Minnesota 2016 PSAP Survey Report
And
NG9-1-1 Life Cycle Funding Analysis

June 2016

Prepared by:

"Unleashing the Power of Technology"
Federal Engineering®

Federal Engineering, Inc.
10600 Arrowhead Dr, Suite 160
Fairfax, VA 22030
703-359-8200

Executive Summary

Nationwide an evolutionary change is taking place in the way people communicate with one another and with publicly funded services like 9-1-1. Smart phones, apps, data plans, and the connectedness they provide have all dramatically changed the way many people live, work and play. It is important to understand how much has changed and how quickly it has occurred because it has created a disparity between the smartphone technology widely used today and the technologies used to provide 9-1-1 service to the public.

The original 9-1-1 system was designed to locate callers using a landline phone confined to one static location with a single address associated with that phone number in a 9-1-1 database. Today, nearly 80% of 9-1-1 calls are placed from mobile phones that have the ability to identify their location using a latitude and longitude coordinate.

All of the components that make up the 9-1-1 system in the state of Minnesota, at both the state and local levels, are in the middle of a transition to a new kind of 9-1-1 technology known as Next Generation 9-1-1 or NG9-1-1.

Minnesota is one of a few states at the forefront of NG9-1-1 deployment and is actively addressing the 9-1-1 technology gap. The transition to NG9-1-1 in Minnesota has been underway for many years and will continue for the near future. The Enhanced 9-1-1 fund supports the current transition and will be required to fund additional changes in the coming years. The only way to address the 9-1-1 technology gap is to fund, support and implement changes like those taking place in Minnesota today.

The 9-1-1 centers or Public Safety Answering Points (PSAPs) are usually locally operated call centers that answer 9-1-1 calls in a given jurisdiction like a county or a city. Some PSAPs answer calls for an entire region composed of multiple counties. There are 104 PSAPs in Minnesota and over 6,000 PSAPs across the country.

This report provides insight, analysis and information on a number of elements related to PSAPs, 9-1-1 calls, 9-1-1 call handling, and Public Safety in the state of Minnesota, all of which are supported by the Enhanced 9-1-1 fund established by State Statute 403.113.

In performing this analysis, Federal Engineering, Inc., (***FE***) relied on two primary sources of data and information:

1. The *Minnesota Emergency Communication Networks (ECN) PSAP Survey 2016* used to collect information directly from PSAPs. ***Of the 104 PSAPs receiving the survey, 79 responded with information used in this report.***

2. The review of Department of Public Safety (DPS)/Emergency Communication Networks (ECN) generated documents and materials related to the operation of the state of Minnesota 9-1-1 system as part of the ARMER/ECN program.

A primary goal of this report is to provide understanding as to how past distributions of E9-1-1 funds to Minnesota PSAPs supports the transition to NG9-1-1 and what future NG9-1-1 funding demands remain so that ECN can ensure that future funding priorities are aligned with future PSAP needs and demands.

An additional goal of this report is to analyze the equipment and technology replacement life cycles for technologies used by PSAPs to support the processing of 9-1-1 calls and understand how or why the transition to NG9-1-1 might impact other PSAP system costs.

PSAP Survey Findings and Analysis

FE identified several key findings from an extensive review of the data provided by the PSAPs in response to the survey distributed in March 2016. Section 3 of this report provides more analysis of the information collected from the PSAPs. The following are our high-level findings and analysis of the PSAP provided survey information:

- Call Processing Equipment (CPE) upgrade / replacement of old analog systems to NG9-1-1 capable CPE is a priority and PSAPs are planning to make the necessary changes in the next 3 years.
    - Thirty-four PSAPs plan to upgrade to NG9-1-1 capable CPE in the next 3 years, ten additional PSAPs might have to upgrade based on the information they provided. Forty-four total possible replacements represent 42% of all MN PSAPs upgrading CPE for NG9-1-1 in the next 3 years.
    - Forty-six PSAPs have upgraded / replaced their CPE in the last 4 years that represents 44% of all MN PSAPs already upgraded CPE for NG9-1-1.
- PSAPs identified training and establishing best practices for telecommunicators as requirements to support the transition to NG9-1-1.
- NG9-1-1 capabilities are in demand by the PSAPs and the public they serve.
    - Seventy PSAPs have plans to deploy and implement Text-to-9-1-1 services according to the survey. This service is an especially vital new tool for PSAPs to communicate with the deaf and hearing impaired community.

  - Thirty PSAPs identified Message Session Relay Protocol (MSRP), a feature of NG9-1-1 capable CPE, as the preferred deployment method for Text-to-9-1-1 service thus allowing the PSAP to receive and respond to text-to-9-1-1 sessions with the same system used to answer traditional 9-1-1 calls. That may take longer to achieve, but should be the method for deploying all Text-to-9-1-1 services at a PSAP.

  - PSAPs are interested in Session Initiation Protocol (SIP). A SIP interface is a requirement of NG9-1-1 capable CPE, allowing additional data to eventually be presented with the call. As PSAPs upgrade / replace their CPE systems, they are gaining SIP capability.

- Computer Aided Dispatch (CAD) upgrades and replacements are being planned and will drive costs, but CAD upgrades and their related costs are not directly driven or caused by the transition to NG9-1-1.

- PSAPs are often not receiving dedicated IT or GIS support. These are both critical support areas for NG9-1-1. PSAPs will have an increasing reliance on and increasing need for support from both GIS and IT support staff in the next 5 years as the transition to NG9-1-1 is completed.

- Administrative phone systems play a role in 9-1-1 in Minnesota; the transition to NG9-1-1 could create additional costs for administrative phone systems. The reverse is also true, new administrative phone systems may create additional costs for CPE systems at PSAPs.

- Reported logging recorder information reflects a trend both in Minnesota and nationally towards regional / shared system costs and cooperation across multiple jurisdictions. This is a good approach and can reduce overall costs.

- Emergency Notification Systems (ENS) data reflects the trend toward a Software as a Service (SaaS) model. Software as a service (SaaS) is a software distribution model in which a third-party provider hosts applications and makes them available to customers over a network or the Internet. SaaS removes the need for organizations to install and run applications on their own computers or in their own data centers. This model can shift costs from upfront capital expenditures to monthly recurring services expenditures that will still be borne by the PSAP and by ECN.

- Dispatch consoles, logging recorders, administrative phones, and ENS systems for the most part are current or have replacement life cycles not directly affected

by NG9-1-1. These systems will continue to require funding at both the ECN and local levels.

NG9-1-1 Lifecycle and Funding Analysis

FE identified several key findings from an extensive review of 2012-2014 E9-1-1 Funding cycle data provided by the PSAPs and ECN. Section 4 of this report provides more analysis of the information derived from this data. The following points are our high-level findings from this information:

- Funding from the 2012-2014 cycle is reflective of NG9-1-1 transition costs at the PSAPs and is a primary factor in the current NG9-1-1 readiness of Minnesota PSAPs, especially as it relates to CPE systems.
- The ongoing transition to NG9-1-1 will require continued funding support over the next 5 years at levels equal to or above funding levels of the 2012-2014 cycle.
- The amount of funding dedicated to CPE systems (hardware, software, phone) during the period from 2012 to 2014 demonstrates the amount of change occurring at PSAPs due to the transition to NG9-1-1.
- PSAPs CPE replacement, past, present and future is directly tied to NG9-1-1 and new capabilities like SIP and Text-to-9-1-1 for PSAPs. E9-1-1 funding support will need to continue, because the transition is incomplete. CPE alone may require upwards of $20 million in additional funding over the next 3 years.
- CAD upgrade/replacement cycles are independent of the transition to NG9-1-1 but costs to upgrade / replace CAD systems will require continued funding from both state and local levels consistent with funding in the 2012-2014 cycle.
- Anticipated costs for other supporting systems like ENS and dispatch consoles align with funding trends from the 2012-2014 funding cycle and will likely remain constant over the next 5-year funding cycle.
- Over the next 5 years, dependency on GIS staff to support operational NG9-1-1 data requirements at the PSAP will increase. This dependency will result in more GIS personnel being hired directly by PSAPs to support NG9-1-1 GIS data requirements.
- IT support costs, in particular cybersecurity costs, will increase over the next 5 years due to the increased IT requirements of operating NG9-1-1 at the PSAPs and the Minnesota 9-1-1 system overall.

- Funding for training at 5% of overall funding in the 2012-2014 cycle is a good indicator of the importance of training to the PSAPs in MN. Funding for training will need to increase as an overall percentage of funding as PSAPs transition to new systems, new tools and new processes because of the transition to NG9-1-1.

- In the next 5 years, costs for systems that support PSAPs will shift from traditional stand-alone physical installations of equipment with large one-time costs to hosted or shared systems that can reduce initial capital costs but increase recurring costs.

- In the next 5 years, NG9-1-1 will bring new Software as a Service (SaaS) models to PSAPs for services like 9-1-1 call processing, and applications such as CAD. Over the long term individual PSAP costs for these systems will likely reduce as economies of scale are achieved.

    - SaaS delivery models that offer common applications and consistent processes to multiple PSAPs promote inter-agency cooperation and the ability to work together when necessary.

- The adoption of new technologies and changing service delivery models will continue to drive overall 9-1-1 technology replacement lifecycles well beyond the completion of the current transition to NG9-1-1 for as long as there are PSAPs in Minnesota.

    - The replacement lifecycle will change from replacing equipment every 5 years to being required to upgrade to the newest version of an application annually or on some well-defined schedule in order to provide access to new features or capabilities at the PSAPs.

    - These new services models will shift funding requirements away from paying for dedicated equipment needed to run an application housed locally, to paying for services that are remotely sourced and delivered and priced based on usage and subscription.

- Because the software and services used are increasingly “internet centric”, the new replacement lifecycles will likely be shorter, as equipment will need to be regularly upgraded to take advantage of new features and functionalities being offered by the vendors for the majority of PSAP systems.

Conclusion

The transition to NG9-1-1 is well underway at both the state and local levels in Minnesota but there is more work to do, equipment to replace or upgrade and new services to deploy. All of this will require the continued support of the E9-1-1 fund, local PSAPs and the ECN to be successful and close the 9-1-1 technology gap.

Table of Contents

1. Background

Minnesota has made tremendous progress to become a leader in implementing landline and wireless Enhanced 9-1-1 service (E9-1-1) statewide. All 87 Minnesota counties provide E9-1-1 (selectively routed 9-1-1 calls providing PSAPs with callback phone numbers and accurate location information) for landline telephones, Phase II E9-1-1 for mobile/wireless telephones, VoIP and prepaid wireless customers. Despite these advances in the level of 9-1-1 service, communication technologies are rapidly transitioning to IP networks and are advancing in ways that the existing analog 9-1-1 network cannot accommodate.

Nationally, the telecommunication industry and public safety agencies are trying to catch up to the change in user's expectations with the transition to an IP enabled Next Generation 9-1-1 (NG9-1-1) network.

To date, the state has been judicious in its approach for funding of the NG9-1-1 migration as each phase has been funded by the 9-1-1 fee deposited in the state 9-1-1 Special Revenue Account (SRA), but completion of the NG9-1-1 build out will be a continuous process with more phases and the continued replacement of existing infrastructure and equipment.

The ongoing transition to NG9-1-1 will require continued investment over the next 5 years. There will be additional costs at the local level to fund call processing equipment, upgrades necessary to deploy some of the new technology, as well as increased training costs to ensure 9-1-1 call takers are adequately prepared to deal with the calls from ever changing devices used by the public.

An important part of achieving this goal is assessing the cost of upgrading all PSAPs to NG9-1-1 capabilities and the cost to sustain technologies that enable statewide NG9-1-1 for the long term. Emergency Communication Networks (ECN) engaged Federal Engineering (***FE***) to conduct an NG9-1-1 Public Safety Answering Point (PSAP) Life Cycle Funding Assessment.

FE performed an assessment to determine the current state of affected PSAP technologies (9-1-1 Call Processing Equipment (CPE), Computer Aided Dispatching (CAD), and related systems) and estimate associated costs for upgrade or replacement and the frequency of upgrade or replacement; that is, the life cycle costs of NG9-1-1 technologies.

The source of data used for the analysis provided in this report was information provided by ECN and the preparation and distribution of an electronic survey entitled "Minnesota

ECN PSAP Survey 2016". The survey was made available on line to all of the State's 104 PSAPs. More than 75% (79 PSAPs) completed responses to the survey.

In fulfillment of the tasks associated with this engagement, Federal Engineering presents this *Minnesota 2016 PSAP Survey Report and NG9-1-1 Life Cycle Funding Analysis*.

1.1 How Big is the Minnesota 9-1-1 System?

In terms of calls, the 9-1-1 system in Minnesota, consisting of both state and locally funded systems and services, processes nearly 3 million calls per year (as of 2015). As Table 1 shows, most 9-1-1 calls in Minnesota come from wireless phones. The few calls that are reported as "Unknown" were answered, but the data regarding the call type was unclear.

Table 1 – Statewide 9-1-1 Calls 2015

Statewide 9-1-1 Calls 2015		
Total Wireless calls in 2015	2,146,398	74.02%
Total Wireline calls in 2015	701,642	24.20%
Total VoIP calls in 2015	51,391	1.77%
Total Unknown calls in 2015	318	0.01%
Total Calls processed in 2015	2,899,749	100.00%

Approximately 75% of Minnesota PSAPs responded to the survey. Based on this response rate, ***FE*** estimates that there are over 2,000 trained full and part time PSAP personnel supporting 9-1-1 in Minnesota. In other words, the PSAPs of Minnesota employ ***over 2,000 Minnesotans*** at the local level. Table 2 lists PSAP staff by category.

Table 2 – PSAP staffing

Total Reported and Estimated PSAP 9-1-1 Staffing	
Category	**# of Personnel**
Total Reported Full Time Supervisory Staff	206
Total Report Part Time Supervisory Staff	17
Total Reported Full Time Call Takers/Dispatchers	1,070
Total Reported Part Time Call Takers/Dispatchers	179
Total Reported PSAP Staffing	1,472
Estimated Total PSAP Staffing for all PSAPs	2,000

Total Reported and Estimated PSAP 9-1-1 Staffing	
Category	**# of Personnel**
(if 1472 = 75% of PSAP personnel, then 2000 = 100%)	

They in turn support over ***2,200 first responder agencies/departments*** responsible for responding to emergencies or requests for support through the use of the 9-1-1 system in Minnesota, as shown in Table 3. Based on the survey response rate of 75%, ***FE*** estimates that there are over 2,200 first responder agencies in Minnesota.

Table 3 – First Responder Agencies

Total First Responder Agencies Served by Type	
Total Reported Police/Law Enforcement	409
Total Reported Fire	749
Total Reported EMS	435
Total Reported Other	77
Total Reported Agencies	1,670
Total Estimated Agencies **(if 1670 = 75% of PSAPs then 2200 = 100%)**	2,200

1.2 What Does the 9-1-1 System in Minnesota Look Like Today?

Figure 1 is a network diagram showing the legacy carrier connections on the left hand side, the State's Emergency Services IP Network (ESInet) infrastructure in the middle, and the PSAP equipment on the right hand side of the diagram.

Today all 104 PSAPs in Minnesota, are connected to a common IP network backbone referred to as the ESInet. This network provides two diverse circuit paths to all PSAPs. Each of these circuit paths is capable of carrying all of the traffic to and from the PSAP, in the event that one becomes compromised or fails. The network as shown, includes 4 shared call handling systems shared by 14 of the PSAPs. Fifteen PSAPs have Direct Session Initiation Protocol (SIP) connectivity today.

This design allows for selective routing of all wireline, wireless and Voice over IP (VoIP) calls. This design also allows for the transfer of 9-1-1 calls between all of the PSAPs in Minnesota, and will include location data and call back information when the call is transferred.

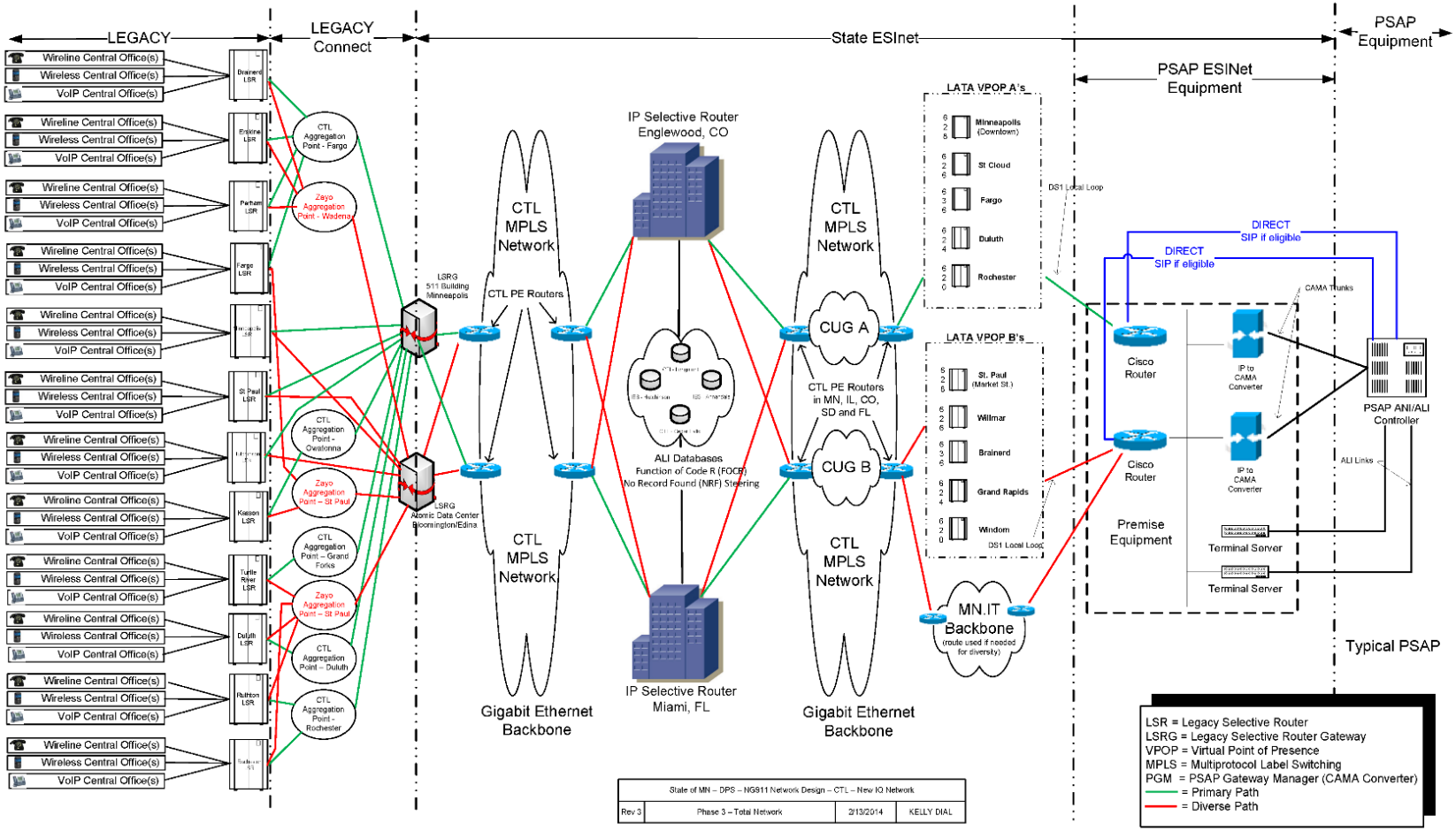

Figure 1 – Minnesota 9-1-1 System Functional Diagram

The network infrastructure allows MN PSAPs to explore interoperability opportunities with other states. For example, Polk County, Wisconsin is able to seamlessly transfer wireless callers to the PSAP in Chisago County, Minnesota. ECN is also participating in a pilot project with North Dakota, South Dakota, and Iowa and is testing the transfer of wireless calls between bordering counties in Minnesota and North Dakota.

The primary focus of this report is on the PSAP side of this diagram. The costs analyzed throughout this report are specific to systems, services and equipment at the PSAP. The other areas depicted on the diagram also require funding and oversight in addition to and in cooperation with the funding and oversight provided to the PSAPs by ECN.

Both elements, the ECN ESInet and the CPE at the PSAPs have to work together to make the delivery of a 9-1-1 call successful.

1.3 Minnesota is Transitioning to NG9-1-1

A major transition is under way in Minnesota – the transition to Next Generation 9-1-1 or NG9-1-1.

The following Phases show the progression of Minnesota's implementation of NG9-1-1:

- Phase 1 – Implementing seamless interoperability between ten selective routers used in the state by installing the core of the Emergency Services Internet Protocol network (ESInet)--two IP selective routers, between the legacy selective routers. This allows for the transfer of 9-1-1 calls between all Minnesota PSAPs with phone number and location information included. The State completed this Phase of the NG9-1-1 system migration in September 2010.

- Phase 2 – Providing for the transitioning and testing of two PSAPs (one rural, one metro) from analog circuits to IP circuits connecting them to the ESInet was completed in March 2013.

- Phase 3 – Providing for the transition of the remaining state PSAPs to the ESInet and IP selective routers enabling PSAPs access to the functions and features of the NG9-1-1 network.

- Phase 4 – Migration of existing legacy telecommunications end office networks into the statewide ESInet. The legacy analog selective routers, which are the backbone of the existing 9-1-1 network, will be decommissioned. Similarly, future steps will require the replacement of existing PSAP equipment with IP equipment capable of implementing the functions and features of NG9-1-1 as they evolve.

- Phase 5 - Text-to-9-1-1 migration.

- Phase 6 – Location Based or GIS Routing of 9-1-1 calls using the latitude and longitude of the caller. ECN has begun preparing for this multi-phased project in cooperation with all of the counties and the Minnesota Geospatial Information Office (MNGEO).

The Enhanced 9-1-1 fund has been used to drive the transition to NG9-1-1 through the eligible use of Enhanced 9-1-1 funds as Table 4 shows. The top three funding categories shown below are consistent with funding trends across the country as PSAPs begin to upgrade or replace critical systems in anticipation of NG9-1-1.

Table 4 – 9-1-1 Fund Distributions 2012 - 2014

Statewide 9-1-1 Funding Distributions		
Category	**Cost**	**% of Total Cost**
Hardware	$12,240,193	28%
Software	$10,952,647	25%
Phone	$7,964,472	18%
Alert System	$3,310,587	8%
Dispatch	$2,496,593	6%
Recorder	$2,267,501	5%
Training	$2,083,613	5%
MSAG[1]	$1,332,618	3%
Trunks	$1,059,928	2%
LD Charges	$1,874	0%
Total Disbursed	$43,710,026	100%

Indicates funding categories driven by the transition to NG9-1-1

[1] Master Street Address Guide uses the caller's telephone number to match the origination of the call to a street location.

2. Methodology

2.1 Project Planning Meeting

FE launched Phase 1 of the project with the state of Minnesota on December 9, 2015, with an on-site meeting at the State Department of Emergency Communication Networks (ECN) offices. Recurring project status calls between ECN and the ***FE*** team began January 6, 2016.

The project initiation meeting and ongoing status calls established a common understanding of the project goals, objectives, and vision between our respective management teams and staffs. ***FE*** also established a preliminary project plan and schedule, providing the foundation for the completion of the project tasking. Figure 2 shows the project's tasking to date.

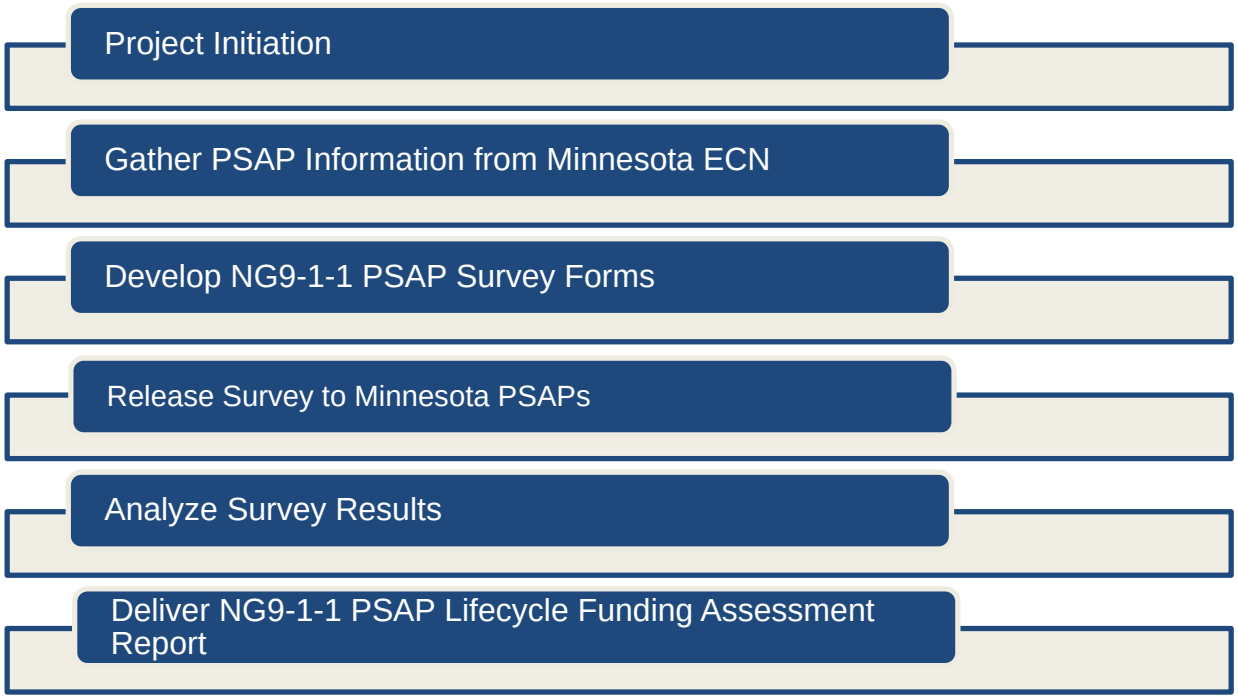

Figure 2 – Project Tasking

2.2 Discovery Process

FE developed a Request for Information document and submitted that document to ECN on December 9, 2015. That document requested information about the 104 PSAPs in the state of Minnesota, including:

- The number and type of PSAPs in the state.
- Historical information including previous survey information, call volumes and other PSAP data.
- Funding information, to gain a better understanding of how the ECN gathers and distributes funds to the PSAPs.
- 9-1-1 network Information.

ECN provided this information to ***FE*** electronically.

2.3 NG9-1-1 PSAP Survey

FE developed a draft survey using the SurveyMonkey® web-based survey tool through an iterative process that allowed ECN and members of the NG9-1-1 Committee, a committee under the Statewide Emergency Communications Board (SECB), to review the draft, recommend modifications, and vet the draft with the Minnesota Sheriff's Association (MSA) and the SECB. At the end of January of 2016, ***FE*** met with ECN and with representatives of the MSA and the NG9-1-1 Board at their regularly scheduled meetings to solicit additional input regarding the survey and its contents. ***FE*** incorporated suggestions received from both groups into the final survey. Appendix A provides a copy of the survey.

ECN identified contacts at each of the PSAPs to be surveyed and following finalization of the survey tool at the end of February, released the survey to the PSAPs on March 4, 2016. Each of the contacts received an introductory email explaining the purpose of the survey with a link to the survey. The survey remained open for approximately 3 weeks, with the last survey completed on March 28, 2016.

Of the 104 PSAPs (99 primary, and 5 secondary) that received the survey, nearly 75% (79 of 104) completed responses to the survey.

2.4 Data Analysis

FE used the data collected through responses to the NG9-1-1 PSAP Readiness Survey and from ECN provided information as the basis for this report. Documents reviewed include:

- 2012 E9-1-1 Fund Audit Summary.
- 2013 E9-1-1 Fund Audit Summary.

- 2014 E9-1-1 Fund Audit Summary.
- ECN-MN SIP-PAD-Augmentation List 12-31-15.
- 2015 ECN PSAP Call Counts.

3. NG9-1-1 PSAP Survey Results

Use of the survey tool developed in collaboration between the ECN, members of the NG9-1-1 Committee, and ***FE*** to determine elements required for incorporation into the survey provided consistency in the type of data collected and the cataloging of the data for capturing the current state of each responding PSAP.

The survey included questions on these important topics, discussed in detail in the following sections:

1. PSAP Profiles.
2. PSAP Staffing.
3. PSAP Training Plans.
4. Current 9-1-1 Call Processing Equipment (CPE).
5. Current Computer Aided Dispatch system (CAD).
6. Current Radio Dispatch Console equipment.
7. Current Logging Recorder system.
8. Current administrative telephone system.
9. Current Emergency Notification System (ENS).
10. Current costs for existing systems.

3.1 PSAP Survey Respondent Profiles

The survey collected information about PSAPs in multiple areas including training, operations, technologies used, replacement plans, and also sought information regarding items not currently funded through the distributions of 9-1-1 funds.

The following subsections summarize the responses to survey questions related to PSAPs.

Q3 – How would you categorize the size of your PSAP? (Workstations are defined as capable of answering 9-1-1 calls, staffed or not).

We asked the PSAPs to put themselves into a size category based on the number of work stations in the PSAP. Table 5 shows the size categorization and Figure 3 provides a visualization of this comparison.

Table 5 – PSAP sizes reported by survey respondents

Answer Options	PSAPs
Small (4 total workstations or less)	54
Medium (5 to 15 total workstations)	20
Large (16 total workstations or more)	5
Total	79

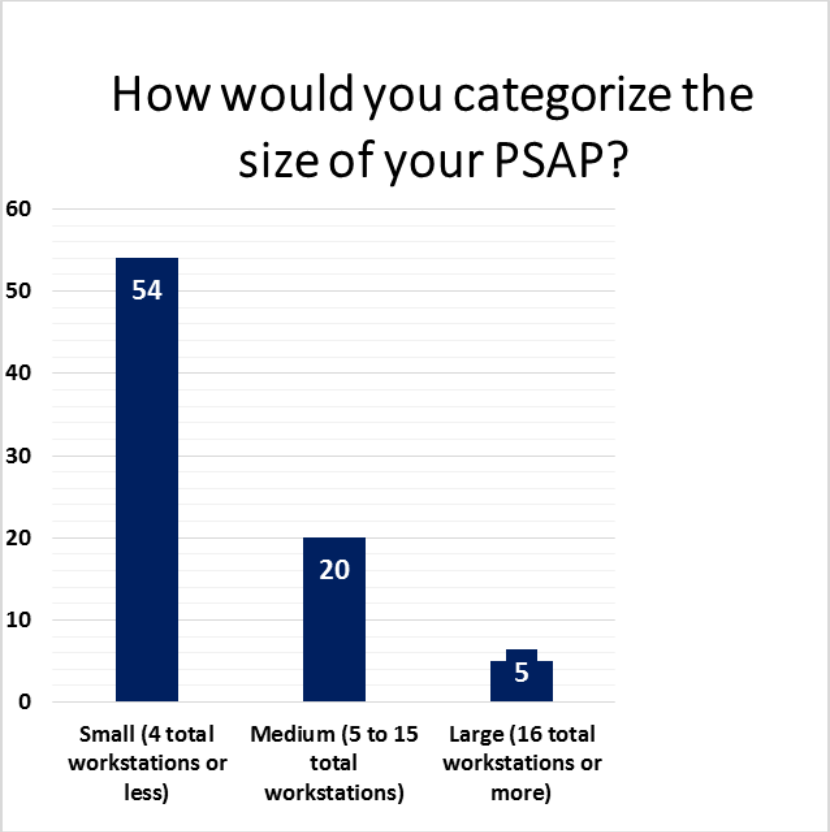

Figure 3 – PSAPS by size

PSAP size categorization is important and these delineations, shown in Figure 3, will be used and reflected in the analysis that follows in other portions of the report.

FE noted that some of the PSAPs answered differently when answering this question as opposed to other questions concerning number of positions. For example, 54 PSAPs identified themselves as being "Small – 4 workstations or less", but 56 of the PSAPs stated that they had 4 positions or less with 9-1-1 call processing equipment (CPE). Similarly, 20 PSAPs identified themselves as medium sized, but only 17 reported having 5 to 15 workstations when answering questions about CPE, and 21 PSAPs report having 5 to 15 radio consoles. Finally, 5 PSAPs identified themselves as large – 16 or more workstations when answering this question, but 6 PSAPs indicate that they have 16 or more 9-1-1 answering positions, and only 5 have 16 or more radio consoles.

3.1.1 Minnesota PSAPs Support Minnesota First Responders

Table 6 summarizes the number and types of agencies dispatched by Minnesota PSAPs. Figure 4 provides a visualization of this data. As previously stated, approximately 75% of Minnesota PSAPs responded to the survey. Extrapolating from this response rate, ***FE*** estimates that there are over 2,200 first responder agencies in Minnesota.

Q13 – Please provide the count of agencies your PSAP dispatches for.

Table 6 – Number and type of agencies dispatched

Total First Responder Agencies Served by Type	Agencies
Total Reported Police/Law Enforcement	409
Total Reported Fire	749
Total Reported EMS	435
Total Reported Other	77
Total Reported Agencies	1,670
Total Estimated Agencies **(if 1670 = 75% of Agencies then 2200 = 100%)**	2,200

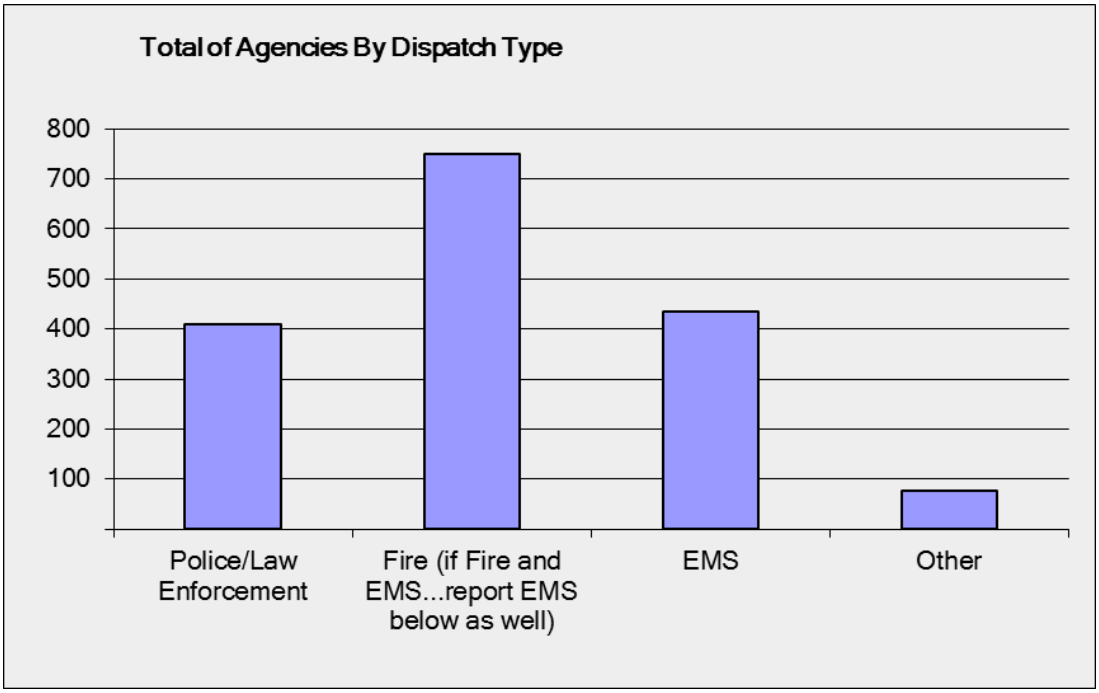

Figure 4 – Agencies by Dispatch Type

3.1.2 Text-to-9-1-1 Plans at the PSAP

The public expects to be able to communicate with 9-1-1 using the same options used to communicate with others. There are 48 million Americans who are deaf or hearing impaired and 7.5 million Americans with speech disabilities who expect to be able to reach 9-1-1 using text.

Text-to-9-1-1 can also benefit a "caller" when placing a voice call would reveal their location and place them in danger. For example, a caller attempting to hide and summon help during a domestic violence situation. The FCC has required carriers to implement a solution to deliver Text-to-9-1-1 to PSAPs and now that carriers have complied, it is essential that ECN deploy a solution to enable Text-to-9-1-1 to be used when it is not possible to make a voice call to 9-1-1.

Minnesota PSAPs, by a wide margin, are ready to implement Text-to-9-1-1 services as shown in Table 7 and visualized in Figure 5.

Q33 – Does your PSAP plan to implement Text-to-9-1-1 services once the State selects a vendor and is ready to deploy this service?

Table 7 – Text-to-9-1-1 survey response information

Text-to-9-1-1 Survey Response Information	
Answer Options	**PSAPs**
Yes, we plan to implement Text-to-9-1-1 Service	70
No, we do not plan to implement Text-to-9-1-1 Service	10
Other	8
Answered question ***(some provided two responses)***	88

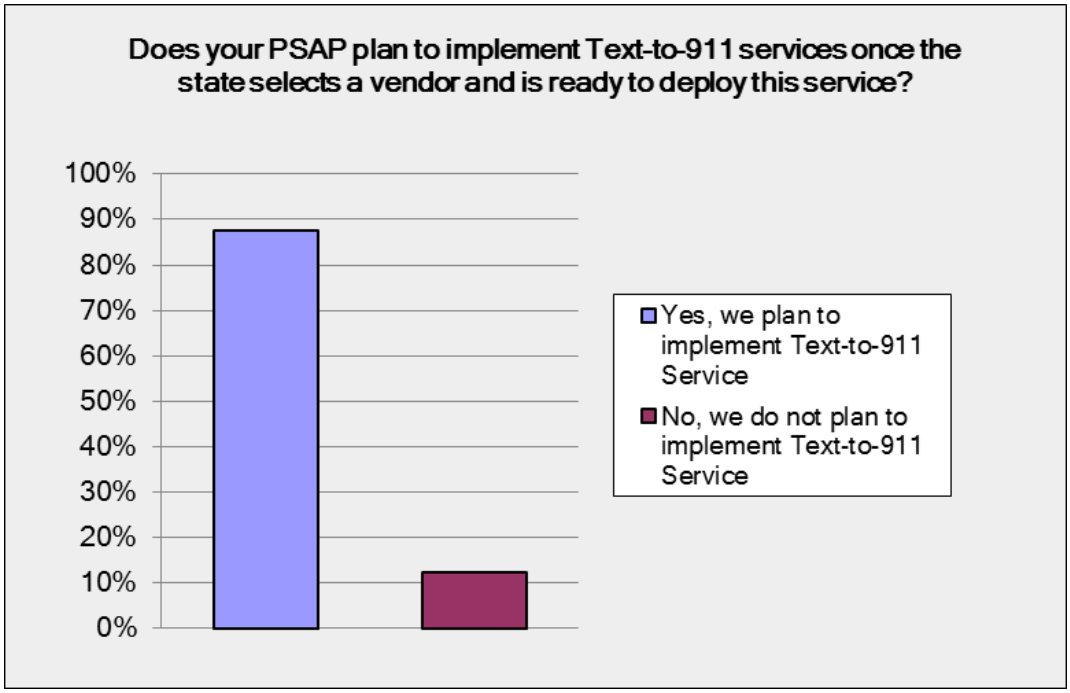

Figure 5 – Plans for Text-to-9-1-1 services

PSAPs that stated they have no plans to implement Text-to-9-1-1 indicate that they are waiting until they have more information, or have a clearer direction from the ECN and/or from other PSAPs.

Q34 – How soon would you like to deploy Text-to-9-1-1?

Table 8 summarizes PSAP timeframes to deploy Text-to-9-1-1 services.

Table 8 – Timeframe to deploy Text-to-9-1-1

Timeframe to Deploy Text-to-9-1-1	
Answer Options	**PSAPs**
Immediately when the State is ready	30
Not until several other PSAPs in the State have deployed and can provide an impact statement	26
No plans at this time	13
Other (please specify)	9
Answered question	78
Skipped question	1

Q35 – What method of Text-to-9-1-1 Service do you plan to deploy?

Minnesota PSAPs plan to implement a permanent Text-to-9-1-1 solution, not an interim one. This may result in a longer deployment due to the requirement for the CPE to handle text messaging in a manner similar to the way the CPE handles 9-1-1 calls.

Message Session Relay Protocol (MSRP) is a protocol for exchanging a series of related instant messages across an IP network in the context of a session. To support Text-to-9-1-1 capability, a PSAP's CPE system must be able to process incoming text messages and respond via outgoing text messages using this protocol. This allows the PSAP to receive and respond to text-to-9-1-1 sessions with the same system used to answer traditional 9-1-1 calls. This is vitally important as it allows text-to-9-1-1 sessions to be processed, recorded, logged and reported on using the same system as the 9-1-1 call.

The major CPE vendors in Minnesota are each deploying MSRP capable systems today (May 2016). Any new purchases of CPE by a PSAP should include the requirement for MSRP text capabilities. Table 9 summarizes Text-to-9-1-1 methods planned.

Table 9 – Text-to-9-1-1 service method planned

Text-to-9-1-1 Service Method Planned	
Answer Options	**PSAPs**
Message Session Relay Protocol (MSRP) using our current CPE system	30
TDD/TTY using our current CPE system	12
Web Browser Application using an internet connected PC	5
Other (please specify)	32
Total Responses	47
Skipped question	32

3.1.3 Demand for SIP is Building

Session Initiation Protocol (SIP) capability is a fundamental NG9-1-1 protocol required for the NENA i3 call processing environment. It will be the protocol used to deliver location information with a 9-1-1 request delivered to the PSAPs.

A PSAP's CPE must be capable of 'talking SIP' in order for the CPE to be considered NG9-1-1 capable. A working assumption is that any system purchased in the last 5 years is either currently capable of, or can be upgraded to, SIP capability as defined by industry standards. Table 10 summarizes PSAP plans to implement SIP connectivity.

Table 10 – Migration to SIP connectivity

Planned Migration to SIP Connectivity?	
Answer Options	**PSAPs**
12 months or less	22
13 - 24 months	4
24 - 36 months	0
Not currently planned	11
Answered question	37
Skipped question	42

3.2 Cyber-Security is a Priority in Minnesota PSAPs

As 9-1-1 technology is being upgraded across the nation, moving from an analog to a IP-based digital platform, protecting that infrastructure becomes paramount.

Every day there are more and more threats to the nation's IT infrastructure. It is essential to evaluate and protect the 9-1-1 system from risk. All existing and new systems must be evaluated including call handling equipment, radio equipment, and the networks supporting them.

Hackers have a variety of motives and are becoming more advanced with less knowledge. Hacking tools are easier to obtain and use. Attacks on public safety are on the increase with a goal to tie up 9-1-1 call handling, or to create chaos as a means of distracting first responders.

The need for cybersecurity protection for all 104 MN PSAPs operating in an IP environment is paramount. This includes, but is not limited to, SIP firewall purchase, configuration, installation, and on-going monitoring and maintenance of networks and applications used by PSAPs.

It is clear from the response summarized in Table 11 that cyber-security is a priority for the PSAPs that answered the survey. As PSAPs move to IP technologies, and connect with more external networks, security and the costs of maintaining security becomes critical.

Q12 – Has your IT staff either implemented or discussed the importance of implementing firewalls to protect your equipment from cyber security threats?

Table 11 – Firewall / cybersecurity plans

Firewall / Cybersecurity Plans	
Answer Options	**PSAPs**
Yes	74
No	0
Not Sure	5
Answered question	79

3.3 Staffing Survey Section Summary

According to the 79 PSAPs responding to the survey, they employ nearly 1,500 trained PSAP personnel whose responsibilities include answering 9-1-1 calls or managing those who answer 9-1-1 calls.

Approximately 75% of Minnesota PSAPs responded to the survey. Based on this response rate, ***FE*** projects that there are approximately 2,000 trained full and part time PSAP personnel supporting 9-1-1 in the 104 Minnesota PSAPs as shown in Table 12.

Table 12 – PSAP staffing levels

PSAP Staffing Levels	
Staffing Category	**Number of Staff**
Total Reported Full Time Supervisory Staff	206
Total Reported Part Time Supervisory Staff	17
Total Reported Full Time Call Takers/Dispatchers	1,070
Total Reported Part Time Call Takers/Dispatchers	179
Total Reported PSAP Staffing	1,472
Estimated Total PSAP Staffing for all PSAPs (.75 * 2,000=1,500)	2,000

Q6 – Please identify the number of supervisory staff at your PSAP

Table 13 summarizes responses for PSAP supervisory staff.

Table 13 – Reported supervisor staffing levels

Reported Supervisor Staffing Levels			
Category	**Average**	**Total Reported**	**PSAPs**
Full Time	2.90	206	71
Part Time	.47	17	36
Total		213	
Answered question			78
Skipped question			1

Q7 – Please identify the number of telecommunicators (e.g., dispatchers, call takers) at your PSAP

Table 14 summarizes responses for PSAP telecommunicator staff.

Table 14 – Number of telecommunicators Reported

Answer Options	Average	Total Reported	PSAPs
Full Time	14.27	1,070	75
Part Time	2.71	179	66
Total Reported		1,249	
Answered question			79

Q4 – Do your telecommunicators perform other duties in addition to / while also answering 9-1-1 calls?

Minnesota telecommunicators have many responsibilities outside of their primary call taking and dispatching responsibilities. Table 15 shows that 74 of the responding PSAPs stated that their telecommunicators were required to perform other duties. Figure 6, provides a graphic representation of some of the more common additional duties performed.

Table 15 – Other telecommunicator duties

Other Telecommunicator Duties	
Answer Options	**PSAPs**
Yes	74
No	4
Answered question	78
Skipped question	1

It is common for PSAP personnel to be asked to perform duties beyond their normal call taking and dispatching duties. Only three of the responding PSAPs answered that their telecommunicators did not perform other duties in addition to answering 9-1-1 calls and /

or dispatching first responders. PSAP personnel are on duty 24/7, so it is not unusual for agencies to assign them duties like security monitoring and building access control.

The PSAPs reported dozens of other duties, but the graph in Figure 6 shows the most commonly reported extra duties. Telecommunicators must regularly answer administrative phone lines, make hot file entries, provide building access, perform security camera monitoring and meet the public at the walk up window. They often must perform jail duties including sally port access, visitor registration and other duties.

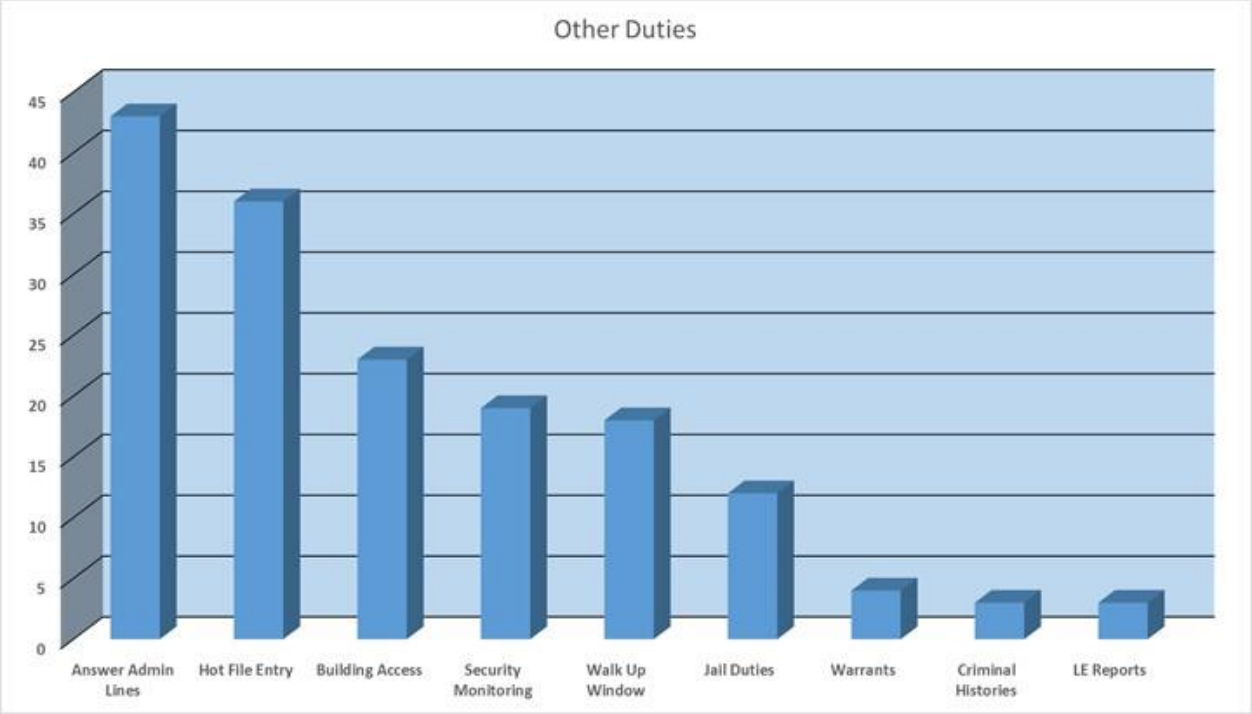

Figure 6 – Additional telecommunicator duties

Q8 – Does your PSAP have dedicated MSAG / GIS support staff?

Geographic Information Systems (GIS) are a critical component of NG9-1-1. GIS data is critical to the routing of 9-1-1 calls to the right PSAP and in determining the location of the caller or event in an NG9-1-1 environment. Today, a majority of Minnesota PSAPs rely on outside staff for GIS support.

Generally speaking, the larger the PSAP, the more likely it is that the PSAP will have dedicated GIS support personnel.

In spite of the fact that the majority of survey respondents currently have no MSAG/GIS support staff, as Table 16 shows, over the next 5 years, dependency on GIS staff to support operational NG9-1-1 data requirements at the PSAP will increase. This

dependency will result in the hiring of more GIS personnel directly by PSAPs to support NG9-1-1 GIS data requirements.

Table 16 – MSAG / GIS support staff

MSAG / GIS Support Staff	
Answer Options	**PSAPs**
Yes	35
No	44
Answered question	79

Q10 – Does your PSAP have dedicated IT support staff?

A majority of Minnesota PSAPs rely on outside services for IT support, as Table 17 shows. IT support takes on a more critical role in an NG9-1-1 operating environment and can be a critical success factor for the implementation of NG9-1-1. IT support for network operations and cybersecurity at the PSAP are the primary drivers.

Over the next 5 years, dependency on IT staff to support operational NG9-1-1 systems, cybersecurity and equipment at the PSAP will increase. This dependency will result in the hiring of more IT personnel directly by PSAPs to support the NG9-1-1 operating environment.

Table 17 – Dedicated IT Support Staff

Dedicated IT Support Staff	
Answer Options	**PSAPs**
Yes	35
No	44
Answered question	79

Generally speaking, the larger the PSAP, the more likely it is that the PSAP will have dedicated IT support.

3.4 Training Survey Section Summary

The transition to NG9-1-1 brings with it more than just changes in equipment at the PSAP. New systems, new tools, new processes all add to the demands placed upon telecommunicators when processing 9-1-1 calls. Given that NG9-1-1 primarily moves away from a system designed to handle landline 9-1-1 calls to a system that can process multiple types of calls, it is likely that lack of training could become an obstacle to the deployment of NG9-1-1 at the PSAP. Training will be necessary to operationalize many of the capabilities promised by NG9-1-1.

For example, when deploying Text-to-9-1-1, PSAP personnel will require training in the use of new tools, new operating procedures and a new forms of communicating with a person in possible distress.

The replacement of any system in the PSAP will require some level of training for PSAP staff.

The responses received from the PSAPs and shown in Table 18, clearly demonstrate that training is a high priority for Minnesota PSAPs.

Q14 – Does your PSAP have training programs planned for 2016?

Table 18 – Training plans

PSAP 2016 Training Plans	
Answer Options	**PSAPs**
Yes	**60**
No	**12**
Other	**6**
Answered question	**78**
Skipped question	**1**

Q16 – If no training is planned for 2016, please state the reason why.

The survey responses from 12 of the PSAPs indicated they have no current plan for training in 2016. All but one of those PSAPs identified themselves as being a small PSAP.

The two most commonly identified reasons were staffing and budget concerns. PSAPs report that they have limited budget to allow for training or that they have insufficient personnel to provide coverage when other staff members are off duty for training.

Three of the 13 that currently have no plan stated that they were developing a plan, but that it had not been finalized. Others noted that they believe that training opportunities are limited, and they will attempt to schedule training when it becomes available.

Q17 – What other training subjects or opportunities would be useful for your PSAP?

The PSAPs provided a varied list of other types of training they would find useful. The most commonly identified class topics were call taking / call handling, dispatcher / radio training or certification, and ARMER training. At least 25% of those responding to this survey question identified these as important topics.

Other important training topics identified by multiple PSAPs included:

- Stress management.
- 9-1-1 and NG9-1-1 technologies.
- Active Shooter.
- Suicide & Crisis Intervention.
- Customer service.

Q19 – Identify certifications that you think would be of value to your personnel.

PSAPs identified a number of certifications that they believed would be beneficial to their personnel. Nearly 33% of respondents stated that they wanted to see certifications for dispatchers, including discipline specific certifications for law and fire dispatchers. A large number of PSAPs (20%) identified EMD certifications as needed.

Other certifications identified include:

- ARMER.
- 9-1-1.
- CPR.
- Active Shooter / Active Assailant.

Several PSAPs said they were in favor of having certification and minimum standards for call takers and dispatchers throughout the state.

Q19 – What type of training venue is most practical or beneficial for your PSAP?

Table 19 shows the preferences for PSAP training venues. As the data demonstrates, PSAPs primarily want training in two ways, face-to-face meetings and on line, web-based training opportunities.

Table 19 – Preferable training venue

Preferable Training Venue	
Answer Options	**PSAPs**
On-Line	32
Regional hosted	35
Statewide hosted	3
Other	8
Answered question	78
Skipped question	1

Q20 – Do you believe that there should be recommended best practices established for call takers / dispatchers in the state of Minnesota?

PSAP responses clearly show that the PSAPs want recommended best practices to be established for call takers / dispatcher statewide in Minnesota. Table 20 and Figure 7 show these data.

Table 20 – Establishment of best practices

Desire for Best Practices	
Answer Options	**PSAPs**
Yes	68
No	10
Answered question	78
Skipped question	1

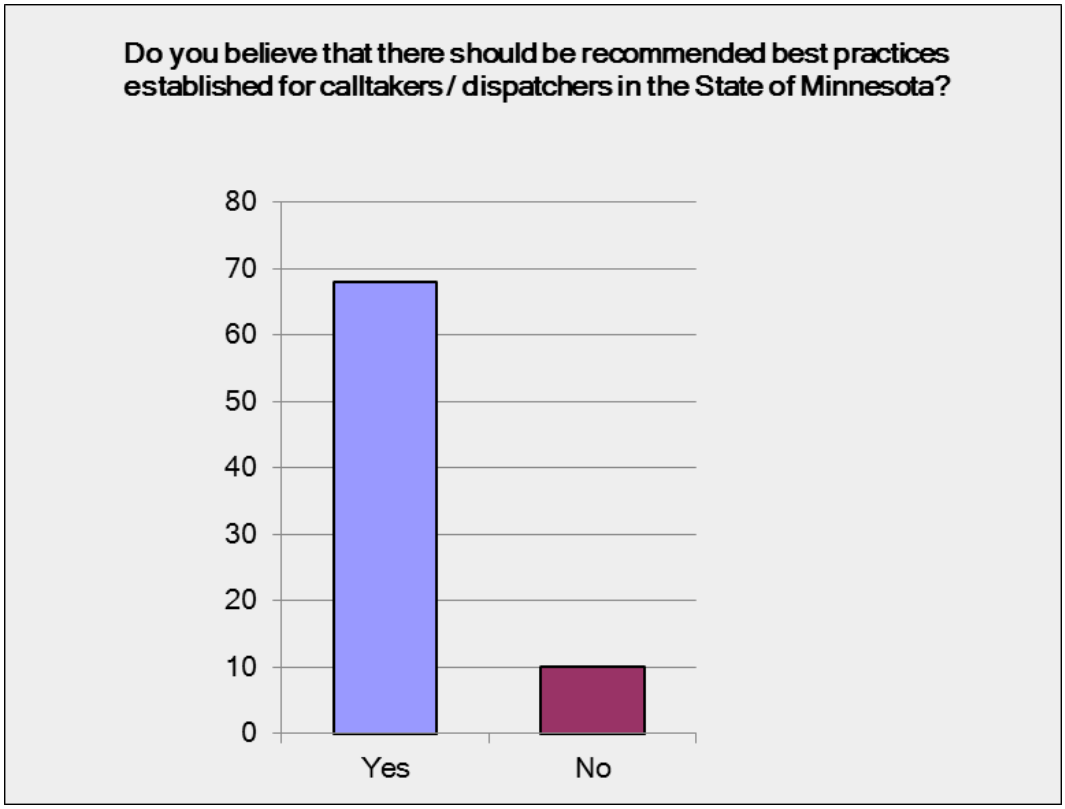

Figure 7 – Desire for statewide best practices

3.5 Call Processing Equipment (CPE) Survey Section Summary

Call Processing Equipment or CPE is the specialized equipment and software that enables a PSAP to answer and process a 9-1-1 call from the public. CPE is directly impacted by the migration to NG9-1-1 as CPE must be capable of processing 9-1-1 calls and other emergency request types using the SIP interface referenced in Section 3.1.3 of this report.

As a result, PSAPs across the country have had to replace or upgrade their CPE systems in order to deploy CPE capable of operating in an NG9-1-1 environment. The survey responses show that Minnesota PSAPs have been making this change and plan to continue to replace or upgrade their CPE in order to enable NG9-1-1 functionality.

Of the responses received, 34 PSAPs indicated they have plans to replace or upgrade their CPE systems over the next 3 years. The majority, 29, intend to replace or upgrade their CPE in the next 12 months.

Q28 – What was the purchase date of your CPE?

The median age of CPE systems as reported by the survey respondents is 4 years old. The oldest system reported is 26 years old, the most recent purchase was in March 2016. As the graph in Figure 8 demonstrates, the last two 5-year cycles show marked increases in CPE replacements. This visualization of the responses received helps to demonstrate the preparedness of Minnesota PSAPs for NG9-1-1.

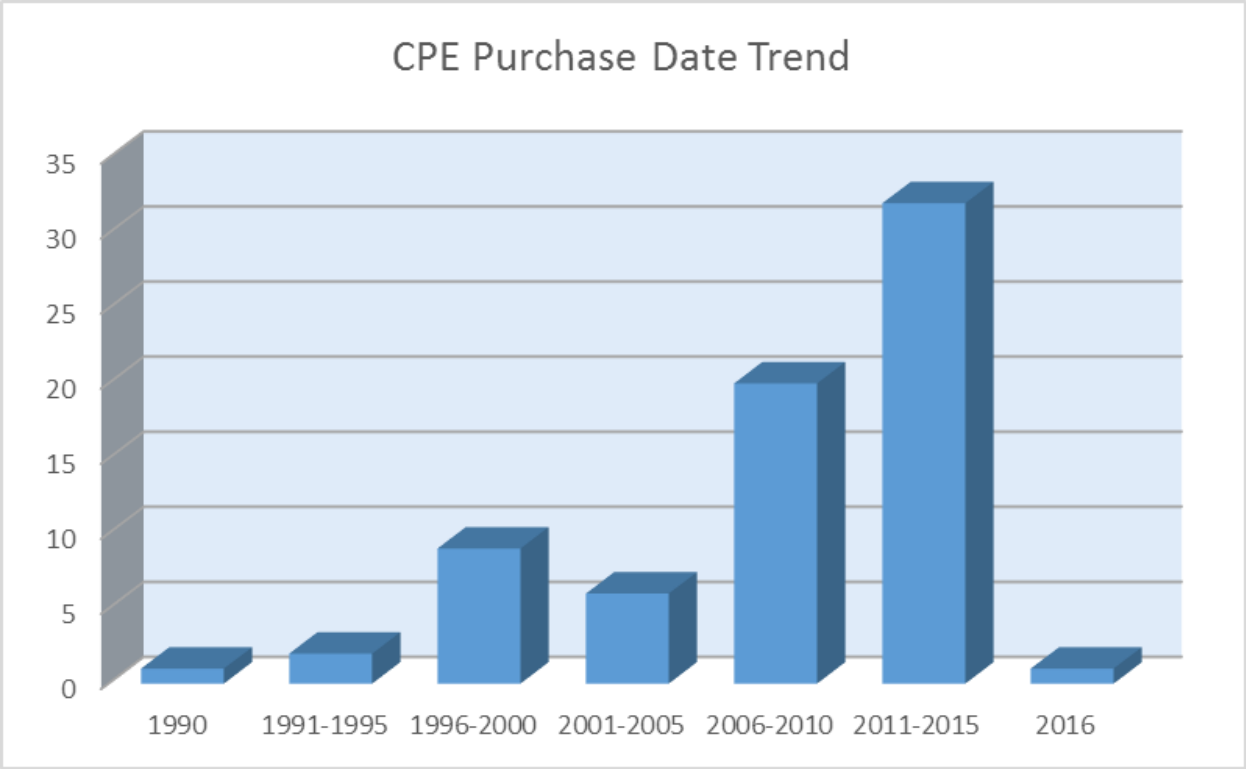

Figure 8 – CPE Purchase Date Trends

Q25 – How many CPE positions does your PSAP have?

Table 21 shows the total number of CPE positions reported by PSAPs classifying themselves as either Large, Medium or Small. For example, six PSAPs, identified as Large (16 or more workstations) reported having a total of 160 call-taking positions, or an average of 26 positions per PSAP.

Table 21 – Summary of Positions by PSAP Size

9-1-1 Call Taking Position Summary Table				
Category	**PSAPs**	**Number of Positions**	**% of Positions**	**Average # Positions**
Large	6	160	35%	26.0
Medium	17	135	30%	7.9
Small	56	158	35%	2.8
Total	79	455		5.6

Q21 – Q23 What is the make and model of your CPE?

The PSAPs are using common systems, common models, common service providers. Minnesota PSAPs, with a few exceptions use CPE manufactured by Airbus/VESTA or West/Positron. Each of these companies has a large national install/user base and offers NG9-1-1 CPE solutions. NG9-1-1 Systems in other states use CPE from each of these vendors as well. Each makes SIP-based CPE and each is developing MSRP Text-to-9-1-1 capabilities. Table 22 shows the distribution of CPE systems from these vendors.

Table 22 – Reported CPE by manufacturer

CPE by Manufacturer	
CPE by Manufacturer	**PSAPs**
Airbus	57
West/Positron	21
Zetron®	1
Total Responses	79

All of the current CPE equipment was provided by one of the three manufacturers shown in Table 22. Table 23 and Figure 9 summarize all CPE models in use in the State by manufacturer and by the number of call taker positions using each vendors' equipment.

Table 23 – CPE Models in Service

CPE Models in Service				
CPE Models	**# of Positions**	**% by Position**	**PSAPs**	**% by PSAP**
CM	5	1%	1	1%
Rescue Star	29	6%	12	15%
Sentinel®	9	2%	3	4%
Sentinel Patriot	59	13%	19	24%
Vesta®	202	44%	22	28%
Viper™	147	32%	21	26%
Zetron® Max	4	1%	1	1%
Total	455		79	

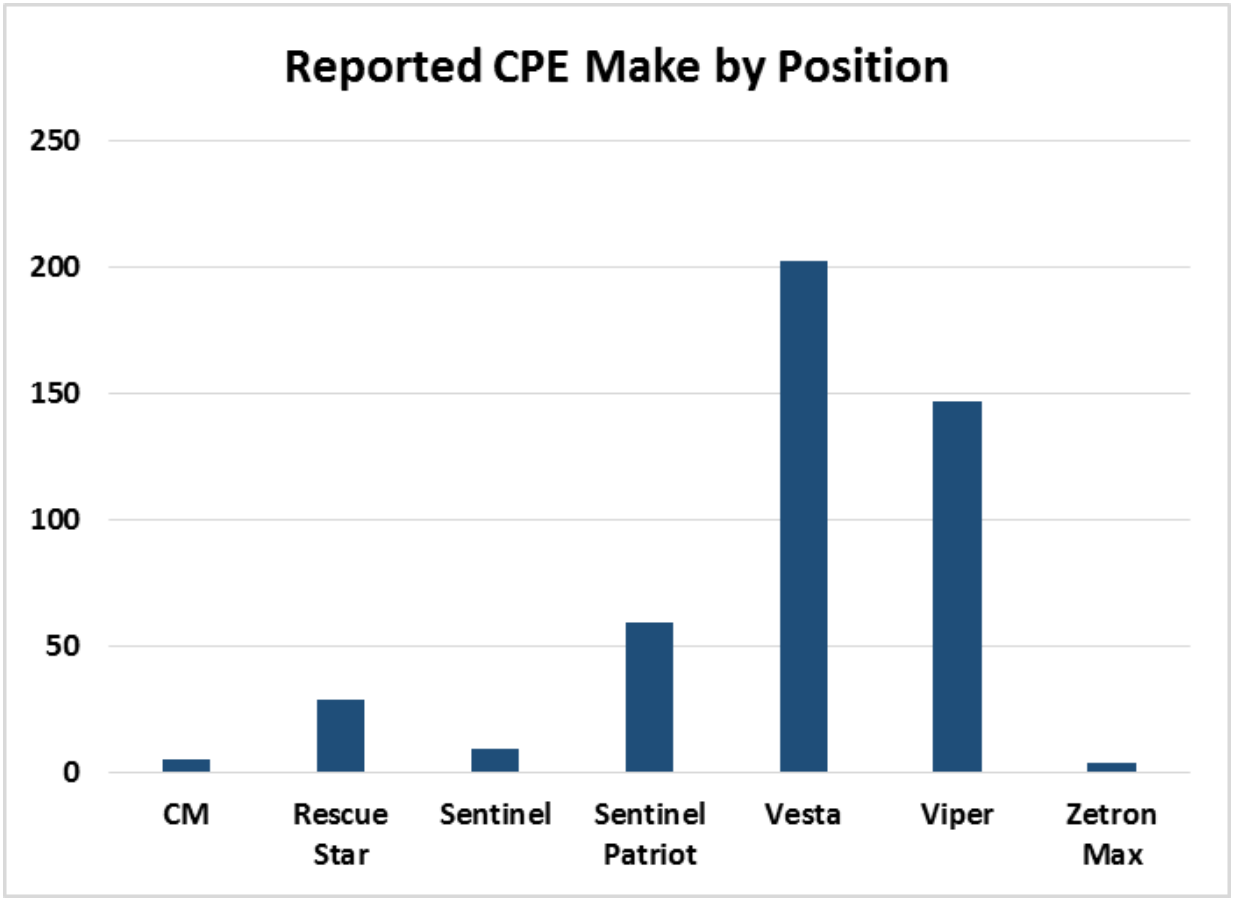

Figure 9 – Summary of CPE use by manufacturer/position

Q26 – Q27 Reported Call Processing Equipment (CPE) costs

Twenty-eight of the responding PSAPs did not provide purchase costs for their current CPE systems. The remaining 51 PSAPs provided CPE system purchase costs. Table 24 provides a summary of these reported costs. These costs represent about 50% of MN PSAPs and are used to estimate and validate other costs in this report.

Table 24 – Reported CPE COSTS by PSAP size

Reported CPE Costs by PSAP Size			
PSAP Size	**PSAPs Reporting CPE costs**	**Reported CPE Costs**	**Avg. Reported CPE Cost/PSAP**
Small	36	$5,336,332	$148,231
Medium	11	$2,744,439	$249,484
Large	4	$10,528,049	$2,632,012
Total Reported CPE Purchase	51	$18,608,819	
Total Reported CPE Annual Maintenance Costs		$1,282,700	

The average cost per PSAP figures are consistent with the industry and generally fall in line with the expected costs associated with systems purchased by PSAPs across the country.

Q31 – Do you have any plans to upgrade or replace your current CPE?

Table 25 provides survey results showing that 34 PSAPs have plans to replace or upgrade their current CPE system.

Table 25 – CPE upgrade / replacement plans

CPE Upgrade / Replacement Plans	
Answer Options	**PSAPs**
Yes	34
No	43
Answered question	77
Skipped question	2

Q32 – If yes, please select your CPE upgrade / replacement timeframe.

As shown in Table 26, 21 PSAPs intend to upgrade their CPE in the next 12 months.

Table 26 – CPE upgrade / replacement timeframe

CPE Upgrade / Replacement Timeframe	
Answer Options	**PSAPs**
12 months or less	21
13 - 24 months	8
24 - 36 months	1
Other	6
answered question	36
skipped question	43

Section 4.3.1 provides additional analysis on the anticipated costs associated with implementing these planned changes to CPE.

3.6 Computer Aided Dispatch System (CAD) Survey Summary

The Computer Aided Dispatching (CAD) system is one of the most important tools utilized by a Public Safety Answering Point (PSAP). It is such a critical component for many PSAPs that the Association of Public Safety Communications Officials (APCO) developed a guiding standard to aid PSAPs when they seek to upgrade or replace their CAD systems.

This standards document, APCO ANS 1.110.1-2015, states:

> *"A Computer Aided Dispatch (CAD) system is the principal application used by many public safety agencies to manage law enforcement, fire, and EMS incidents from the initial time an incident is reported to the conclusion of the incident. CAD is also used to track the status and location of resources, and for post incident analysis of the response."*[2]

[2] https://www.apcointl.org/doc/911-resources/apco-standards/584-11011-2015-multi-functional-multi-discipline-cad/file.html - Accessed May1, 2016

All reported incidents are entered, dispatched, managed, and tracked via the CAD system, making it a mission critical system. The lives of citizens and public safety personnel depend heavily on the CAD system consistently performing at its maximum operational effectiveness and reliability.

While CAD systems may not be as directly affected by the migration to NG9-1-1, as are the current CPE systems, CAD systems will need to continue to evolve to allow entry of caller, location and event data (e.g., videos, digital photographs) not currently included in the traditional flow of data through the 9-1-1 system. CAD systems will remain a critical component of PSAP operations that will require ongoing funding support from ECN.

CAD Providers

The CAD market has seen much consolidation in recent years as vendors acquire other vendors to gain market share or to acquire a product that provides them with a better competitive advantage in the market.

In 2015, TriTech purchased Tiburon and Zuercher Technologies. Zuercher, in turn, purchased LETG. Table 27 shows the distribution of CAD providers among the 79 PSAPs that responded to the survey. While this table shows 13 different CAD vendors in use by the PSAPs in the state of Minnesota, 44 of the 78 responding PSAPs, or 56.4%, use CAD products provided by TriTech or one of its recently acquired companies. Eliminating the six PSAPs with no CAD from the mix leaves 61.1% of reported CAD installations using products provided by TriTech and its subsidiaries.

Table 27 – CAD Providers

CAD Providers	PSAPs	% By PSAP	# of Positions	% by Positions
LETG	22	28%	74	12%
CIS	13	17%	134	22%
TriTech	9	12%	133	21%
Zuercher Technologies	8	10%	52	8%
Tiburon	5	6%	76	12%
Motorola®	4	5%	51	8%
Pro Phoenix®	3	4%	18	3%
New World	2	3%	28	5%
TAC10	2	3%	8	1%
Harris Global	1	1%	14	2%
Intergraph®	1	1%	30	5%

CAD Providers	PSAPs	% By PSAP	# of Positions	% by Positions
In House	1	1%	0	0%
Zoll Data Systems	1	1%	3	0%
N/A - No CAD	6	8%	0	0%
TOTAL	78		621	*
***does not add up to 100% due to rounding**				

Table 28 provides the CAD costs reported by the PSAPs, showing the average for each size PSAP.

Table 28 – Reported CAD Costs

Reported CAD Costs			
PSAP Size	**PSAPs Reporting CAD costs**	**CAD Costs Reported**	**Avg. Reported CAD Cost**
Small	25	$3,999,564	$159,983
Medium	13	$16,698,820	$1,284,525
Large	1	$3,500,000	$3,500,000
Total Reported CAD Purchase	39	$24,198,384	
Total Reported CAD Annual Maintenance Costs		$2,312,853	

Section 4.3.2 provides additional analysis on the anticipated costs associated with implementing these planned changes to CAD.

3.7 Radio Dispatch Console Survey Section Summary

The state of Minnesota Allied Radio Matrix for Emergency Response (ARMER) radio system is one of the largest, if not the largest standards-based shared statewide land mobile radio network in the nation, based on the geographic area served, along with the number of tower sites, dispatch centers and mobile/portable radios active on the system. All but one of the counties in Minnesota have migrated their radio operations to the ARMER system.

PSAPs use Radio Dispatch Console Systems to communicate with first responders on the ARMER system and/or locally owned radio networks. Regardless of the radio network used, MnDOT does not provide for maintenance and upgrades for radio dispatch

consoles located at the PSAPs, and these costs continue to be funded through the PSAPs.

The ARMER system uses a backbone network provided by Motorola Solutions, Inc., and our survey responses indicate that more than 91% of the PSAPs use Radio Dispatch Console systems provided by Motorola.

The State plans to upgrade the software used to control the network, and as a result those PSAPs that originally reported that they were using Motorola Gold Elite consoles had to replace that aging equipment. All of the Motorola Gold Elite equipment that was reported by the PSAPs in response to the survey has been replaced by Motorola MCC 7500 dispatch consoles. That change is reflected in Table 29 below.

PSAPs responding to the survey reported that Motorola Solutions accounts for the more than 91% of Radio Dispatch Console Systems in use in the State. Zetron® provided the remaining radio consoles. While the PSAPs were not asked why they chose a particular console manufacturer, it is likely that the preponderance of Motorola radio consoles is a direct result of the fact that all but one of the counties in Minnesota use the ARMER system, which Motorola Solutions provided.

As the locally owned and ARMER radio networks continue to be upgraded, the radio console systems will also have to be upgraded to keep pace, Resulting in ongoing radio console upgrade and maintenance costs for the PSAPs.

Q35 – Q40 Reported radio console information

Table 29 shows the different console models reported by the 79 PSAPs that provided a response.

Table 29- Radio consoles by manufacturer and model

Radio Consoles by Manufacturer and Model			
Manufacturer / Model	**Console Counts by Model**	**PSAPs**	**% of PSAPs by Mfr.**
Motorola		72	91.14%
Motorola Gold Elite/Elite	0		
Motorola MCC 5500	1		
Motorola MCC 7500	70		
Motorola Model Unknown	1		

Radio Consoles by Manufacturer and Model			
Manufacturer / Model	**Console Counts by Model**	**PSAPs**	**% of PSAPs by Mfr.**
Zetron®		7	8.86%
Zetron® 4000 Series	3		
Zetron® MAX	2		
Zetron® Model Unknown	2		
Total	79	79	100%

On average, the PSAPs reported having 6 radio console positions. Hennepin County reported the largest count, 53 consoles, while Lake of the Woods reported having only one radio console position.

Q41 – Q45 Reported radio console costs and replacement plans

Table 30 provides reported console purchase and maintenance costs in total and per console.

Table 30 – PSAP survey reported console costs

PSAP Survey Reported Console Costs	
Category	**Cost**
Reported Radio Console Costs	$20,164,351
Reported Radio Console Annual Recurring Costs	$1,257,632
Reported Number of Radio Consoles	466
Average Cost per Console Position	$43,271
Average Maintenance per Console Position	$2,699

Four PSAPs reported having plans to replace their existing radio consoles, 3 in 12 months or less and 1 in 24 to 36 months.

Q44 – Do you have any plans to upgrade or replace your current consoles?

Because the large majority of PSAPs have already upgraded their consoles to provide support for ARMER, few PSAPs have current plans to replace or upgrade their radio consoles, as shown in Table 31. It is important to note that as the ARMER system continues to be upgraded, PSAPs will be required to upgrade their console systems to

maintain compatibility with ARMER. The costs for these console upgrades are not borne by MnDOT, but will fall to the PSAPs.

Table 31 – Console Replacement Plans

Dispatch Console Replacement Plans	
Answer Options	**PSAPs**
Yes	4
No	75
Answered question	79

Q45 – If yes, please select your radio dispatch console upgrade / replacement timeframe.

Table 32 – Radio dispatch console upgrade / replacement timeframe

Radio Dispatch Console Upgrade / Replacement Timeframe	
Answer Options	**PSAPs**
12 months or less	3
13 - 24 months	0
24 - 36 months	1
Other	6
Answered question	10
Skipped question	69

Section 4.3.3 provides additional analysis on the anticipated costs associated with implementing these planned changes to Dispatch Consoles.

3.8 Logging Recorder Survey Section Summary

Logging recorders record 9-1-1 call conversations between a 9-1-1 caller and a PSAP and capture the radio dispatch traffic between a PSAP and first responders.

Systems today typically consist of hardware and software that interface to the 9-1-1 CPE system, dispatch consoles and certain administrative lines at a PSAP. Logging recorders capture detailed data about recordings for calls or radio traffic, including start/stop timestamps, station number or agent name, dialed numbers, Caller ID, radio talk group, radio channel and more.

Most systems allow supervisors to listen to live conversations or to access records from a remote location over a Local Area Network (LAN). In addition, analytical tools are often used that allow searching and quality reporting.

For PSAP logging recorders, there is overlap in usage between the 9-1-1 system processing a 9-1-1 call and the PSAP radio systems used to dispatch first responders to the location of a 9-1-1 caller.

The information provided here profiles the use and structure of PSAP logging recorder systems and future plans for upgrade / replacement as reported by the PSAPs responding to the survey.

Q56 – Does your logging / recording system record both phone and radio traffic?

Table 33 underscores the overlap that MN PSAPs have between their 9-1-1 phone and radio system.

Table 33 – Phone and radio traffic recording capabilities

Phone and Radio Traffic Recording Capabilities	
Answer Options	**PSAPs**
Yes	75
No	4
Don't know	0
Answered question	79

Q57 – Do you share a radio logging recorder with another agency?

Of the 79 responding PSAPs, 15 share a logging recorder and the associated costs, as Table 34 shows.

Table 34 – Shared logging recorder systems

Shared Logging Recorder Systems	
Answer Options	**PSAPs**
Yes	15
No	12
Don't know	1

Shared Logging Recorder Systems	
Answer Options	**PSAPs**
Answered question	28
Skipped question	51

Q62 – Please identify the level of recording provided by your logging recorder.

Table 35 summarizes responses concerning logging recorder function by console position and trunk that includes phone audio and radio transmission audio. Figure 10 provides a visualization of these statistics as a percentage of the total number of PSAPs responding to this question.

Table 35 – Level of recording by logging recorder

Level of Recording by Logging Recorder	
Answer Options	**PSAPs**
Records phone audio by position	62
Records phone audio by trunk	38
Records radio audio by position	37
Records radio audio by channel / talkgroup	66
Answered question	78
Skipped question	**1**

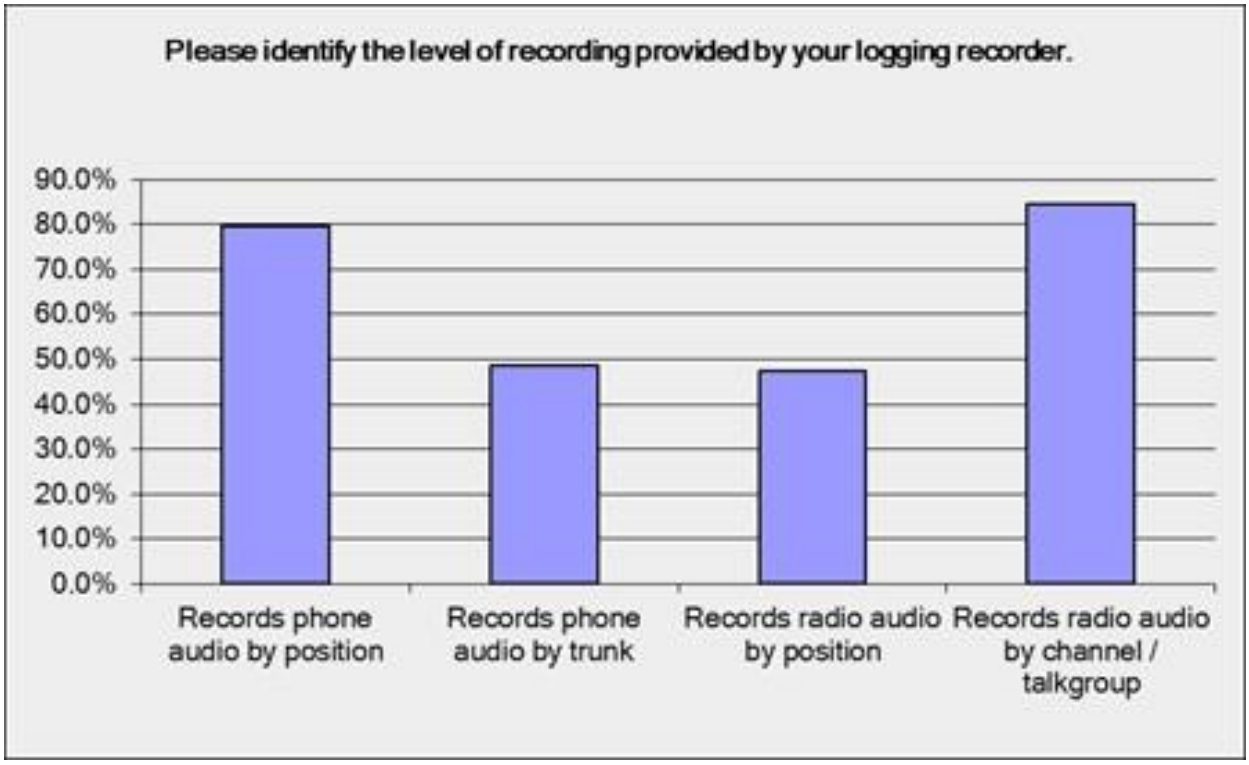

Figure 10 – Level of recording provided by logging recorder

Q58 – Q61 Reported logging recorder information

Table 36 and Figure 11 list the logging recorder information by manufacturer.

Table 36 – Logging recorder information

Logging Recorder Information	
Recorders by Make / Model	**PSAPs**
Verint®	34
HigherGround®	16
NICE	11
Eventide®	5
Cybertech	4
DSS	4
CVDS	1

Logging Recorder Information	
Recorders by Make / Model	**PSAPs**
Oaisys® Recording	1
Racom	1
WahlTek	1

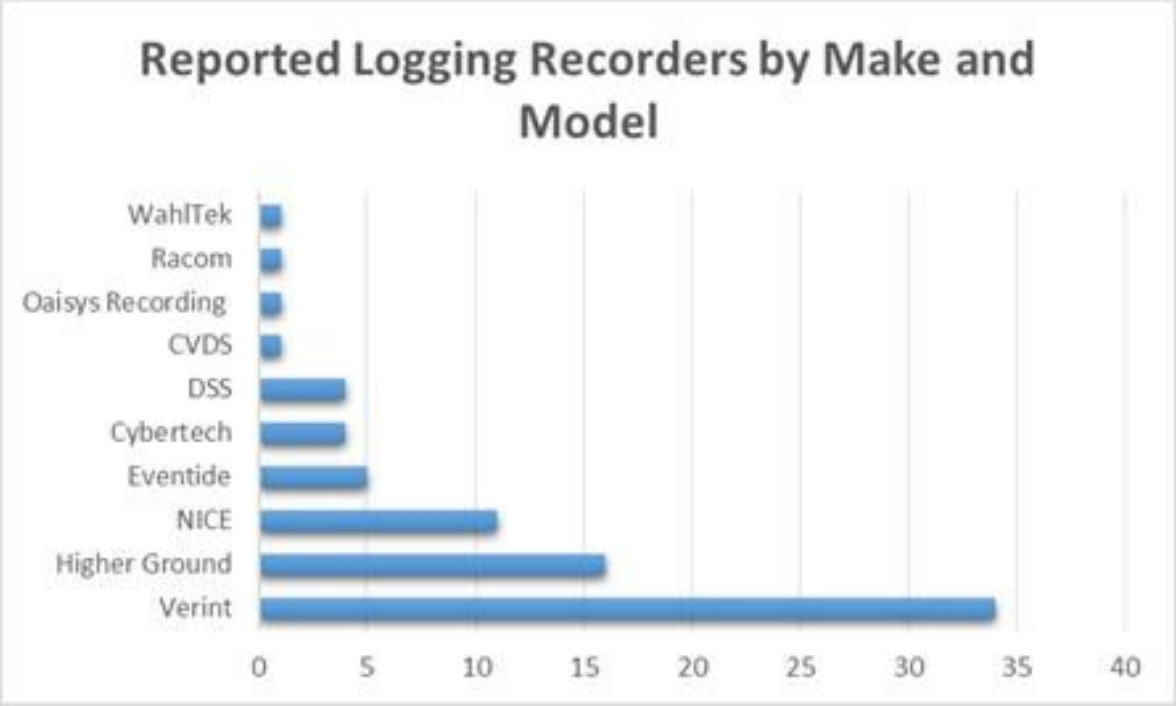

Figure 11 – Logging recorders by manufacturer and model

Q58 – Q61 Reported logging recorder cost Information

Table 37 below shows the reported logging recorder costs from the survey.

Table 37 – Logging recorder cost information

Logging Recorder Costs	
Category	**Cost**
Reported Logging Recorder Costs	$3,262,860
Reported Logging Recorder Annual Recurring Costs	$427,295

Q67 – Do you have any plans to upgrade or replace your current logging / recording System?

As noted below in Table 38, 13 PSAPs intend to upgrade / replace their Logging Recorder systems over the next 3 years, most of those are planned in the next 24 months.

Table 38 – Logging recorder system upgrade / replacement plans

Logging Recorder Upgrade / Replacement Plans	
Answer Options	**PSAPs**
Yes	13
No	66
Answered question	79

Q68 – Please select your logging / recording system upgrade / replacement timeframe.

Table 39 provides a time line for logging recorder replacement or upgrade by the 20 PSAPs that responded to this question.

Table 39 – Logging recorder system upgrade / replacement timeframe

Logging Recorder Upgrade / Replacement Timeframe	
Answer Options	**PSAPs**
12 months or less	8
13 - 24 months	4
24 - 36 months	1
Other	7
Answered question	20
Skipped question	59

Section 4.3.4 provides additional analysis on the anticipated costs associated with implementing these planned changes to logging recorders.

3.9 Administrative Telephony Survey Section Summary

An Administrative phone system, in the context of a PSAP, is the telephone system used by the PSAP to conduct business unrelated to the processing of a 9-1-1 call. The survey shows that the majority of PSAPs in MN support many functions in addition to answering 9-1-1 calls.

Much of the additional work done by a PSAP, regardless of size, is done using a traditional phone system with a handset that has dial tone and uses what is known as the Public Switch Telephony Network (PSTN) to connect callers with each other. This is no different from a phone system used in a normal office or hotel environment.

PSAPs in Minnesota may or may not be in control of the administrative phone system as administrative phone systems are often part of a larger county or other agency related telephone system. For example, the PSAP may use the Sheriff's office phone system.

Because they are often integrated with the CPE, and may be used as a backup to the CPE, administrative phone systems could be affected by the upgrade / replacement of CPE by PSAPs. The converse is also true; a replacement of an administrative phone system could have cost implications for the CPE at a PSAP. The following sections explore this connection.

Q73 and Q74 – Does the administrative phone system tie to 9-1-1?

Table 40 shows that a large majority of responding PSAPs (more than 80%) have administrative phone systems integrated with their CPE systems. Because of this integration, replacing the CPE can affect the administrative phone system, possibly requiring its upgrade or replacement.

Table 40 - Administrative phones tied to 9-1-1

Integrated Administrative Phone System	
Answer Options	**PSAPs**
Yes	62
No	15
Other	0
Answered question	77
Skipped question	2

Using the information reported, 62 PSAPs or 80% of reporting Minnesota PSAPs have ties between their 9-1-1 system and their administrative phone system. Reasons for this level of integration vary by agency, but Table 41 shows that a majority of PSAPs rely on the administrative phone system as a backup system for processing 9-1-1 calls.

Per 9-1-1 service provider industry practice, an administrative phone system can often serve as a backup to the PSAP's 9-1-1 system, as the two systems often operate independently depending on what might be causing the actual 9-1-1 system to be unable to take calls. Network issues tend to affect both administrative and 9-1-1 traffic, but PSAP-based system failures do not usually affect the administrative phone system too.

Table 41 – Administrative phone system as 9-1-1 backup

Administrative Phone System as 9-1-1 Backup	
Answer Options	**PSAPs**
Yes	46
No	27
Other	4
Answered question	77
Skipped question	2

Q69 – Q75 – Administrative phone system information

Many PSAPs have no direct control over the administrative phone system used to backup or interface to the 9-1-1 CPE. Costs for this integration occur at points of interface for basic telephony operations like dial tone, or an ability to make calls from a PSAP using the administrative phone system. Any PSAP planning to upgrade their CPE for NG9-1-1 must consider what, if any, implications that upgrade might have for the administrative phone system used by that PSAP.

Reported costs associated with administrative phone systems varied, with many respondents unsure or unable to identify the cost of their administrative phone system. Those that did respond provided the cost information in Table 42.

Table 42 – Administrative phone system costs

Administrative Phone System Costs	
Category	**Cost**
Reported Admin Telephone System Costs	$3,896,264
Reported Admin Telephone System Recurring Costs	$134,937
Reported Number of Admin Telephone System Positions	3,593

Q79 – Do you have any plans to upgrade or replace your current administrative phone system?

As reported by the survey and shown in Table 43, nine PSAPs plan to replace their administrative phone systems over the next 3 years, and Table 44 shows the timeframe for those plans. Note that none of the 3 PSAPs that indicated a 24 to 36-month replacement timeframe for their administrative phone systems answered that they had plans to replace those systems. Similarly, one of the PSAPs that indicated a plan for replacement did not provide a timeframe for that planned replacement.

Table 43 – Administrative phone system replacement plans

Administrative Phone System Replacement Plans	
Answer Options	**PSAPs**
Yes	9
No	66
Answered question	75
Skipped question	4

Q80 – If yes, please select your administrative phone system upgrade / replacement timeframe.

Table 44 – Administrative phone system upgrade / replacement timeframe

Administrative Phone System Upgrade Timeframe	
Answer Options	**PSAPs**
12 months or less	6
13 - 24 months	2
24 - 36 months	3
Other	5
Answered question	16
Skipped question	63

Section 4.3.5 provides additional analysis on the anticipated costs associated with implementing these planned changes to administrative phone systems.

3.10 Emergency Notification System Survey Section Summary

Emergency Notification Systems (ENS) are one-way communications systems that allow PSAPs to communicate emergency messages to the community or a subset thereof. Mass automated dialing services and siren systems used to alert for tornadoes, tsunami, air-raid, etc., are examples of emergency notification systems.

ENS systems as reported in the survey reflect systems that allow PSAPs to notify large groups of people of an emergent event. Systems of this type allow emergency managers to interactively select an area on a map, and have the system automatically call all of the people in that area to inform them of the situation.

These services typically require that the PSAP or some other entity maintain a database of phone numbers associated with each affected residence. Many people have abandoned the use of landline phones, opting instead for wireless phones or VOIP phones in their homes. If these people want to be notified of an emergency situation, they must register their wireless or VOIP phone number, and associate it with a physical location or locations to allow them to be notified of events affecting those locations.

During the search for the Boston Marathon bombers, authorities used an ENS system to warn residents to stay in their homes during specific times. After the Sandy Hook

Elementary School shootings, an ENS system informed parents in the Newtown, CT, area of the shooting incident.

The Federal Emergency Management Agency (FEMA) also provides a national alerting service, called the Integrated Public Alert and Warning System (IPAWS). IPAWS is an initiative of federal, state and local public safety officials, the National Weather Service, the Federal Emergency Management Agency (FEMA), and private industry working to ensure that citizens can receive alerts and warnings quickly through several different technologies at home, at school, at work, or even when on vacation.

IPAWS allows alerting authorities to use FEMA's IPAWS-OPEN platform to send geographically targeted text-like alerts to the public via their cell phones and other wireless devices. After completing FEMA sponsored training, local alerting authorities, such as state, county and local emergency management officials can also use IPAWS to transmit messages over multiple additional media. These include:

- Emergency Alert System, using AM, FM, and satellite radio as well as broadcast, cable, and satellite TV.
- The Commercial Mobile Alert System will send alerts to cell phones and other commercial mobile network devices, based on their location, even if cellular networks are overloaded and can no longer support calls, text, and emails.
- The National Oceanic and Atmospheric Administration will deliver alerts through the National Weather Service all hazards radio.
- Alerts will be available on the internet through web-based applications, such as Email, Instant Messaging and RSS feeds in any web browser.

FEMA also states that IPAWS alerts can be delivered using locally available ENS solutions. The following questions assess the PSAP's use of, and access to IPAWS. Table 45 shows the number of PSAPs with ENS and Table 46 shows the number of PSAPs with system integration to IPAWS. Of those not fully integrated, Table 47 shows the number of PSAPs with access to IPAWS. Table 48 shows the number of PSAPs with plans to use IPAWS and Table 49 shows the timeframe for those plans.

Q81 – Does your PSAP use an Emergency Notification System?

Table 45 – PSAP Emergency Notification System

PSAP Emergency Notification System	
Answer Options	**PSAPs**
Yes	63
No	15
Answered question	78
Skipped question	1

Q89 – Does your Emergency Notification System have an interface to FEMA's Integrated Public Alert and Warning System (IPAWS)?

Table 46 – IPAWS systems integration

IPAWS System Integration	
Answer Options	**PSAPs**
Yes	39
No	30
Answered question	69
Skipped question	10

Q90 – Does your PSAP have access to / use the FEMA IPAWS notification system?

Table 47 – IPAWS access

IPAWS Access	
Answer Options	**PSAPS**
Yes	26
No	47
Answered question	73
Skipped question	6

Q91 – Does your PSAP plan to access / use the FEMA IPAWS notification system?

Table 48 – Plans to use IPAWS

Plans to Use IPAWS	
Answer Options	**PSAPs**
Yes	55
No	14
Answered question	69
Skipped question	10

Q93 – Please identify when you plan to implement / begin using the FEMA IPAWS notification system.

Table 49 – IPAWS implementation timeframe

Timeframe to Implement IPAWS	
Answer Options	**PSAPs**
12 months or less	39
13 - 24 months	8
24 - 36 months	5
Answered question	52
Skipped question	27

Table 50 provides the capital costs and recurring costs for ENS as reported by 39 PSAPs. Tables 51 shows the number of PSAPs with plans to deploy ENS and of those with plans, Table 52 shows the timeframe of those plans.

Table 50 – Emergency notification system costs

Reported Emergency Notification System Costs	
Category	**Cost**
Reported ENS System Costs	$801,734
Reported ENS System Annual Recurring Costs	$664,071

Q94 – Do you have any plans to upgrade or replace your current Emergency Notification System?

Table 51 – ENS system upgrade plans

ENS System Upgrade Plans	
Answer Options	**PSAPs**
Yes	7
No	68
Answered question	75
Skipped question	4

Q95 – If yes, please select your Emergency Notification System upgrade / replacement timeframe.

Table 52 – ENS upgrade / replacement timeframe

ENS Timeframe	
Answer Options	**PSAPs**
12 months or less	4
13 - 24 months	4
24 - 36 months	0
Other	4
Answered question	12
Skipped question	67

Section 4.3.6 provides additional analysis on the anticipated costs associated with implementing these planned changes to ENS systems

3.11 Survey Reported System Costs Summary

As noted, of the 104 PSAPs surveyed, 76% completed the survey. The survey asked for and obtained an extensive amount of cost data from the survey respondents. Tables 53 and 54 provide reported capital costs and annual recurring costs, respectively, by category.

Table 53 – PSAP survey reported capital costs

PSAP Survey Reported Capital Costs		
Total PSAP Survey Reported Costs by Category	**Totals**	**% of Total Reported Costs**
Total Reported CPE Costs	$18,608,819	26%
Total Reported CAD system Costs	$24,153,828	34%
Total Reported Radio Console Costs	$20,164,351	28%
Total Reported Logging Recorder Costs	$3,262,860	5%
Total Reported Admin Phone System Costs	$3,896,264	5%
Total Reported ENS System Costs	$801,734	1%
Total Reported Costs	$70,887,856	100%

Table 54 – PSAP reported annual recurring costs

PSAP Reported Annual Recurring Costs		
Total Costs by Survey Category	**Totals**	**%***
Total Reported CPE Annual Recurring Costs	$1,282,700	7%
Total Reported CAD Annual Recurring Costs	$2,312,653	10%
Total Reported Radio Console Annual Recurring Costs	$1,257,633	6%
Total Reported Logging Recorder Annual Recurring Costs	$70,280	2%
Total Reported Admin Phone System Annual Recurring Costs	$134,937	3%
Total Reported ENS System Annual Recurring Costs	$664,071	83%

PSAP Reported Annual Recurring Costs		
Total Costs by Survey Category	**Totals**	**%***
Total Reported Annual Costs	$5,722,274	8%
Total Reported Costs	$70,887,856	
***Represents the % of the total reported costs for this category as listed in Table 53**		

3.12 NG9-1-1 PSAP Survey Summary

Based on the responses provided by the PSAPs, ***FE*** identified the following high level findings regarding the data:

PSAP Survey Findings and Analysis

FE identified several key findings from an extensive review of the data provided by the PSAPs in response to the survey distributed in March 2016. Section 3 of this report provides more analysis of the information collected from the PSAPs. The following are our high-level findings and analysis of the PSAP provided survey information:

- Call Processing Equipment (CPE) upgrade / replacement of old analog systems to NG9-1-1 capable CPE is a priority and PSAPs are planning to make the necessary changes in the next 3 years.
    - Thirty-four PSAPs plan to upgrade to NG9-1-1 capable CPE in the next 3 years, ten additional PSAPs might have to upgrade based on the information they provided. Forty-four total possible replacements represent 42% of all MN PSAPs upgrading CPE for NG9-1-1 in the next 3 years.
    - Forty-six PSAPs have upgraded / replaced their CPE in the last 4 years that represents 44% of all MN PSAPs already upgraded CPE for NG9-1-1.
- PSAPs identified training and establishing best practices for telecommunicators as requirements to support the transition to NG9-1-1.
- NG9-1-1 capabilities are in demand by the PSAPs and the public they serve.
    - Seventy PSAPs have plans to deploy and implement Text-to-9-1-1 services according to the survey. This service is an especially vital new

tool for PSAPs to communicate with the deaf and hearing-impaired community.

  - Thirty PSAPs identified Message Session Relay Protocol (MSRP), a feature of NG9-1-1 capable CPE, as the preferred deployment method for Text-to-9-1-1 service thus allowing the PSAP to receive and respond to text-to-9-1-1 sessions with the same system used to answer traditional 9-1-1 calls. That may take longer to achieve, but should be the method for deploying all Text-to-9-1-1 services at a PSAP.

  - PSAPs are interested in Session Initiation Protocol (SIP). A SIP interface is a requirement of NG9-1-1 capable CPE, allowing additional data to eventually be presented with the call. As PSAPs upgrade / replace their CPE systems, they are gaining SIP capability.

- Computer Aided Dispatch (CAD) upgrades and replacements are being planned and will drive costs, but CAD upgrades and their related costs are not directly driven or caused by the transition to NG9-1-1.

- PSAPs are often not receiving dedicated IT or GIS support. These are both critical support areas for NG9-1-1. PSAPs will have an increasing reliance on and increasing need for support from both GIS and IT support staff in the next 5 years as the transition to NG9-1-1 is completed.

- Administrative phone systems play a role in 9-1-1 in Minnesota; the transition to NG9-1-1 could create additional costs for administrative phone systems. The reverse is also true, new administrative phone systems may create additional costs for CPE systems at PSAPs.

- Reported logging recorder information reflects a trend both in Minnesota and nationally towards regional / shared system costs and cooperation across multiple jurisdictions. This is a good approach and can reduce overall costs.

- Emergency Notification Systems (ENS) data reflects the trend toward a Software as a Service (SaaS) model. Software as a service (SaaS) is a software distribution model in which a third-party provider hosts applications and makes them available to customers over a network or the Internet. SaaS removes the need for organizations to install and run applications on their own computers or in their own data centers. This model can shift costs from upfront capital expenditures to monthly recurring services expenditures that will still be borne by the PSAP and by ECN.

- Dispatch consoles, logging recorders, administrative phones, and ENS systems for the most part are current or have replacement life cycles not directly affected by NG9-1-1. These systems will continue to require funding at both the ECN and local levels.

4. NG9-1-1 Life Cycle Funding Assessment Summary

4.1 Enhanced 9-1-1 Funding in Minnesota

Minnesota Statutes Section 403.113, Subdivision 4 requires that every year all Minnesota cities, counties, or other governmental agencies with 9-1-1 Public Safety Answering Points (PSAPs), send an audit of their E9-1-1 funds to the Department of Public Safety. The Calendar Year Audit forms are distributed to each entity in January for the prior year. The statute provides for the collection of the enhanced 9-1-1 fee for the following purposes:

> *"…to fund implementation, operation, maintenance, enhancement, and expansion of enhanced 9-1-1 service, including acquisition of necessary equipment…"*

The following is a brief list of expenditures approved for use of E9-1-1 funding:

Note: E9-1-1 funds can be applied to the necessary upgrades for migration to the Next Generation 9-1-1 platform.

- Components related to 9-1-1 call answering equipment.
- Equipment necessary for map display within the PSAP.
- Backup power (UPS) prorated for amount applicable to the PSAP.
    - PSAPs located in a law enforcement center, or sheriff's office, apply only the amount required for the PSAP to operate during a power outage to the E9-1-1 funding.
- Expenditures relative to a back-up PSAP can only be applied to E9-1-1 funding after all approved applicable expenditures for the primary PSAP have been covered.
- Training and conference expenses for registration and travel:
    - These expenses do not to include reimbursement of salaries and benefits of the employee attending.
    - Likewise, they do not include reimbursement of salaries and benefits for employee(s) providing coverage in the PSAP for those in training.

- Equipment in the PSAPs for monitoring traffic cams or alarm cams where a dispatchable event may need to be created based on an incident occurring in the area being monitored.

- Ancillary software for continued maintenance of community alert/notification systems:

    - IPAWS upgrades to Early Alert and Warning or mass notification systems is an allowable expense.

The following items are NOT allowable expenditures for E9-1-1 funding:

- Mobile radio equipment, including handheld radios, used by public safety response agencies and personnel are ineligible.

- Payments to MNDOT associated with ARMER radio maintenance costs are not eligible, except for those costs associated with upgrade(s) to the Motorola 7500 radio console(s) residing in the PSAP.

- Air cards or cell phones (along with their associated invoices) used by response personnel, or dispatch supervisors/managers, to communicate with dispatch personnel are excluded.

- Expenditures for a back-up PSAP without having met the obligations of the primary PSAP are not allowable.

- Equipment “outside” of the four walls of the PSAP:

    - NOTE: This is not to be interpreted to mean that every item within the four walls of the PSAP qualifies as an approved expenditure for E9-1-1 funding.

- Any expenditures reimbursed through the grant reimbursement process cannot also be applied to the E9-1-1 Fund.

The following considerations are used in the decision making process when applying expenditures to the E9-1-1 funding:

- Is the proposed use of those funds directly related to the "actual implementation, operation, maintenance, enhancement, and expansion of enhanced 9-1-1 services?”

- If the equipment is not telecommunications equipment directly related to providing enhanced 9-1-1 services, is the equipment related to interpreting data provided with the call or to document the call?

- If the equipment is communication equipment, is it "necessarily located within the PSAP and used to communicate with the emergency services requested by the 9-1-1 callers"?

- Is the proposed use of funds for equipment or for training related to the equipment upgrade?

- Is the equipment telecommunications equipment, which is used to provide enhanced 9-1-1 or NG9-1-1 services?

- If the equipment is a community alerting system, is it necessarily located within the PSAP?

    - If the answer is "yes", the funds may be used for that purpose.

Q96 – Please identify expenses that are not allowable for purchase with 9-1-1 funds that you feel should be considered allowable.

Responding PSAPs listed a number of different categories not currently covered by 9-1-1 funding, but they believed should be eligible. PSAPs identified several categories of personnel costs that could be funded including:

- Overtime costs to attend training.
- Dispatcher clothing.

They also noted a number of technologies or equipment located outside of the dispatch center, which they identify as being essential for dispatch operations. These included:

- Bi-Directional Antenna (BDA) systems inside government buildings.
- Tower site expenses including leases and maintenance costs.
- Air cards / connectivity to mobile CAD clients.
- Subscriber radios in patrol vehicles.

It is important to note that 9-1-1 fees collected by the telephone carriers are specifically meant to pay for the costs of operating a PSAP. Many of the costs listed above fall outside the operation of a PSAP and if used for these items could put the state in jeopardy of

losing the 9-1-1 fees to other agencies such as fire and police agencies or could lead to losing the funding from telephone carriers altogether.

The allocation of 9-1-1 fees outside of the costs related to operating a PSAP could also result in the loss of any grant funding by the federal government for NG9-1-1 related activities.

4.2 Three Year ECN PSAP Funding Cycle Analysis

Minnesota Statute requires that all Minnesota cities, counties, or other governmental agencies with PSAPs, send an audit of their E9-1-1 funds to the Department of Public Safety annually. The Calendar Year Audit forms are distributed to each entity in January for the prior year.

FE used the following audit reports provided by ECN as the basis for our analysis of past 9-1-1 funding.

- 2012 E9-1-1 Fund Audit Summary.
- 2013 E9-1-1 Fund Audit Summary.
- 2014 E9-1-1 Fund Audit Summary.

This is a crucial period for analysis, as many of the costs shown increasing or decreasing year over year in Table 55 are related to the transition to NG9-1-1. Table 55 provides a summary of ECN funding totals by funding category for 2012 – 2014. Figure 12 provides a visualization of the distribution of the funds.

Table 55 – ECN PSAP Funding Totals 2012-2014 by Category

ECN PSAP 2012-2014 Funding Totals by Category					
	FY2012 Spending	**FY2013 Spending**	**FY2014 Spending**	**Total by Category**	**% of ECN Funds**
Hardware	$4,805,000	$2,710,719	$4,724,474	$12,240,193	28%
Software	$3,362,323	$3,109,124	$4,481,200	$10,952,647	25%
Phone	$2,523,884	$2,542,877	$2,897,710	$7,964,472	18%
Alert System	$340,858	$1,420,079	$1,549,650	$3,310,587	8%
Dispatch	$1,540,313	$451,861	$504,419	$2,496,593	6%
Recorder	$770,885	$555,078	$941,538	$2,267,501	5%
Training	$730,857	$818,221	$534,535	$2,083,613	5%

ECN PSAP 2012-2014 Funding Totals by Category					
	FY2012 Spending	FY2013 Spending	FY2014 Spending	Total by Category	% of ECN Funds
MSAG	$423,805	$413,981	$494,831	$1,332,618	3%
Trunks	$308,916	$461,748	$289,264	$1,059,928	2%
LD Charges	$1,874	$0	$0	$1,874	0%
Total Spent	$14,808,715	$12,483,688	$16,417,621	$43,710,026	

Indicates funding categories driven by the transition to NG9-1-1

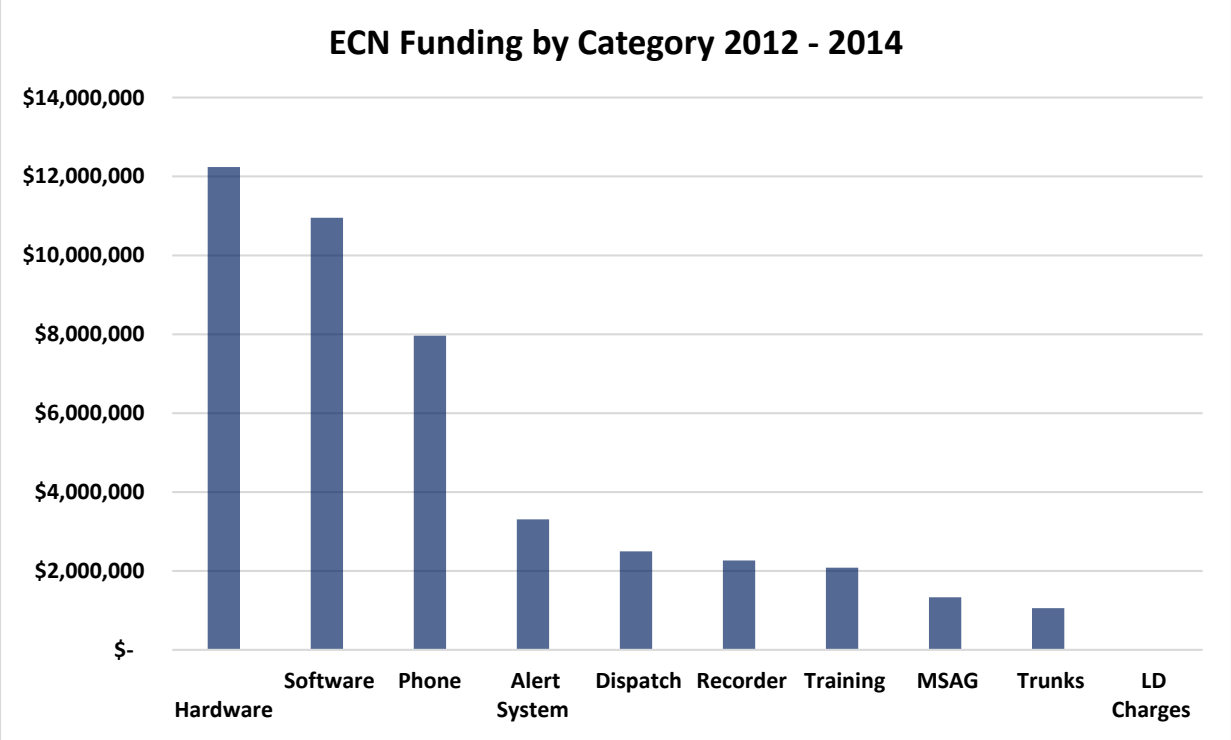

Figure 12 – ECN Funding by Category 2012-2014

Overall, a review of the data shows that Minnesota 9-1-1 funding has shifted away from traditional telephony costs (trunks, LD charges) as the ECN provided ESInet has been deployed to the PSAPs during the period from 2012 to 2014.

The amount of funding dedicated to CPE and CAD systems (hardware, software, phone) in this time period demonstrates the rate of change occurring at PSAPs due in part to the transition to NG9-1-1. As the survey results show, the need to sustain or increase funding for these categories will continue at or above the levels funded in the 2012-2014 cycle.

Funding for training at 5% of the overall funding is a good indicator of the importance of training to the PSAPs in MN. Funding for training will need to increase as an overall percentage of funding as PSAPs transition to new systems, new tools and new processes because of the transition to NG9-1-1.

Funding for ENS or Alert Systems increased dramatically in this time period and will continue to require recurring funding for the subscription like services offered by the ENS service providers.

MSAG/GIS support costs will increase due to increased GIS requirements from NG9-1-1 at the PSAP.

4.3 Anticipated Costs by System

The PSAP survey captured extensive data related to the major technology systems used in PSAPs today as well as any plans to upgrade or replace these critical systems in the future. The following sections provide a system-by-system breakdown of past, current and anticipated costs for the systems funded by the E9-1-1 fund and analyzed in this report.

4.3.1 CPE Replacement Plans

In the survey, more PSAPs identified plans to replace their CPE than any other category of system funded by the E9-1-1 fund. This is not surprising given that for a PSAP, NG9-1-1 primarily means replacing analog CPE with IP capable CPE. Comparing the survey results with past spending on CPE replacements in the 2012-2014 funding cycle reveals that well over 50% of the PSAPs in MN have upgraded to NG9-1-1 capable CPE in the last 5 years. The fact that 34 PSAPs plan to upgrade or replace their CPE reinforces the fact that the transition to NG9-1-1 is in full swing and will continue for at least the next 5 years.

While CPE is not specifically broken out into its own category in Table 56, the overall costs of Hardware, Software and Phone serve as a gauge against CPE costs reported by PSAPs in the survey.

Table 56 – ECN Spending on Hardware and Software 2012 - 2014

ECN PSAP 2012-2014 Funding Totals by Category					
	FY2012 Spending	**FY2013 Spending**	**FY2014 Spending**	**Total by Category**	**% of Total Funding**
Hardware	$4,805,000	$2,710,719	$4,724,474	$12,240,193	28%
Software	$3,362,323	$3,109,124	$4,481,200	$10,952,647	25%
Phone	$2,523,884	$2,542,877	$2,897,710	$7,964,472	18%

Table 57 shows the breakdown of PSAP reported costs for CPE from the survey. Costs reflected in this table include costs incurred outside of the 2012-2014 funding cycle.

Table 57 – Reported CPE Costs by PSAP Size

Reported CPE Costs by PSAP Size			
PSAP Size	**PSAPs Reporting CPE costs**	**Reported CPE Costs**	**Avg. Reported CPE Cost/PSAP**
Small	36	$5,336,332	$148,231
Medium	11	$2,744,439	$249,484
Large	4	$10,528,049	$2,632,012
Total Reported CPE Costs	51	$18,608,819	
Total Reported CPE Annual Recurring Costs		$1,282,700	

Thirty-four PSAPs indicated they have plans to replace or upgrade their CPE systems over the next 3 years. The majority, 29, intend to replace or upgrade their CPE in the next 12 months. Table 58 provides information related to those PSAPs that indicated they are replacing their CPE.

Table 58 – Agency CPE upgrade / replacement plans

PSAPs with Planned CPE Replacements				
PSAP Name	**PSAP Size**	**Positions**	**Current Manufacturer / Model**	**Planned Replacement**
Aitkin County Sheriff Office	Small	3	Sentinel	12 months or less
Anoka County Central Communications	Medium	15	Viper	12 months or less
Beltrami County PSAP	Small	4	Sentinel Patriot	12 months or less
Bloomington Police and Fire		6	Viper	13 - 24 months
Brown County Sheriff's Office	Small	3	Sentinel Patriot	n/a
Carlton County Sheriff's Office 9-1-1 Dispatch	Small	4	Viper	12 months or less
Chippewa County Sheriff's Office	Small	3	Rescue Star	12 months or less
Crow Wing County Sheriff's Office	Medium	5	CM (similar to Patriot)	12 months or less
Dodge County	Small	3	RescueStar	12 months or less
Douglas County-shared		5	Vesta	13 - 24 months
Grant County Sheriff's Office-shared	Small	2	Sentinel Patriot	13 - 24 months
Lake County PSAP	Small	3	Sentinel Patriot	13 - 24 months
Lake of the Woods	Small	1	Rescue Star	12 months or less
Le Sueur County	Small	2	Sentinel Patriot	n/a
Lyon County Sheriff	Small	2	Rescue star	12 months or less
McLeod County Communications	Small	4	Rescue Star	12 months or less
Meeker County Sheriff's Office	Small	3	Rescue Star	12 months or less
Mille Lacs County	Small	3	Viper	12 months or less
Minnetonka Police Department	Small	4	Sentinel Patriot	13 - 24 months

PSAPs with Planned CPE Replacements				
PSAP Name	**PSAP Size**	**Positions**	**Current Manufacturer / Model**	**Planned Replacement**
Nobles County Sheriff's Office	Small	3	Sentinel Patriot	12 months or less
Otter Tail County-shared	Small	4	Sentinel Patriot	12 months or less
Pipestone County Sheriff's Office	Small	3	Sentinel Patriot	for Text-to-9-1-1
Pope County Sheriff Department-shared	Small	3	Sentinel Patriot	12 months or less
Renville Co. Sheriff's Office	Small	2	Rescue Star	12 months or less
Rice Steele 9-1-1 Center	Medium	6	Sentinel Patriot	13 - 24 months
Rock County Sheriff's Office	Small	2	Rescue Star	12 months or less
Roseau County Sheriff's Department	Small	4	Sentinel	12 months or less
Sherburne County Sheriff	Small	4	Viper	12 months or less
Sibley County Sheriff's Office Dispatch	Small	2	Rescue Star	12 months or less
St. Louis Park	Small	3	Viper	24 - 36 months
Stevens County PSAP-shared	Small	2	Sentinel Patriot	13 - 24 months
Swift County Sheriff's Office	Small	2	Rescue Star	12 months or less
Wabasha County	Small	3	Viper	12 months or less
Yellow Medicine County Dispatch	Small	2	Rescue Star	12 months or less

Any CPE system purchased before 2011 is likely not capable of operating in an NG9-1-1 environment using SIP or MSRP for Text-to-9-1-1. In analyzing the survey results and using a 2011 CPE purchase date or earlier as a filter shows that 10 PSAPs reported CPE purchased during or before 2011. PSAPs that should consider upgrading their CPE but indicated that they have no current plans to upgrade/replace their CPE need to be factored in to any future CPE funding analysis as well. Table 59 lists those agencies.

Table 59 – Probable CPE Replacements

PSAPs that will likely have to replace or upgrade their CPE				
PSAP Name	**PSAP Size**	**Positions**	**Current Manufacturer / Model**	**Reported Purchase Date**
Wilkin County Sheriff's Office-shared	Small	2	Sentinel Patriot	07/01/2006
Faribault County Sheriff's Office	Small	4	Vesta	04/01/2009
Kanabec County Sheriff's Office PSAP	Small	3	Viper	01/21/2010
Mower County LEC	Small	3	Sentinel Patriot	10/01/2010
Hubbard County SO	Small	2	Vesta	01/01/2011
Chisago County Emergency Communications Center	Small	4	Viper	10/05/2011
Houston County Emergency Dispatch	Small	2	Sentinel Patriot	10/31/2011
Blue Earth County PSAP	Medium	5	Sentinel Patriot	11/01/2011
Jackson County Dispatch	Small	2	Sentinel Patriot	12/20/2011

Table 60 combines the data from PSAPs that indicated they are making a CPE change and those PSAPs that should consider a CPE change.

Table 60 – CPE Replacement Plans Summary

CPE Replacement Summary				
	Reported Costs	**PSAPs**	**# of Positions**	**Anticipated Costs**
Small PSAPs planning upgrade	$2,479,068	29	83	$6,225,000
Small PSAPs unplanned	$880,959	8	22	$1,650,000
Medium PSAPs planning upgrades	$674,547	5	37	$2,775,000
Medium PSAPs unplanned	$227,500	1	5	$375,000
Large PSAPs planning upgrades	0	0	0	0
Large PSAPs unplanned	0	0	0	0
Totals	$4,262,074	43	147	$11,025,000
$75,000 per CPE position is the budgetary amount used to calculate Anticipated Costs.				

The E9-1-1 fund must be prepared to support the replacement of CPE at 43 PSAPs over the next 3-year funding cycle. Working with information provided, and accounting for PSAPs that did not participate in the survey, the E9-1-1 fund will likely require in excess of $20,000,000 for CPE replacements from 2016-2018.

CPE funding demand increased during the 2012-2014 funding cycle, which the reported CPE system purchases in the last 5 years corroborated. The survey data indicates an additional 44 PSAPs will be addressing CPE for NG9-1-1. In total, the CPE systems at nearly all PSAPs in Minnesota will be NG9-1-1 capable within the next 3 years.

The CPE lifecycle for dedicated hardware CPE remains in the 5-year range, CPE overall cost of ownership could decrease as PSAPs and 9-1-1 service providers deploy cloud-based or hosted CPE solutions. Service based models will move costs from one-time expenses to pay for equipment to service-based monthly recurring or subscription based fees.

4.3.2 CAD Replacement Plans

Twenty of the 79 responding PSAPs have plans to replace their current CAD systems. However, three of those 20 PSAPs reported that they are currently in the process of upgrading their CAD systems, one noted that they perform routine software upgrades as

directed by their current CAD vendor, and one noted that they had no definite timeframe for the planned upgrade.

It appears that the following 5 PSAPs, shown in Table 61, are performing “routine” software upgrades, and are not replacing their CAD systems.

Table 61 – PSAPs with planned CAD upgrades

PSAP Name	Plans for Upgrade
Dakota Communications Center	We go live on a new system as of June 1, 2016
Minnetonka Police Department	Migrating to TriTech CAD 3/30/2016
Scott County Sheriff's Office.	In a current upgrade
City of Minneapolis	Routine software upgrades on the vendors schedule
Koochiching County Sheriff's Office	No definite timeframe

Of the remaining 15 PSAPs, eight state that they plan to upgrade or replace their CAD in the next 12 months, six say that they will upgrade or replace CAD in 13-24 months, and one plans to upgrade or replace CAD in 24-36 months.

Lincoln County said in their survey response that they purchased their current CAD system in January of 2016. It is unclear if they intend to upgrade the CAD that was just purchased, or if they believe that their new CAD system will be operational in 13 to 24 months.

Based on this information, it seems most likely that 14 PSAPs are truly planning to replace their CAD in the next 3 years. Table 62 shows those PSAPs.

Table 62 – Counties replacing CAD in next 3 years

CAD 3-Year Replacement		
PSAP Name	**PSAP Size**	**Replacement Plan**
Hennepin County Sheriff's Office	Large	13 - 24 months
Washington County Sheriff’s Office	Large	13 - 24 months
Bloomington Police Dept.	Medium	12 months or less
Rice Steele 9-1-1 Center	Medium	12 months or less
St. Louis County Sheriff's Office	Medium	13 - 24 months

CAD 3-Year Replacement		
PSAP Name	**PSAP Size**	**Replacement Plan**
Becker County Sheriff's Office	Small	12 months or less
Benton County Sheriff's Office	Small	12 months or less
Carlton County Sheriff's Office	Small	13 - 24 months
Cook County Sheriff's Office	Small	13 - 24 months
Lake County Sheriff's Office	Small	12 months or less
Lincoln County Sheriff's Department	Small	13 - 24 months
Meeker County Sheriff's Office	Small	12 months or less
Rock County Sheriff	Small	24 - 36 months
Roseau County Sheriff's Department	Small	12 months or less

Table 63 outlines the amounts that ECN has spent on CAD Hardware and Software between 2012 and 2014.

Table 63 – ECN Spending on Hardware and Software 2012 - 2014

ECN PSAP 2012-2014 Funding Totals by Category					
	FY2012 Spending	**FY2013 Spending**	**FY2014 Spending**	**Total by Category**	**% of ECN Funding**
Hardware	$4,805,000	$2,710,719	$4,724,474	$12,240,193	28%
Software	$3,362,323	$3,109,124	$4,481,200	$10,952,647	25%

Thirty-nine PSAPs provided answers to the survey question asking them to identify the initial purchase and annual maintenance costs for their CAD systems. The data that they provided is shown in Table 64.

Table 64 – Reported CAD Costs

Reported CAD Costs			
PSAP Size	**PSAPs Reporting CAD costs**	**Reported CAD Costs**	**Avg. Reported CAD Cost**
Large (>15 seats)	1	$3,500,000	$3,500,000
Medium (5-15 seats)	13	$16,698,820	$1,284,525

Reported CAD Costs			
PSAP Size	**PSAPs Reporting CAD costs**	**Reported CAD Costs**	**Avg. Reported CAD Cost**
Small (< 5 seats)	25	$3,999,564	$159,983
Total Reported CAD Purchase	39	$24,198,384	
Total Reported CAD Annual Maintenance Costs		$2,312,853	

Table 65 shows Low, Mid and High price ranges for the purchase of CAD systems in today's overall market. These ranges reflect the fact that when PSAPs are purchasing software systems such as CAD, their requirements can vary greatly, from a relatively "no frills" product (Low Range) to one providing "all of the bells and whistles" (High Range). These "market prices" also appear to align well with the purchase pricing information provided by the PSAPs in Table 64.

Using the High Range value from Table 65 the estimated replacement costs for the PSAPs expressing an intent to replace their CAD systems could be as high as $26 million.

Table 65 – CAD replacement cost ranges

CAD Replacement Cost Ranges by Reported PSAP Size			
PSAP Size	**Low Range**	**Mid-Range**	**High Range**
Large (>15 seats)	$2,400,000	$3,200,000	$4,000,000
Medium (5-15 seats)	$800,000	$1,900,000	$3,000,000
Small (< 5 seats)	$200,000	$600,000	$1,000,000

FE also notes that of the 57 PSAPs that have not stated that they plan to upgrade or replace their existing CAD systems, 11 of those PSAPs purchased their CADs in 2002 or earlier, it is reasonable to expect that these PSAPs will also need to replace their aging CAD systems. The replacement cost for those CAD systems could be as high as $19 million.

4.3.3 Dispatch Console Replacement Plans

Only four PSAPs have plans to replace or upgrade their radio consoles. It is important to note that as the ARMER system continues to be upgraded, PSAPs will be required to upgrade their console systems to maintain compatibility with ARMER. The costs for these

console upgrades are not borne by MnDOT, but will fall to the PSAPs. Table 66 shows the funding that was provided to PSAPs by ECN for dispatch console replacements between 2012 and 2014. Table 67 shows the costs for purchase and maintenance of radio consoles by the PSAPs.

Table 66 – ECN Funding for Dispatch Consoles 2012 - 2014

ECN PSAP 2012-2014 Funding Totals for Dispatch Consoles					
	FY2012 Spending	**FY2013 Spending**	**FY2014 Spending**	**Total by Category**	**% of ECN Funding**
Dispatch Consoles	$1,540,313	$451,861	$504,419	$2,496,593	6%

Table 67 – Reported radio console costs

Reported Radio Console Costs	
Reported Radio Console Costs	$20,164,351
Reported Radio Console Annual Recurring Costs	$1,257,632

Table 68 lists the four PSAPs that reported plans to upgrade or replace their radio dispatch consoles.

Table 68 – PSAPs with planned console replacements

PSAPs with Planned Console Replacements				
PSAP Name	**PSAP Size**	**Positions**	**Current Manufacturer / Model**	**Planned Replacement**
Beltrami County PSAP	Small	4	Zetron® 4000 Series	12 months or less
Red River Regional Dispatch Center	Medium	12	Motorola Gold Elite	12 months or less
Wabasha County	Small	4	Motorola MCC 7500	12 months or less
Rock County Sheriff's Office	Small	2	Zetron® 4000 Series	24 - 36 months

4.3.4 Logging Recorder Replacement Plans

Thirteen PSAPs reported plans to upgrade or replace their logging recorder. Table 69 provides the distribution of these investments over the 3-year period from 2012-2014.

Table 69 – ECN Spending on logging recorders 2012 - 2014

ECN PSAP 2012-2014 Funding Totals for Recorder Category					
	FY2012 Spending	FY2013 Spending	FY2014 Spending	Total by Category	% of ECN Funding
Recorder	$770,885	$555,078	$941,538	$2,267,501	5%

Per the survey, PSAPs replaced 37 logging recorder systems from 2012 – 2014. Also, per the survey, 11 PSAPs purchased new logging recorders in 2015 and early 2016, which accounts for the discrepancy between tables 69 and 70. Table 71 summarizes PSAP plans to replace logging recorders.

Table 70 – Logging recorder reported costs

Logging Recorder Reported Costs	
Category	**Cost**
Reported Logging Recorder Costs	$3,262,860
Reported Logging Recorder Annual Recurring Costs	$427,295

Table 71 – Logging recorder replacement plans

PSAPs with Planned Logging Recorder Replacements			
PSAP Name	**PSAP Size**	**Current Manufacturer / Model**	**Planned Replacement**
Aitkin County Sheriff Office	Small	Higher Ground	12 months or less
Allina Health EMS-shared	Medium	Audiologger	12 months or less
Beltrami County PSAP	Small	Cybertech	12 months or less
Crow Wing County Sheriff's Office	Medium	N/A	12 months or less
Minneapolis Emergency Communications Center-MECC-Shared	Large	Capture 911	12 months or less
Morrison County Sheriff's Office	Small	N/A	12 months or less
Rock County Sheriff's Office	Small	Zetron®	12 months or less
Scott County	Medium	N/A	12 months or less
Marshall County	Small	Cybertech Pro	13 – 24 months

PSAPs with Planned Logging Recorder Replacements			
PSAP Name	**PSAP Size**	**Current Manufacturer / Model**	**Planned Replacement**
Norman County	Small	Nice	13 – 24 months
Wilkin County Sheriff's Office-shared	Small	Cybertech Myracle	13 – 24 months
Todd County Sheriff's Office PSAP-shared	Small	Eventide VR725	24 - 36 months

4.3.5 Administrative Telephone System Replacement Plans

Administrative phone systems could be affected by the upgrade / replacement of CPE by PSAPs. The converse is also true; a replacement of an administrative phone system could have cost implications for the CPE at a PSAP. Tables 72, 73, and 74 provide annual expenditures for administrative phone systems, a breakdown of capital costs and maintenance costs, as well as a list of PSAPs with plans to replace their administrative phone systems.

Table 72 – 2012-2014 funding for administrative phone costs

ECN PSAP 2012-2014 Funding Totals for Phone Category					
	FY2012 Spending	**FY2013 Spending**	**FY2014 Spending**	**Total by Category**	**% of ECN Funding**
Phone	$2,523,884	$2,542,877	$2,897,710	$7,964,472	18%

Table 73 – Administrative phone line costs

Administrative Phone Line Costs	
Reported Admin Telephone System Costs	$3,896,264
Reported Admin Telephone System Maintenance Costs	$134,937

Nine PSAPs reported that they plan to upgrade or replace their administrative phone system.

Table 74 – Administrative phone system replacement

PSAPs with Planned Administrative Phone System Replacements			
PSAP Name	**PSAP Size**	**Current Manufacturer / Model**	**Planned Replacement**
Hennepin County 911 Dispatch-shared	Large	Airbus	N/A
Anoka County Central Communications	Medium	N/A	12 months or less
Lake County PSAP	Small	N/A	12 months or less
Morrison County Sheriff's Office	Small	Cisco Business Addition	12 months or less
Mower County LEC	Small	Lucent	12 months or less
Ridgeview EMS Secondary	Small	Option 61	12 months or less
Winona County PSAP	Small	Avaya Affinity G3si	12 months or less
Martin County PSAP	Small	N/A	13 – 24 months
Minnetonka Police Department	Small	CISCO Unified Communicator	13 – 24 months

4.3.6 Emergency Notification System Replacement Plans

The ECN funding cycle 2012-2014, Table 75, shows an increase in the funding for Alert Systems, with the majority of that funding being allocated in the 2013 and 2014 funding years.

Table 75 – 2012-2014 Funding for Alert Systems

ECN PSAP 2012-2014 Funding Totals for ENS					
	FY2012 Spending	**FY2013 Spending**	**FY2014 Spending**	**Total by Category**	**% of ECN Funding**
Alert System	$340,858	$1,420,079	$1,549,650	$3,310,587	8%

Emergency Notification Systems (ENS) data reflects a trend toward a Software as a Service (SaaS) model. Software as a service (SaaS) is a software distribution model in which a third-party provider hosts applications and makes them available to customers

over the Internet. SaaS removes the need for organizations to install and run applications on their own computers or in their own data centers.

Thirty-nine counties provided ENS pricing information with an average one-time cost of approximately $20,000 per PSAP. Forty-three PSAPs reporting recurring costs for ENS systems with an average annual recurring cost per PSAP of approximately $14,000.

This model can shift costs from upfront capital expenditures to recurring service expenditures that will still be borne by the PSAP. Table 76 shows how those costs are distributed today.

Table 76 – ENS PSAP reported costs

ENS System Costs	
Reported ENS System Costs	$801,734
Reported ENS System Annual Recurring Costs	$664,071

Thirty-nine counties provided ENS pricing information with an average one-time cost of approximately $20,000 per PSAP. Forty-three PSAPs reporting recurring costs for ENS systems with an average annual recurring cost per PSAP of approximately $14,000.

Seven PSAPs reported plans to upgrade or replace their ENS system as shown in Table 77.

Table 77 – ENS replacement plans

PSAPs with Planned ENS Replacements			
PSAP Name		**Current Manufacturer / Model**	**Planned Replacement**
Minnetonka Police Department	Small	Everbridge	12 months or less
Ridgeview EMS Secondary	Small	Lynx	12 months or less
Meeker County Sheriff's Office	Small	N/A	12 months or less
Todd County Sheriff's Office PSAP-shared	Small	N/A	12 months or less
Aitkin County Sheriff Office	Small	CodeRed	13 - 24 months
Mower County LEC	Small	N/A	13 - 24 months
St. Louis County 911 Communications	Medium	N/A	13 - 24 months

4.4 NG9-1-1 Lifecycle and Funding Analysis Summary

Based on our analysis of the information provided by ECN and the PSAP survey, we find that 9-1-1 funding has been and remains in alignment with the needs of the PSAPs, even though it may not be able to meet all of the PSAPs funding needs.

We specifically identified the following trends:

- Funding from the 2012-2014 cycle is reflective of NG9-1-1 transition costs at the PSAPs and is a primary factor in the current NG9-1-1 readiness of Minnesota PSAPs, especially as it relates to CPE systems.
- The ongoing transition to NG9-1-1 will require continued funding support over the next 5 years at levels equal to or above funding levels of the 2012-2014 cycle.
- The amount of funding dedicated to CPE systems (hardware, software, phone) during the period from 2012 to 2014 demonstrates the amount of change that is occurring at PSAPs due to the transition to NG9-1-1.
- PSAPs CPE replacement, past, present and future is directly tied to NG9-1-1 and new capabilities like SIP and Text-to-9-1-1 for PSAPs. E9-1-1 funding support will need to continue, as the transition is incomplete. CPE alone may require upwards of $20 million in additional funding over the next 3 years.
- CAD upgrade/replacement cycles are independent of the transition to NG9-1-1 but costs to upgrade / replace CAD systems will require continued funding from both state and local levels consistent with funding in the 2012-2014 cycle.
- Anticipated costs for other supporting systems like ENS and dispatch consoles align with funding trends from the 2012-2014 funding cycle and will likely remain constant over the next 5-year funding cycle.
- Over the next 5 years, dependency on GIS staff to support operational NG9-1-1 data requirements at the PSAP will increase. This dependency will result in more GIS personnel being hired directly by PSAPs to support NG9-1-1 GIS data requirements.
- IT support costs, in particular cybersecurity costs, will increase over the next 5 years due to the increased IT requirements of operating NG9-1-1 at the PSAPs and the Minnesota 9-1-1 system overall.

- Funding for training at 5% of overall funding in the 2012-2014 cycle is a good indicator of the importance of training to the PSAPs in MN. Funding for training will need to increase as an overall percentage of funding as PSAPs transition to new systems, new tools and new process because of the transition to NG9-1-1.

- In the next 5 years, costs for systems that support PSAPs will shift from traditional stand-alone physical installations of equipment with large one-time costs to hosted or shared systems that can reduce initial capital costs but increase recurring costs.

- In the next 5 years, NG9-1-1 will bring new Software as a Service (SaaS) models to PSAPs for services like 9-1-1 call processing, and applications such as CAD. Over the long term individual PSAP costs for these systems will likely reduce as economies of scale are achieved.

    - SaaS delivery models that offer common applications and consistent processes to multiple PSAPs promotes inter-agency cooperation and the ability to work together when necessary

- The adoption of new technologies and changing service delivery models will continue to drive overall 9-1-1 technology replacement lifecycles well beyond the completion of the current transition to NG9-1-1 for as long as there are PSAPs in Minnesota.

    - The replacement lifecycle will change from replacing equipment every 5 years to being required to upgrade to the newest version of an application annually or on some well-defined schedule in order to provide access to new features or capabilities at the PSAPs.

    - These new services models will shift funding requirements away from paying for dedicated equipment needed to run an application housed locally, to paying for services that are remotely sourced and delivered and priced based on usage and subscription.

- Because the software and services used are increasingly “internet centric”, the new replacement lifecycles will likely be shorter, as equipment will need to be regularly upgraded to take advantage of new features and functionalities being offered by the vendors for the majority of PSAP systems.

Appendix A - Minnesota ECN PSAP Survey 2016

Minnesota ECN PSAP Survey 2016

Welcome to Our Survey

The State of Minnesota currently has 104 E9-1-1 capable PSAPs. With the onset of Next Generation 9-1-1 (NG 9-1-1) PSAPs will be required to transition to Internet Protocol (IP) based technologies that meet NENA i3 standards.

This transition will require the upgrade and/or replacement of 9-1-1 legacy technologies as well as supporting systems, resulting in an increase in capital expenditures as well as an increase in recurring costs for PSAPs. Furthermore, the manner in which 9-1-1 calls for service are delivered to the PSAP will require Geographic Information Systems (GIS) data to be compliant with NG 9-1-1 standards.

ECN is seeking the information requested in this survey in an effort to understand the current state of PSAP technologies (CAD/RMS/CPE/Logging Recorders/Radio Consoles), to identify the associated costs for upgrade and/or replacement of those technologies, along with the anticipated timeframe in which those upgrades and/or replacements will take place.

The information that you provide will aid the Sheriffs, PSAP management, and Emergency Communication Networks (ECN) in planning and budgeting for PSAPs to continue migration to NG 9-1-1 compatible technologies and explore new features and functionalities. More importantly, this information will be used to understand how this new technology impacts hardware and software upgrade frequency and the impact upon state and local budgets.

Minnesota ECN PSAP Survey 2016

PSAP Contact Information

Please provide the name and contact information for the person replying to this survey. Please also provide the physical address and primary phone number of the PSAP responding to this survey.

* 1. Survey Point of Contact

Name	
Title	
Agency	
Email Address	
Contact Phone Number	

* 2. PSAP Information

PSAP Name	
PSAP Address	
PSAP Address 2	
PSAP City/Town	
PSAP ZIP/Postal Code	
PSAP Main Number	

Minnesota ECN PSAP Survey 2016

PSAP Operational Information

* 3. How would you categorize the size of your PSAP?
(workstations are defined as capable of answering 911 calls, staffed or not)

- ◯ Small (4 total workstations or less)
- ◯ Medium (5 to 15 total workstations)
- ◯ Large (16 total workstations or more)

4. Do your telecommunicators perform other duties in addition to / while also answering 911 calls? (e.g. walk up windows, answering admin lines, jail duties, LE Reports, building access, security monitoring and Hot File Entry)

- ◯ Yes
- ◯ No

5. If yes, please list any additional duties performed by your telecommunicators.

6. Please identify the number of Supervisory staff at your PSAP

Authorized FTE's	
Full TIme	
Part Time	

7. Please identify the number of Telecommunicators (i.e dispatchers, calltakers) at your PSAP

Authorized FTE's	
Full TIme	
Part Time	

8. Does your PSAP have dedicated MSAG / GIS Support Staff?

- ( ) Yes
- ( ) No

9. Please select which of the following apply to your MSAG / GIS Support Staff

- [ ] Full time on site support provided by PSAP staff
- [ ] Part time on site support provided by PSAP staff
- [ ] Part time on site support provided by County IT department
- [ ] Full time remote support provided by other agency's staff
- [ ] Part time remote support provided by other agency's staff
- [ ] Full time on site support provided by a third party contractor or vendor
- [ ] Part time on site support provided by a third party contractor
- [ ] Full time remote support provided by a third party contractor or vendor
- [ ] Part time on site support provided by a third party contractor or vendor
- [ ] Other (please specify)

10. Does your PSAP have dedicated IT Support Staff?

- ( ) Yes
- ( ) No

11. Please select which of the following apply to your IT Support Staff

- [ ] Full time on site support provided by PSAP staff
- [ ] Part time on site support provided by PSAP staff
- [ ] Part time on site support provided by County IT department
- [ ] Full time remote support provided by other agency's staff
- [ ] Part time remote support provided by other agency's staff
- [ ] Full time on site support provided by a third party contractor or vendor
- [ ] Part time on site support provided by a third party contractor
- [ ] Full time remote support provided by a third party contractor or vendor
- [ ] Part time on site support provided by a third party contractor or vendor
- [ ] Other (please specify)

12. Has your IT staff either implemented or discussed the importance of implementing firewalls to protect your equipment from cyber security threats?

- ( ) Yes
- ( ) No
- ( ) Not Sure

* 13. Please provide the count of agencies your PSAP dispatches for

Police/Law Enforcement	
Fire (if Fire and EMS...report EMS below as well)	
EMS	
Other	

Minnesota ECN PSAP Survey 2016

PSAP Training

14. Does your PSAP have training programs planned for 2016?

- ○ Yes
- ○ No
- ○ Other (please specify)

15. Please list the PSAP training programs planned for 2016

16. If no training is planned for 2016, please state the reason why

17. What other training subjects or opportunities would be useful for your PSAP?

18. What type of training venue is most practical or beneficial for your PSAP?

- ○ On-Line
- ○ Regional hosted
- ○ Statewide hosted
- ○ Other (please specify)

19. Identify certifications that you think would be of value to your personnel

20. Do you believe that there should be recommended best practices established for calltakers / dispatchers in the State of Minnesota?

- ◯ Yes
- ◯ No

Minnesota ECN PSAP Survey 2016

PSAP NG9-1-1 Applications

The following sections of the survey are focused on the technical systems used by your PSAP.

Minnesota ECN PSAP Survey 2016

PSAP Technology Survey - CPE

21. Who is your Call Taking system provider (CPE)?
(e.g. Plant, Positron, CML)

22. What is the make and model of your CPE system?
(e.g. CML Patriot or Positron Viper)

23. What software version or hardware version of CPE do you have?
(e.g. Vesta 4, Sentinel 3.2)

24. How many call taking positions do you have?
(total, all seats including training/backup)

25. Who maintains your CPE equipment?
(e.g. CenturyLink)

26. What was the cost of your current CPE system?
(less maintenance)

27. What is the annual cost for CPE hardware / software maintenance?

28. When did you purchase your current CPE (MM/YYYY)?

29. Does your current CPE support Session Initiation Protocol (SIP) Connectivity?

- ( ) Yes
- ( ) No
- ( ) Don't Know

30. If No, when do you plan to migrate to SIP connectivity?

- ( ) 12 months or less
- ( ) 13 - 24 months
- ( ) 24 - 36 months
- ( ) Not currently planned

31. Do you have any plans to upgrade or replace your current CPE?

- ( ) Yes
- ( ) No

32. If yes, please select your CPE upgrade/replacement timeframe.

- ( ) 12 months or less
- ( ) 13 - 24 months
- ( ) 24 - 36 months
- ( ) Other (please specify)

[ ]

* 33. Does your PSAP plan to implement Text-to-911 services once the state selects a vendor and is ready to deploy this service?

- ( ) Yes, we plan to implement Text-to-911 Service
- ( ) No, we do not plan to implement Text-to-911 Service

Other (please specify)

[ ]

34. How soon would you like to deploy Text-to-911?

- ( ) immediately when the state is ready
- ( ) Not until several other PSAPs in the State have deployed and can provide an impact statement
- ( ) No plans at this time
- ( ) Other (please specify)

35. What method of Text-to-911 Service do you plan to deploy?

- ( ) Web Browser Application using an internet connected PC (not on my CPE)
- ( ) TDD/TTY using our current CPE system
- ( ) Message Switch Routing Protocol (MSRP) using our current CPE system

Other (please specify)

Minnesota ECN PSAP Survey 2016

PSAP Technology Survey - Radio Dispatch Consoles

36. Who is your Radio Dispatch Console system provider?
(e.g. Avtec, Harris, Motorola, Moducom, Zetron)

37. What is the make and model of your Radio Dispatch Console system?
(e.g. ACOM, Elite, Maestro)

38. What software version or hardware version of Radio Dispatch Console do you have?

39. How many Radio Dispatch Consoles do you have (total, all licenses)?

40. Who maintains your Radio Dispatch Console equipment?

41. What is the annual cost for Radio Dispatch Console hardware / software maintenance?

42. When did you purchase your current Radio Dispatch consoles (MM/YYYY)?

43. What was the cost of your current Radio Dispatch console system (excluding maintenance)?

44. Do you have any plans to upgrade or replace your current Consoles?

- ○ Yes
- ○ No

45. If yes, please select your Radio Dispatch Console upgrade/replacement timeframe.

- ○ 12 months or less
- ○ 13 - 24 months
- ○ 24 - 36 months
- ○ Other (please specify)

Minnesota ECN PSAP Survey 2016

PSAP Technology Survey - Computer Aided Dispatch (CAD)

46. Who is your CAD system provider?

47. What is the make and model of your CAD system?

48. What is the software version of your CAD system?

49. How many CAD workstations do you have (total, all licenses)?

50. Who maintains your CAD system equipment?

51. What is the annual cost for CAD hardware / software maintenance?

52. When did you purchase your current CAD system (MM/YYYY)?

53. What was the cost of your current CAD system?

54. Do you have any plans to upgrade or replace your current CAD system?

- ○ Yes
- ○ No

55. If yes, please select your CAD system upgrade/replacement timeframe.

- ○ 12 months or less
- ○ 13 - 24 months
- ○ 24 - 36 months
- ○ Other (please specify)

Minnesota ECN PSAP Survey 2016

PSAP Technology Survey - Logging/Recording System

56. Does your logging/recording system record both phone and radio traffic?

- ○ Yes
- ○ No
- ○ Don't know

57. If no, do you share a radio logging recorder with another agency?

- ○ Yes
- ○ No
- ○ Don't know

58. Who is your Logging/Recording system service provider?

59. What is the make and model of your Logging/Recording System?

60. What is the software version of your Logging/Recording System?

61. How many Logging/Recording licenses do you have (total, all licenses)?

62. Please identify the level of recording provided by your logging recorder.

- ☐ Records phone audio by position
- ☐ Records phone audio by trunk
- ☐ Records radio audio by position
- ☐ Records radio audio by channel / talkgroup

63. Who maintains your Logging/Recording System equipment?

64. What is the annual cost for Logging / Recording system hardware / software maintenance?

65. When did you purchase your current Logging/Recording System (MM/YYYY)?

66. What was the cost of your current Logging/Recording System?

67. Do you have any plans to upgrade or replace your current Logging/Recording System?

- ○ Yes
- ○ No

68. If yes, please select your Logging/Recording System upgrade/replacement timeframe.

- ○ 12 months or less
- ○ 13 - 24 months
- ○ 24 - 36 months
- ○ Other (please specify)

Minnesota ECN PSAP Survey 2016

PSAP Technology Survey - Administrative Phone System

69. Who is your Administrative Phone System service provider?

70. What is the make and model of your Administrative Phone System?

71. What is the software version of your Administrative Phone System?

72. How many Administrative Phone System end stations or licenses do you have (total, all licenses)?

73. Is your administrative phone system integrated with your 911 CPE?

- ○ Yes
- ○ No
- ○ Other (please specify)

74. Do you use your administrative phone system as a backup for your 911 calls?

- ○ Yes
- ○ No
- ○ Other (please specify)

75. Who maintains your Administrative Phone System equipment?

76. What is the annual cost for Administrative Phone system hardware / software maintenance?

77. When did you purchase your current Administrative Phone System (MM/YYYY)?

78. What was the cost of your current Administrative Phone System?

79. Do you have any plans to upgrade or replace your current Administrative Phone System?

- ○ Yes
- ○ No

80. If yes, please select your Administrative Phone System upgrade/replacement timeframe.

- ○ 12 months or less
- ○ 13 - 24 months
- ○ 24 - 36 months
- ○ Other (please specify)

Minnesota ECN PSAP Survey 2016

PSAP Technology Survey - Emergency Notification System

81. Does your PSAP use an Emergency Notification system?

- ( ) Yes
- ( ) No

82. If so, what is the make and model of your Emergency Notification System?

83. What is the software version of your Emergency Notification System?

84. How many Emergency Notification System stations or licenses do you have (total, all licenses)?

85. Who maintains your Emergency Notification System equipment?

86. What is the annual cost for Emergency Notification System hardware / software maintenance?

87. When did you purchase your current Emergency Notification System (MM/YYYY)?

88. What was the cost of your current Emergency Notification System?

89. Does your Emergency Notification System have an interface to FEMA's Integrated Public Alert and Warning System (IPAWS)?

- ( ) Yes
- ( ) No

90. Does your PSAP currently have access to / use the FEMA IPAWS notification system?

- ◯ Yes
- ◯ No

91. Does your PSAP plan to access / use the FEMA IPAWS notification system?

- ◯ Yes
- ◯ No

92. If your PSAP does NOT plan to access/use the FEMA IPAWS notification system, why not?

93. If yes, please identify when you plan to implement / begin using the FEMA IPAWS notification system.

- ◯ 12 months or less
- ◯ 13 - 24 months
- ◯ 24 - 36 months

94. Do you have any plans to upgrade or replace your current Emergency Notification System?

- ◯ Yes
- ◯ No

95. If yes, please select your Emergency Notification System upgrade/replacement timeframe.

- ◯ 12 months or less
- ◯ 13 - 24 months
- ◯ 24 - 36 months
- ◯ Other (please specify)

Minnesota ECN PSAP Survey 2016

Conclusion

96. Please identify expenses that are not allowable for purchase with the 911 funds that you feel should be considered allowable.

97. Thank you very much for taking the time to complete this survey. If you have any additional comments please list them here.