a police incident, the police dispatcher has to create a mirrored call which hides police specific or confidential information prior to sending to fire or paramedic service communications. However, testing the time it takes to mirror and send a call revealed that the process usually takes 15 to 20 seconds, but we could not identify the frequency required. We estimate that this also represents less than 400 hours a year in staff time and expected upgrades to the CAD system will eliminate most of this duration.

A consolidated centre offers greater operational interoperability since one dispatch team has oversight of the activity of both police and fire resources and may be able to more easily cancel resources that are found not to be required.

c. Public and Responder Safety

A requirement of the project is for the consultants to assess the effect of the operational models on public and responder safety. Using the current state (the status quo) and considering that
- the recruitment, selection and intake process for communicators at least maintains the same content;
- the training process maintains the same quality and content;
- day to day operations of any of the models is competently accomplished;
- technology continues as planned;
- police, fire, and EMS responders are the same responders as they are now, and new staff are selected and trained as at present;
- oversight in the form of operations and governance is constructed to ensure that decisions and accountability are properly rendered;

then none of the models have an impact on public or responder safety.

d. Impact on Medical Emergency Response Times

There is no indication that any of the models will have a negative effect on medical emergency response times. Medical responses are rarely time sensitive no matter how often we hear that seconds count. There is a substantive amount of research which supports this statement.

In the next 12 to 24 months, the Ministry of Health, which operates most paramedic communication centres in the province, will be implementing the Medical Priority Dispatch
(MPDS) call taking algorithm and closing out the existing Dispatch Priority Index call taking process. Medical Priority Dispatch is in use at more than 6,000 locations worldwide and has a greater sensitivity and specificity resulting in more accurate patient prioritization than the current call taking algorithm. The expectation is that simultaneous dispatch to fire departments will occur only after sufficient information has been gathered by the paramedic communication centre (CACC) to assign a determinant to a medical incident. Currently, simultaneous dispatch happens upon key answers being assigned in the paramedic communication centre’s CAD. The expectation is that additional time will be allocated at the call taking stage to improve an accurate resource selection before ambulance and, sometimes, fire is dispatched.

While the province is replacing the Dispatch Priority Index with MPDS to improve resource allocation, the National Health Service in England has taken more definitive steps and replaced, in some ambulance services, MPDS with Pathways, which is software utilized by the National Health Service of England to triage public telephone calls for medical care and emergency medical services – such as 999 or 111 calls – in some NHS trusts and five of the ambulance services in the country. The intent of Pathways is to further reduce, beyond that achieved by MPDS, unnecessary call-outs for emergency services.

We see no concern that any of the operational or organizational models being considered will have a negative effect on medical emergency response times.

The 911 call taking, and WRPS call taking and dispatch process is shown in Appendix L. The detail is difficult to follow but the processes, as depicted have been approved as accurate by police and fire representatives. None of the models discussed here, including combined or consolidated, would affect the content elicited from callers although slight streamlining, as discussed above, may be possible.

e. Operation of a Combined or Consolidated Communication Centre

We asked our legal team at McKenzie Lake Lawyers to consider and advise us on legislation, regulations, collective agreement, and other implications pertaining to four possible oversight models of combined or consolidated communications centres. In other words, are there legal influences as to which models could be considered?

The oversight models considered are

- operated by Kitchener Fire Services;
- operated by Waterloo Regional Police Service;
- operated by an independent agency under the auspices of the region or a municipality;
- contracted with an external, private company.
The result of the legal opinion indicates that an operational model other than that operated by fire or police services is not desirable. If a combined or consolidated communications centre is considered, operation by the police service has the greatest chance of acceptance within the applicable Acts and Regulations, and by the Ontario Civilian Police Commission.

f. Other Considerations Within a Combined or Consolidated Operating Model

Major considerations of combined or consolidated communications centres, where staff are expected to be competent in both police and fire call taking and dispatching, are

- the recruitment and selection process;
- training staff to be capable in both forms of call taking and dispatching;
- executing competent call taking and dispatching for both emergency services; and
- the resources to accomplish training and quality assurance.

Appendix G demonstrates

- Individual communications centres selection and recruitment processes.
- Individual communications centres fire and police initial training processes.
- Individual communications centres call taking and dispatch processes.

Also in Appendix G is, for combined or consolidated communication centre

- An expected recruitment and selection process.
- An expected training process to achieve competence in fire and police call taking and dispatching.
- An expected call taking and dispatch process.

g. Resources Required

Trainers

The WRPS communications centre has two trainers who are committed full time to the training process. They are assisted as required by other communications staff who provide training support when available. The fire department uses supervisory staff and on-the-job training as part of the training regimen. Although content is different, there are similarities between the police and fire training processes. But in December 2020

- only 36% of full time permanent staff at the police communications centre were considered to be cross-trained to call take and dispatch police services;
- in December 2019 57% were cross-trained;
- in December 2018 57% were cross-trained (64% in October 2018);
- In December 2017, 64%;
- In December 2016, 55%. 
We suggest that it will be difficult to consider combining or consolidating communications centres until a significant component – more than 80% - of full time staff at the police communications centre are cross trained. We expect training additional staff and scheduling adequate dispatch capable staff will be a considerable challenge if fewer than 60% of current police staff are cross-trained.

The availability of additional training staff will assist in accomplishing this goal but the current cross-trained percentage is a major impediment to considering a combined or consolidated dispatch option.

On the other hand, it should be remembered that a combined or consolidated communications centre requires a new facility to be implemented, which is several years from now, thus providing sufficient time for WRPS to implement two additional trainers and achieve a high percentage of cross-trained staff.

**Recruitment Process**

The police service recruitment process is protracted in part because the screening aspect is manual. The Human Resources Information System that Waterloo Region and Waterloo Regional Police Service are partnering on securing should reduce the recruitment process in the next two to three years.

The fire service recruitment and selection processes are streamlined and usually accomplished within 6 to 8 weeks.

There is no evidence to suggest that a recruitment, selection, and training process for a combined or consolidated centre would not be successful if properly planned.
13. Governance

The Institute on Governance, an international organization headquartered in Ottawa, offers the following statement about governance:

*The need for governance exists anytime a group of people come together to accomplish an end. Though the governance literature proposes several definitions, most rest on three dimensions:*

*authority, decision-making, and accountability. ...*

*Governance determines who has power, who makes decisions, how other players make their voice heard and how account is rendered.*

With respect to an operating model, the legal opinion received is that a combined or consolidated communications centre would have to be operated by either the fire or police service and, because of Ontario Regulation 3/99, likely by the police service. How then would a combined or consolidated centre be governed to ensure all voices are heard?

Our experience with consolidated communication centres indicates that sometimes governance isn’t given the profile required, which results in operational considerations, rather than strategic and governance aspects, being the major factor in decisions.

It should be acknowledged that police services usually have the greatest call volume, highest number of staff, largest budgets, and influence in combined or consolidated centres. For those reasons, decisions about what policy to implement, action to take when budgets are limited, and greatest positive effect within available resources, often fall in favour of police services. For those reasons, governance has to be strong and capable to ensure that decisions are objective and sound which means a governing body must be made up, in part, of the highest level executives from member municipalities. We have experienced situations where communication centre governance groups are made up of senior departmental staff but from an operational background.

Governance means understanding risks, challenges, and ensuring strategy and objective-setting takes place. In many ways, it is advantageous for governance members to have little knowledge of operations or to be influenced by interest groups, which is why senior executives within a municipality may be good candidates. In addition, similar to a police services board or governance members of a private corporation, community representatives are sometimes good candidates.

Another important factor is ‘who controls the money’? An option to ensure all parties have the opportunity to present their case for funding priorities is to have a financial oversight group within the governing body or, at least, a competent independent analyst who can act as a financial arbitrator to assist monetary decisions.
14. **Strategic Innovation and Opportunities**

   a. **Technology road map**

   Waterloo Regional Police Service and the Kitchener Fire Department have followed a technology road map set out in the original Kimball report and subsequent studies to move toward a shared CAD platform and new interoperable radio system.

   By adopting a single CAD platform, they are well positioned to adopt any of the proposed operating models with relatively minor changes, primarily to the CAD platform, that may be related to call flow. WRPS is also well positioned to continue to provide support of critical systems to Kitchener Fire and the PRIDE agencies that would also enable their ability to adopt a different operating model.

   Work towards NG911 is also well underway, and with WRPS implementing a planned Call Handling Solution for the PRIDE Agencies and Kitchener Fire, they are positioned to take advantage of changing technology as it relates to the future interface with the public – moving away from a legacy telephone system (one that is significantly behind current consumer and business telephony infrastructure), to a new 911 platform that is designed to allow multimodal forms of communication via 911 that includes texting, video streaming, and interfaces to telematics systems (i.e. OnStar).

   b. **P25 radio network**

   WRPS has implemented a Motorola P25 radio system also used by Kitchener Fire. P25 (APCO Project 25) is an open set of standards for interoperable radio. Fundamentally this allows interconnection of other radio systems (for example from other jurisdictions), or the use of non-proprietary radios on the network.

   This means that in the future when it is time to refresh the terminal equipment (portable and mobile radios), a non-Motorola vendor could be selected that will operate on the Motorola network. The primary advantage of this is opening up competition for the equipment that could result in significant cost savings. Other large public sector organizations in Canada have realized savings of up to 40%, or several thousand dollars per radio, by using third party radio equipment.

   Of course, the radio network vendors can still add proprietary features to their terminal equipment, so it would be necessary to conduct an assessment to see if a third-party product has the features expected and required.

   Canada has also allocated dedicated 700 MHz spectrum to public safety use in the bands 764–770 MHz and 794–800 MHz. In the future the radio system could be migrated to this spectrum (however this entails implementing a new radio system with new technology) to support a larger
regional radio footprint. It could also allow WRPS to provide a data network built to public safety grade standards, instead of using commercial networks. More importantly, the use of this dedicated spectrum could enable larger regional implementation of interoperable radio networks that would facilitate mutual aid and perhaps enable consolidation with EMS especially in the borderless manner in which EMS operates. As stated by Industry Canada, Innovation, Science and Economic Development Canada, “A flexible policy would enable interoperability as required, and take into account shared public safety needs in a given geographic area.”

c. Paramedic Services

As outlined in Section 5 Future Paramedic Services Considerations, in order for WRPS to implement a consolidated communication system including EMS they would have to ensure that the borderless, stateless style of operation would be maintained. Proposing a consolidation platform without addressing their current method of operation and integration with the surrounding jurisdictions would not manifest itself with agreement from MOHLTC. To accomplish this would require significant changes to the Hexagon CAD system as outlined in Section 5. Hexagon CAD has large EMS systems in use, the largest in Canada being for the BC Ambulance Service at their 3 land and 1 air ambulance dispatch centres. That means that Hexagon has existing EMS functionality including Medical Priority Dispatch System and electronic patient care record (ePCR) integration. That said, extensive modifications would still be required, but could be built on a fundamentally strong EMS CAD platform.

d. Future Technology That’s Available Now

i. Attend Anywhere

In the United Kingdom, North East Ambulance Service (NEAS) is using ‘Attend Anywhere’ software to allow ambulance staff to speak via video link to patients who require advice but may not need an ambulance to attend to them. After going through the triage system on either NHS111 or 999, patients who need to speak to a clinician may be given a secure link via text message, which will take them through to a video call on their smart phone or tablet.


ii. Video Calls

In San Antonio, 911 dispatchers are using video calls to help reduce unnecessary ambulance responses. Callers who don’t appear to be in a life-threatening situation are transferred to a

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17 https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf09133.html#s5
18 https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf09133.html#s5
special clinical dispatcher. That dispatcher then sends the patient a link for a smart phone app called Good Sam, and both sides are able to talk via a video connection.

In addition to the dispatcher clinician being able to see the patient, the application can check respiration, O2 saturation, and pulse. San Antonio estimates the application, implemented in late 2020, has eliminated an average of 13 ambulance responses daily. The fire department used the application around 40 times a day during February 2021’s winter storm in order to help callers experiencing water and electricity issues. You can see a video here https://www.firehouse.com/tech-comm/cad-dispatch-systems/video/21220521/tx-dispatchers-use-911-video-calls-to-reduce-ambulance-runs.

iii. GoodSAM

In those rare medical cases when time counts, such as cardiac arrest, fire and paramedics can’t respond quickly enough. In that case, alerting someone in the area of the incident, combined with the use of a public access defibrillator offer a better patient outcome while fire and paramedics are responding.

The GoodSAM app (apparently not the same one as used in San Antonio) alerts people who are trained in CPR and the use of an Automated External Defibrillator, and who have volunteered through the application to respond. If a GoodSAM responder is within 1000 metres of a suspected cardiac arrest they will receive an alert via their phone giving them the opportunity to respond. The app also shows responders the location of the incident and the known closest AEDs. The application offers different response and volunteer levels depending on a person’s training. https://www.stjohn.org.nz/first-aid/goodsam/

A point to be aware of about these Future Technology That are Available Now possibilities is that none of them depend on NG911 to be activated since they are internet based.

e. NG911

The greatest potential impact of technology in the future is the migration to Next Generation 911. As outlined in Section 4, part c, “the public will be able to make voice, text, or video emergency "calls" from any communications device via Internet Protocol-based networks. In the future, PSAPs will also be able to receive data from personal safety devices such as Advanced Automatic Collision Notification systems, medical alert systems, and sensors of various types”.

This means that potentially much more data about the call (for example telematics information from OnStar that may include number of passengers in a car that is reporting a collision) may be available including more precise location information.

Perhaps more prescient is the potential advent of live video streaming – can video from the scene inform type of response required? Seeing video of a collision scene may help determine
the magnitude of a collision to help ascertain the number of vehicles that should be dispatched, or if people are trapped necessitating fire rescue response. Seeing video of a structure fire may help determine before on scene arrival that a second alarm is required.

Furthermore, as stated in Section 4, “the NG911 network called Emergency Services IP Network (ESI-net) will support networking of 9-1-1 services, and transfer emergency calls to other PSAPs - including any accompanying data”.

What this means is that the opportunity may exist for WRPS to offer overflow call taking service to the PRIDE police agencies to help them handle call surges that typically come with many public events such as collisions. While that would require minor changes to the CAD platform to route calls taken by WRPS, on behalf of a PRIDE member, to the PRIDE agency dispatch queue, the NG911 platform would enable this type of service.

Video calls may also help if other services are offered, such as transferring mental health calls to a mental health practitioner in the communication centre. Being able to see a suicidal caller for example, may provide more information about the threat level that individual poses to themselves.

NG911 also requires the same equipment at primary, secondary, and backup PSAPs.
## 15. Summary Assessment

The assessment criteria that follow are provided at a high level for discussion purposes and explanation. It assumes that staff are fully trained and competent unless indicated otherwise.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Status Quo: Independent Communication Centers</th>
<th>Centralized Call Taking – Separated Dispatch</th>
<th>Co-located Communication Centers</th>
<th>Combined or Integrated Communication Centers</th>
<th>Consolidated Center</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Service Levels: Summary Assessment</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Service levels</td>
<td>It is assumed that the service levels that are currently in place will continue – no impact on service levels.</td>
<td>Assuming staff are trained and competent, and staffing levels are as recommended, service levels should not be affected positively or negatively</td>
<td>There is no evidence that service levels will be affected positively or negatively</td>
<td>There is no evidence that service levels will be affected positively or negatively</td>
<td>There is no evidence that service levels will be affected positively or negatively</td>
</tr>
<tr>
<td>Community safety</td>
<td>There is no evidence that service levels, thus community safety, will be affected positively or negatively</td>
<td>There is no evidence that service levels, thus community safety, will be affected positively or negatively</td>
<td>There is no evidence that service levels, thus community safety, will be affected positively or negatively</td>
<td>There is no evidence that service levels, thus community safety, will be affected positively or negatively</td>
<td>There is no evidence that service levels, thus community safety, will be affected positively or negatively</td>
</tr>
<tr>
<td>First responder safety</td>
<td>There is no evidence that first responder safety will be affected positively or negatively</td>
<td>There is no evidence that first responder safety will be affected positively or negatively</td>
<td>There is no evidence that first responder safety will be affected positively or negatively</td>
<td>There is no evidence that first responder safety will be affected positively or negatively</td>
<td>There is no evidence that first responder safety will be affected positively or negatively</td>
</tr>
<tr>
<td>Impact on all emergency response times including impact on medical</td>
<td>There is no evidence that service levels will be</td>
<td>There could be a small reduction in call taking time because the 911 call</td>
<td>There is no evidence that service levels will be</td>
<td>Assuming that the call taker is a ‘common call taker’ for 911 and</td>
<td>There could be a small reduction in call taking time because the 911 call</td>
</tr>
<tr>
<td>Models</td>
<td>Status Quo: Independent Communication Centers</td>
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<tr>
<td>emergency response times involving the tiered response agreement</td>
<td>affected positively or negatively</td>
<td>affected positively or negatively</td>
<td>responding service, a reduction in call taking times like the Common Call Taking Separated Dispatch model would occur. As with the Common Call-Taking model, this is an internal workload consideration rather than a favourable impact on medical emergency response times to the public. Seconds rarely make a difference in more than a few percent of medical calls (only about 5% are time sensitive, and those aren’t measured in seconds), and the public doesn’t experience any delay because of the process.</td>
<td>taker, if he or she is also the responding service’s call taker, would not have to transfer the call to another agency and remain on the line to ensure transfer of information took place. The improvement is expected to be 20 to 30 seconds per call. This is a workload consideration rather than a favourable impact on medical emergency response times to the public. Seconds rarely make a difference in more than a few percent of medical calls (only about 5% are time sensitive, and those aren’t measured in seconds), and the public doesn’t experience any delay because of the process.</td>
<td></td>
</tr>
</tbody>
</table>
**Status Quo: Independent Communication Centers**

- Potential for service delivery to other municipalities or agencies outside Waterloo Region:
  - Each service—police and fire—could offer services to municipalities and agencies outside Waterloo Region but providing dispatch and radio services or other technology might be more complex because of technology agreements with more than one service provider.
  - WRPS already offers services outside of the Region (PRIDE partners) and dispatches for municipal by-law.

**Centralized Call Taking – Separated Dispatch**

- Offering service outside the Region could be more complex because agreements would have to be made with two provider agencies (call taking and dispatch). Technology agreements may also be more complex because of the possibility of two agreements being required.

**Co-located Communication Centers**

- Like the Common Call Taking – Separated Dispatch model, potential clients would still have to reach agreements with more than one provider.

**Combined or Integrated Communication Centers**

- Better potential for providing service to clients outside the Region since clients would have only one provider with which to reach an agreement.

**Consolidated Center**

- Best potential for providing services to outside clients since clients would have only one administrative organization to deal with.

---

<table>
<thead>
<tr>
<th>Technology and Operations: Summary Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational interoperability</td>
</tr>
</tbody>
</table>

<p>| Communication interoperability | Communications interoperability has been achieved already through a common platform. None of these dispatch models is likely to lead to responders from police, fire, and EMS agencies talking to each other directly; it is easier to communicate through dispatch. There is only one |</p>
<table>
<thead>
<tr>
<th>Models</th>
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</thead>
<tbody>
<tr>
<td>police agency, and one paramedic service. Fire services can already, by virtue of a common platform talk to each other. There are no identifiable communication interoperability advantages in any of the models.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology - CAD/Telephony</td>
<td>No changes to current platform other than what is currently planned. A reduction in licensing costs since there will be one or two fewer call taker positions than with the status quo.</td>
<td>No changes to current platform other than what is currently planned. A reduction in licensing costs since there will be one or two fewer call taker positions than with the status quo.</td>
<td>Reduction in number of dispatch seats which results in lower licensing costs. Elimination of high speed MPLS data connection to Fire Dispatch. May require relocation of Home Monitoring equipment.</td>
<td>Reduction in number of dispatch seats. Elimination of high speed MPLS data connection to Fire Dispatch. May require relocation of Home Monitoring equipment.</td>
<td></td>
</tr>
<tr>
<td>Technology – Radio system</td>
<td>No changes to current radio system infrastructure</td>
<td>No changes to current radio system infrastructure</td>
<td>Reduction in the number of firehall alerting positions required. Elimination of radio system connections at fire dispatch. Moving to a new centre may require changes to radio system infrastructure depending on location and links required.</td>
<td>Reduction in number of firehall alerting positions required. Elimination of radio system connections at fire dispatch and fire backup centre. Moving to a new centre may require changes to radio system infrastructure depending on location and links required.</td>
<td>Reduction in number of firehall alerting positions required. Elimination of radio system connections at fire dispatch and fire backup centre. Moving to a new centre may require changes to radio system infrastructure depending on location and links required.</td>
</tr>
<tr>
<td>Standardized call handling</td>
<td>We have concluded that standardized call handling is not something that would be accomplished in any of the models under consideration. Fire and police incidents are different in nature and distinct questions must be asked of a caller. If EMS communications becomes part of one of these models, medical algorithm questions will still have to be as asked as they are now.</td>
<td></td>
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</tbody>
</table>

Page | 51
## Status Quo: Independent Communication Centers

- Plans to implement NG9-1-1 platform require seats for fire dispatch and the backup centre. Requires IP connection to ESInet which is the backbone of NG9-1-1.

## Centralized Call Taking – Separated Dispatch

- Small reduction in number of seats for NG9-1-1 telephony platform and a minimal reduction in licensing – maintenance costs.

## Co-located Communication Centers

- Require same number of NG9-1-1 telephony seats as the status quo. Reduction in IP connection and associated network equipment required to ESInet.

## Combined or Integrated Communication Centers

- Reduced number of seats required for NG91-1 telephony platform. Reduction in IP connection and associated network equipment required to ESInet.

## Consolidated Center

- Reduced number of seats required for NG91-1 telephony platform. Reduction in IP connection and associated network equipment required to ESInet.

### Operational efficiency

None of these models is more operationally efficient or effective than another. There is distinct staffing resource efficiency in the consolidated model and, to a lesser extent in the combined-integrated model but operational efficiency and effectiveness depends on how well the organization is operated and governed so consolidation, as a model, does not mean it is any more effective operationally than other models.

### Staffing and Labour: Summary Assessment

<table>
<thead>
<tr>
<th>Staffing impacts:</th>
<th>Status Quo</th>
<th>Centralized Call Taking – Separated Dispatch</th>
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<th>Combined or Integrated Communication Centers</th>
<th>Consolidated Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are no staffing impacts for the status quo. The status quo is the baseline against which the other models are measured.</td>
<td></td>
<td>This model represents a potential reduction of one position at approximately $85,000 annually</td>
<td>There are no staffing impacts in this model. Co-location means that the communication centers operate independently in the same building.</td>
<td>We estimate that there could be an efficiency of two positions in this model, representing approximately $170,000 a year. But the estimate is dependent upon the number of staff who are capable to call take and dispatch for both police and fire. More important is the fact that in a combined or integrated communications centre, the greatest economic opportunity with a potential net offset of $733,000 annually after increasing trainer complement by two positions. However, please see the staffing impact notation below.</td>
<td>This model offers the greatest staffing efficiency opportunity with a potential net offset of $733,000 annually after increasing trainer complement by two positions. However, please see the staffing impact notation below.</td>
</tr>
</tbody>
</table>
## Review of Fire and Police Communications and Dispatch in Waterloo Region

### Models

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<tbody>
<tr>
<td>Efficiency is achieved when all staff are fully trained; so, essentially a consolidated model. This means that two additional trainers, at a conservative estimate of $200,000 annually for both, will be needed to help achieve as close to a 'consolidated' staffing model as possible. It's possible that $200,000 a year could be incurred to save $170,000, although the savings are likely to be greater than that.</td>
<td></td>
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</table>

### Staffing impacts notation

All staffing impact comments presented here are dependent upon a staffing model that redistributes staff levels to be more aligned with call volume. Current communicator staffing at both the fire and police centres are static meaning that staff levels are essentially uniform 24 hours a day even though call volume, in some hours, declines buy up to 60% from higher volume hours.

### Staff requirements

- **No change.**
- A potential reduction of one full time equivalent position.
- No staff requirement changes from current.
- A potential decrease in two FTE positions, or more, but an increase in two trainer positions at a higher rate of pay.
- A potential decrease of 22,890 hours of staffing per year or almost 11 FTE, plus an increase in two trainer positions resulting in a decrease of 9 FTE. Please see Staff Impact Notation above.
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</thead>
<tbody>
<tr>
<td>Impact on recruitment, selection, intake, training</td>
<td>No change</td>
<td>All call takers would have to meet police service’s recruitment, selection, intake, and training requirements.</td>
<td>No change</td>
<td>All staff would have to meet police service’s recruitment, selection, intake, and training requirements.</td>
<td>All staff would have to meet police service’s recruitment, selection, intake, and training requirements.</td>
</tr>
<tr>
<td>Scheduling and roster impact</td>
<td>No change</td>
<td>There may be minimal change in scheduling and rostering for call takers – but unknown at this point</td>
<td>No change</td>
<td>Scheduling and rostering would be dependent on the number of staff who can fulfill all call taking and dispatching tasks. There will be changes from current but the degree is unknown.</td>
<td>Major change in scheduling and rostering. Please see Staffing Impacts Notation above. However, this model is also influenced by the number of staff who are competent at all call taking and dispatching tasks but the target is that 80% to 90% would be.</td>
</tr>
<tr>
<td>Staff retention</td>
<td>No change</td>
<td>Unlikely to precipitate a change in retention.</td>
<td>No change</td>
<td>A decrease in retention may occur due to a higher, although not overwhelming, workload in a combined centre. Staff have told us they prefer being busy because it ‘makes the shift go faster’. it’s uncertain that a</td>
<td>A decrease in retention may occur due to a higher, although not overwhelming, workload in a consolidated centre. Staff have told us they prefer being busy because it ‘makes the shift go faster’. it’s uncertain that a</td>
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## Review of Fire and Police Communications and Dispatch in Waterloo Region

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<td></td>
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<td></td>
<td>variance in retention could be attributed to the model</td>
<td>variance in retention could be attributed to the model</td>
</tr>
<tr>
<td>Labour relations</td>
<td>No changes</td>
<td>This model is dependent on a) resolution of the No Contracting Out clause in the Kitchener Professional Firefighters Collective Agreement and b) the ability to employ scheduling based on workload and call volume. Scheduling is part of the collective agreements for both firefighters and civilian police employees.</td>
<td>No changes</td>
<td>This model is dependent on a) resolution of the No Contracting Out clause in the Kitchener Professional Firefighters Collective Agreement and b) the ability to employ scheduling based on workload and call volume. Scheduling is part of the collective agreements for both firefighters and civilian police employees.</td>
<td>This model is dependent on a) resolution of the No Contracting Out clause in the Kitchener Professional Firefighters Collective Agreement and b) the ability to employ scheduling based on workload and call volume. Scheduling is part of the collective agreements for both firefighters and civilian police employees.</td>
</tr>
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## Financial: Summary Assessment

<table>
<thead>
<tr>
<th>Financial impact:</th>
<th>Capital costs to implement</th>
<th>Capital costs ongoing</th>
<th>Operating costs to implement</th>
<th>Operating costs ongoing</th>
<th>Cost contributions from agencies;</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Please see Appendices J and K</td>
<td>Please see Appendices J and K</td>
<td>Please see Appendices J and K</td>
<td>Please see Appendices J and K</td>
<td>No change</td>
</tr>
<tr>
<td></td>
<td>This represents a reduction in technology costs of $59,192 per year and a potential staffing efficiency of $85,000 a year which could represent Co-located communications has no impact on staff costs. There is a very small reduction in annual licensing, but the capital</td>
<td>Co-located communications has no impact on staff costs. There is a very small reduction in annual licensing, but the capital</td>
<td>As with the co-located model, cost for capital and maintenance could be distributed based on space that would be needed and used in stand-alone</td>
<td>As with the co-located model, cost for capital and maintenance could be distributed based on space that would be needed and used in stand-alone</td>
<td></td>
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<td>Models</td>
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<tr>
<td></td>
<td>a reduction in costs for fire services currently dispatched by Kitchener.</td>
<td>cost of a building at approximately $46,000,000 plus a one time investment in new communications consoles of $1.085 million represents a large investment with little to show in benefit. Contribution to the costs could be based on the pro rata of space that might be required for police communications and fire communications if they were separate.</td>
<td>centres, plus a pro rata based on the existing dispatch agreements. This, though, doesn’t resolve the capital costs that may be allocated to fire departments, considering that they would not be incurred if the fire communications centre remained at its current location.</td>
<td>centres, plus a pro rata based on the existing dispatch agreements. This, though, doesn’t resolve the capital costs that may be allocated to fire departments, considering that they would not be incurred if the fire communications centre remained at its current location.</td>
<td></td>
</tr>
<tr>
<td>Physical space requirements: Summary Assessment</td>
<td>No change in space required for the fire dispatch. Police services will need additional space as a priority considering it will take several years before space is useable and commissioned.</td>
<td>No change in space requirements for the fire dispatch. Theoretically, call taking could be centralized and the 911 centre – police fire dispatch although WRPS have identified that no additional staff can be accommodated.</td>
<td>A co-located building will require up to 39,000 square feet or more to house separate fire and police communications facilities. Depending on the cost per foot, which could range from $800 to $1,100 a square foot, capital cost might be between $31,000,000 and</td>
<td>A combined or integrated communications centre, and a consolidated centre require generally the same amount of space, estimated at 37,778 square feet with a cost between $33,400,000 and $45,960,000.</td>
<td></td>
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</tbody>
</table>
## Review of Fire and Police Communications and Dispatch in Waterloo Region

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<tbody>
<tr>
<td>$42,000,000. The fire communication service is adequately housed and do not need to consider a move.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Governance: Summary Assessment</td>
<td>No change in governance required</td>
<td>No change in governance required although quality assurance standards would have to be monitored for fire dispatch.</td>
<td>No change in governance</td>
<td>Strong governance board or entity required to oversee either the combined – integrated model or the consolidated model</td>
<td></td>
</tr>
<tr>
<td>Future Growth Potential: Summary Assessment</td>
<td>Growth potential is possible although potential dispatch clients may have to sign two contracts; one for dispatch services and one for communications hardware – software. Alternatively, Kitchener Fire Department could take on a supplier role for hardware software meaning that new clients would have to contract with just one agency.</td>
<td>Same as status quo</td>
<td>Same as status quo</td>
<td>Similar to status quo although since this would be a single entity, no third-party contract holder would be required for hardware – software as in the previous three models.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Similar to status quo although since this would be a single entity, no third-party contract holder would be required for hardware – software as in the previous three models.</td>
<td>Similar to status quo although since this would be a single entity, no third-party contract holder would be required for hardware – software as in the previous three models.</td>
<td>Similar to status quo although since this would be a single entity, no third-party contract holder would be required for hardware – software as in the previous three models.</td>
<td>It may be possible that a greater emphasis could be put on marketing services to other municipalities if it is a single entity promoting the idea.</td>
<td></td>
</tr>
<tr>
<td>Overall Assessment</td>
<td>There is no evidence that this model underperforms or increases risk to the</td>
<td>This model would make better use of staff and slightly reduce the overall</td>
<td>This is the same as the status quo except there would be a large capital</td>
<td>This model is potentially more efficient with respect to surplus staff capacity</td>
<td>This model is potentially the most efficient of all the</td>
</tr>
</tbody>
</table>
## Models

<table>
<thead>
<tr>
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<tr>
<td><strong>public or responders. The technology platform is shared throughout the Region which is the same in the five models being assessed.</strong>&lt;br&gt;There is a greater level of surplus staff capacity in this model and is one of the most inefficient under review, but it is not ineffective.</td>
<td>surplus capacity, and it would slightly reduce the telephone committed time during the 911 portion of call taking but this is only about 300 hours a year overall and it doesn’t have any impact on the public except that it may occasionally increase wait time for 911 callers who have not been answered and are in queue.&lt;br&gt;There is no evidence that this model would underperform or outperform other models or increase risk to the public or responders.</td>
<td>cost for a new building. A new or renovated building is required by police communications but not fire. The fire dispatch is satisfactory for the foreseeable future. &lt;br&gt;There is no evidence that this model would underperform or outperform other models or increase risk to the public or responders.</td>
<td>than all but the consolidated model. There would be a large capital cost for a building to house the dispatch service and there is an unknown recovery period because there is no way to forecast the number of staff that will be required to operate this model. &lt;br&gt;There is no evidence that this model would underperform or outperform other models or increase risk to the public or responders.</td>
<td>models from a use of staff perspective.&lt;br&gt;It has the potential of being the most operationally and technologically effective but not by a wide margin.&lt;br&gt;Strategically, assuming it is well governed and operated, it has the greatest potential of expansion and marketing services than the other models.&lt;br&gt;A new communications facility is required for this option to be considered and the potential for cost recovery on the capital, due to efficient and effective use of staff, is only possible if the cost of a new building for a stand-alone police</td>
</tr>
<tr>
<td>Models</td>
<td>Status Quo: Independent Communication Centers</td>
<td>Centralized Call Taking – Separated Dispatch</td>
<td>Co-located Communication Centers</td>
<td>Combined or Integrated Communication Centers</td>
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<tr>
<td>----------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Probability of success; impediments; risk</td>
<td>No impediments; the status quo remains; the police service will still have to incur the cost of a new or renovated communications centre. There is no measurable risk.</td>
<td>The return on investment is small but this model makes better use of resources than the status quo. There is a major impediment with respect to collective agreements (see Labour Relations above). There is no measurable risk</td>
<td>There is no benefit in this model and it is not recommended considering it is the status quo but located in a new building which incurs substantial capital cost.</td>
<td>This model represents a set of unknowns: how many staff will be able to fulfill the requirements of police and fire communicators? how many staff will be required on each shift rotation? does this represent improved efficiency and effectiveness than other</td>
</tr>
<tr>
<td>Models</td>
<td>Status Quo: Independent Communication Centers</td>
<td>Centralized Call Taking – Separated Dispatch</td>
<td>Co-located Communication Centers</td>
<td>Combined or Integrated Communication Centers</td>
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<tr>
<td></td>
<td>models including the status quo?</td>
<td></td>
<td></td>
<td>virtue of having a single department to deal with.</td>
</tr>
<tr>
<td></td>
<td>The labour relations considerations add to the uncertainty. Under the current circumstances of having a police and a fire communication centre in the region, competently functioning, this model is not recommended.</td>
<td></td>
<td></td>
<td>Strategically, it is better suited to accommodate change such as the possibility of ambulance communications becoming regionalized.</td>
</tr>
<tr>
<td></td>
<td>The impediments are labour relations and collective agreements as noted several times in this summary and throughout the report.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Centralizing regional fire and police call taking and dispatch offers the best administrative support to implementing the Strategic Innovation and Opportunities outlined in Section 14 of the report.</td>
<td></td>
<td></td>
<td>Having one administration responsible for assessing</td>
</tr>
</tbody>
</table>
## Review of Fire and Police Communications and Dispatch in Waterloo Region

<table>
<thead>
<tr>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Status Quo:</strong> Independent Communication Centers</td>
</tr>
<tr>
<td>and implementing innovation is expected to be administratively more efficient and effective than several agencies.</td>
</tr>
<tr>
<td>Considering this model to be the most desirable depends on competent governance.</td>
</tr>
</tbody>
</table>

## Conclusion and Principal Recommendation

We recommend a consolidated emergency services communications model because it offers the greatest potential for cost savings, makes best use of staff resources, and strategically positions the region and municipalities to provide service to other municipalities and entities.
16. **Next Steps**

If a decision is made to explore our recommendation further, we suggest the following steps. Short-term steps are defined as in the next two years; medium-term is two to four years; and long-term is thereafter.

a. **Short Term**

- Strike a committee to explore the recommendation further;
- present findings to Waterloo Region, Waterloo Regional Police Service Board, the municipalities for a decision;

Assuming a consolidated model is accepted

- Strike an oversight and steering committee to direct the project;
- establish working groups to conduct preliminary assessments on funding and setting a budget, technology, operations, building and location, labour relations, and development and acceptance of the most appropriate and mutually acceptable governance model;
- choose a Go – No Go target date after working groups have completed their assessments, to make a final decision whether to move forward;
- WRPS to hire two training staff and bring staff up to minimum 80% cross-trained capability by last quarter of 2024;
- WRPS and City of Kitchener to engage respective staff associations to find a route to consolidating communications staff;
- approval to build or renovate a communications centre would have to occur with 18 months of a decision to accept a consolidated model.

b. **Mid-Term**

- Determine a location for a communications centre or renovation;
- issue a Request for Quotation for design or design-build;
- proceed with construction
- start the process of consolidating and cross-training staff into a single organization even though they will continue to work in separate locations (successful cross training for 80% of police service staff has to be accomplished prior to this step);

c. **Long-Term**

- Complete construction and commission the building;
- transfer operations of one of the work units to the new location;
- transfer operations of the second work unit to the new location
- commission the former police communications centre as the backup centre (unless the existing police communications was chosen for renovation.)
Appendix A: Project Scope
Review of Fire & Police Communications/Dispatch in Waterloo Region

Purpose:

The purpose of this review is to explore and analyze options, and make recommendations, on the future provision of fire and police communications/dispatch in Waterloo region, within the broader context of the Public Safety Access Point (PSAP) and the future impact of Next Generation 911 (NG911).

Scope:

1. Review progress against Kimball Report and Rubenstein Report
   b. Analyze and document progress that has been made to date towards the vision outlined in the Kimball and Rubenstein report, identify gaps and opportunities that remain and/or exist.

2. Undertake background research and analysis
   a. Learn best practices by researching and documenting fire and police communications models being utilized by other municipalities within Ontario, North America and beyond in the context of their Public Safety Access Point model, and the context of implementing NG911 within Police and Fire services.

3. Review of options
   a. Analysis of pros and cons and cost benefit analysis of moving towards previous reviews’ vision vs. the status quo vs. other plausible options/scenarios identified, including:
      i. impact on medical emergency response times involving the tiered response agreement
      ii. first responder safety
      iii. community safety
      iv. operational interoperability
      v. service levels
      vi. technology
      vii. standardized call handling
      viii. governance
      ix. shared cost models/financial impact of proposed models
x. personnel and labour relations
xi. physical space requirements, and
xii. location options

Analyze cost-benefit of options including community impacts and safety of first responders; quantify the costs of options, including budget requirements and anticipated partner contributions.

b. Analyze, and provide a confidential formal legal opinion on, legal issues identified during the review, including labour relations implications/options, and legislated agreements, e.g., Tiered Response Agreement and provincial simultaneous dispatch tool.

c. Consider potential for service delivery to other municipalities/agencies outside the Region of Waterloo.

4. Based on the information above, make recommendations as to:

a. The most effective, efficient and appropriate dispatch service delivery model for Fire and Police within a broader Public Safety Access Point model.

b. Workplan enhancements and budget requirements to support future technology upgrades and acknowledging future NG911 requirements.

5. Identify short – medium – long-term next steps.
Appendix B: Operational Configuration
The Communications Capability diagram shown below indicates the number of positions, sometimes called ‘seats’, at the fire communications centre, and the technical capabilities. The five positions are capable of both call taking and dispatching.

**Communications Complement (Approved)**
- Chief of Communications (1)
- Communications Officers (Supervisors) (4)
- Communicators (Communications Operators) (12)

**Kitchener Fire Dispatch AS-IS Communications Capability**
Review of Fire and Police Communications and Dispatch in Waterloo Region

The Communications Capability diagram shown below indicates the number of positions at the 911 and WRPS communications centre, and the technical capabilities.
Appendix C Organizational Configuration
The diagram below shows the positions at the fire communication centre and their responsibilities.
Review of Fire and Police Communications and Dispatch in Waterloo Region

The diagram below shows the positions at the 911 and WRPS communication centre and their responsibilities.
Appendix D Call Volume Activity Charts
In 2018, the WRPS Communications Centre answered 122,576 911 calls and a further 211,335 non-emergency calls. However, non-emergency calls may still be serious in nature with people reporting thefts, assaults, seeking personal assistance, and other reasons. Non-emergency calls are also handled by police call takers and must be included in overall call load.

In 2019, WRPS communicators answered over 145,000 911 calls and 229,385 non-emergency calls. The average call patterns by hour of day are shown in Exhibit 1 and Exhibit 2.
In 2019, based on computer aided dispatch (CAD) information, 293,445 police units were dispatched to 273,135 events recorded in the computer aided dispatch system. This included officer initiated incidents.

Although the volume of calls is higher in 2019 than 2018 the distribution of incidents is similar. And, although these charts represent annual average distribution, when call volumes are assessed on a day by day and hour by hour basis (information has been assessed but not presented here) peak call loads occur on Fridays and Saturdays in the hours around midnight.

a. Fire Communications and Dispatch

The fire communications centre received just over 31,000 911 calls in 2019. That dropped to 18,927 incidents in 2020 because of COVID considerations.

The 31,102 fire call incidents in 2019 resulted in over 57,000 vehicle dispatches which followed a similar distribution as incidents shown in Exhibit 3.
Exhibit 4 shows the call volume relationships in 2019 between 911 calls, non-emergency calls, and fire calls. Fire calls depicted by the yellow line are included in the quantity of calls handled by the 911 call takers and then transferred to the fire communications centre as described earlier.
Exhibit 4: Fire and Police Call Volume and Distribution 2019

Exhibit 5 shows the volume change of 911 calls by year. Volume change for non-emergency calls since 2016 – 2017 was unavailable.

Exhibit 5: 911 Call Volume Change by Year
Exhibit 6: Computer Aided Dispatch Volume from Calls Received and Officer Initiated Activity

Exhibit 7 indicates the number of police units dispatched by hour, on average, in 2019. This information, based on computer aided dispatch (CAD) activity includes officer initiated incidents. In 2019, 293,445 police vehicles were dispatched to 273,135 events recorded in the computer aided dispatch system.

Exhibit 7: Distribution of Police Vehicle Dispatches by Hour 2019

Exhibit 8 demonstrates the distribution of police vehicle activity (dispatch) by day and hour in 2019. Exhibit 9 represents the same for the fire communications centre.

Please note that each hour shown by day occurs 52 times a year. Therefore, to determine the average hourly volume by day requires dividing the indicated volume by 52. As an example, the peak average police CAD activity occurred on Saturdays between 11 PM and midnight with 3,214 dispatches; divided by 52 results in an average of 62 dispatches per hour.
Exhibit 8: Distribution of police vehicles dispatched (CAD activity) by day and hour in 2019

WRPS: Number of Police Units Alerted by Day and Hour in 2019

Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
Exhibit 9: Distribution of Unique CAD Incidents in 2019

Kitchener Fire Dispatch: Number of Unique CAD Incidents by Hour and by Day in 2019
The charts above indicate the distribution of several call types: 911, non-emergency, fire related; and the distribution of dispatch activity which essentially follows the 911 and non-emergency call receiving activity.

Although the annual pattern of calls varies depending on whether they are incoming telephone calls, dispatches, and police or fire, they all generally follow a wave pattern showing most activity from approximately 0800 hours (8:00 AM) to 2100 hours (9:00 PM) and the lowest activity periods from midnight to 0600. That varies on weekends with peaks on Friday and Saturdays around the midnight hours.

Exhibit 11 shows the relationship of 911 call volume to police CAD activity (dispatch) to population change. The intent of this chart is to demonstrate whether there has been an association between population change and incident activity. We have not taken 2020 into account for both police and fire because of the COVID effect.

We don’t consider that population change is directly consistent with call taking and dispatch activity.

Exhibit 12 shows population forecast in Waterloo Region with 2020 as the base year for calculating percentage change. The horizontal orange line and right vertical axis indicate percentage change, and the blue bars show population change.

Exhibit 12: Waterloo Region Population Forecast to 2031
Appendix E: Next Generation 911 (NG911)
b. Progress of the Communications Centres Relative to Earlier Studies

Following the 2014 Kimball report, Waterloo Regional Police Service and the municipal fire services in Waterloo Region set out to implement the technology recommendations contained therein in support of a possible future communications consolidation. Most of the work involved moving the fire dispatch, operated by the Kitchener Fire Department, to the Hexagon CAD system used by WRPS. Migrating to a Motorola P25 radio network was also a major consideration.

As a result of following this roadmap WRPS and Kitchener Fire are positioned well to continue the current organizational and operational model or move to one of the other models under consideration. The implementation of Next Generation 9-1-1 could facilitate other operating models that will be discussed in the NG911 section that follows.

To support the combined CAD platform and the P25 radio system WRPS committed to:

- manage the shared system server equipment and software
- manage the network and security services
- implement and manage the radio system
- manage emergency backup systems
- centrally coordinate and ensure up-to-date and consistent mapping & information databases.

Table 4 references the technology recommendations in the Kimball report and the status regarding implementations.

---

19 Common Technology Platform for Police and Fire Dispatch in Waterloo Region, CAO Presentation 04-18-2017

20 Excerpt from Technology Report authored by, Cathy Marks, Program Manager, Fire Systems and Projects, Fire Dept. City of Kitchener
## Table 4: Kimball Report (2014) Recommendations and Status

<table>
<thead>
<tr>
<th>Report Reference</th>
<th>System</th>
<th>Recommendation by Kimball</th>
<th>Update</th>
<th>Go Live Date</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3</td>
<td>Next Generation 911</td>
<td>CAD and telecoms changes to support NG911 Voice</td>
<td>Project will be starting shortly in conjunction with WRPS / PRIDE</td>
<td>2023</td>
<td>In Progress</td>
</tr>
<tr>
<td>4.4.8</td>
<td>P25 Voice Radio System</td>
<td>Regional interoperable P25 System</td>
<td>Phase 1 Completed July, 2020 Phase 2 in progress KFD has hired Five9 to help with implementation of Phase 2</td>
<td>2020</td>
<td>Phase 1 Complete Phase 2 In Progress</td>
</tr>
<tr>
<td>5.5.1.1 - 1</td>
<td>Computer Aided Dispatch</td>
<td>Expansion of the Intergraph CAD system in use by PRIDE to include the dispatch of both law enforcement and fire agencies</td>
<td>KFD Dispatch went live with WRPS/PRIDE - Hexagon CAD in April 2019</td>
<td>2019</td>
<td>Completed</td>
</tr>
<tr>
<td>5.5.1.1 - 2</td>
<td>Computer Aided Dispatch Fire Module</td>
<td>Fire Module turned on within the existing CAD system with WRPS</td>
<td>KFD Dispatch went live with WRPS/PRIDE - Hexagon CAD in April 2019</td>
<td>2019</td>
<td>Completed</td>
</tr>
<tr>
<td>5.5.1.1 - 3</td>
<td>CAD Emergency Medical Services – Technology Interoperability Framework (EMS_TIF) Interface</td>
<td>Implement the EMS-TIF/ CAD interface</td>
<td>WRPS/Hexagon developed a solution for the EMS-TIF interface. Solution going live January 2022</td>
<td>2022</td>
<td>In Progress</td>
</tr>
<tr>
<td>5.5.1.1 - 4</td>
<td>CAD / Direct Detect Software Interface</td>
<td>Direct Detect Mastermind Fire Alarm system interface with CAD</td>
<td>Mastermind / CAD interface project in progress</td>
<td>2022</td>
<td>In Progress</td>
</tr>
<tr>
<td>5.5.1.1 - 5</td>
<td>CAD / Bell Interface</td>
<td>CAD Interface with Bell 511</td>
<td>Live with CAD Hexagon Implementation</td>
<td>2019</td>
<td>Completed</td>
</tr>
<tr>
<td>5.5.1.1 - 6</td>
<td>CAD / 9-1-1 Answering Equipment</td>
<td>CAD Interface with 9-1-1 answering equipment</td>
<td>Live with CAD Hexagon Implementation</td>
<td>2019</td>
<td>Completed</td>
</tr>
<tr>
<td>5.5.1.1 - 7</td>
<td>CAD Unit Recommend</td>
<td>Implement unit recommend fire services, automatically send initial aid</td>
<td>Live with CAD Hexagon Implementation</td>
<td>2019</td>
<td>Completed</td>
</tr>
<tr>
<td>5.5.1.1 - 8</td>
<td>CAD Backup Technology</td>
<td>Redundancy should exist, no single point of failure</td>
<td>Redundancy built on the WRPS / PRIDE side</td>
<td>2019</td>
<td>Completed</td>
</tr>
</tbody>
</table>
## Review of Fire and Police Communications and Dispatch in Waterloo Region

<table>
<thead>
<tr>
<th>Report Reference</th>
<th>System</th>
<th>Recommendation by Kimball</th>
<th>Update</th>
<th>Go Live Date</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.5.1.1 - 9</td>
<td>CAD System Capacity</td>
<td>System capacity is guaranteed</td>
<td>Tested with WRPS / PRIDE before going live in 2019</td>
<td>2019</td>
<td>Completed</td>
</tr>
<tr>
<td>5.5.1.1 -10</td>
<td>CAD 24/7 Support</td>
<td>System support and maintenance coverage</td>
<td>WRPS / PRIDE provide first level help desk support 24/7. Escalation process in place</td>
<td>2019</td>
<td>Completed</td>
</tr>
<tr>
<td>5.5.1.1 -11</td>
<td>CAD Interfaces</td>
<td>Interfaces to existing fire systems</td>
<td>RMS interface completed with CriSys in 2019, new RMS system interfaces in 2021 and 2022. All other interfaces are in progress (MAS, P25)</td>
<td>Ongoing</td>
<td>In Progress</td>
</tr>
<tr>
<td>5.5.1.1 -12</td>
<td>CAD Backup Plan</td>
<td>Manual back up plan in place if there is a system failure or if KFD needs to evacuate they go to the back up centre</td>
<td>Manual back up plan or Alternate Emergency Communication Centre</td>
<td>2022</td>
<td>In Progress</td>
</tr>
<tr>
<td>5.5.2</td>
<td>GIS Mapping</td>
<td>GIS Data in the CAD systems remains accurate, current and is always up to date</td>
<td>Completed all recommendations and GIS teams from all cities and townships are pushing their mapping requirements to WRPS / PRIDE. Regular map updates to be pushed out every six months</td>
<td>Ongoing</td>
<td>In Progress</td>
</tr>
<tr>
<td>5.5.3.1</td>
<td>Mobile Data</td>
<td>Integrated mobile data solution with recommended CAD vendor</td>
<td>Completed all recommendations and KFD went live with WRPS / PRIDE issued MDTs</td>
<td>2019</td>
<td>Completed</td>
</tr>
<tr>
<td>5.5.4.1</td>
<td>RMS</td>
<td>All Fire agencies consolidate to a single RMS</td>
<td>Selected Option 1: All of Fire will be moving to the new Records Management software called Emergency Reporting Kitchener Fire - July 26th, 2021 Wellesley - July 26th, 2021 Wilmot - end of 2021 Woolwich - 2022 Waterloo - end of 2021 Cambridge - 2022 North Dumfries - 2022</td>
<td>2021</td>
<td>In Progress</td>
</tr>
</tbody>
</table>
Review of Fire and Police Communications and Dispatch
in Waterloo Region

Table 5 includes additional comments about the implementation status in Table 4

Table 5: Technology Implementation Additional Information

<table>
<thead>
<tr>
<th>Kimball Report (2014) Section</th>
<th>Additional Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3 Next Generation 9-1-1</td>
<td>Reference NG911 Section of this report.</td>
</tr>
<tr>
<td>4.4.8 P25 Radio System</td>
<td>Reference Radio Section of this report.</td>
</tr>
<tr>
<td>5.5.1.1-1 Computer Aided Dispatch and 5.5.1.1-2 Computer Aided Dispatch Fire Module</td>
<td>The migration of fire to the police Hexagon CAD platform was completed in 2019. To maintain separation of confidential police information from the fire dispatch component, the WRPS domain is separate from fire and fire communications positions, they do not have a Canadian Police Information Centre originating agency identifier, and therefore cannot connect to CPIC. The fire CAD computers are stand alone and City of Kitchener applications are run on separate municipal computers, not on the CAD computers. Police and fire record management systems are separated. Connection from Kitchener Fire to the CAD system is over a dedicated MPLS (Multiprotocol Label Switching) high speed connection to WRPS headquarters.</td>
</tr>
</tbody>
</table>
The existing CAD is capable of supporting multiple Dispatch operating models.

Access to CAD incidents by fire personnel is done via Hexagon I/NetViewer tool that allows for viewing of CAD incidents but not directly on the CAD.

The following simulated call shows the existing CAD system after the call taker has generated a police and fire incident.
<table>
<thead>
<tr>
<th>Kimball Report (2014) Section</th>
<th>Additional Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.5.1.1 - 3 CAD Paramedic-Technology Interoperability Framework Interface</td>
<td>Prior to the implementation of Hexagon CAD for Kitchener Fire, the CrySis CAD platform linked directly to the EMS CAD platform and EMS requests for service were entered directly into the CrySis CAD. The Apexpro 2019 report “Implementation Report Common Technology Platform for Police and Fire Dispatch in Waterloo Region” identified in Section 1.2 that “In agreeing to move to a common technology platform for Police and fire dispatch the group acknowledges that MOHLTC is not prepared to re-establish the EMS-TIF interface, currently used by Kitchener Fire, following the dispatch center’s migration to the shared police-fire CAD platform; and that the Waterloo Regional representatives will need to aggressively advocate the Ministry if access to TIF is be maintained/re-established”. With the advent of Hexagon CAD, currently if Cambridge Central Ambulance Communication Centre (CACC) requests fire to respond it is sent via a web-based application and arrives on a separate monitor at fire communications. The call taker – dispatcher then must transpose that information to the Hexagon CAD. The province plans to implement an application in January of 2022 to enable automatic input into CAD as a one-way interface. With that integration calls created by EMS will be dropped into the fire dispatch queue directly. NOTE: At this time the direct interface will only be for calls in the jurisdiction of Kitchener Fire. It will not include calls for the 4 townships, the city of Waterloo, or the city of Cambridge.</td>
</tr>
<tr>
<td>5.5.1.1 - 4 Direct Detect Software Interface</td>
<td>Direct Detect is an alarm monitoring system and work is in progress to interface directly with the CAD. There are dedicated servers external to the CAD that would have to be relocated to a new combined communication centre.</td>
</tr>
<tr>
<td>5.5.1.1 – 5-6 CAD Bell Interface and In Call Location Updates (ICLU)</td>
<td>Upgrade was completed for IP based ANI/ALI interface with Bell Canada and obtaining location updates for calls in progress. NG911 will require a new interface for location information.</td>
</tr>
<tr>
<td>5.5.1.1 – 7 CAD Unit Recommend</td>
<td>Updating the CAD to automatically recommend vehicles for response based on pre-plans. This has been completed.</td>
</tr>
<tr>
<td>Kimball Report (2014) Section</td>
<td>Additional Comments</td>
</tr>
<tr>
<td>-------------------------------</td>
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</tr>
<tr>
<td>5.5.1.1 – 8 CAD Backup</td>
<td>The recommendation was for full redundancy in the CAD platform with servers at multiple locations. Currently there is no backup CAD platform, this is however planned to be updated in November of 2021. Note that the backup configuration will not have CPIC (on police vehicles) or GPS modems on fire and police vehicles. WRPS backup facility and the Kitchener Fire AECC (Alternate Emergency Communication Centre) backup centre have CAD workstations installed. Kitchener Fire is expanding this from 3 to 5 workstations in 2022. When the expansion is complete, they will also have all systems at the backup centre including Direct Detect and all phone lines. The calls at the backup centre are not recorded for instant playback.</td>
</tr>
</tbody>
</table>

The diagram below shows the new CAD platform with redundant servers\(^{21}\). |

\(^{21}\) WRPS, Steven Palmer, IT supervisor Business Applications
5.5.1.1 – 9 CAD System Capacity
The CAD platform has been scaled to accommodate the workload of police and fire and it was tested for performance prior to migrating to the combined CAD platform in 2019. Currently there are no reports of system performance issues.

5.5.1.1 – 10 CAD 24/7 Support
WRPS provides first level support 24/7 basis. Level 2 calls and above are escalated to WRPS personnel or the vendors as appropriate (e.g., Intergraph, Motorola).

5.5.1.1 – 11 Interfaces
The Fire RMS interface is done as a simple export of fire incident details only to a SFTP server (Secure File Transfer Protocol) and the data is imported into the Emergency Reporting RMS system.

An interface to the Motorola Mach Firehall Alerting System is underway for a text to speech alerting system that will replace the dispatchers voice announcing the call details. Connection to the fire halls uses the Regional WREPNet with a bridge to the radio...
<table>
<thead>
<tr>
<th>Kimball Report (2014) Section</th>
<th>Additional Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>core for OTA (Over the air) notification. Automated announcements of call details will eliminate the dispatch time taken to voice the call details and will ensure consistent tone and modulation of the announcements.</td>
<td>The P25 radio interfaces are in progress and Kitchener Fire has hired Five9 to help with the radio related initiatives. An interface to the Home Monitoring system by Mastermind is planned for January of 2022. There are receivers and external antennas that would need to be relocated to a new combined communication centre. The CAD system does not have a Business Intelligence tool for Fire but the CAD data for fire is downloaded as a flat file and the City of Kitchener PowerBI tool is used to analyze the data and will be used to build a dashboard in the future.</td>
</tr>
<tr>
<td>Planning is underway to have redundant CAD servers in November 2021 which should reduce instances of going to manual dispatch if the CAD is down.</td>
<td>GIS teams from the cities and townships are sending mapping updates to WRPS which then updates the master GIS database and pushes them out to the departments to update the local mobile workstations. Future updates are planned quarterly, although there has been delay recently in uploading mapping updates due to a GIS staff member vacancy. See the Next Generation 9-1-1 section for details of the mapping process.</td>
</tr>
<tr>
<td>The Hexagon CAD platform provides mobile data solution for police and fire, and Kitchener fire enabled mobile workstations in 2019 for Kitchener Fire, Cambridge Fire and Waterloo Fire. The townships are not using mobile workstations.</td>
<td>Kitchener Fire is moving away from the CriSys RMS to Emergency Reporting RMS which is hosted in Toronto and Montreal. (Firehouse just purchased Emergency Reporting continuing consolidation of vendors in the CAD and RMS marketplace.) Kitchener Fire dispatches for 6 other departments and they will be moving to the RMS platform over the next year (4 out of 7 in 2021 and the balance in 2022). Each fire department will have access to only their own incident information in the RMS. Kitchener Fire does not have access to township RMS, and no departments can see the RMS data from other departments. To load fire incident information in the RMS, when an incident is opened the CAD system feeds into a city SFTP and updates are done throughout the life of the call. The RMS then uploads the call data from the SFTP. The process is not real time and can take 15 minutes before it is in township or city RMS.</td>
</tr>
<tr>
<td>Upgrade of the telephony platform to a CTI (computer telephony integration) Call Handling Solution (CHS) is required and planned for Next Generation 9-1-1. This is detailed in the Next Generation 9-1-1 section.</td>
<td></td>
</tr>
<tr>
<td>Kimball Report (2014) Section</td>
<td>Additional Comments</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>5.5.6.1 Logging Recorder</td>
<td>Kitchener Fire uses the NICE call recorder and NICE Inform for playback of radio transmissions. This was implemented with the migration to the Motorola P25 radio system. The system has redundancy setup between WRPS and Kitchener Fire.</td>
</tr>
<tr>
<td>5.5.7 Master Clock</td>
<td>The master clock is a clock that obtains a GPS based time stamp and synchronizes all major equipment including CAD, radio, and logging equipment. This was implemented in 2019/2020.</td>
</tr>
<tr>
<td>Radio System</td>
<td>The region migrated to a new Motorola P25 Digital Trunked Radio system with Phase 1 complete in July of 2020. Work is continuing the second phase of the implementation which improves on system redundancy and failover and integration with the CAD platform.</td>
</tr>
<tr>
<td></td>
<td>There are three main components of the radio system: Core (voice), Firehall Alerting, Voice recording.</td>
</tr>
<tr>
<td></td>
<td>Voice and radio logging is on a NICE logging system and playback of radio transmissions uses NICE Inform module. ANI/ALI data from the Bell 9-1-1 network and the radio transmissions are recorded on NICE equipment at WRPS HQ.</td>
</tr>
<tr>
<td></td>
<td>The Motorola radio consoles provide a dedicated paging system for the Township fire departments and station alerting is either OTA (Over the Air) or via dedicated network to the municipal firehalls.</td>
</tr>
</tbody>
</table>
Exhibit 14: Radio Network Backhaul Summary
c. Next Generation - NG911

Next Generation 9-1-1, also known as NG911, is the mandatory replacement of the current Enhanced 9-1-1 service in Canada. Rather than a series of separate legacy proprietary telephone systems, NG911 is a nation-wide structure of integrated standards-based systems.

NG911 in Canada follows standards developed by NENA (National Emergency Number Association) which forms the basis for deploying this new service in Canada, the US, and around the world.

The change to NG911 will modernize public safety communications services with new broadband network capabilities supporting multimodal communication methodologies. It will be a national interoperable network that allows sharing of real-time information between communication centres and callers using different message methods.

Currently the public can primarily make only emergency voice calls and text over voice calls for the deaf or hearing impaired. Only minimal data is delivered with these calls, such as Automatic Number Identification (ANI), subscriber name, and Automatic Location Identification (ALI), when available.

With the NG911 environment, the public will be able to make voice, text, or video emergency "calls" from any communications device via Internet Protocol-based networks. In the future PSAPs will also be able to receive data from personal safety devices such as Advanced Automatic Collision Notification systems, medical alert systems, and sensors of various types. The NG911 network called Emergency Services IP Network (ESInet) will support networking of 9-1-1 services, as well as transfer of emergency calls to other PSAPs - including any accompanying data.

Exhibit 15 highlights the benefits of NG911 as stated by the Canadian Interconnect Steering Committee (CISC)\(^\text{22}\).

\(^{22}\) CISC Emergency Services Working Group

[www.911.gov](http://www.911.gov) and NENA
Exhibit 15: Benefits of NG911

WHAT ARE THE BENEFITS OF NG9-1-1?

- **Better Location Accuracy**
  - NG9-1-1 allows PSAPs to get not just a caller's latitude and longitude, but also provide an accurate dispensible location. In the future, PSAPs will be able to view a three-dimensional map showing which floor in a building someone is calling from. Even better, all the data that comes in with a next-generation call can be immediately transferred to field responders, medical providers, or other authorized parties who may need the additional location data.

- **Improved Crash Data**
  - Telematics, already integrated into many vehicles, are capable of not only 9-1-1 with additional precise location information and crucial details like speed at impact, airbag deployment, number of occupants, and how many seat belts were in use. This data, available at dispatch, helps fire services and EMS prepare appropriate equipment and provides EMS staff with key information to plan for transport to the appropriate medical or trauma centre.

- **Safer Communities**
  - In the future, once PSAPs are able to easily and quickly access media such as video and photos, citizens can readily report crimes, enabling callers/dispatchers to better understand a situation and more effectively dispatch law enforcement. For example, a witness might capture a video of a hit-and-run in progress and send it to NG9-1-1. PSAPs to dispatchers, and then officers can see the situation and respond.

- **More Ways to Help All Types of Callers**
  - NG9-1-1 will enable new services like language assistance/translation for non-native English speakers and help for the deaf and hard-of-hearing. These technologies will be able to be potentially embedded in Next-Gen platforms, making them seamless for callers/dispatchers to use.

- **Improved Field Responder Safety & Awareness**
  - New and emerging technologies in the NG9-1-1 environment provide information in the form of photos, streaming video, text, and other data that helps police in law enforcement, fire services, and EMS better understand what’s happening, even before they’re on the scene. Callers/dispatchers could potentially access building sensors and video feeds, helping identify hazardous materials, environmental conditions or the location of potential victims.

- **Greater Reliability & Coordination with Other Agencies**
  - During a natural disaster, large-scale emergency or an event that generates large call transaction volumes, the NG9-1-1 system can automatically route calls when necessary to additional staff and/or another PSAP. The system also allows for better coordination with first responders and between other emergency services and agencies in the serving area and beyond, ensuring that all 9-1-1 calls are answered, even if one PSAP experiences an overload of transactions.
With benefits also comes some risks, in particular the risk of cyber attacks as the system architecture moves from closed, internal networks with little to no interconnections with other systems, to a broadband IP based networks with multiple interconnections.\textsuperscript{23}

**Exhibit 16: Benefits and Risks of NG911**

- **Benefits**
  - NG911 will enhance response capabilities:
    - Enables receipt of data (e.g., video, text) from the public over a variety of networks
    - Enables data sharing between PSAPs
    - Improves location data
    - Allows for virtual PSAPs for survivability

- **Risks**
  - NG911 is different from traditional systems:
    - Requires standardized identity management and credentialing across systems
    - Allows for potential attacks to quickly escalate or proliferate across systems
    - Introduces new attack vectors

The Canadian timelines for NG911 implementation are shown in Exhibit 17\textsuperscript{24} (RTT is Real Time Text).

**Exhibit 17: NG911 Timeline in Canada**

Bell Canada is expected to provide access to an NG911 Onboarding Portal early in 2022 so that preparation can start for the requirements to interconnect to the Bell NG911 system.

\textsuperscript{23} https://www.911.gov/pdf/OEC_Fact_Sheet_Cyber_Risks_NG911.pdf

\textsuperscript{24} CISC Emergency Services Working Group
d. Reasons for Moving to Next Generation 9-1-1

The primary reason for moving to Next-Generation 9-1-1 is because it is a mandatory replacement of the current Enhanced 9-1-1 infrastructure, systems, processes, and procedures across Canada. The current 9-1-1 system has reached end of life and as such it cannot keep up with evolving technologies and current expectations of a modern 9-1-1 system such as the ability to text to 9-1-1 (separate from the existing Text with 9-1-1 (T9-1-1)).

An NG911 compliant Call Handling Solution (CHS) is required for all public safety answering points (PSAP) in Canada including (primary, secondary, and backup sites). This means that PSAPs move from physical desk phones to computer-based telephone applications (aka softphones). This is currently in the planning stages by WRPS for all PRIDE (Police Regionalized Information Data Entry) partner agencies including Kitchener Fire.

The existing 9-1-1 system is mandated to be decommissioned on March 4, 2025, and current Public Safety Answering Points (PSAPs) must transition to be capable of receiving and processing 9-1-1 calls from the public after this date. This multi-year migration will require the execution of a new NG911 Service Agreement with Bell with new interface requirements, plus future changes for addressing and mapping data from all municipalities.

For information purposes the diagram below illustrates NG911 architecture\(^{25}\).

Exhibit 18: Next Generation 911 Architecture

e. Baseline Next Generation 9-1-1

As defined by the National Emergency Number Association, required components or capabilities of baseline NG911 include:

- ESInet (Emergency Service IP network). In Ontario, Bell has been mandated to develop and implement the ESInet at their cost.
- GIS data creation to support call routing as outlined below, and associated management tools. Publication of NG911 Validation related databases to validate civic addresses (in replacement of Master Street Address Guide MSAG – which is a tabular listing of addresses matched to phone number and Emergency Service Zone). (NOTE: This is a future requirement which will include common addressing standards for Canada.)
- Publication of NG911 Routing Data.
- Support for legacy originating services via gateways (e.g., access to traditional ALI databases).
- Geospatial controlled IP software call routing function. (NOTE: This is a future requirement which will include mapping standards for Canada).
- The ability to control call routing based upon a policy routing function (NOTE: During the Onboarding process, Bell will provide significant new real-time and backup options at the network level).
- Additional data acquisition after call delivery to facilitate call processing by call taker or other public safety entities.
- Support for transfer of calls with accumulated call taker notes and added data, or defined access to such data, to any authorized entity interconnected by ESInets.
- Ability to interconnect with other PSAPs.
- Support for system monitoring/logging/discrepancy reporting necessary to support troubleshooting and ongoing operation and maintenance.

The above required components or capabilities of baseline NG911 encompass architectural, security, data, confidentiality, interconnection with other 9-1-1 systems, and operations aspects of NG911 service as defined in NENA Standards and related documentation.26

f. Critical components of NG911 for WRPS and PRIDE Agencies

The implementation of NG911 will have an impact on the following technology components at WRPS and associated agencies and downstream partners. The following list of PSAP systems will need to be NG911 capable before the Stage 2 – Onboarding to the Bell NG911 network:

i. Connection to the ESInet

As of March 1st, 2022, all dispatch centres and backup centres will be required to have dedicated, secure connections to the Bell NG911 network. These will use existing Bell IPVPN (Internet Protocol Virtual

26 https://www.nena.org/page/NG911_Baseline?&hhsearchterms=%22NG911+and+components

Page | 98
Private Network) 9-1-1 connections already in place or new links at a consolidated site which are completely separated from other network traffic.

The NG911 network provider, Bell, is responsible for regulated ESInet costs to the point of demarcation. PSAPs are responsible for everything after that point, and for non-regulated services.

The number of dispatch centres will affect the number of connections required. Although a co-located or consolidated communications centre model would reduce the number of connections, any operational model changes that may be considered are unlikely to occur in the time frame required to install NG911. Therefore, WRPS has planned the connections required based on the current dispatch architecture of WRPS and Kitchener Fire. A fully redundant secondary 9-1-1 centre requires dual circuits at each location.

The move to IP (Internet Protocol) connectivity introduces additional cybersecurity issues. Any network that facilitates the transport of a public safety application, and all other networks that are physically connected to it, should be considered within scope. Recently some Canadian public safety agencies have experienced ransomware attacks which crippled significant public safety architecture including computer aided dispatch and records management servers. It is possible that future ransomware attacks could also impact NG911 components including the call handling system.

ii. CAD System

The Hexagon CAD system has been upgraded to support NG911 features. WRPS is targeting the Hexagon CAD to be 98% NG911 compliant in November of 2021. A remaining future upgrade will be required so I/CAD (I/CAD is what Hexagon names their CAD product) can support the receipt and transmission of EIDO (Emergency Incident Data Object) call data when a call is received or transferred from the PSAP using the new NG911 Call Handling Solution that will be implemented in the following years.

NOTE: When the system is fully upgraded and WRPS is ready to include or receive CAD related data in-line with the call transfer; the NG911 Call Handling Solutions noted above will be able to handle EIDO by March 1, 2022.

**Hexagon Mobile CAD:** NG911 will not directly impact Mobile CAD in 2021 or 2022; however future changes (2023 and beyond) to provide more data about the location, the call, and/or the caller may require changes regarding what and how information is provided to mobile devices.
NICHE Record Management System: NG911 will not directly impact RMS; however, as more information becomes available at the new NG911 Call Handling Solution and Hexagon CAD, WRPS may consider updating these interfaces to retain the additional location, call, and caller data in the RMS system. Additional information including photos and videos may become part of the evidentiary record of the RMS.

Radio Consoles and Alerting Systems: NG911 will not directly impact these systems.

iii. Telephony Platform

Every PSAP must be NG911 enabled and capable of managing and monitoring all NG911 call processing functions before March 4, 2025. *(NOTE: In NG911, a "call" refers to more than just the traditional voice communication. It also includes NG911 text messaging and future forms of multimedia e.g., streaming video, etc., used to contact the PSAP to identify an emergency.)*

There are 3 possible options available in the Canadian NG911 marketplace currently:

- Customer-premised Turnkey Solution (3 proven vendors with numerous installations across Canada)
  - Intrado Viper
  - Motorola Solutions Vesta
  - Solacom Guardian (Comtech)
- Upgrade Solution (multi-staged upgrade process with numerous installations across Canada)
  - Avaya partnered with Komutel Communications
    [NOTE: Upgrade path possible for Avaya CS1000 customers – the system used by WRPS and Kitchener Fire.]
- Hosted Solution (no installed customers to date)
  - TELUS partnered with Motorola Solutions Vesta (offered across Canada)
    [NOTE: This solution is currently subject of a CRTC proceeding to determine if/how it can be deployed by TELUS, plus any other vendor that may enter the marketplace (if any).]  

WRPS conducted an RFP in 2019 for a softphone solution to handle NG911 calls. The original intention was to replace all phones (dispatch and administrative) with the new solution which turned out to be prohibitively expensive.

WRPS intends to conduct another RFP focused on the requirements for the call taking and dispatch positions for all agencies in time to meet the deadline outlined above. At this point WRPS is planning for a self hosted solution, although they will essentially be providing a hosted solution for PRIDE agencies including Kitchener Fire.
For PRIDE agencies WRPS will be project lead and each agencies’ local IT will assist (i.e., for local hardware support). The local IT departments are a resource for onsite assistance however they will not be authorized to change the phone configuration. The Telecom administrator is/will be a PRIDE employee.

Moving from the current Avaya desktop phone sets to a NG911 Call Handling Solution will require that call taking, incident handling, and dispatching processes and procedures are reviewed, and additional options can be considered including routing calls to alternate PSAPs or managing a primary and secondary centre configuration. New local and network-based call handling options will be available.

### iv. GIS Spatial Database

The future migration to geo-routing 9-1-1 calls will require a comprehensive spatial database. Once implemented (expected 2025 or later) Bell will need much more frequent updates regarding changes such as new road segments, change of street names, address updates etc.

WRPS has put in place processes with all PRIDE partner agencies to receive regular updates which are merged into the master database, which is then tested by the partner agency, and the data is subsequently moved into the production CAD environment.

Currently WRPS collects GIS data from municipal sources and PRIDE agencies once a month via FTP server or email. WRPS maintains different layers – zones for police, hydrants for fire, for example. They have a test platform that they put up for 2 – 3 weeks and ask the agencies to test and ensure their components (layers – changes etc.). Changes are then moved to the production environment.

As noted above, when Bell is mandated to implement geo-routing of 9-1-1 calls (2025 or later), they will require much more frequent updates. However, the goal for WRPS is to have the GIS update completed quarterly. The NG specifications for GIS will finalized and published by late 2022. New NG911 processes are expected to simplify this complex process by provisioning a Bell provided map with the 9-1-1, police, fire, and EMS layers included.

Currently when updates are ready to be uploaded, WRPS IT stops the service on server, and the help desk pushes it out (they leave the old maps for backup). When the vehicles log in with MDTs it will update the map from the installation file. Fire IT manages the updates for Fire.

### v. Voice Logging

**NICE Short and Long-term Recording/Logging System:** The voice logging system must be capable of recording NG911 format audio as well as additional data that is sent with the call including location coordinates as well as recording meta data of the communication session (such as time, duration etc.), and radio channels. The current voice logging system, NICE, is already NG911 capable, however an upgrade to software/hardware may be necessary in the future to support the interface to the Call Handling Solution that is procured.
The diagram below shows NICE Inform (playback component of the NICE logging system) and some of the additional information captured from an NG911 call including text and video. NICE Inform allows 9-1-1 text messages to be combined with audio, radio communications, video and pictures that may be part of a NG911 call.

Exhibit 19: NICE Inform Playback

**g. Backup Site Implications and Options**

The move to NG911 also impacts how back-up sites are configured and utilized. Planning for a new NG911 Call Handling Solution must include provisioning the same hardware/software at the primary, secondary, and backup sites. The alternate locations must have the full features of the primary site.

**h. Potential Impact on Call Handling and Dispatch**

The implementation of NG911 will have a potential impact on call taking and dispatch modalities in moving from just voice to text, streaming video, telematics information, and additional potential IoT (Internet of Things) sensors, alerts, and data.

Over next 2-5 years, additional 9-1-1 functionality may be introduced including:
• Ability for 3rd party operators such as private 9-1-1\(^{28}\) (VoIP call transfers) to provide phone number, location, and call details in-line with a call transfer to the PSAP
• Vehicle telematics information e.g., number of occupants, speed, impact severity, etc. may be available with the call details, rather than having, for example an OnStar operator relay the information verbally.
• Customer provided information on emergency contacts, medical data, etc. available with the call is planned for the future.

The CISC Emergency Services Working Group is coordinating with all 9-1-1 stakeholders to ensure the receipt and use of this information is standardized for all PSAPs across Canada (similar to the delivery of Phase II location information).

i. Transition from Text with 9-1-1 to NG911 Text Messaging (RTT)

Real-time Text (RTT) will eventually replace the current Text with 9-1-1 (T9-1-1) that is delivered in parallel with the voice network, however the current proposed timing to introduce it has been pushed out to Q2-2024. This was done to ensure PSAPs have ample opportunity to ensure that a new NG911 Call Handling Solution can properly support RTT per the current NENA NG911 standards. Some vendors already indicate they support RTT, however the Canadian configuration is still being built, so until it can be properly tested end to end, vendors will not be able to fully implement and support RTT. It is important to note that all primary and secondary PSAPs must have an NG911 system that supports RTT.

Text to 9-1-1 (T9-1-1) is the current subscription-based service for the deaf, hard of hearing and speech-impaired (DHHSI) community. It is being replaced by NG911 Text Messaging using Real-time Text) for use by all 9-1-1 callers. However, T9-1-1 might be used by PSAPs for a period after NG911 implementation occurs to address some very specific operational scenarios such as abandoned call management. During the transition period, PSAPs should plan for use of T9-1-1 in parallel with NG911 Real-time text messaging.

Handling RTT will have an impact on the communication centre both in how the calls are handled and how they are down streamed to secondary agencies. Anecdotally it has been indicated that text calls can take up to 6 minutes versus average of 2 minutes for a voice call. However – also anecdotally – at one time some NG911 advocates were forecasting that as much as 40% of all ‘calls’ to 911 may be text. Information thus far has shown that in the United States in 2019 the highest use of text messaging was in Texas at 2% and other states, such as California, were at 0.2%. 2019 is the latest data year available through www.gov.911.

\(^{28}\) An example is Northern 911, a company based out of Sudbury, Ontario, that provides 9-1-1 call centre services for VOIP & POTS providers such as Rogers Telecom, Primus Canada, SaskTel, etc. as a Public Safety Answering Point. In addition, the company provides fire dispatch, alarm monitoring, and telematics services.
j. Streaming Video (not video and picture files)

One of the common highlights with the move to NG911 is the ability to handle pictures and videos. Due to cybersecurity concerns, there are no current plans to facilitate the delivery of picture or video files directly from 9-1-1 callers due to cyber security issues. Many police PSAPs across Canada already have procedures in place to safely receive and handle picture and video files from the public; that is expected to continue. WRPS will need to have a local solution to receive and securely handle picture and video files. That includes determining who will have access to the video files and then controlling who has access to them according to policy (how is that managed on a call that involves police and fire response for example), and also where they will be stored and what is the retention period.

Live streaming video 9-1-1 (but not user submitted picture and video files) calls are expected to eventually be introduced; however, this requires extensive work by 9-1-1 stakeholders to ensure that the benefits outweigh the risks to PSAP staff who must process these calls. A coordinated national approach is planned to move forward with streaming video for emergency calls.

k. Call Management Options/Considerations

NG911 will allow the opportunity to manage and handle calls between primary and secondary PSAPs to handle call surges that are typical with major events. For example, with the implementation of the PRIDE partner agencies call handling solution, call overflow could be managed between centres such that when Stratford Police receive an influx of calls for a collision, the excess calls are automatically routed to WRPS or another PRIDE member. This would of course require changes to the CAD to allow WRPS to take a Stratford call which is then entered into the Stratford call queue.

Alternately call overflow situations could be managed within WRPS such that overflow calls are routed to non-emergency call takers (in an operational model that has call takers dedicated to non-emergency calls). This would of course require installation of CHS and CAD for additional agents. Another option could be to staff a primary and backup centre so that there is always a ‘hot’ backup arrangement – this is known as a ‘Live/Live’ state – receiving calls at the Primary and Backup site simultaneously. This could be done with the existing telephony solution; however, NG911 would make the configuration and handling of incoming 9-1-1 calls in this manner more efficient.

In NG911 the ability to handle this is determined by Policy Routing Rules (PRRs). The PRRs will be determined at two different levels:

- the Network Level (by NG911 network providers - Bell)
- the PSAP level, within the Call Handling Solution (CHS) i.e. local policy rules

Policy Routing Rules would include current PSAP state as well as real-time thresholds that can be established for overflow scenarios, such as:

29 CISC Emergency Services Working Group has provided source material for this report.
• number of calls in queue is greater than ‘x’
• if the number of calls is greater than a specific % of call takers (logged on agents)
• specific time of day/day of week – to compensate for decreased staffing levels

Policy Routing Rules in NG911 will provide more options for PSAPs to create new rules based on multiple conditions and to adjust or initiate these PRRs in real-time for surge capacity and/or for contingency purposes.

It is important to recognize that even though technology will offer many options for call handling and call flow, the ability of communications centres to put them into operation, which may require agreements with other public safety answering points, may be the more difficult part of accomplishing the NG911 vision.

Bell will be responsible to work with WRPS to create individual PRRs and will continue to provide manual intervention during situations that may not be covered by pre-existing rules.
Appendix F: NG911 Estimated Cost FAQ
NG9-1-1 Estimated Cost FAQ *(v3 – 2021Sep07)*

- This document was established to help agencies better calculate budgetary requirements for NG9-1-1 upgrades and transition costs.
- Estimates provided in this document are for budgetary planning purposes only and should not be construed as final or all-inclusive. Every agency is unique and therefore must perform their own due diligence to determine costs specific to them.
- Estimates are based on rough order of magnitude figures (+/- 25%).
- Cost estimates are proposed in the upper range to reduce the risk of underfunded requests for capital and ongoing operating and support costs.
- This estimate does not include costs incurred due to the upgrade of internal and/or external facilities and infrastructure such as electrical, HVAC and modifications required for the agent workstation such as desk space requirements for additional systems, monitors, additional network and electrical circuits.

1. **Who is responsible for NG9-1-1 ESInet connection costs?**

   The NG9-1-1 network providers (Bell, Telus, and SaskTel) are responsible for regulated Emergency Services IP network (ESInet) costs to the point of demarcation. PSAPs are responsible for everything after that point, and for non-regulated services.

   NG9-1-1 network providers are responsible for interconnection costs to the ESInet up until the PSAP Border Control Function (BCF); but may not cover required new physical infrastructure e.g. for diversity purposes. There will be a cost to upgrade various PSAP hardware, software, services, and interconnection after the point of demarcation. PSAPs will need to work with their NG9-1-1 network provider and related vendor(s) to determine specific requirements for each of their primary and backup sites (as applicable).

2. **How will PSAPs connect to NG9-1-1 service?**

   Every PSAP will have a point of demarcation identified for the regulated ESInet connection. This will be determined by the PSAP and their NG9-1-1 network provider as approved in the related CRTC decisions.

   An analysis of current state versus future state will be required to determine overall interconnection/infrastructure costs (both one-time and on-going).
3. What is the Difference Between NG9-1-1 and the Public Safety Broadband Network (PSBN)?

Next Generation 9-1-1 (NG9-1-1) is the Internet Protocol (IP) based architecture for 9-1-1 services regulated by the CRTC to deliver and process emergency calls from the public to the appropriate PSAPs, including transfer and exchange of data between emergency dispatch providers (as applicable).

Essentially the NG9-1-1 network is the network that connects the citizens to the 9-1-1 PSAPs; the PSBN is the network that connects the PSAPs to the Emergency Responders.

4. What costs do PSAPs need to plan for?

PSAP managers must review every system and service in the PSAP against NG9-1-1 readiness requirements as outlined in the NENA i3 standard (*NENA Detailed Functional and Interface Standards for the NENA i3 Solution*). PSAPs are responsible for evaluating and preparing systems to connect to the NG9-1-1 network provider ESInet (becoming NG9-1-1 ready).

- Generally, systems and integrations to be evaluated for possible upgrades, replacements, additions, or other cost implications may include (at a minimum):
  - 9-1-1 call handling and management (the ability to answer, transfer, and conference 9-1-1 calls)
  - Logging and recording systems (systems which record audio (phone & radio) and data traffic associated with each incident)
  - Local network segregation and management (network design to keep 9-1-1 systems isolated from business/corporate LANs)
  - Risk assessment (identify hardware/software/operational vulnerabilities and develop threat detection and remediation strategies)
  - Overall cybersecurity, reliability, and resilience, of all related infrastructure
  - Ongoing coordination with the PSAP Credentialing Agency (i.e. Bell, SaskTel, or TELUS) to facilitate real-time management of login credentials and data authority for staff. This includes being the Local Registration Authority (LRA) for the requests, validation, support, and compliance processes related to digital certificate control, issuance, and/or termination.
  - New administrative and operational responsibilities (24x7 monitoring of network devices *aka managing and monitoring*, capacity and performance of all network(s) components (e.g. bandwidth, QoS strategy, etc.), network maintenance, including the real-time management, support, and refresh of the network equipment)
  - Integration with Computer Aided Dispatch or CAD (incident management system for dispatching and tracking incident response and data sharing)
Other interfaces and integrations to consider (e.g. call taker/dispatch workstations, station alerting, mobile data terminals, traffic control mechanisms, paging systems, etc.)

New Geographical Information Systems (GIS) responsibilities as NG9-1-1 moves forward e.g. real-time management of addressing, mapping, and related interfaces

Related staffing and supervisor requirements including new skills, training, and resourcing for updated/new working environment (including service evolution and integration)

Professional and managed services associated with the above list of activities

5. **What Costs are Involved to Connect to the ESInet? XXX**

There is no charge from the carrier to connect to the regulated ESInet, however, there would be inherent costs to the PSAPs to ensure compliance with the User Network Interface (UNI) requirements. Each PSAP will need an NG readiness assessment to identify those requirements.

6. **What Options are available for PSAP NG9-1-1 Call Handling Systems?**

There are five possible configurations for NG9-1-1 call handling solutions.

   a. Stand-alone system (a single PSAP with an onsite solution)
   b. Cloud based system hosted by the NG9-1-1 network provider
   c. Cloud based system hosted by a trusted third party (vendor)
   d. A hybrid system; a cloud-based solution with onsite hardware for failsafe redundancy
   e. Shared system between PSAPS with a system core located at one of the PSAPs and facilities shared between one to many other PSAPs

7. **How are PSAP costs categorized?**

Assumptions:

- There is an initial cost to build the call handling solution for the PSAP (core infrastructure) regardless of the number of seats.

- The figures shown in this document represent hardware, software, and license costs required to deliver the NG9-1-1 audio and text call and data to a workstation. It does not include current or future related systems used by the PSAP (per item 8 below)

- There are no economies of scale for very small centres as they will pay the maximum cost for infrastructure, software and licensing, and for service and maintenance agreements.
• The division between sizes is for estimating and budgetary planning only. Cost(s) will vary for each call centre based on local requirements and actual costs may vary by plus/minus 25%.

### One Time Capital Cost Per Seat Estimate (+/- 25%)

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</tbody>
</table>

8. What items are included and not included in the capital cost chart?

<table>
<thead>
<tr>
<th>Category</th>
<th>General Inclusions (This is a general list only and may vary by vendor)</th>
</tr>
</thead>
</table>
| NG9-1-1 Call Handling System (Core)| - Required hardware to ensure a redundant, resilient & fault tolerant 9-1-1 call handling system with no single point of failure including but not limited to:  
    - servers  
    - switches (core and access)  
    - application software (controller and NG9-1-1 Management Information System (MIS))  
    - power  
    - environment control (cooling)  
    - Cabinet/Rack,  
    - Local Bridging Service(s) for 9-1-1 functionality such as voice conferencing,  
    - IP 9-1-1 trunk interfaces to connect to the ESI.net  
    - Border Control Functions i.e. Session Border Controls and Firewalls for IP call handling and connections to relevant databases  
    - Internet Protocol (IP) connection to NG9-1-1 Core Services for correct call routing  
    - Internet Protocol (IP) connection to NG9-1-1 GIS services  
    - Interfaces to connect legacy CADs or printer(s)  
    - VoIP and data connections to NG9-1-1 compliant multi-media recorders  
    - Installation engineering and labour  
    - Ongoing support and maintenance |
| NG9-1-1 Call Handling Workstation | - Position workstation equipment e.g. single screen, keyboard, mouse, keypad  
    - Audio control unit to connect to radio and other audio sources  
    - One headset and/or handset  
    - Position software license(s)  
    - Instant Recall Recorder at each position to replay communications |
Review of Fire and Police Communications and Dispatch in Waterloo Region

<table>
<thead>
<tr>
<th>Category</th>
<th>General Exclusions (This is a general list only and may vary by vendor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NG9-1-1 Call Handling System (Core)</td>
<td>• Any fees charged for connections other than to the point of demarcation such as connections from a vendor hosted data centre to a PSAP (not currently defined). Legacy 9-1-1 trunk gateways (Note: gateways will only be allowed on an interim basis as part of an NG transition plan) • PSAP status boards such as wall displays • Local Area Network (LAN) design and configuration to segregate, secure and actively monitor the Emergency Communication Centre network • Backup and redundant power (e.g. UPS, batteries, etc.) • Technical services to regularly patch operating systems and software and actively monitor security • System Engineering or Professional Services • Project Management Services • Service Level Agreements (SLAs) • Space renovations to accommodate Next Generation equipment • Removal and disposal of legacy equipment</td>
</tr>
<tr>
<td>NG9-1-1 Call Handling Workstation</td>
<td>• Cabling work from Core system server(s) to workstations • Local UPS(s) for workstations</td>
</tr>
</tbody>
</table>

9. What items are included and not included in the operating cost chart?

Operating costs are generally considered to comprise approximately 20-25% of the capital purchase cost regardless of size of the PSAP. Refer to the following chart;

<table>
<thead>
<tr>
<th>Annual Operating Cost Per Seat</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Small (4-14)</strong></td>
</tr>
<tr>
<td>Cost Per Seat</td>
</tr>
<tr>
<td>25% of cap cost</td>
</tr>
</tbody>
</table>

Operating costs generally include the following:

<table>
<thead>
<tr>
<th>Category</th>
<th>General Inclusions (This is a general list only and may vary by vendor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NG9-1-1 Call Handling System (Core)</td>
<td>• Ongoing support and maintenance programs will vary by vendor</td>
</tr>
<tr>
<td>NG9-1-1 Call Handling Workstation</td>
<td>• Ongoing support and maintenance programs will vary by vendor</td>
</tr>
</tbody>
</table>
10. What else will I need to plan for?

Migrating from your current 9-1-1 service to NG9-1-1 is the first step. The system will continue to evolve as the process moves forward. Ongoing dedicated resources are required to design, develop, test, implement and maintain new systems, networks, and operational capacities. The new call handling environment is a computer system and requires the same maintenance as a regular computer system (updates, patches, lifecycle management, etc.)

- Initial and ongoing specialized IS/IT and network support resources
- Network and network facilities readiness assessment
- CAD and event logging workflow assessment
- Cyber security strategy and active alerting and monitoring tools
- Infrastructure/systems reporting (real-time/historical for troubleshooting and fault management)
- Operational real time managing/monitoring, and business/performance analysis (e.g. workload, scheduling, and staffing)
- Transition planning and change management
- Dedicated Project Management Services (this is not a corner of desk project. Resources must be dedicated)
- GIS operational workflow and potential data updates and reconciliations
- Potential new infrastructure expenses e.g. secure access, card readers, 2-factor authentication, real-time management (24x7) and auditing
- Changes to existing vendor Service Level Agreements. Costs may change based on new infrastructure. Changes may be required for additional functionality or features based on solution configuration.
- Training, including new procedures to handle additional call types e.g. Real Time Text
- Training and staffing to support new data analytic tools for systems and operations that are required for the new PSAP environment.
- As standards continue to evolve the requirements for financial and resourcing support to effect changes will be required.
- Future NG9-1-1 Capabilities and Functions: moving from ANI/ALI equivalency to obtaining rich data about the call, caller, and location, and delivering data by value and/or by reference.
- Wider community: additional public safety entities such as Coast Guard, and other supporting response agencies.
- New Modalities (future): moving from just voice to text, video, photos, audio and video recordings, files, telematics information, IoT (Internet of Things triggers, sensors, alerts and data), etc.
11. Where can I find more information about NG9-1-1?

- See Appendix 2 and Appendix 3 in: https://www.911.gov/pdf/DRAFT_911_Data_Information_Strategic_Plan_PUBLIC.pdf

(although most of these references are US, many of these groups include Canadian participants and standards have been adopted as standards in Canada)

- CRTC website: https://crtc.gc.ca/eng/phone/911/gen.htm

  o CRTC Telecom Regulatory Policy 2017-182: Next-generation 9-1-1 – Modernizing 9-1-1 networks to meet the public safety needs of Canadians CRTC 2017-182, as amended in CRTC Telecom Decision 2018-188: New Brunswick 9-1-1 Bureau, on behalf of public safety answering point organizations – Application to review and vary Telecom Regulatory Policy 2017-182 regarding next-generation 9-1-1 services

  o CRTC ESWG Website: https://crtc.gc.ca/cisc/eng/cisf3e4g.htm

    - ESSR1902.pdf - Chair's Status Report (Summary) – 27 September 2019
    - Telecom Decision CRTC 2018-217 approving ESWG report ESRE0078.pdf - NG9-1-1 Originating Network Considerations (follow-up to CRTC Telecom Policy 2017-182)
    - Telecom Decision CRTC 2018-217 approving ESWG report ESRE0079.pdf - NG9-1-1 ESInet and NGCS Considerations (follow-up to CRTC Telecom Policy 2017-182)
    - Telecom Decision CRTC 2018-217 approving ESWG report ESRE0080.pdf - NG9-1-1 PSAP-based Considerations (follow-up to CRTC Telecom Policy 2017-182)
    - Telecom Decision CRTC 2018-217 approving ESWG report ESRE0081.pdf - NG9-1-1 Voice Trial Considerations (follow-up to CRTC Telecom Policy 2017-182)
    - Telecom Decision CRTC 2019-226 approving ESWG report ESRE0083.pdf - Real-time Text (RTT) based NG9-1-1 Text Messaging Specifications
    - ESRE0091.pdf - Status Update for NG9-1-1 Voice Trial Logistics (Dec 2019)
    - CRTC Letter Notification – 8 April 2020: Interim NG9-1-1 Implementation Date Changes
    - Telecom Decision CRTC 2021-199: Final NG9-1-1 Implementation Dates

- Bell 9-1-1 Flex Portal (requires login credentials): https://911flex.bell.ca/Login.html
• NENA Website: https://www.nena.org
• NENA Master Glossary of Terms: https://www.nena.org/page/Glossary

• NENA Standards Index: https://www.nena.org/page/Standards

• NENA Detailed Functional and Interface Standards for the NENA i3 Solution: https://www.nena.org/page/i3_Stage3
Appendix G: Recruitment Selection and Intake
Recruitment, Selection, and Intake

Kitchener Fire Department and Waterloo Regional Police Service have similar hiring processes which can be seen in the process maps in Exhibit 20 and Exhibit 21.

The recruitment, selection, and intake process are similar for police and fire except for psychological testing at the police service. Both services utilize testing tools such as Perfex or Critical30, typing speed tests, and fire communicator candidates are provided a mental resiliency test whereas police communicator candidates receive a behavioural interview. Mental resiliency tests and behavioural interviews are similar in that they assess an individual’s aptitude and attitude. There are several different tests available which require professional interpretation to determine those aptitudes and attitudes considered desirable for the position.

The variance in these respective fire and police processes is that police communicator candidates participate in a psychological assessment and undergo a background check.

The fire communicator process, from the time a vacancy occurs until a candidate is hired is estimated at 16 to 18 weeks. The elapsed time at WRPS is estimated at approximately 24 weeks but our calculations suggested closer to 28 presently but some of that is due to process management in that applications have to be screened manually. WRPS Human Resources estimates that recent competitions received as many as 1,000 applications. We expect that timeline to be reduced upon WRPS implementing a human resources system that will include screening tools. Our understanding is that late 2022 or 2023 is a reasonable time frame.

The selection, recruitment, and hiring process is, for all purposes, the same for police and fire communicators up to the point of the police communicator psychological interview. The purpose of the selection activity, to that point, is to ascertain if a candidate has the aptitude and attitude to be trained as a communicator. We have not been made aware of, neither have we seen, anything that suggests that candidates are being screened for activities or tasks that require an ability unique to either department. However, past this point the police communicator candidates undergo more rigor in the form of a psychological evaluation and background check.

We conclude that any candidate that successfully achieves all the criteria to receive a job offer would be considered capable to be trained as either a fire or police communicator.

---

30 Critical and Perfex are tools which test candidates’ ability to gather, record, and utilize information.
Exhibit 21: Recruitment and Selection Process - WRPS Communications
Appendix H: Intake Training
Intake Training

Exhibit 22 and Exhibit 23 detail the communicator intake training for fire and police services. Because both services use the same technology platform, some aspects of the training process are similar. However, where fire communicator training is estimated to take 16 to 20 weeks, depending on remedial training requirements, WRPS communicator training takes 42 to 45 weeks. The process mapping indicates that while some of the training content is similar, there is a greater volume of information to learn in a police dispatching environment than in a fire dispatching environment, thus the extended duration for police dispatcher training.
Exhibit 22: Communications Intake Training Process Kitchener Fire Department

As-Is Training Process - Kitchener Fire Dispatch Centre

Start

In Class Training Topics include but not limited to:
- Emergency & Non-Emergency Call Taking
- City and Regional Emergency Management Measures
  - Flood Evacuation
  - AlertWR
- Contra Systems & Equipment & Basic Troubleshooting
  - P25 Radios & Pagers
  - Telephone System
  - CAD
  - RMS
  - NICE Audio Recording
  - FLEXTIF
  - MAStarMind
- Emergency & Non-emergency Dispatching
- Direct Detect Alarm Monitoring and Troubleshooting
- Incident Command and General Firefighting Practices

Conduct In-Class Written Exam

Lead Trainer/Communication Division

Exhibit

Provide On-Shift Hands-on Training (for all above topics)

Progressive Training from Observation to Working Independently as Call Taker and Dispatcher over the 4 week period

Recruit Increment Exam (Written & Practical Components)

Remedial In-class Training

Yes

Progressive Training from Observation to Working Independently as Call Taker and Dispatcher over the 4 week period

Recruit Increment Exam (Written & Practical Components)

Remedial On-Shift Training

Yes

Exam

Pass?

No

Pass?

No

Yes

Start on Shift as 5th Class Communicator

Annual Incremental Exams (Written & Practical)

Increase from 5th Class to 1st Class over 5 years upon successful Increment Scores

1063 Certification Completed

End

Version 1.0 (Approved version)
Date: September 08, 2021

Pomax Inc.
Exhibit 23: Communications Intake Training Process, Waterloo Regional Police Service

Review of Fire and Police Communications and Dispatch
In Waterloo Region
Appendix I: Communication Centre Operational Model Staffing
a. Staffing Requirements

This section evaluates staffing requirements at the fire and police communications centres in relation to staffing levels in a consolidated centre.

There are two tables below (Table 6: Fire Communication Centre Staffing Requirements, page 127) and Table 7: Waterloo Regional Police Communication Centre Staffing Requirements, page 129) which represent average staffing needs by hour for fire communications in Waterloo Region and WRPS communications and 911.

The staffing requirements were based on the call activity workload patterns using 2019 as a representative year. Please see Appendix D.

The calculations are averages and do not allow for surges such as receiving 30 or more 911 calls in a few minutes due to a major incident. Since the tables below are averages, any staffing model would have to make allowances for surge, and those allowances depend on local knowledge to determine the appropriate staff required to accommodate surge beyond the averages. These models can also be calculated on a day of week, seasonal, or other basis but scheduling and rostering has to be taken into account in setting staff levels.

The parameters we used to determine the levels were

- A 911 call (police, fire, EMS), which is then transferred to fire or paramedic services, and the 911 call taker listens to determine if police are also required, is calculated to take 36 seconds or 0.6 of a minute
- A 911 call (police, fire, EMS), and a determination that the call is for police services, and the 911 call taker then continues to take the call details is calculated to take 2.5 minutes
- In 2019 there were 145,383 9-1-1 calls
- 31,103 were for fire; an estimated 50,000 were for paramedic services; for a total of 81,103
- Estimated 50%, or 40,552, also required police presence
- Therefore, 64,280 911 calls required call taker engagement for 2.5 minutes; 40552 (or 28%) required call taker engagement for 0.6 minutes
- In 2019 there were 229,385 non-emergency calls
- In 2019 there were 38,349 internal calls although internal call volume is on a downward trend. In 2018 there were 47,532 internal calls. Internal calls are not included in the staffing calculations
- In 2019 there were 293,445 police dispatches related to the approximately 345,216 9-1-1 and non-emergency calls received for police services
Kitchener Fire Department received 31,103 calls transferred from 911 plus an unknown number of others due to multiple calls for a single incident

57,610 fire trucks were dispatched in 2019

Communicators at both centres were assumed to be able to work 42.5 minutes of an hour, on average, taking into account vacation, training, scheduled breaks, unscheduled breaks, and other approved time off.

In Table 6: Fire Communication Centre Staffing Requirements, the fire communication centre staffing calculations,

- row 16 represents the average amount of time spent on each administration or alarm testing call
- row 15 represents the average amount of time spent on each fire-related or emergency dispatch. Some calls require more time, some less
- row 14 represents the average amount of time allocated to taking a 911 call
- row 13 shows the estimated number of alarm testing or administration calls received in that hour
- row 12 shows estimated average time it takes to handle administration or alarm testing calls in that hour
- row 11 indicates the number of 911 calls received in 2019 by hour (average)
- row 10 shows the average time required in minutes for 911 calls in this hour
- row 9 indicates the average minutes of dispatcher interaction per dispatch in the hour; includes thought processing time
- row 8 indicates the average time required in minutes to address 911 calls and administration and alarm calls in this hour
- row 7 shows the average workload per hour in minutes for Kitchener fire dispatch. Workload is a result of multiplying the number of incidents by the time allocated for each incident type.
- row 6 shows the number of call takers required per hour on average
- row 5 indicates the number of call takers required per hour on average at minimum (minimum 1)
- row 4 shows the number of dispatchers required per hour on average
- row 3 shows the number of dispatchers required per hour on average at minimum (minimum 1)
- **row 2 indicates the total fire communicators required per hour, on average**
- row 1 indicates the hour of day
Table 6, row 2, shows that the Kitchener Fire Communications Centre requires two communicators an hour to handle the average calculated workload. But, as noted, surge capacity isn’t included which may require an additional person each hour in some cases. We must also recognize that some hours, particularly overnight, indicate a requirement for less than 0.4 call takers and 0.5 dispatchers meaning there is workload for 1 FTE. Incidents don’t occur on an average though and there will be some periods where two or three communicators could be busy.

The fire communications centre schedules three communicators and a supervisory position 24 hours with minimum staffing of three communicators, which may include the supervisor.

Considerations with respect to staff schedules are included in the collective agreement between the Corporation of the City of Kitchener and the Kitchener Professional Firefighters’ Association.
Table 6: Fire Communication Centre Staffing Requirements

<table>
<thead>
<tr>
<th>Kitchener Fire Dispatch</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hour</td>
<td>00-01</td>
</tr>
<tr>
<td>Total fire communicators required per hour, on average</td>
<td>2</td>
</tr>
<tr>
<td>Dispatchers required per hour on average (minimum 1)</td>
<td>1</td>
</tr>
<tr>
<td>Dispatchers required per hour on average</td>
<td>0.49385</td>
</tr>
<tr>
<td>Call takers required per hour on average (minimum 1)</td>
<td>1</td>
</tr>
<tr>
<td>Call takers required per hour on average</td>
<td>0.37038</td>
</tr>
<tr>
<td>Average load per hour in minutes for Waterloo Regional fire dispatch</td>
<td>37</td>
</tr>
<tr>
<td>Average time required in minutes to address 911 calls and admin and alarm calls in this hour</td>
<td>16</td>
</tr>
<tr>
<td>Average minutes of dispatcher interaction per dispatch; includes thought processing time</td>
<td>21</td>
</tr>
<tr>
<td>Average time required in minutes for 911 calls in this hour</td>
<td>3</td>
</tr>
<tr>
<td>Number of 911 calls received in 2019 by hour (average)</td>
<td>3</td>
</tr>
<tr>
<td>Average time in minutes to address 911 calls for fire</td>
<td>3.5</td>
</tr>
<tr>
<td>Average minutes of dispatcher interaction per fire dispatch; includes thought processing time</td>
<td>8</td>
</tr>
<tr>
<td>Other calls for alarm testing and administration</td>
<td>2.5</td>
</tr>
</tbody>
</table>
In Table 7, page 129, the WRPS 911, call taking, and dispatch staffing calculations

- row 16 is the estimated average minutes of dispatcher interaction per dispatch; includes thought processing time
- row 15 is the estimated average minutes to address a non-emergency call
- row 14 is the estimated average minutes to address a police call originating from 911
- row 13 is the estimated average minutes to address a 911 call transferred to another agency
- row 12 is the average dispatch load per hour (average)
- row 11 represents the average dispatch load in minutes per hour
- row 10 indicates the dispatchers required per hour
- row 9 shows the average load in minutes for non-emergency calls in the hour
- row 8 shows the average load in minutes for 911 calls in the hour for police
- row 7 indicates the average load in minutes for 911 calls in the hour transferred to another agency
- row 6 shows the average total telephone call load in minutes in the hour
- row 5 indicates the call taker staff requirement on average by hour
- row 4 indicates the call taker staff requirement by hour (average) (rounding)
- row 3 shows the dispatchers required by hour (average) (rounding)
- **row 2 shows the total number of police communicators required by hour (average)**
- row 1 shows the hour of the day

In Table 7 the WRPS 911 and dispatch staffing calculations indicate that the staff required to meet the average call load varies by time of day but with a relatively consistent pattern where the greatest number of staff are required during daytime and evening hours and the fewest staff during overnight hours. There are variances on this pattern such as the call peaks experienced on Fridays and Saturdays during the period around midnight.

As with the fire department communicator calculations, these averages don’t account for volume surges or day of week and hour staffing requirements; for example, Friday and Saturday nights. Adequate staffing is dependent on local knowledge.

The WRPS communications centre schedules 18 communicators and one supervisor although with time off and training, 13 or 14 staff and a supervisor is the usual staffing.

As with fire communications, considerations with respect to staff schedules are included in the collective agreement between the Waterloo Region Police Services Board and the Waterloo Regional Police Association.


### Table 7: Waterloo Regional Police Communication Centre Staffing Requirements

<table>
<thead>
<tr>
<th>Table 7: Waterloo Regional Police Communication Centre Staffing Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Waterloo Regional Police Service 2019</strong></td>
</tr>
<tr>
<td><strong>Hour</strong></td>
</tr>
<tr>
<td><strong>Total Police Communicators required by hour (average)</strong></td>
</tr>
<tr>
<td><strong>Dispatch load in minutes per hour</strong></td>
</tr>
<tr>
<td><strong>Average load in minutes for 911 calls in the hour for police</strong></td>
</tr>
<tr>
<td><strong>Average load in minutes for non-emergency calls in the hour</strong></td>
</tr>
<tr>
<td><strong>Dispatchers required per hour</strong></td>
</tr>
<tr>
<td><strong>Dispatch load in minutes per hour</strong></td>
</tr>
<tr>
<td><strong>Average minutes to address a 911 call transferred to another agency</strong></td>
</tr>
<tr>
<td><strong>Average minutes to address a police call originating from 911</strong></td>
</tr>
<tr>
<td><strong>Average minutes to address a non-emergency call</strong></td>
</tr>
<tr>
<td><strong>Average minutes of dispatcher interaction per dispatch; includes thought processing time</strong></td>
</tr>
</tbody>
</table>

### Comparing

- the average fire communications staffing requirement estimates (Table 6), plus
- the average police communication staffing requirement estimates (Table 7), with
- the minimum staffing levels at the two organizations,

reveals a considerable surplus staffing capacity in some hours (row 1, Table 8, below). If three staff members are added during all hours for contingency (row 5) the result is 22,890 hours of staff time available, which is the equivalent of 11 full time equivalent staff (FTE) or approximately $933,000 a year if calculated at $88,000 annually per person, which is the salary of a 3rd level police communicator in 2021. Compensation levels proceed from 1 at the lowest to 4 at the maximum salary. As of July 1st, 2020, a fire communication operator, one level below maximum, would earn $82,438 annually. An estimated 2% salary increase in 2021 would bring that level to $584,000.

This indicates that the most effective staffing structure would be in a consolidated communication centre where dynamic staffing – staffing that follows call patterns – is in effect. Dynamic staffing could be implemented in the fire and police communication centres individually but contingency staffing would reduce some of the surplus capacity advantage, in each centre, that would be realized in a consolidated centre.

The three equivalent staff members allocated for contingency purposes also allow training or other activity to take place when they aren't serving a contingency role.

### Collective agreement clauses and shift pattern smoothing may eliminate a portion to all of the $933,000 offset.

### Table 8: Staffing Variance: Required Compared to Available Capacity

<table>
<thead>
<tr>
<th>Table 8: Staffing Variance: Required Compared to Available Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hour</strong></td>
</tr>
<tr>
<td><strong>Hours available [365 x variance per hour]</strong></td>
</tr>
<tr>
<td><strong>Variance between usual minimum staffing available and communicators required</strong></td>
</tr>
<tr>
<td><strong>Total police and fire communicators available; usual minimum staffing including supervisors</strong></td>
</tr>
<tr>
<td><strong>Total requirement including contingency</strong></td>
</tr>
<tr>
<td><strong>Contingency staffing for surge situations</strong></td>
</tr>
<tr>
<td><strong>Total Communicators Required Police and Fire (average)</strong></td>
</tr>
<tr>
<td><strong>Total Police Communicators required by hour (average)</strong></td>
</tr>
<tr>
<td><strong>Total fire communicators required per hour, on average</strong></td>
</tr>
</tbody>
</table>
b. Staffing Hours

The fire communications centre
- schedules four communicators, including a supervisor, 24 hours a day. That results in 35,040 hours of staffing per year.
- staffs a minimum of three communicators, which might include a supervisor, 24 hours a day. That’s 26,280 hours of minimum staffing.

The police communications centre
- schedules 18 communicators, including a supervisor, 24 hours a day. That results in 157,680 hours of staffing per year.
- staffs a minimum of 14 communicators, which includes a supervisor, 24 hours a day. That’s 122,640 hours of minimum staffing.

The total minimum staffing between the fire communications centre and police communications centre is (26,280 + 122,640 =) 148,920 hours annually.

Annual staffing hours required in a consolidated centre, based on row 4, Table 8, which includes contingency staffing, is 126,030, a difference of 22,890 hours.

As noted earlier, collective agreement clauses and shift pattern smoothing may eliminate a portion to all of the 22,890 hours and $933,000 offset.

j. What if it does?

In the event that the Regional Municipality, the municipalities, and the Waterloo Regional Police Service decide upon a consolidated communications centre but shift pattern smoothing and collective agreement clauses prohibited a schedule based on call volume patterns, there remains the advantage of having sufficient complement in a consolidated centre to ensure adequate staff during all hours. This may forestall staffing pressure and future complement growth at either or both communications centres.

---

31 Some shifts results in fewer staff than 14 communicators because of scheduling, training, and staff availability.
Appendix J: Technical Cost Analysis
Please note that this section addresses the technical costs of the models. The benefits, challenges, and other considerations are tackled in Appendix L.

This cost comparison is unlike those found in most options analyses. Often, when co-location, integration, or consolidation are some of the options to be cost assessed, technology changes such as dispatch consoles, radio system configuration, telephone, paging, and 911 services have to be reconciled.

That isn’t the case in this options analysis. The fire services participate in a centralized fire dispatch using technology within a regional system which is the same as the Waterloo Regional Police Service. So technology platform changes are already in place as planned by the region and municipalities.

This technology cost analysis is dependent on whether any operational or organizational models require additional capital costs such as servers, buildings, communications consoles, computers, etc., or if one model has greater benefit in the form of lower maintenance and support costs or staff levels.

This cost analysis was conducted on a ‘per seat’ basis. It was assumed that since the incremental positions required in different models were small, they would not require additional server capacity for the CAD and future Call Handling Solution; and furthermore that the CAD and CHS platforms do not need to be expanded for the backup centre(s). We also assumed that the existing WRPS communication centre would become the backup for a new stand-alone police communication centre, a co-located centre, or consolidated centre.

The following technology and costs for the main dispatch centres and backup locations were taken into account in conducting the cost analysis.

<table>
<thead>
<tr>
<th>Item</th>
<th>Capital Cost</th>
<th>Annual Fees and Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>i/dispatcher workstation licenses (computer aided dispatch)</td>
<td>$32,400</td>
<td>22.252% ($7,298)</td>
</tr>
<tr>
<td>CAD terminals (computers and monitors)</td>
<td>$5,000</td>
<td></td>
</tr>
<tr>
<td>i/page (paging)</td>
<td>$38,900</td>
<td>22.252% ($8,762)</td>
</tr>
<tr>
<td>Softphone (computer-based phones to assist NG911) (per position)</td>
<td>$5,000</td>
<td>25% ($1,250)</td>
</tr>
<tr>
<td>Workstations (communicators)</td>
<td>$45,000</td>
<td></td>
</tr>
<tr>
<td>Motorola dispatch console (each) – based on original bulk purchase costs. Recent single console purchase was $150,000</td>
<td>$50,000</td>
<td>$12,500</td>
</tr>
<tr>
<td>Motorola firehall alerting console</td>
<td>$300,000</td>
<td>$66,000</td>
</tr>
<tr>
<td>Bell lines to primary and backup facilities</td>
<td></td>
<td>$12,600</td>
</tr>
</tbody>
</table>

Costs determined with the assistance of Bob Hilhorst, IT Director, Waterloo Regional Police Service
The five models are

<table>
<thead>
<tr>
<th>Operational Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent – Status Quo</td>
<td>The existing operational model</td>
</tr>
<tr>
<td>Common call taking; separate dispatch</td>
<td>The 911 call taker • answers incoming 911 or non-emergency telephone calls; • elicits information from the caller on behalf of police or fire, then • transfers the information to a police dispatcher or fire dispatcher – or both – depending on the incident type. Police and fire dispatchers would remain in separate locations and call information transfer would take place via the computer aided dispatch as it is done now. This is like the current operational model except the fire communication centre would not have call takers, just dispatchers.</td>
</tr>
<tr>
<td>Co-located</td>
<td>The police service and fire service would be in the same building but operate separately. Technical and building Infrastructure would be shared but operations and governance would remain distinct</td>
</tr>
<tr>
<td>Combined (integrated)</td>
<td>Police and fire communicators would work for the same organization but distinct work streams would remain in place. Some staff would be police call takers, or fire call takers, or police dispatchers, or fire dispatchers. Some staff would be able to accomplish all duties but there would not be an expectation that all employees would be able to call take or dispatch seamlessly for either service.</td>
</tr>
<tr>
<td>Consolidated</td>
<td>All staff work for the same organization and, upon being fully trained, would be able to call take for police or fire and dispatch for police and fire. If paramedic services communications became part of a consolidated model, staff would be able to call take and dispatch for all three agencies after successful training.</td>
</tr>
</tbody>
</table>

The status quo means nothing changes, including expected costs, and is the benchmark against which the other models are compared.

The common call taking – separate dispatch model can be implemented, theoretically, in a relatively short period once police and fire call takers are cross trained as call takers. We estimate that is a one-year process from a decision date. Because call taking would occur at one location to use technology at the lowest cost, that setting would have to be the 911 centre. Again in theory, there is space at the 911 centre because police communications usually staff 13 or 14 communicators and a supervisor which means that three consoles would be available for one, and during some hours, two call takers. The other consideration though is that the 911 –

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32 Waterloo Regional Police Service is budgeting for the construction or major renovation of a communications centre.
police communications is considered crowded and the WRPS may not be receptive to adding staff.

The first cost table that follows (Table 9) shows zeros in all categories. That’s because it is the status quo and no new costs are expected other than what has been planned. If everything remains as is, there will be no new costs. This is the delta – the point to which other model costs relate.

The tables indicate a decrease in costs where applicable, in addition to increases.
### Table 9: Status Quo - Separate Police and Fire Communications Centres

<table>
<thead>
<tr>
<th>Status Quo: Separate Police and Fire Call Taking &amp; Dispatch</th>
<th>i/Dispatcher Workstation (CAD) Licences</th>
<th>CAD Terminals (Computer and Monitors)</th>
<th>i/Page</th>
<th>Softphone Per Seat</th>
<th>Sit Stand Workstations</th>
<th>Motorola Dispatch Console</th>
<th>Motorola Firehall Alerting Console</th>
<th>Bell Lines to Facility Primary and Backup</th>
<th>Total Capital</th>
<th>Annual Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Costs for 911, Police, Fire Centres</td>
<td>$32,400</td>
<td>$5,000</td>
<td>$38,900</td>
<td>$5,000</td>
<td>$45,000</td>
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<td>$300,000</td>
<td></td>
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</tr>
<tr>
<td>Maintenance Cost or Monthly Fees</td>
<td>22.525%</td>
<td>22.525%</td>
<td>25.00%</td>
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<td></td>
<td>$7,298</td>
<td>$8,762</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>PSAP and Police Communications</th>
<th>Capital Quantity</th>
<th>Maintenance Quantity</th>
<th>Capital Expense</th>
<th>Maintenance Expense</th>
<th>Capital Quantity</th>
<th>Maintenance Quantity</th>
<th>Capital Expense</th>
<th>Maintenance Expense</th>
<th>Total Capital</th>
<th>Annual Maintenance</th>
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<table>
<thead>
<tr>
<th>Fire Communications Centre</th>
<th>Capital Quantity</th>
<th>Maintenance Quantity</th>
<th>Capital Expense</th>
<th>Maintenance Expense</th>
<th>Capital Quantity</th>
<th>Maintenance Quantity</th>
<th>Capital Expense</th>
<th>Maintenance Expense</th>
<th>Total Capital</th>
<th>Annual Maintenance</th>
</tr>
</thead>
<tbody>
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<td>Capital Costs for 911, Police, Fire Centres</td>
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<table>
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<th>Maintenance Expense</th>
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<th>Maintenance Expense</th>
<th>Total Capital</th>
<th>Annual Maintenance</th>
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<table>
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<th>0</th>
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</table>


Table 10 shows a small decrease of $59,192 annually in maintenance costs if call taking is centrally located at the primary public safety answering centre.

<table>
<thead>
<tr>
<th>Central Call Taking - Separate Dispatch</th>
<th>i/Dispatcher Workstation (CAD) Licences</th>
<th>CAD Terminals (Computer and Monitors)</th>
<th>i/Page</th>
<th>Softphone Per Seat</th>
<th>Sit Stand Workstations</th>
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<th>Motorola Firehall Alerting Console</th>
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</table>
Review of Fire and Police Communications and Dispatch in Waterloo Region

<table>
<thead>
<tr>
<th>Police Move to a New Communications Facility; Existing Centre Becomes Backup; No Change at Fire</th>
<th>CAD Terminals (Computer and Monitors)</th>
<th>Sit Stand Workstations</th>
<th>i/Page</th>
<th>Softphone Per Seat</th>
<th>Motorola Dispatch Console</th>
<th>Motorola Firehall Alerting Console</th>
<th>Bell Lines to Facility Primary and Backup</th>
<th>Total Capital</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Capital Costs for 911, Police, Fire Centres</td>
<td>$32,400</td>
<td>$5,000</td>
<td>$38,900</td>
<td>$5,000</td>
<td>$45,000</td>
<td>$50,000</td>
<td>$300,000</td>
<td></td>
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</tr>
<tr>
<td>Maintenance Cost or Monthly Fees</td>
<td>22.525%</td>
<td>22.525%</td>
<td>25.00%</td>
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<td></td>
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<td>PSAP and Police Communications</td>
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<td>$300,000</td>
<td>$1,085,000</td>
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</table>
Table 11 assumes that in the next several years the police service will move to a new communication centre due to limitations at the existing centre, and the existing centre will become the backup. The fire communications centre will remain separate. This model estimates the cost of communications equipment only. New facility costs are addressed in Appendix M. A capital cost of $1.085 million would be incurred due to new dispatcher desks and computer aided dispatch computers and monitors.

Table 11: New Police Communications Centre - Separate Fire Communications

<table>
<thead>
<tr>
<th>Equipment / Service</th>
<th>CAD Terminals (Computer and Monitors)</th>
<th>I/Page</th>
<th>Softphone Per Seat</th>
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</table>

Page | 138
Review of Fire and Police Communications and Dispatch
in Waterloo Region

Table 12 indicates the cost associated with co-locating the police and fire communication centres. This model assumes that police and fire would be located in a new communications centre (building cost estimates addressed in Appendix K) but that police and fire would operate independently. Capital costs of $1.1 million would be incurred due to new dispatcher desks and CAD computers and monitors, and there would be a slight decline of $12,600 due to fewer Bell line connections required. These costs are the same as for an integrated centre. This model assumes that existing desks and computers would be moved from the fire communications centre to the new location. Fire backup would remain as is.

Table 12: Co-Located Fire and Police Communications Centres

<table>
<thead>
<tr>
<th>Co-Location at a New Facility; Existing PSAP becomes Backup</th>
<th>i/Dispatcher Workstation (CAD Licences)</th>
<th>CAD Terminals (Computer and Monitors)</th>
<th>i/Page</th>
<th>Softphone Per Seat</th>
<th>Sit Stand Workstations</th>
<th>Motorola Dispatch Console</th>
<th>Motorola Firehall Alerting Console</th>
<th>Bell Lines to Facility Primary and Backup</th>
<th>Total Capital</th>
<th>Annual Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Costs for 911, Police, Fire Centres</td>
<td>$32,400</td>
<td>$5,000</td>
<td>$38,900</td>
<td>$5,000</td>
<td>$45,000</td>
<td>$50,000</td>
<td>$300,000</td>
<td>$300,000</td>
<td>$1,085,000</td>
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<tr>
<td>Maintenance Cost or Monthly Fees</td>
<td>22.525%</td>
<td>22.525%</td>
<td>25.00%</td>
<td>$12,500</td>
<td>$66,000</td>
<td>$12,600</td>
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<td>$1,085,000</td>
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<tr>
<td>PSAP and Police Communications</td>
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<td>Backup Facility Capital Quantity</td>
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<td>Backup Facility, Maintenance</td>
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<td>Backup Facility Capital Expense</td>
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<td>Backup Facility Maintenance</td>
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</table>
Table 13 evaluates the technology cost changes of a consolidated model. This model assumes that police and fire would be located in a new communications centre (building cost estimates addressed in Appendix K) and that one department would call take and dispatch fire and police. Capital costs of $1.1 million would be incurred due to new dispatcher desks and CAD computers and monitors, and there would be a slight decline of $59,932 in annual maintenance costs. The existing PSAP would become the backup location.

<table>
<thead>
<tr>
<th>Consolidated at New Facility; Existing PSAP Becomes Backup</th>
<th>Capital Costs for 911, Police, Fire Centres</th>
<th>Maintenance Cost or Monthly Fees</th>
<th>Total Capital</th>
<th>Annual Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>i/Dispatcher Workstation (CAD) Licences</td>
<td>$32,400</td>
<td>22.525%</td>
<td>$1,100,000</td>
<td>-29,696</td>
</tr>
<tr>
<td>CAD Terminals (Computer and Monitors)</td>
<td>$5,000</td>
<td>22.525%</td>
<td>$0</td>
<td>$1,100,000</td>
</tr>
<tr>
<td>i/Page</td>
<td>$38,900</td>
<td>25.00%</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Sit Stand Workstations</td>
<td>$5,000</td>
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<td>Motorola Dispatch Console</td>
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<tr>
<td>Motorola Firehall Alerting Console</td>
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<tr>
<td>Bell Lines to Facility Primary and Backup</td>
<td>$300,000</td>
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<tr>
<td>Total Capital</td>
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<td>$0</td>
<td>-29,696</td>
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<tr>
<td>Annual Maintenance</td>
<td>$0</td>
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<td>$0</td>
<td>-12,600</td>
</tr>
</tbody>
</table>

Table 13: Consolidated Communications Centre
Table 14 offers a summary of the costs and offsets for each model examined. A 15-year maintenance cost column is shown since the useable life of new communications consoles should be at least 15 years.

Table 14: Technology Cost Estimate Summary

<table>
<thead>
<tr>
<th>Model Summary</th>
<th>Primary Centres Capital Expense</th>
<th>Primary Centres Annual Maintenance</th>
<th>Backup Centres Capital Expense</th>
<th>Backup Centres Annual Maintenance</th>
<th>Total Capital</th>
<th>Total Annual Maintenance</th>
<th>15-year Maintenance Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent - Status Quo</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
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</tr>
<tr>
<td>Central Call Taking - Separate Dispatch</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>-$59,192</td>
<td>$0</td>
<td>-$59,192</td>
<td>-$887,886</td>
</tr>
<tr>
<td>Police Move to a New Communications Facility; Existing PSAP Becomes Backup Centre; No Change at Fire</td>
<td>$1,085,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$1,085,000</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Co-Location at a New Facility</td>
<td>$1,085,000</td>
<td>$0</td>
<td>$25,000</td>
<td>-$12,600</td>
<td>$1,110,000</td>
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<td>-$189,000</td>
</tr>
<tr>
<td>Consolidated at New Facility; Existing PSAP Becomes Backup Centre</td>
<td>$1,100,000</td>
<td>-$29,696</td>
<td>$0</td>
<td>-$29,696</td>
<td>$1,100,000</td>
<td>-$59,392</td>
<td>-$890,886</td>
</tr>
</tbody>
</table>

Firehall alerting already exists; no quantity change

To summarize, with respect to technology only:

- continuing the status quo means no change in expected costs.
- centralizing the call taking process while maintaining separate fire and police dispatch functions results in a savings of just over $59,000 a year due to technology efficiency.
- a move by the police service to a new facility, due to the need to replace the existing PSAP and communications centre, would incur a capital cost of $1.085 million. The existing communications centre would become the backup center.
- co-locating fire and police communications at a new building would incur capital costs of $1.1 million and a reduction of $12,600 in maintenance costs.
- combined or integrated
- consolidating fire and police communications centres at one new building would incur capital costs of $1.1 million for technology and an annual reduction of $59,900 in annual maintenance. The existing communications centre would become the backup center.
Review of Fire and Police Communications and Dispatch
in Waterloo Region

With respect to technology

- status quo represents no economic advantage annually or over a 15-year period
- central call taking results in $59,192 annual cost reduction, or $887,000 over 15 years assuming that central call taking can be accommodated within the existing PSAP
- moving the PSAP and police communications to a new facility, and the existing communications centre becoming the backup represents no immediate or ongoing technology economic advantages although there may be several operational improvements
- consolidating police and fire dispatch at a new location incurs capital costs of $1.1 million and an annual decrease of $59,932 annually or over $890,000 15 years.

Central call taking represents the greatest overall cost reduction, if it can be accomplished within the current PSAP, without incurring capital cost outside the planned technology replacement cycle.
Appendix K: Building Requirements and Cost
Review of Fire and Police Communications and Dispatch in Waterloo Region

The architectural program analysis report which follows is a result of assessing the building and associated infrastructure requirements of the operational models evaluated in this study.

The program analysis reports on a co-located and consolidated operating models – since those require changes in building structure – in relation to the status quo and evaluates options which includes the possibility of incorporating the Ambulance communications function in the future.

The per foot cost of a building, dependent on whether it is a post disaster\textsuperscript{33} standard, and the extent to which it is sustainable and built to standards such as LEED (Leadership in Energy and Environmental Design) can range between $800 to $1,100 a square foot or $30,000,000 to $46,000,000 depending on the functionality and number of staff\textsuperscript{34}.

It is important to note that if WRPS builds a stand-alone communications centre due to the status quo continuing, that cost is estimated to be over $31,000,000 therefore the differential between a stand-alone communications centre and a co-located centre would be approximately $10,000,000.

If the fire communications centre has to expand within the next 20 years the cost of a stand-alone fire communications centre would start at approximately $6,000,000 in 2021 dollars.

Therefore, the cost difference between a co-located communications centre and individual police and fire communications centres is estimated to be between zero and $5,000,000 depending on several factors noted above.

There are multiple considerations that could influence the cost of a building, or the timing or need for a new communications centre for the fire service, which makes it difficult to ascertain the cost differential between the status quo and co-location or consolidation.

\textsuperscript{33} A post-disaster building is defined as one that is essential to the provision of services in the event of a disaster and must maintain full functionality after a disaster.

\textsuperscript{34} Land costs not included.
Programme Analysis Report

City of Kitchener Fire and Waterloo Regional Police Service
Communications & Dispatch, Waterloo Region

Produced For Pomax Consulting
November 22, 2021
Objective
Approach
Existing Communications Centres
Model Analysis
Adjacency Diagrams
Conceptual Building Outline
Investment

Appendices
A: Co-Location - Occupancy Scenario 01 Model Analysis
B: Co-Location - Occupancy Scenario 02 Model Analysis
C: Consolidation - Occupancy Scenario 01 Model Analysis
D: Consolidation - Occupancy Scenario 02 Model Analysis
1.0 Objective

S2 Architecture, in support of Pomax Consulting’s study of the Region of Waterloo’s Emergency Communications’ delivery, has assessed the relationship and spatial needs of the Fire and Police Communications/Dispatch in the Waterloo Region. Our programme analysis involves the Region of Waterloo, Waterloo Regional Police Service, City of Kitchener, City of Waterloo and the City of Cambridge. Findings are intended to benefit the 4 rural municipalities in the Region - the Townships of North Dumfries, Wellesley, Wilmot and Woolwich, as they are served by, and fund, the existing shared fire dispatch centre.

The programme analysis includes:

- Assessments of current communications and dispatch facilities
- Assessments of current and future staffing requirements- forecasted to 2041
- Assessments of physical space requirements in a new purpose-built communication centre to consolidate fire and police communications/dispatch groups
- Assessments of co-location and consolidated staff models within new communication centre
- Functional relationship and adjacency diagrams based on findings
- Conceptual building outline plans
- Gross order of magnitude estimate for future projected investments

Departments included in the analysis are as follows:

- Waterloo Region Police Communication Service
- Kitchener Fire Department Dispatch Services
- Kitchener Fire Department Dispatch Back-Up Services
- Cambridge Paramedic Communications Services

A new purpose-built facility is being considered for the consolidation of fire and police communications and dispatch groups, to serve as the primary communication centre for the Region. This new centre will house staff communication areas, staff amenities, training/meeting spaces and a Real Time Operations Centre (RTOC). Our analysis also outlines the potential inclusion of the Paramedics Service Communications group into this new facility. It is also assumed that in a consolidated new build scenario, communications back-up would occupy the current Police Communications Services area in the WRPS Headquarters. In other models, backup centres would remain separate.

2.0 Approach

The programme assessment was carried out by Linus Murphy, Architect and Principal and Melissa Chabot, Senior Interior Designer and Associate at S2 Architecture.

A preliminary review of the existing communications centres within the Region of Waterloo was completed. This assessment included current physical space analysis and review of staffing requirements. Future growth projections were compiled to suit each communications/dispatch group.

An analysis of physical space requirements was then completed based on two model scenarios: 1) Co-locating Fire Department Dispatch Services, Police Communication Services and Paramedic Communications Services within one premise, each continuing to operate as independent entities, and 2) Consolidating all functional groups within one premise, operating as a single entity and sharing staff, resourcing and amenities.

Relationship diagrams were created to reflect suggestive adjacencies and a conceptual building outline was formed to suit the area requirements. Furthermore, a gross order of magnitude estimate was completed to project potential future investment by the Municipality.

*All square footage (SF) shown in this analysis are approximate areas only.*
3.0 Existing Communications Centres

The following communications centres were included in the initial assessment of current area and programme requirements.

- WRPS Headquarters, Cambridge, ON
- Fire Department Headquarters, Kitchener, ON
- Fire Operations Centre, Kitchener, ON
- Central Ambulance Communications Centre, Cambridge, ON

Plans were reviewed for each facility to establish current amenities, staff counts and area adjacencies. Additional information was collected by Pomax Consulting during discussions with functional groups.

The departmental growth included throughout this report is based on the staff projections and growth forecasted to 2041, determined by the main communications report developed by Pomax Consulting.

Police Services: 911 Communications Centre

The Communications centre is located within the WRPS Headquarters at 200 Maple Grove Road in Cambridge Ontario.

The centre consist of approximately 2,820 SF with +/- 1,325SF dedicated to communications dispatch functions.

The area is comprised of a central communications area with surrounding offices, a breakroom, a sitting area and telephone room.

**Staffing:**
The centre is staffed with approximately 86 personnel. The centre operates 24 hours a day, 7 days a week, 365 days a year, on 4 shift rotation.

Typical staffing per shift includes:
- Staff Sergeant
- Dispatch Communicators
- Dispatch Supervisors
- Switchboard Operators
- Trainer Analysts

Current staff count and projected growth forecasted to 2041, shown in table below.

<table>
<thead>
<tr>
<th>PROGRAM EXISTING AREA</th>
<th>PROPOSED AREA</th>
<th>EXISTING STAFF COUNT</th>
<th>PROJECTED GROWTH 2025</th>
<th>PROJECTED GROWTH 2031</th>
<th>PROJECTED GROWTH 2041</th>
<th>PROJECTED TOTAL STAFF COUNT</th>
<th>PROJECTED TOTAL POSITION COUNT</th>
<th>CURRENT NET AREA (Approx. SF)</th>
<th>PROPOSED NET AREA PER POSITION/FUNCTION (Approx. SF)</th>
<th>PROPOSED TOTAL NET AREA PER POSITION (Approx. SF)</th>
<th>PROPOSED ADJACENCIES/NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff Sergeant- Office</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>130 SF</td>
<td>150 SF</td>
<td></td>
</tr>
<tr>
<td>Supervisors office</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>200 SF</td>
<td>150 SF</td>
<td></td>
</tr>
<tr>
<td>Current office is shared by both trainers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dispatch: Communicators</td>
<td>14</td>
<td>14</td>
<td>74</td>
<td>20</td>
<td>5</td>
<td>10</td>
<td>109</td>
<td>27</td>
<td>1,325 SF</td>
<td>180 SF</td>
<td>Current console +/-80 SF, proposed new console 180SF</td>
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<tr>
<td>Dispatch: Supervisor (2 consoles)</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>Included w Comms</td>
<td>2</td>
<td>180</td>
<td>360</td>
<td></td>
<td></td>
<td>Proposed new console 180SF</td>
</tr>
<tr>
<td>Switchboard: Operators</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>120</td>
<td>150</td>
<td></td>
<td></td>
<td>Office adjacent to communicators with visibility into comms area</td>
</tr>
<tr>
<td>Trainer analyst</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td></td>
<td>4</td>
<td>150</td>
<td>300</td>
<td></td>
<td></td>
<td>Shared office (2ppl/office)</td>
</tr>
<tr>
<td>RTOC: Civilian analyst</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td></td>
<td>1</td>
<td>180</td>
<td>360</td>
<td></td>
<td></td>
<td>Workstations located within RTOC</td>
</tr>
<tr>
<td>RTOC: Civilian scheduler</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
<td>150</td>
<td>150</td>
<td></td>
<td></td>
<td>Office located near Real Time Ops Centre</td>
</tr>
<tr>
<td>RTOC: Staff Sergeant</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
<td>150</td>
<td>150</td>
<td></td>
<td></td>
<td>Office located near Real Time Ops Centre</td>
</tr>
<tr>
<td>RTOC: Sergeant</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
<td>150</td>
<td>150</td>
<td></td>
<td></td>
<td>Office located near Real Time Ops Centre</td>
</tr>
<tr>
<td>IT office</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
<td>120</td>
<td>150</td>
<td></td>
<td></td>
<td>Office embedded within comms</td>
</tr>
<tr>
<td>CMHA Impact Worker</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td></td>
<td>5</td>
<td>64</td>
<td>64</td>
<td></td>
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</tr>
<tr>
<td>Total Staff Count:</td>
<td>20</td>
<td>86</td>
<td>32</td>
<td>5</td>
<td>10</td>
<td>133</td>
<td>41</td>
<td>1,895</td>
<td>6,994</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Amenities:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breakroom</td>
<td>1</td>
<td>1</td>
<td>240</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sitting Area</td>
<td>1</td>
<td>1</td>
<td>150</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Server Room</td>
<td>1</td>
<td>1</td>
<td>535</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Current Amenities Area:</td>
<td>925</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Location: WRPS Headquarters, 200 Maple Grove Road, Cambridge, ON

POLICE SERVICES: 911 COMMUNICATIONS (WRPS HEADQUARTERS)

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## Fire Department Dispatch Communications Centre

The Fire Department Dispatch Communications Centre is located within the Fire Department Headquarters, at 270 Strasburg Road, Kitchener, ON.

The centre consist of approximately 1,255 SF with +/-800 SF dedicated to communications dispatch functions.

The area is comprised of a central communications area with surrounding offices, telephone/computer room, kitchenette/lounge, with a small washroom. This area is located at the back of the Fire Headquarters building.

**Staffing:**

The centre is staffed with approximately 18 personnel. The centre operates 24 hours a day, 7 days a week, 365 days a year on a 4 shift rotation.

**Typical staff per shift includes:**
- Interim Deput Chief
- Chief of Communications
- Dispatch Communicators
- Communication Officers

Current staff count and projected growth forecasted to 2041, shown in table below.

### Existing Facilities

<table>
<thead>
<tr>
<th>Position/Function</th>
<th>Existing Count</th>
<th>Projected Growth 2025</th>
<th>Projected Growth 2031</th>
<th>Projected Growth 2041</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interim Deput Chief</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Chief of Communications</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Dispatch Communicators</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Communication Officers</td>
<td>18</td>
<td>29</td>
<td>39</td>
<td>51</td>
</tr>
<tr>
<td><strong>Total Staff Count:</strong></td>
<td>24</td>
<td>43</td>
<td>61</td>
<td>83</td>
</tr>
</tbody>
</table>

### Total Current Amenities Area:

- Manager/Director Office: 150 SF
- Nurse Clinicians: 2 Info not available
- Quality Assurance Supervisor: 150 SF
- Supervisor Office: 150 SF
- **Server Room:** 500 SF
- Washroom & Change Room: 45 SF
- **Total Current Amenities Area:** 2,198 SF

---

## Paramedics Service Communications Centre

The Paramedics Service Communications Centre is located within the Central Ambulance Communications Centre, at 15 Reuter Drive in Cambridge, ON.

The centre consist of a communications area, offices, and open workstations, along with a server room, change room/washrooms, and lounge area. No floor plans were provided to confirm area placement.

**Staffing:**

The centre is staffed with approximately 43 personnel. The centre operates 24 hours a day, 7 days a week, 365 days a year on a 4 shift rotation.

**Typical staff per shift includes:**
- Dispatch Communicators
- Dispatch Supervisors
- Supervisor
- Quality Assurance Supervisor
- Nurse Clinicians
- Manager/Director

Current staff count and projected growth forecasted to 2041, shown in table below.
**Fire Dispatch Back-Up Centre**

The Fire Department Dispatch Back-Up Centre is located in the Kitchener Operations Centre, at 131 Goodrich Dr, Kitchener, ON.

The centre consist of approximately 820 SF with +/-490 SF dedicated to communications dispatch functions.

The area is comprised of a communication call area with a staff breakroom.

**Staffing:**
The centre is staffed with approximately 17 personnel. The centre operates 24 hours a day, 7 days a week, 365 days a year on a 4 shift rotation.

Typical staff per shift includes:
- Chief of Communications
- Dispatch Communicators
- Dispatch Supervisors

It is assumed that in a consolidated new build scenario, communications back-up would occupy the current Police Communications Services area in the WRPS Headquarters. In other models, backup centres would remain separate.

Current staff count and projected growth forecasted to 2041, shown in table below.

**4.0 Model Analysis**

Two models were developed for possible inclusion into a new purpose-built communication centre.

**Model 01 Co-Location:**
In this model, all groups would occupy a single facility, each continuing to operate as independent entities, with their own staff work areas and amenities.

**Model 02 Consolidation:**
In this model, all groups would occupy a single contiguous space arrangement, operating as a single entity, and sharing staff, resourcing and amenities.

In each model, two occupancy scenarios were developed:

**Occupancy Scenario 01:**
In this scenario, the following groups are included:
- Police Communications Services
- Fire Department Dispatch Services

**Occupancy Scenario 02:**
In this scenario, the following groups are included:
- Police Communications Services
- Fire Department Dispatch Services
- Paramedic Service Communications

The analysis reflects an estimated required building area of approx. 37,093 - 50,359 SF for a co-location model and approx. 29,286 - 35,946 SF for a consolidated model. A new 1-storey facility is assumed and reflected in this analysis, as a future building site has yet to be selected.

### PROGRAM ANALYSIS SUMMARY

<table>
<thead>
<tr>
<th>Model 01: Co-Location</th>
<th>Model 02: Consolidation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOTAL NET AREA</strong></td>
<td><strong>TOTAL NET AREA</strong></td>
</tr>
<tr>
<td>Total Building Net Area</td>
<td>29,674</td>
</tr>
<tr>
<td>Total Base Building Gross-Ups</td>
<td>7,419</td>
</tr>
<tr>
<td>Total Building Area (Police and Fire)</td>
<td>37,093</td>
</tr>
<tr>
<td>Total building area with the addition of:</td>
<td></td>
</tr>
<tr>
<td><strong>Occupancy Scenario 02: Paramedics Service Communications</strong></td>
<td></td>
</tr>
<tr>
<td>Total Building Net Area</td>
<td>10,613</td>
</tr>
<tr>
<td>Total Base Building Gross-Ups</td>
<td>2,653</td>
</tr>
<tr>
<td>Total ADDED Building Area</td>
<td>13,266</td>
</tr>
<tr>
<td>Total Building Area for All (Police, Fire &amp; Paramedic)</td>
<td>50,359</td>
</tr>
</tbody>
</table>
Model 01: Co-Location Model - Occupancy Scenario 01

Model 01 Co-Location:
In this model, all groups would occupy a single facility, each continuing to operate as independent entities, with their own staff work areas and amenities

Occupancy Scenario 01:
In this scenario, the following groups are included:
- Police Communications Services
- Fire Department Dispatch Services

The total projected staff count and areas are as follows:
- Total staff count: 164
- Total position count: 51
- Proposed total staff area: Approx. 8,224 SF

<table>
<thead>
<tr>
<th>Occupancy Scenario 01:</th>
<th>Proposed Total Staff Count</th>
<th>Proposed Total Position Count</th>
<th>Proposed Total Staff Area (SF)</th>
<th>Proposed Total Amenity Area (SF)</th>
<th>Total Net Area (SF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Police Services: 911 Comm.</td>
<td>135</td>
<td>42</td>
<td>6634</td>
<td>11,965</td>
<td>18,599</td>
</tr>
<tr>
<td>Fire Services Dispatch</td>
<td>29</td>
<td>9</td>
<td>1,660</td>
<td>7,175</td>
<td>8,835</td>
</tr>
<tr>
<td>Shared Amenities/Support Spaces</td>
<td></td>
<td></td>
<td>2,240</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Building Net Area</td>
<td></td>
<td></td>
<td>29,674</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Base Building Gross-Ups</td>
<td></td>
<td></td>
<td>7,419</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Building Area</td>
<td></td>
<td></td>
<td>37,093</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Model 01: Co-Location Model - Occupancy Scenario 02

Model 01 Co-Location:
In this model, all groups would occupy a single facility, each continuing to operate as independent entities, with their own staff work areas and amenities

Occupancy Scenario 02:
In this scenario, the following groups are included:
- Police Communications Services
- Fire Department Dispatch Services
- Paramedic Service Communications

The total projected staff count and areas are as follows:
- Total staff count: 215
- Total position count: 65
- Proposed total staff area: Approx. 10,492 SF

<table>
<thead>
<tr>
<th>Occupancy Scenario 02</th>
<th>Proposed Total Staff Count</th>
<th>Proposed Total Position Count</th>
<th>Proposed Total Staff Area (SF)</th>
<th>Proposed Total Amenity Area (SF)</th>
<th>Total Net Area (SF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paramedics Services Comm.</td>
<td>51</td>
<td>14</td>
<td>2,198</td>
<td>8415</td>
<td>10,613</td>
</tr>
<tr>
<td>Total Building Net Area</td>
<td></td>
<td></td>
<td>10,613</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Base Building Gross-Ups</td>
<td></td>
<td></td>
<td>2,653</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total ADDED Building Area</td>
<td></td>
<td></td>
<td>13,266</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Building Area for All Groups</td>
<td></td>
<td></td>
<td>50,359</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Model 02: Consolidation - Occupancy Scenario 01

Model 02 Consolidation:
In this model, all groups would occupy a single contiguous space arrangement, operating as a single entity, and sharing staff, resourcing and amenities.

Occupancy Scenario 01:
In this scenario, the following groups are included:
- Police Communications Services
- Fire Department Dispatch Services

The total projected staff count and areas are as follows:
- Total staff count: 162
- Total position count: 49
- Proposed total staff area: Approx. 7,894 SF

<table>
<thead>
<tr>
<th>Occupation Scenario 01:</th>
<th>Proposed Total Staff Count</th>
<th>Proposed Total Position Count</th>
<th>Proposed Total Staff Area (SF)</th>
<th>Proposed Total Amenity Area (SF)</th>
<th>Total Net Area (SF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Police Services: 911 Comm.</td>
<td>135</td>
<td>42</td>
<td>7,894</td>
<td>15,535</td>
<td>23,429</td>
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<tr>
<td>Fire Services Dispatch</td>
<td>27</td>
<td>7</td>
<td></td>
<td></td>
<td>5,857</td>
</tr>
<tr>
<td>Total Base Building Gross-Ups</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>29,286</td>
</tr>
</tbody>
</table>

Model 02: Consolidation - Occupancy Scenario 02

Model 02 Consolidation:
In this model, all groups would occupy a single contiguous space arrangement, operating as a single entity, and sharing staff, resourcing and amenities.

Occupancy Scenario 02:
In this scenario, the following groups are included:
- Police Communications Services
- Fire Department Dispatch Services
- Paramedic Service Communications

The total projected staff count and areas are as follows:
- Total staff count: 213
- Total position count: 63
- Proposed total staff area: Approx. 10,092 SF

<table>
<thead>
<tr>
<th>Occupation Scenario 02:</th>
<th>Proposed Total Staff Count</th>
<th>Proposed Total Position Count</th>
<th>Proposed Total Staff Area (SF)</th>
<th>Proposed Total Amenity Area (SF)</th>
<th>Total Net Area (SF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Police Services: 911 Comm.</td>
<td>135</td>
<td>42</td>
<td>7,894</td>
<td>15,535</td>
<td>23,429</td>
</tr>
<tr>
<td>Fire Services Dispatch</td>
<td>27</td>
<td>7</td>
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<td></td>
<td>5,857</td>
</tr>
<tr>
<td>Total Base Building Gross-Ups</td>
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<td></td>
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<td></td>
<td>29,286</td>
</tr>
<tr>
<td>Paramedics Services Comm.</td>
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<td>14</td>
<td>2,198</td>
<td>3,130</td>
<td>5,328</td>
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<tr>
<td>Total ADDED Building Area</td>
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<td></td>
<td></td>
<td>1,332</td>
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<tr>
<td>Total Building Area</td>
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<td></td>
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<td>6,660</td>
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<tr>
<td>Total Building Area for All Groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>35,946</td>
</tr>
</tbody>
</table>
5.0 Adjacency Diagrams

All relationship diagrams shown above are based on projected staff requirements and suggestive adjacencies.

Model 01 - Co-Location/Occupancy Scenario 01
Adjacency Diagrams

- Communications/Dispatch Services - Staff Areas
- Communications/Dispatch Services - Amenities/Support Areas
- Shared Amenities
- Base

All relationship diagrams shown above are based on projected staff requirements and suggestive adjacencies.

Model 02 - Consolidation/Occupancy Scenario 01
6.0 Conceptual Building Outline

Plan assumptions:
- A mechanical penthouse is assumed for a new facility
- Exterior generators are assumed for a new facility
- No public access to building is assumed for a new facility
- No site has been selected as the preferred location for a new communication facility
- A 1-storey facility is assumed until a site has been selected and the required building area is confirmed
- All programme areas shown are approximate only
- It is assumed that in a consolidated new build scenario, communications back-up would occupy the current Police Communications Services area in the WRPS Headquarters. In other models, backup centres would remain separate.

Conceptual building outline is based on a suggestive layout and site.

Model 01- Co-Location/Occupancy Scenario 01

Plan N.T.S.
Conceptual Building Outline

Plan assumptions:
- A mechanical penthouse is assumed for a new facility
- Exterior generators are assumed for a new facility
- No public access to building is assumed for a new facility
- No site has been selected as the preferred location for a new communication facility
- A 1-storey facility is assumed until a site has been selected and the required building area is confirmed
- It is assumed that in a consolidated new build scenario, communications back-up would occupy the current Police Communications Services area in the WRPS Headquarters. In other models, backup centres would remain separate.

Conceptual building outline is based on a suggestive layout and site.
7.0 Investment

A high level gross order of magnitude estimate has been developed for a new purpose-built facility to accommodate Police Service Communications and Fire Dispatch Services departments (occupancy scenario 01). Estimates are shown for both co-location and consolidated models.

The costing analysis takes into consideration the following assumptions:

• All estimates reflect current market pricing as of November 22, 2021
• All departmental growth included throughout this report is based on staffing counts forecasted to 2041
• Green Initiatives include low GHG, high energy performance, Net Zero capable
• Green Initiatives could include electrical PV panels and geothermal systems
• The building design will be to Post Disaster requirements
• Net Zero must include the PV and Geothermal work as well
• Furniture consoles are assumed at 180 SQFT and $45,000 each
• All estimates shown are presented in CAD ($)

The costing analysis also takes into consideration the following exclusions:

• Land Costs, internal client PM, security, and similar
• Green Initiatives exclude any certification process (i.e. Net Zero or LEED Certification)

### GROSS ORDER OF MAGNITUDE ESTIMATE

<table>
<thead>
<tr>
<th>Description</th>
<th>Criteria</th>
<th>Co-Location Model</th>
<th>Consolidated Model</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Building Costs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building Area</td>
<td>Square Feet (sq. ft.)</td>
<td>37,093 sq. ft.</td>
<td>29,298 sq. ft.</td>
</tr>
<tr>
<td>Construction Costs (Low)</td>
<td>$500 / sq. ft.</td>
<td>$18,546,500</td>
<td>$14,649,000</td>
</tr>
<tr>
<td>Construction Costs (High)</td>
<td>$750 / sq. ft.</td>
<td>$27,819,750</td>
<td>$21,973,500</td>
</tr>
<tr>
<td><strong>Site</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Landscaping (Low)</td>
<td>$40,000 / acre</td>
<td>$600,000</td>
<td>$600,000</td>
</tr>
<tr>
<td>Landscaping (High)</td>
<td>$60,000 / acre</td>
<td>$900,000</td>
<td>$900,000</td>
</tr>
<tr>
<td>Infrastructure/Utilities</td>
<td>Lump Sum Estimate</td>
<td>$200,000</td>
<td>$200,000</td>
</tr>
<tr>
<td>Green Initiatives</td>
<td>Separated Below</td>
<td>Separated Below</td>
<td></td>
</tr>
<tr>
<td>Cabling &amp; Network</td>
<td>Cabling, network</td>
<td>$350,000</td>
<td>$350,000</td>
</tr>
<tr>
<td>Parking (1 stall / 350 sq.ft.)</td>
<td>$20,000 / stall</td>
<td>$2,090,000</td>
<td>$1,650,000</td>
</tr>
<tr>
<td><strong>Furniture</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workstations</td>
<td>Lump Sum Estimate</td>
<td>$30,000</td>
<td>$20,000</td>
</tr>
<tr>
<td>Case Goods</td>
<td>Lump Sum Estimate</td>
<td>$105,000</td>
<td>$90,000</td>
</tr>
<tr>
<td>Consoles</td>
<td>Lump Sum Estimate</td>
<td>$2,295,000</td>
<td>$1,710,000</td>
</tr>
<tr>
<td>Meeting and General</td>
<td>Lump Sum Estimate</td>
<td>$950,000</td>
<td></td>
</tr>
<tr>
<td><strong>Soft Costs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fees</td>
<td>Lump Sum Estimate</td>
<td>$2,781,975</td>
<td>$2,197,350</td>
</tr>
<tr>
<td>Permits</td>
<td>Lump Sum Estimate</td>
<td>$278,198</td>
<td>$219,735</td>
</tr>
<tr>
<td>Testing / Commissioning</td>
<td>Lump Sum Estimate</td>
<td>$100,000</td>
<td></td>
</tr>
<tr>
<td><strong>Contingencies:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design Contingency</td>
<td>10%</td>
<td>3,179,975</td>
<td>2,489,350</td>
</tr>
<tr>
<td>Construction Contingency</td>
<td>15%</td>
<td>5,203,463</td>
<td>4,101,525</td>
</tr>
<tr>
<td><strong>Gross Estimated Costs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated Costs</td>
<td>Low Range</td>
<td>36,710,110</td>
<td>28,776,960</td>
</tr>
<tr>
<td>Estimated Costs</td>
<td>High Range</td>
<td>46,283,360</td>
<td>36,401,460</td>
</tr>
<tr>
<td><strong>Therefore</strong></td>
<td></td>
<td>$36m to $46m</td>
<td>$28m to $36m</td>
</tr>
</tbody>
</table>

### Green Initiatives

- Solar Panels: Offsetting 50% Power $1,500,000 $1,300,000
- Geothermal: Lump Sum Estimate $600,000 $500,000
- Net Zero (must involve PV and Geo): Lump Sum Estimate $1,000,000 $1,000,000
### 8.0 Appendices

#### Appendix A

**Co-Location - Occupancy Scenario 01 Model Analysis**

<table>
<thead>
<tr>
<th>Current Position Count</th>
<th>Current Staff Count</th>
<th>Total Area (SQFT)</th>
<th>Proposed Position Count</th>
<th>Proposed Staff Count</th>
<th>Proposed Total Net Area (SQFT)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>180</td>
<td>1,484</td>
<td>27</td>
<td>Programme Analysis Report 750</td>
<td>500</td>
<td>600</td>
</tr>
<tr>
<td>1</td>
<td>180</td>
<td>2,400</td>
<td>600</td>
<td>Training room to accommodate 15ppl, classroom style</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>180</td>
<td>2,400</td>
<td>500</td>
<td>Training room to accommodate 6-8 ppl</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>180</td>
<td>350</td>
<td>180</td>
<td>Small meeting room to accommodate 4-6ppl</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>180</td>
<td>2,240</td>
<td>150</td>
<td>Room for high priority cases, 2 consoles, acting supervisor &amp; asst. Can double as training space.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>180</td>
<td>1,000</td>
<td>150</td>
<td>Police Services to manage building</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>180</td>
<td>1,200</td>
<td>180</td>
<td>Area to accom 4-5 consoles, 2-3 supervisors (offices), 2 civilian analysts, coffee area, WC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Appendix B

**Co-Location - Occupancy Scenario 02 Model Analysis**

<table>
<thead>
<tr>
<th>Current Position Count</th>
<th>Current Staff Count</th>
<th>Total Area (SQFT)</th>
<th>Proposed Position Count</th>
<th>Proposed Staff Count</th>
<th>Proposed Total Net Area (SQFT)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>180</td>
<td>1,484</td>
<td>27</td>
<td>Programme Analysis Report 750</td>
<td>500</td>
<td>600</td>
</tr>
<tr>
<td>1</td>
<td>180</td>
<td>2,400</td>
<td>600</td>
<td>Training room to accommodate 15ppl, classroom style</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>180</td>
<td>2,400</td>
<td>500</td>
<td>Training room to accommodate 6-8 ppl</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>180</td>
<td>350</td>
<td>180</td>
<td>Small meeting room to accommodate 4-6ppl</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>180</td>
<td>2,240</td>
<td>150</td>
<td>Room for high priority cases, 2 consoles, acting supervisor &amp; asst. Can double as training space.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>180</td>
<td>1,000</td>
<td>150</td>
<td>Police Services to manage building</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>180</td>
<td>1,200</td>
<td>180</td>
<td>Area to accom 4-5 consoles, 2-3 supervisors (offices), 2 civilian analysts, coffee area, WC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Appendix C

#### Policing Services Comm./Fire Service Dispatch Co-Location Centre

<table>
<thead>
<tr>
<th>Staff Sub-total</th>
<th>8415</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Building Services Gross-Up:</td>
<td>5%</td>
</tr>
<tr>
<td>Base Building Circulation Gross-Up:</td>
<td>20%</td>
</tr>
<tr>
<td>Total Added Building Net Area:</td>
<td>10,613</td>
</tr>
<tr>
<td>Total net area</td>
<td>27,434</td>
</tr>
<tr>
<td>Total Staff Position Count</td>
<td>27</td>
</tr>
<tr>
<td>Total Staff Count</td>
<td>107</td>
</tr>
<tr>
<td>Fire Services Total Area:</td>
<td>8,835</td>
</tr>
<tr>
<td>Staff Sub-total</td>
<td>7</td>
</tr>
<tr>
<td>Base Building Circulation Gross-Up:</td>
<td>20%</td>
</tr>
<tr>
<td>Total Added Building Net Area:</td>
<td>6,042</td>
</tr>
<tr>
<td>Total net area</td>
<td>20,031</td>
</tr>
<tr>
<td>Total Staff Position Count</td>
<td>41</td>
</tr>
<tr>
<td>Total Staff Count</td>
<td>138</td>
</tr>
<tr>
<td>Base Building Circulation Gross-Up:</td>
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</tr>
<tr>
<td>Total Added Building Net Area:</td>
<td>3,038</td>
</tr>
<tr>
<td>Total net area</td>
<td>27,434</td>
</tr>
<tr>
<td>Total Staff Position Count</td>
<td>27</td>
</tr>
<tr>
<td>Total Staff Count</td>
<td>107</td>
</tr>
<tr>
<td>Fire Services Total Area:</td>
<td>8,835</td>
</tr>
<tr>
<td>Staff Sub-total</td>
<td>7</td>
</tr>
<tr>
<td>Base Building Circulation Gross-Up:</td>
<td>20%</td>
</tr>
<tr>
<td>Total Added Building Net Area:</td>
<td>6,042</td>
</tr>
<tr>
<td>Total net area</td>
<td>20,031</td>
</tr>
<tr>
<td>Total Staff Position Count</td>
<td>41</td>
</tr>
<tr>
<td>Total Staff Count</td>
<td>138</td>
</tr>
<tr>
<td>Base Building Circulation Gross-Up:</td>
<td>5%</td>
</tr>
<tr>
<td>Total Added Building Net Area:</td>
<td>3,038</td>
</tr>
<tr>
<td>Total net area</td>
<td>27,434</td>
</tr>
</tbody>
</table>
Appendix C
Consolidation Occupancy Scenario 01 Model Analysis

Appendix D
Consolidation Occupancy Scenario 02 Model Analysis
Appendix L: Communication Operational Model Discussion
a. Assessing the Operating Models

i. Five Operational Models

We determined that there are five operational models (options) to be considered:

1. Independent - Status quo
2. Common call taking with separate dispatch
3. Co-located communications centres
4. Combined or integrated communications centres
5. Consolidated centre

ii. Technology Assessment Summary

(From Table 14)

- Status quo represents no economic advantage annually or over a 15-year period.
- Central call taking results in $59,192 annual cost reduction, or $887,000 over 15 years assuming that central call taking can be accommodated within the existing PSAP.
- Moving the PSAP and police communications to a new facility, and the existing communications centre becoming the backup represents no immediate or ongoing technology economic advantages although there may be several operational improvements.
- Consolidating police and fire dispatch at a new location incurs capital costs of $1.1 million and an annual decrease of $59,932 annually or over $890,000 over 15 years.

iii. Staffing Summary

- There is no economic advantage to the status quo – current costs will continue
- There is a potential economic advantage in a central call taking model in that existing surplus capacity within the 911 and police call taking centre, during some hours, means that it would not be necessary to increase staff during some hours. Economically, this represents approximately 40 hours a week or a reduction of $85,000 a year in staff costs. However, there are some considerations because this model assumes
  - a dynamic staffing model can be achieved to match staff levels with workload
  - staff can be trained to receive police and fire calls.
- There is no economic advantage to a co-located communications centre from a staffing perspective because both police and fire would maintain the current staffing levels.
- There is no staffing advantage in moving the PSAP and police communications to a new facility and continuing the current operational model although there are facility improvement advantages for the Waterloo Regional Police Service.
- There may be economic advantages in a combined or integrated communications centre
within the assumption that a dynamic staffing model can be achieved to match staff levels with workload

dependent on the number of staff that are able to call take and dispatch for both police and fire services

a conservative estimate is that two full time equivalents, or more, could be saved in this model. Two full time equivalents represent $170,000 annually.

- There are staffing economic advantages to a consolidated communications centre (Table 8). A dynamic shift schedule in a consolidated communications centre could offset as much as $933,000 in staff costs annually assuming that a dynamic staffing model can be achieved to match staff levels with workload. It is possible that shift pattern smoothing may reduce some of the identified possible saving.

b. Operational Considerations

- The status quo means that the current operational model continues. Fire and police communications continue to operate separately, there is surplus capacity in both departments resulting in a more pronounced surplus when the requirements of both departments are added together.

- The common call taking but separate dispatch model might reduce some of the surplus capacity found in the current model and it will also reduce the 30 to 36 seconds of monitoring time by 911 call takers when transferring calls to fire department call taker. It wouldn’t reduce the monitoring time when transferring a call to paramedic services since paramedic services communications is expected to continue operating a separate communications centre.

  - This monitoring time equates to less than 400 hours of staff time a year

- A co-located centre offers no quantitative operational advantages since each communications department would operate separately although housed in the same facility. There may be qualitative advantages in enhanced operational relationships and interaction since staff would use common amenities.

- There may be operational advantages in a combined or integrated communications centre if a significant number of staff members are capable of call taking and dispatching for both services. In that case, some of the benefits of a common call taking model or the consolidated model may be achieved. However, since we are defining a combined or integrated communications as one where the duties and tasks of a 911 – fire – police communications centre are achieved, but the intent is not necessarily to cross-train all staff, it is difficult to identify advantages.

---

35 Assuming that a dynamic staffing model can be achieved to match staff levels with workload.
36 A 911 call (police, fire, EMS), which is then transferred to fire or paramedic services, and the 911 call taker listens to determine if police are also required, is calculated to take 36 seconds or 0.6 of a minute.
• A consolidated model, like the common call taking model, will reduce some of the call transfer and monitoring time currently experienced. However, in most cases, this averages 30 to 36 seconds per call and totals less than 400 hours of staff time per year.

Also, currently, when a police services dispatcher determines that fire or paramedic services are required at a police incident, the police dispatcher has to create a mirrored call which hides police specific or confidential information prior to sending to fire or paramedic service communications. However, testing the time it takes to mirror and send a call revealed that the process usually takes 15 to 20 seconds per call but we could not identify the frequency required. We estimate that this also represents less than 400 hours a year in staff time and expected upgrades to the CAD system will eliminate most of this time requirement.

A consolidated centre offers greater operational interoperability since one dispatch team has oversight of the activity of both police and fire resources and may be able to more easily cancel resources that are found to be not required.

c. Public and Responder Safety

A requirement of the project is for the consultants to assess the effect of the operational models on public and responder safety. Using the current state (the status quo) and considering that

• the recruitment, selection and intake process for communicators at least maintains the same content;
• the training process maintains the same quality and content;
• day to day operations of any of the models is competently accomplished;
• technology continues as planned;
• police, fire, and EMS responders are the same responders as they are now, and new staff are selected and trained as at present;
• oversight in the form of operations and governance is constructed to ensure that decisions and accountability are properly rendered;

then none of the models have an impact on public or responder safety.

d. Impact on Medical Emergency Response Times

There is no indication that any of the models will have a negative effect on medical emergency response times. Medical responses are rarely time sensitive no matter how often we hear that seconds count. There is a substantive amount of research which supports this statement.

In the next 12 to 24 months, the Ministry of Health, which operates most paramedic communication centres in the province, will be implementing the Medical Priority Dispatch (MPDS) call taking algorithm and closing out the existing Dispatch Priority Index. Medical
Priority Dispatch is in use at more than 6,000 locations worldwide and has a greater sensitivity and specificity resulting in more accurate prioritization than the current call taking algorithm. The expectation is that simultaneous dispatch to fire departments will occur only after sufficient information has been gathered by the paramedic communication centre (CACC) to assign a determinant to a medical incident. Currently, simultaneous dispatch happens upon key answers being assigned in the paramedic communication centre’s CAD. The expectation is that additional time will be allocated at the call taking stage to improve an accurate resource selection before one is dispatched.

While the province is replacing the Dispatch Priority Index with MPDS to improve resource allocation, the National Health Service in England has replaced, in some ambulance services, MPDS with Pathways, which is software utilized by the National Health Service of England to triage public telephone calls for medical care and emergency medical services – such as 999 or 111 calls – in some NHS trusts and five of the ambulance services in the country. The intent of Pathways is to further reduce, beyond that achieved by MPDS, unnecessary call-outs for emergency services.

We see no concern that any of the operational or organizational models being considered will have a negative effect on medical emergency response times.

The 911 call taking, and WRPS call taking and dispatch process is shown in Exhibit 24, page 150, and the fire services call taking and dispatch process is shown in Exhibit 25, page 151. The detail is difficult to follow but the processes, as depicted have been approved as accurate by police and fire representatives. None of the models discussed here would affect the content elicited from callers although slight streamlining, as discussed above, may be possible.
Exhibit 25: Kitchener Fire Dispatch Centre Call Taking and Dispatch Process
e. Other Considerations Within a Combined or Consolidated Operating Model

Major considerations of combined or consolidated communications centres where staff are expected to be competent in both police and fire call taking and dispatching, are the

- recruitment and selection process;
- training staff to be capable in both forms of call taking and dispatching;
- executing competent call taking and dispatching for both emergency services; and
- the resources to accomplish training and quality assurance.

- Individual selection and recruitment processes are shown in Exhibit 20, page 117, and Exhibit 21, page 118.
- Individual fire and police initial training processes are shown in Exhibit 22 on page 121, and Exhibit 23 on page 122.
- Individual call taking and dispatch process are shown in Exhibit 24, page 150, and Exhibit 25, page 151.

In the case of a combined or consolidated communication centre

- An expected recruitment and selection process is shown in Exhibit 26.
- An expected training process to achieve competence in fire and police call taking and dispatching is shown in Exhibit 27.
- An expected call taking and dispatch process is shown in Exhibit 28.
Exhibit 26: Recruitment & Selection: Combined or Consolidated Communications Centre

Review of Fire and Police Communications and Dispatch in Waterloo Region
Exhibit 27: Training Process for a Combined or Consolidated Communications Centre
Exhibit 28: Call Taking Dispatch Process: Combined or Consolidated Communications Centre
i. Resources Required

Trainers
The WRPS communications Centres has two trainers who are committed full time to the training process. They are assisted as required by other communications staff who provide training support when available. The fire department uses supervisory staff and on-the-job as part of the training regimen. Although content is different, there are similarities between the police and fire training processes. But in December 2020

- only 36% of full time permanent staff at the police communications centre were considered to be cross-trained to call take and dispatch police services;
- in December 2019 57% were cross-trained;
- in December 2018 57% were cross-trained (64% in October 2018);
- In December 2017, 64%;
- In December 2016, 55%.

We suggest that it will be difficult to consider combining or consolidating communications centres until a significant component – more than 80% - of full time staff at the police communications centre are cross trained. We expect training additional staff and scheduling adequate dispatch capable staff will be a considerable challenge if fewer than 60% of current police staff are cross-trained.

The availability of additional training staff will assist in accomplishing this goal but the current cross-trained percentage is a major impediment to considering a combined or consolidated dispatch option.

On the other hand, it should be remembered that a combined or consolidated communications centre requires a new facility to be implemented, which is several years from now, thus providing sufficient time for WRPS to implement two additional trainers and achieve a high percentage of cross-trained staff.

Recruitment Process
The police service recruitment process is protracted in part because the screening aspect is manual. The Human Resources Information System that Waterloo Region and Waterloo Regional Police are partnering on securing should reduce the recruitment process in the next two to three years.

The fire service recruitment and selection processes are streamlined and usually accomplished within 6 to 8 weeks.

There is no evidence to suggest that a recruitment, selection, and training process for a combined or consolidated centre would not be successful if properly planned.
Appendix M: Considerations for Locating a Communications Centre
This appendix is offered in response to the Request for Proposal’s intent to assess communication centre location options. The following pages offer Exhibit B from the National Emergency Number Association’s *NENA Public Safety Answering Point Site Selection Criteria Information Document*. It’s an extensive publication which includes some of the considerations in locating a PSAP.

There are other considerations which people who work for municipal property groups take into account when suggesting sites for buildings – some of which can be problematic. A vacant field which used to be part of a farm can seem like an ideal site but it may entail removing 100 years of farmed soil before reaching undisturbed earth, and then having to fill the area from which the soil was removed. Services and utilities may not be available and the installation could represent a significant cost. Also, redundant fibre and cable networks may have to be extended and installed.

Most important is employee access. Consider the mindset of staff who are facing a 12 or 14 hour night shift in January and have to use a public parking lot and a several minute walk to access a communications centre that is built downtown. Currently, both fire and police communicators have relatively easy parking and building access. Ease of access assists employee retention.

We had one client that decided to build the consolidated communications centre where it could act as an anchor for neighbourhood renewal. Parking was difficult and expensive, public transportation was not as available on weekends or outside business hours, and there was an employee retention problem. Staff often left for one of several suburban communication centres, for a number of reasons, not just the location of the centre – but it was a major contributor.

So, we suggest that in addition to the list of considerations NENA offers, and the principals that municipality reality departments wish to observe, that the preeminent consideration should be staff ease of access and best work environment.
NENA Public Safety Answering Point Site Selection Criteria Information Document

**Abstract:** This document contains a variety of strategies, points for consideration, and other operational guidance related to the processes and criteria used in the identification and selection of facilities and/or sites considered for a community’s public safety answering point (PSAP).

NENA Public Safety Answering Point Site Selection Criteria Information Document

NENA-INF-039.2-2018 (originally 56-506)
DSC Approval: 07/17/2007
PRC Approval: 07/17/2007
NENA Board of Directors Approval: 07/17/2007
Document Reviewed: 08/17/2018
Next Scheduled Review Date: 02/17/2023

Prepared by:
National Emergency Number Association (NENA) PSAP Operations Committee, Document Review Working Group

Published by NENA
Printed in USA

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**Exhibit B: Sample PSAP Site Selection Criteria and Definitions**

The following is a sample listing of potential PSAP Site Selection Criteria (alphabetically sorted). The table lists the criteria and a sample description / definition related to each criterion.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description / Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-Year Flood Plain</td>
<td>Whether the facility / site is in or out of the community's 100-year flood plan</td>
</tr>
<tr>
<td>Airport Traffic Patterns</td>
<td>The approximate distance from the facility to existing airport systems and designated take-off and landing corridors (e.g., flight paths)</td>
</tr>
<tr>
<td>Building Size Restrictions</td>
<td>Whether the site has restrictions against total facility and / or site size</td>
</tr>
<tr>
<td>Buildings</td>
<td>The ability of the facility / site to support expansion of existing building/s, or the placement and construction of new facility related buildings (e.g., storage)</td>
</tr>
<tr>
<td>Capacity Planning and Management</td>
<td>The ability of the facility to support full occupancy (e.g., emergency mobilization), allow for the efficient movement of people (e.g., shift change) and allow timely evacuation of the facility in an emergency.</td>
</tr>
<tr>
<td>Clean-Up, Asbestos Removal, etc. for existing building</td>
<td>If an existing facility, the estimated costs to perform asbestos abatement services to the facility and the cumulative impact on the project schedule</td>
</tr>
<tr>
<td>Code Compliance</td>
<td>Compliance with applicable National Fire Protection Administration (NFPA) codes (e.g., NFPA 1221), local / state electrical and other codes compliance, fire sprinklers, etc.</td>
</tr>
<tr>
<td>Communications Center Location</td>
<td>The ability of the facility to support placement of the communications center area away from an exterior wall</td>
</tr>
<tr>
<td>Communications Center Support</td>
<td>The ability of the facility to support the arrangement of the dispatching work area/s, supervisors' offices and training room/s so they are as close as possible to the computer room, enabling cabling runs to be minimized.</td>
</tr>
<tr>
<td>Construction Approach</td>
<td>If an existing facility, the rough order of magnitude costs and time to completion between remodeling an existing space or adding on to an existing facility</td>
</tr>
</tbody>
</table>

07/17/2007
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description / Definition</th>
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</thead>
<tbody>
<tr>
<td>Construction Costs</td>
<td>Approximate cost per square foot to build / renovate a facility</td>
</tr>
<tr>
<td>Controllable Access</td>
<td>The ability of the site to support controlled egress and ingress to the facility (e.g., natural / man made, security check points, setbacks)</td>
</tr>
<tr>
<td>Crime Impact</td>
<td>The level of crime experienced in the area, including opportunistic (e.g., burglary, theft) and predatory (e.g., robbery, assault) crimes</td>
</tr>
<tr>
<td>Day Care Facilities</td>
<td>Distance of the facility to convenient day care services and their relationship to the facility</td>
</tr>
<tr>
<td>Demographics</td>
<td>Median age of residents, community make up (residential versus commercial), median education level, median income, community composition by race, sex, etc.</td>
</tr>
<tr>
<td>Demolition Costs</td>
<td>If an existing facility, the projected costs associated with demolishing unwanted structures and removing debris to landfill</td>
</tr>
<tr>
<td>Docking/Shipping and Receiving</td>
<td>The ability of the facility / site to support expansion of existing shipping and receiving / docking spaces.</td>
</tr>
<tr>
<td>Drilling or Coring Restrictions</td>
<td>Whether the site has drilling and / or coring restrictions</td>
</tr>
<tr>
<td>Easement/Right-of-Way Restrictions</td>
<td>Whether the site has adequate easement / right of way clearance and applicable distance requirements (e.g., public utility / telephone companies allowed to run lines on or under private property).</td>
</tr>
<tr>
<td>Electrical Grid Power</td>
<td>The approximate distance of the facility / site from the regional electrical power grid. There is a relationship between distance from the grid and costs associated with supplying clean electric power to the facility</td>
</tr>
<tr>
<td>Emergency Generator Use</td>
<td>Any community or neighborhood-imposed prohibitions against the uses of fuel powered emergency generators</td>
</tr>
<tr>
<td>Employee Commute – Safety &amp; Security</td>
<td>The impact or potential impact to employee safety while commuting to and from the facility</td>
</tr>
<tr>
<td>Employee Support Areas</td>
<td>The ability of the facility to support the arrangement of bathrooms, break rooms and other areas that have plumbing so there is diminished possibility that spills, leaks or other water problems could flood or damage the dispatch work area or computer room, including floor drains and scuppers.</td>
</tr>
<tr>
<td>Environment</td>
<td>The relative attractiveness of the site and its surroundings from</td>
</tr>
<tr>
<td>Criteria</td>
<td>Description / Definition</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Suitability</td>
<td>an aesthetic viewpoint (e.g., clean neighborhoods, well maintained residents and business, lack of debris and abandoned cars)</td>
</tr>
<tr>
<td>Fiber Optic Service</td>
<td>The ability of the site to support fiber optic communications capabilities, including the construction of related infrastructure elements</td>
</tr>
<tr>
<td>Geographical Constraints</td>
<td>Whether the site is susceptible to geographic constraints (e.g., fault lines, sink holes, salt domes)</td>
</tr>
<tr>
<td>Government Restrictions</td>
<td>The existence or lack thereof of land use restrictions applicable to the site</td>
</tr>
<tr>
<td>Growth Flexibility or Extensibility</td>
<td>The ability of the facility / site to expand beyond existing borders to accommodate growth (parking, building expansion, etc.). Growth can be defined in vertical and horizontal terms</td>
</tr>
<tr>
<td>Higher Education Resources</td>
<td>Distance of the facility to local education resources (high schools, community colleges, universities)</td>
</tr>
<tr>
<td>Housing</td>
<td>The proximity of the site to residential housing, commercial areas and such, as well as the existence of applicable zoning restrictions</td>
</tr>
<tr>
<td>Impact on Existing Employee Base</td>
<td>The impact or potential impact on existing employees that may have additional commute times, suffer incremental costs for transportation to/ from work, and similar quality of life issues</td>
</tr>
<tr>
<td>Information Technology and Computer Systems</td>
<td>The ability of the site to support incremental computing and communications demands</td>
</tr>
<tr>
<td>Litigation Costs</td>
<td>The potential costs (both in time and money) that might be incurred due to legal challenges made by &quot;interested parties&quot; with regard to the construction of a new / remodeled PSAP facility and / or the placement of related facilities (e.g., tower construction). This includes, but is not limited to, legal challenges by special interest groups (e.g., environmental groups) and community based organizations (e.g., homeowner associations).</td>
</tr>
<tr>
<td>Major Freeways</td>
<td>The closer a facility is to a major freeway or interchange system, the risk to the facility increases that it could be involved in some type of mishap on the freeway (either directly or indirectly)</td>
</tr>
<tr>
<td>Man Made Disasters</td>
<td>Relative distance of the facility from railroad crossings and/or</td>
</tr>
<tr>
<td>Criteria</td>
<td>Description / Definition</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>(Susceptibility)</td>
<td>tracks, major transportation arteries, gasoline stations and other potentially threatening infrastructure elements (e.g., oil wells, water storage tanks, oil refineries, gasoline storage tanks)</td>
</tr>
<tr>
<td>Mechanical Infrastructure (e.g., UPS, Generator, HVAC)</td>
<td>If an existing facility, the adequacy of existing support systems, including uninterruptible power supply (UPS), generators, and heating, ventilation and air conditioning (HVAC)</td>
</tr>
<tr>
<td>Microwave Transmission Capabilities/Tower Construction</td>
<td>The ability of the site to support microwave transmission capabilities (e.g., line of sight), including the construction of microwave towers</td>
</tr>
<tr>
<td>Multi-road access</td>
<td>Existing surface transportation is adequate or of sufficient quality to support commuting employees and constituents. If not: 1. What is the estimated cost and time to upgrade / build an adequate transportation route? 2. What is the impact to time to completion?</td>
</tr>
<tr>
<td>Natural Disasters (Susceptibility)</td>
<td>Relative distance of the facility from adverse geographic elements and other potentially threatening natural elements (e.g., waterfalls, rivers, dams)</td>
</tr>
<tr>
<td>Owned Property</td>
<td>Whether the property being considered for a PSAP site is already owned by the community / city with clear title.</td>
</tr>
<tr>
<td>Parking</td>
<td>The ability of the facility / site to support multi-use parking, including public access, employee (controlled) access, secured / restricted areas (EOC, mobile command vehicles, etc.)</td>
</tr>
<tr>
<td>Physical Security</td>
<td>The ability of the facility to support physical security requirements, including CPED, lighting, access control, closed circuit television</td>
</tr>
<tr>
<td>Political Support</td>
<td>Support derived from governing bodies (e.g., councils, commissions) and their chief executives (e.g., Mayor, Commissioner) by way of their office, position, alliances with community organizations and the private sector (e.g., business development, chambers of commerce).</td>
</tr>
<tr>
<td>Protection from Sabotage/Terrorist Attack (Setbacks)</td>
<td>The ability of the site to support protection of the site from potential attacks from saboteurs, terrorists and other threats (e.g., see Crime Prevention Through Environmental Design and...</td>
</tr>
<tr>
<td>Criteria</td>
<td>Description / Definition</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Public transportation</td>
<td>Service availability to location by public transportation (e.g., bus, train, subway)</td>
</tr>
<tr>
<td>Radio Tower Restrictions</td>
<td>Whether the site has restrictions on radio tower construction (e.g., height, construction, proximity to neighborhoods)</td>
</tr>
<tr>
<td>Radio Transmission Capabilities/Coverage now</td>
<td>The ability of the site to support radio transmission capabilities over the existing coverage area. Please note that a radio transmission propagation study may be required to assess current conditions / capabilities</td>
</tr>
<tr>
<td>Redundant Electrical Power Sources</td>
<td>The availability of redundant electric power sources and routes of supply into the facility</td>
</tr>
<tr>
<td>Reliable Telecommunications Provider</td>
<td>The ability of the regional telecommunications provider to provide infrastructure, redundant and diverse routing and other telecommunications support (e.g., wire line services, E911 services, PSAP CPE technology and support)</td>
</tr>
<tr>
<td>Restaurants, Health Clubs, etc.</td>
<td>Distance of the facility to restaurants, health clubs and other quality of life facilities</td>
</tr>
<tr>
<td>Restricted Drainage or Run-Off Area</td>
<td>Whether the site has restrictions against drainage or secondary run off into community sewer systems</td>
</tr>
<tr>
<td>Security Requirements/Fencing</td>
<td>The adequacy of the site to support perimeter security requirements and exterior (outer) and anterior (interior) fencing needs</td>
</tr>
<tr>
<td>Sewer Utility</td>
<td>The availability of sewer services to the facility, as well as any costs associated with extending existing sewer lines and such</td>
</tr>
<tr>
<td>Site Preparation Costs</td>
<td>Approximate cost to clear a selected site and render it suitable for new or renovated construction (e.g., tree stumps, trash removal, demolition, reclamation)</td>
</tr>
<tr>
<td>Storage Tanks</td>
<td>The ability of the site to support various storage tanks required to support the facility (e.g., water, oil, fuel) and any restrictions / prohibitions that might apply</td>
</tr>
<tr>
<td>Support Rooms and Facilities</td>
<td>The ability of the facility to support a reception area for visitors, administrative offices, employee locker room, break room, conference/meeting room, training room, (expandable) dispatch work floor, storage rooms, computer room, emergency operations room.</td>
</tr>
<tr>
<td>Criteria</td>
<td>Description / Definition</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Underground Utility Source</td>
<td>The availability of an underground utility source to the facility (including water, electric, natural gas, fuel oil).</td>
</tr>
<tr>
<td>Utility Rates</td>
<td>Prevailing average “cost-to-beat” rates for utilities (e.g., water, gas, electric)</td>
</tr>
<tr>
<td>Vendor/Supplier Support</td>
<td>The more remote a facility is to a community, the time to respond by vendors tends to increase</td>
</tr>
<tr>
<td>Water Main Sources</td>
<td>The availability of multiple water sources to the facility.</td>
</tr>
<tr>
<td>Water Utility</td>
<td>The availability of potable water to the facility, as well as any costs associated with drilling wells, extending existing water supply lines and such</td>
</tr>
</tbody>
</table>
Exhibit D: Sample Conceptual Facility Site Plan