

Business Case for *Next Generation 9-1-1 Technology*

**Oregon Military Department,
Office of Emergency Management,
9-1-1 Program**

Date: January, 2013
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Business Case – Authorizing Signatures

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Executive Summary

The purpose of this Business Case is to identify the problems with the current 9-1-1 system in Oregon and address the topic of consolidation. This Business Case presents and recommends a solution to resolve these issues and prepare Oregon for the Next Generation of 9-1-1.

There is a misperception that 9-1-1 is the entire process of emergency dispatch and response. Many times, citizens will cite 9-1-1 as the response phase of an incident or, more likely, use it to refer to the entire incident. However, 9-1-1 is simply an easily remembered numeric that allows citizen entry into our emergency services. Once reported via 9-1-1, the actual 9-1-1 component is no longer viable in the continuum. Once the 9-1-1 information is received at the Public Safety Answering Point (PSAP) the call then flows into what is generically termed “dispatch.” As a formal function dispatch should not be confused with 9-1-1. At the very least dispatch involves determining the appropriate response matrix for a given incident at a given location, notifying (usually via radio) first responders, monitoring the incident as it progresses and finally contributing to the disposition of the call. More to the point, dispatch is always a function of local government wholly funded locally with current 9-1-1 surcharges supporting the 9-1-1 function only.

Oregon’s 9-1-1 service is funded through the Emergency Communications Tax. The funding distribution is split between 35 percent for network and equipment and 60.5 percent directly distributed to local entities for 9-1-1 call taking and processing. Four percent is used for the Office of Emergency Management, State 9-1-1 Program (OEM 9-1-1) administrative costs and up to .5 percent is used by the Department of Revenue for the collection of the Emergency Communications Tax. *This Business Case only addresses the 35 percent portion of the Tax. Dispatch functionality is not funded by the Emergency Communications Tax.*

Problem

The current 9-1-1 system operates on outdated analog technology that is near end-of-life, is increasingly expensive to maintain and cannot accommodate the need to receive and process a steadily increasing call-load from the modern digital communications devices used by our citizens. The current network cannot accommodate digital communications. The constant evolution of communications technology impacts the functionality of the 9-1-1 system and the public’s expectation of the system. Next Generation features available today with a digital network, such as the increased ability to handle and recover from disasters, obtain accurate caller location information, and enable applications such as text, video, and telematics, can greatly improve emergency response, meet public expectations and in turn, save lives.

Consequences of Failure to Act

Doing nothing and leaving the public safety of Oregon citizens to an antiquated analog system that is not compatible with modern communications technologies is not a viable option and quickly becomes cost prohibitive. The investment required to attain Next Generation 9-1-1 (NG9-1-1) deployment can be viewed as minimal as opposed to the alternative of missing emergency notifications from the public’s digital devices. In the case of an emergency seconds can mean the difference between life and death. This is a concern shared across the country, not just in the State of Oregon. Choosing to remain on the current network would be depriving the citizens and visitors of Oregon the highest level of public safety possible today.

Alternatives

This Business Case identifies three alternatives for the future of Oregon’s 9-1-1 system: 1) Status Quo, 2) NG9-1-1 network implementation for 48 PSAPs prior to organic PSAP consolidation and 3) Mandated regional call answering point consolidation prior to NG9-1-1 implementation.

The Status Quo alternative is offered to show the implications to the State of Oregon (State) if no action is taken to resolve the problems or embrace the opportunities introduced above. Remaining on the current analog network will increase State costs and hinder the public's ability to use new technologies to access 9-1-1. The current 9-1-1 call delivery model is being supported by the local telephone companies that continue to increase equipment and network costs for 9-1-1 services. The 9-1-1 equipment used on an analog network can provide a higher level of 9-1-1 service on a digital NG9-1-1 network.

Alternative Two describes the two-year migration of the State to a NG9-1-1 system. This migration will encourage on-going organic consolidation statewide. A NG9-1-1 network will allow PSAPs to share data and resources easily and efficiently – saving time and, consequently, lives in the event of an emergency. The NG9-1-1 system will provide a backup system that will meet the needs of the State now and is scalable to meet future needs such as the implementation of text, video and other data. The transition from analog to digital networks will involve a careful deployment process. This process includes the simultaneous operation of the two networks to prevent a degradation of service during the transition. Consolidation can be a natural progression of NG9-1-1. In addition to new technological capabilities, an Internet Protocol (IP)-based digital NG9-1-1 network will provide more flexibility to determine where PSAPs can geographically be located.

Alternative Three describes mandating the consolidation of 9-1-1 call taking functions (not dispatch functions) to nine regional call answering points before implementing a NG9-1-1 network. The existing PSAPs would stay in place, but only as local dispatching sites. When determining the optimal number of PSAPs for the State of Oregon, Kimball stressed the need to keep 9-1-1 call taking and dispatch functions together within each facility. The optimum number of recommended PSAPs within the Kimball *Consolidation Analysis and Next Generation 9-1-1 Implementation Study* was predicated on this assumption. If only 9-1-1 call taking functions are consolidated into regional call answering points, then *the recommended number of nine regional facilities no longer represents the most efficient or cost effective model*. Service level and life safety improvements have been achieved as the result of consolidation efforts across the country. However, many of these service level and life safety improvements are only possible if both call taking and dispatching functions remain together within each region. The overall impact of consolidating only the 9-1-1 call function statewide is an emergency communications system that is fractured and less effective. Additionally, attempting to consolidate on the analog network will pose technical roadblocks throughout the State.

Long Term Goals

The implementation of NG9-1-1 furthers the long term goals OEM 9-1-1 and other State level initiatives including the Governor's April 2012 10-Year Plan for Oregon, the State of Oregon Consolidated Plan 2011-2015, the OEM 9-1-1 Five Year Strategic Plan and Oregon's Enterprise Information Resources Management (EIRM) Strategy. OEM 9-1-1 intends to leverage existing State network resources and State facilities wherever possible to link each PSAP within the State with a high-speed secure and managed network. OEM 9-1-1 further intends to reap the benefits of its geographic information system (GIS) work that spans the past five years. Utilizing the standards that exist for NG9-1-1, State resources and the cooperation of local public safety, OEM 9-1-1 believes the ability to achieve NG9-1-1 is both realistic and advisable.

Risk Management

Legislative concepts were submitted for the upcoming 2013 Legislative Session that have the potential to impact this project in different ways.

- A legislative concept was submitted that would revise current statute ORS 403.200 Sec 4. (1) to extend the date of the 9-1-1 tax to sunset prior to January 1, 2026. The Tax for Emergency Communications is set to expire on January 24, 2014. If the 9-1-1 tax is not extended there will

be a loss of approximately 80 million dollars per biennium for Statewide Enhanced 9-1-1 (E9-1-1) services.

- Another legislative concept submitted by OEM 9-1-1 would increase the funds available for NG9-1-1 and any resulting consolidation. This legislative concept would amend current statutes to include the recovery of the existing Tax on Emergency Communications on prepaid wireless customers through providers of prepaid services. This is a source of funding for the E9-1-1 system that is not currently being realized and would be additional revenue that could be used to help fund the transition to NG9-1-1.
- A legislative concept was recently put forth by the Senate Veterans and Emergency Preparedness Committee that would grant the authority needed to OEM 9-1-1 to mandate consolidation. No authority exists within the current statutory framework to implement alternative three and mandate Statewide consolidation of 9-1-1 call taking. Mandating consolidation is a risk as it will cost the entire 9-1-1 community in Oregon heavily, including OEM 9-1-1, as detailed in the costs analysis. Building new facilities across the state for the consolidated call taking functions and buying new equipment would be a huge cost endeavor.
- Two Legislative Concepts were submitted by members of the Legislature which would prevent sweeps of the Enhanced 9-1-1 Subaccount. If sweeps of that account continue to occur, not only will there not be enough funding to implement NG9-1-1, but there will be no funding available to improve the 9-1-1 system at all. Essential services and response times will be negatively affected. Additionally, the State will continue to be ineligible for Federal 9-1-1 Grant funding.

Cost Analyses

Cost analyses were performed for each alternative and show that long term cost savings are only recognized with the implementation of NG9-1-1. There would be substantial financial implications to continue with the status quo and remain on the current analog network. OEM 9-1-1 as administrator of the Enhanced 9-1-1 Subaccount expends on average \$12.2 million per year for analog 9-1-1 services from this account. These costs are reflective of both tariffed and contracted expenses. The cost of the current analog network, which is a part of the 9-1-1 services, is approximately \$712,000.00 per year. The cost of the current network has increased on average 4.5 percent per year. This cost continues to rise every year.

Once the recommended NG9-1-1 alternative is fully implemented and operational, the Enhanced 9-1-1 Subaccount should recognize approximately \$5 million per year in savings for 9-1-1 services while costs would continue to rise in the current environment. The implementation of NG9-1-1 and any resulting consolidation would be funded exclusively by the Emergency Communications Tax and local funds under the current statutory structure. No State-appropriated General Funds would be required for NG9-1-1 implementation. Current estimates place the initial investment at approximately \$4.23 million with an ongoing obligation of approximately \$7.2 million per year. When compared to the costs of the current system of approximately \$12.12 million per fiscal year, a NG9-1-1 system reduces costs while providing increased functionality.

Alternative Three does not include the price of transitioning to a NG9-1-1 network. The costs provided are an estimate to implement a single regional call answering point (as one of the nine regional call answering points); it is also important to note that all current carrier network charges, such as selective routers, would still be applicable in this environment and are not included in this cost estimate. Current estimates place the initial investment for CAMA trunks to route all calls in the region to the consolidated call center at \$378,000 - \$420,000 with \$78,000 - \$120,000 of recurring costs. Additionally, the Emergency Communications Tax would have to cover the costs of building facilities for the regional call answering points. The following table provides estimated costs for new construction of new facilities

based upon each of the nine recommended regions' workstation needs. It is important to note that page 38 of this document lists the assumptions needed to further understand these estimates.

Number of Workstations	Square Footage/ Workstations	Building Square Footage	Cost Square Foot	Total Estimate
5	1,000	5,000	\$350	\$1,750,000
7	1,000	7,000	\$350	\$2,450,000
9	1,000	9,000	\$350	\$3,150,000
12	1,000	12,000	\$350	\$4,200,000

Table 1—Estimated Construction Costs

As a result of the current statutory structure, neither OEM 9-1-1 nor the State has authority to recognize any of the cost savings achieved with consolidation, whether consolidation occurs organically at local levels, or by State mandate. It would be prohibitively expensive to consolidate PSAPs in the current current environment due to existing telephone company tariffs and technology roadblocks. Any money spent on consolidating PSAPs in the current environment would take away from the funds available to implement NG9-1-1 as costs to maintain the current 9-1-1 services are continually increasing. If Oregon were to transition to a NG9-1-1 network after consolidating to nine regional call centers there would be an additional expense to replace equipment and technology once again.

Recommendation

Kimball recommends that the State of Oregon move forward with Alternative Two to transition to a NG9-1-1 network and foster organic consolidation of PSAPs across the state. In order to provide a level of service that meets the expectations of Oregon's citizens and to keep up with technological changes, Oregon PSAPs need an end-of-lifecycle technology replacement to convert the analog 9-1-1 system to an IP-enabled digital broadband network that will provide enhanced functionality throughout the state. The implementation of NG9-1-1 will result in an environment that more efficiently utilizes the Emergency Communications Tax funds and may eventually result in a natural consolidation of PSAPs in the State.

Background

In reference to the information provided in this document, it must be noted that it addresses only the 9-1-1 call flow and the systematic processing of that emergency call from caller to telecommunicator. No discussion has been included that references the local dispatching of the call to the emergency responders. The State of Oregon has no authority or jurisdiction to determine the local dispatching protocol. Dispatching is the responsibility of the local authority.

The Current Oregon 9-1-1 Environment

Current 9-1-1 systems were developed using 1960s technology and were designed to handle wired landline calls on analog telephone systems. These legacy systems have served their purpose for the last four decades; however, communications technologies that are used to call 9-1-1 have changed dramatically over the last 15 years and continue to change rapidly.

Figure 1 demonstrates the wireline 9-1-1 call flow on the current analog network. In Figure 1 the voice-only call goes over an analog telephone circuit to the PSAP controller. The location information data arrives at the PSAP via a separate path. While the outline for a digital IP network is similar, the new system could transport not only voice but also text, photos, video and data along with the voice.

Wireline 9-1-1 Functional Components

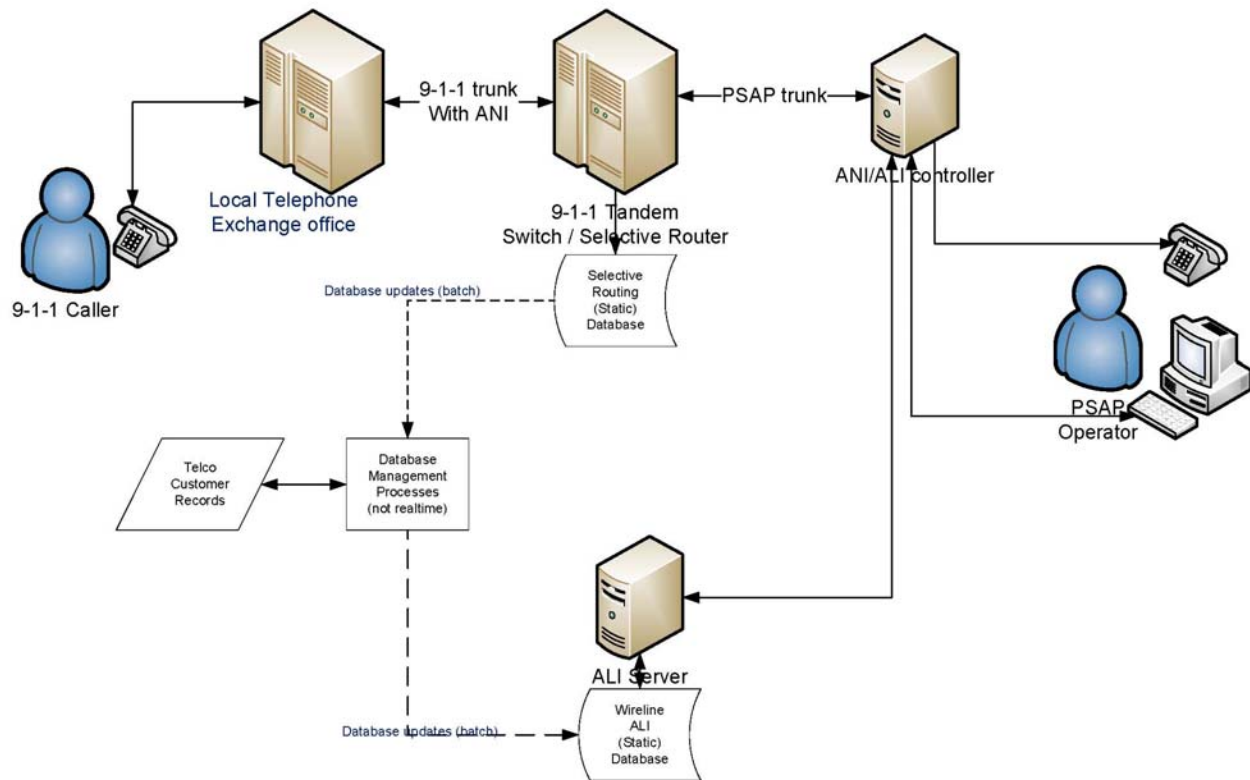


Figure 1—Current Wireline Call Flow Process

Oregon’s 9-1-1 environment is controlled by the regulated division of the local telephone companies. Tariffs are in place that set pricing for 9-1-1 services and associated databases. Since 1996, the local telephone companies have split service offerings into regulated (tariff) and unregulated offerings. Services can be either contracted through the unregulated section of the telephone company or the regulated (tariff) service offerings. Telephone companies operate within fixed geographic locations within defined local access and transport area (LATA) boundaries.

This issue of LATA boundaries causes problems with consolidation planning. Consolidating call centers on the current analog system can prove difficult if LATA boundaries must be crossed. Transport of calls and associated information required to locate 9-1-1 emergency callers across LATA boundaries currently in place will require inter-LATA circuits. The tariffed inter-LATA circuits are priced much higher than circuits within the LATA.

The traditional wired home telephone which falls within these LATA boundaries has been and continues to be replaced by wireless cellular phones and Voice over IP (VoIP) phones. The volume of 9-1-1 calls from wireless devices continues to increase. In 2010, Federal Communications Commission (FCC) Chairman Julius Genachowski stated that almost 70 percent of calls made to 9-1-1 were from mobile

phones.¹ An overlay was developed to be able to deliver wireless 9-1-1 calls over wired systems. This overlay added expense and created additional steps for 9-1-1 telecommunicators. Wireless technology in Oregon was implemented in two phases. Phase I delivers the wireless 9-1-1 call to the correct PSAP with the caller's phone number and the caller's cell tower location. Phase II includes the longitude and latitude (X, Y coordinates) of the caller's location along with the Phase I data. Today, each PSAP in Oregon is capable of receiving wireless Phase II data direct from the wireless service provider. Figure 2 below demonstrates the wireless 9-1-1 call flow process.

Wireless 9-1-1 Functional Components

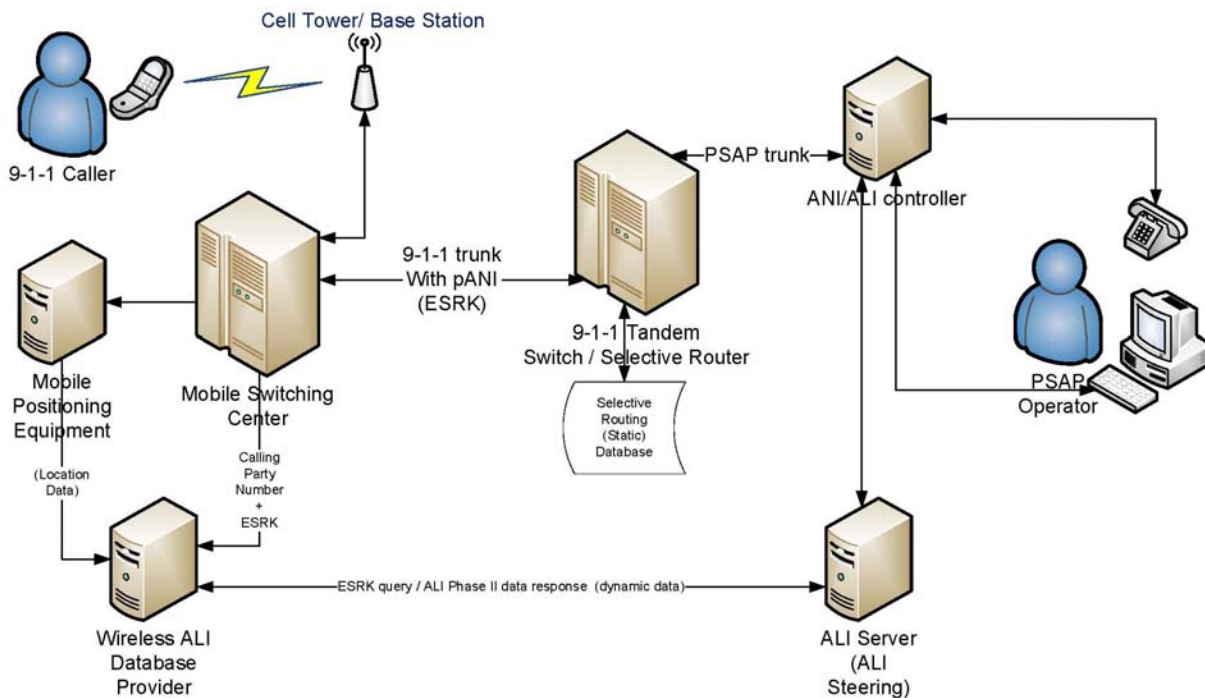


Figure 2—Current Wireless Call Flow Process

The Department of Justice recognized that the Deaf and Hard of Hearing community relies heavily on cell phone text messaging as their primary means of non-face-to-face communications and is considering revising the requirements for direct, equal access to 9-1-1 centers for individuals with disabilities to reflect changes in telecommunication technology.² Currently, analog telecommunications devices for the deaf/teletypewriters (TDD/TTY) are the primary way for the Deaf and Hard of Hearing to access 9-1-1. These devices operate over analog circuits and use telephone handsets to communicate over dial up telephone lines. The telephone handset is placed on top of the device after 9-1-1 is dialed.

¹ See Statement of Julius Genachowski, http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-10-200A2.pdf.

² See Nondiscrimination on the Basis of Disability in State and Local Government Services; Accessibility of Next Generation 9-1-1, 75 Fed. Reg. 43446 (Jul. 26, 2010).

Figure 3 below is a picture of a TDD/TTY machine to illustrate the antiquated technology that is still being used today on the analog network.



Figure 3—TDD Machine

National NG9-1-1 Planning

In order to address many of these public safety communication issues, a next generation of public safety networks has been in discussion at the national level for many years. In December 2005, the FCC's National Reliability and Interoperability Council VII published a report describing the future 9-1-1 system. Since then, the National Emergency Number Association (NENA) has worked with 9-1-1 professionals and technology industries to determine the needs, solutions and standards for what has become known as NG9-1-1. Next Generation 9-1-1 will allow 9-1-1 "calls" from multiple devices and technologies, and provide a new mission critical, redundant yet flexible system to serve 9-1-1 now and into the future. The central theme of NG9-1-1 is a digital network that will allow PSAPs to receive text, video, photos and data, in addition to voice.

Currently, at least 33 states are either in the planning or implementation process for migration to NG9-1-1. Programs within the U.S. Department of Transportation (USDOT) and FCC support the efforts of these states, encouraging states to work together on intra-state and inter-state levels in an effort towards NG9-1-1.

Office of Emergency Management Overview

OEM 9-1-1 has a responsibility to all citizens and visitors of Oregon to assure effective and efficient 9-1-1 service throughout the state. OEM 9-1-1 provides administration of the legislative mandate for Statewide E9-1-1 telephone services that allow uniform, prompt, and efficient access to public and private safety services for the citizens of, and visitors to, the state of Oregon. OEM 9-1-1 was established by the 1981 Oregon Legislature (ORS 403.100 – 403.380), its primary mission is to ensure the seamless operation of the Statewide E9-1-1 system. OEM 9-1-1 is responsible for the continual coordination and management of the network necessary to deliver 9-1-1 calls, the customer premise equipment (CPE) used by the PSAPs to process those calls, as well as consulting and assisting local governments with the challenges faced in the delivery of and participation in the Statewide E9-1-1 emergency reporting system³.

³ Oregon Emergency Management State 9-1-1 Program, <<http://www.oregon.gov/OMD/OEM/OR911/911program.shtml>> (last accessed 2/3/2011)

A 9-1-1 Advisory Committee (Committee) provides OEM 9-1-1 with input from the 9-1-1 community. The Committee consists of PSAP representatives, local exchange carrier representatives, and representatives from Oregon chapters of NENA and Association of Public Safety Communications Officials (APCO). While OEM 9-1-1 is responsible for final decisions, Committee recommendations are taken into consideration when planning and implementing OEM 9-1-1's projects, creating and reviewing OEM 9-1-1's policies, and creating and revising OEM 9-1-1 objectives.⁴

Office of Emergency Management NG9-1-1 Implementation Project

OEM 9-1-1 is currently taking steps toward implementing NG9-1-1 throughout the State. OEM 9-1-1 NG9-1-1 implementation project has been established to improve the level of 9-1-1 system service across the state. OEM 9-1-1 has taken many steps, including working with Kimball to produce two studies, the *Next Generation 9-1-1 Cost Analysis*, and the *Consolidation Analysis and Next Generation 9-1-1 Implementation Study*, phase one and two, respectively. These studies served as preliminary steps towards determining what was feasible for the State of Oregon in terms of NG9-1-1 and consolidation. These reports support the analysis included in this business case. The phase one and two studies may be utilized in the future to aid in planning how a transition to NG9-1-1 can occur and may serve as a starting point for a full consolidation planning. The State is proactively pursuing a transition to a NG9-1-1 system. A Request for Information (RFI) was released in July 2012 and the State is researching the optimal number of PSAPs needed in the State per the budget note.

OEM 9-1-1 has involved stakeholders in initiatives that impact the system. For this project, OEM 9-1-1 staff has coordinated meetings in cooperation with the state chapters of NENA and APCO to address issues concerning the technology upgrade to NG9-1-1. These organizations are composed of PSAP managers, PSAP employees, training managers and other PSAP employees from across the State.

OEM 9-1-1 Policy Package 303 requested a new OEM 9-1-1 staff position that would plan the development of NG9-1-1 in the State and be the resident expert on NG9-1-1. The creation of this position would allow existing staff to focus their efforts on their traditional duties. The primary responsibility of the NG9-1-1 Program Manager would be to manage the NG9-1-1 deployment and implementation project for OEM 9-1-1. This position would be the single point of accountability for project delivery and escalations in support of the NG9-1-1 project. This staff member would be responsible for the overall success of planning and implementing the project that meets stakeholder needs and typically supports the initiatives of the NG9-1-1 Program. The NG9-1-1 Program Manager would be responsible for the overall direction, coordination, implementation, execution, control and completion of the NG 9-1-1 project ensuring consistency with OEM 9-1-1's strategy, commitments and goals.

9-1-1 Funding in Oregon

In Oregon, 9-1-1 is currently funded by an Emergency Communications Tax of \$0.75 per device or per circuit per month. No state-appropriated General Funds are used to pay for 9-1-1 costs—only funds from the Emergency Communications Tax and local monies. The distribution of the funds generated from the Emergency Communications Tax to the 9-1-1 jurisdictions is approximately 25 percent of the total resources needed to operate a PSAP. The remainder of 9-1-1 funding for a respective PSAP is funded through various local sources depending on the locality.⁵ More information about 9-1-1 funding in Oregon can be found in Appendix A.

OEM 9-1-1 administers the fund distribution from the Emergency Communication Tax. OEM 9-1-1 recently submitted a legislative concept requesting to extend the Emergency Communications Tax that expires on January 24, 2014, to January 2026. Funding from the Emergency Communications Tax is

⁴ Ibid, http://www.oregon.gov/OMD/OEM/OR911/911_advisory_committee.shtml (last accessed 2/3/2011)

⁵ Ibid, 403.235

the sole funding source for OEM 9-1-1. Without those funds, Oregon would lose 9-1-1 leadership and the centralized ability to execute maintenance and advancement of the 9-1-1 system. This funding is essential to implementing a NG9-1-1 system and may provide incentives for PSAP consolidation in the future. Successful passage of this legislative concept is vital to advancing NG9-1-1.

Problem or Opportunity Definition

Problem

The current 9-1-1 system operates on outdated technology that is increasingly expensive to maintain; and cannot accommodate the need for a more robust and flexible system to allow the public greater access to 9-1-1.

Public Expectation

The constant evolution of communications technology impacts the functionality of the 9-1-1 system and the public's expectation of the system. In many cases, the general public is unaware of the limitations of today's 9-1-1 system and those limitations largely impact groups that rely on new forms of communication. Texting and video messaging and social media are the favored means of communication for many young people and members of the Deaf and Hard of Hearing community. Recent incidents, including the 2007 Virginia Tech shootings where students tried to text 9-1-1 for help, underscore the technology limitations of the current 9-1-1 system and the need for a more robust and flexible 9-1-1 communications system.

Outdated System

Oregon's PSAPs operate with technology that is outdated on an analog voice network that provides basic location identification services, but cannot provide Next Generation services that are based on new technologies. Public Safety Answering Points do not have the data sharing capabilities on the current analog network that are often needed in emergency situations. Oregon's PSAPs cannot accept essential data or transfer this data between centers over the antiquated analog infrastructure. The analog system is not designed for continuity of operations in the event of a natural disaster, such as a tsunami.

Opportunity

A NG9-1-1 network has more enhanced features than the current network and would position the State to accept new applications such as text, video, photos, data, social media and telematics as they become available for use. These applications will be beneficial to 9-1-1 call takers, but do not work with the current network. For example, in a NG9-1-1 environment a 9-1-1 caller could take a photograph of a person or license plate and transmit that photograph to the call taker at the time of the 9-1-1 call. The call taker could then share the information with emergency responders in their jurisdiction, surrounding counties or statewide. Public Safety Answering Points could also have the ability to share crash data with emergency responders and send that information to nearby hospitals. Given that it is likely that the ability to receive text, video, photos and data from 9-1-1 calls will become the new service level standard, it is Kimball's opinion, that PSAPs that do not employ Next Generation technology may be considered to be providing sub standard service resulting in the potential for increased liability.

Opportunity to Benefit the Citizens of Oregon

All citizens of Oregon would benefit from the increased functionality and level of service of a NG9-1-1 system. However, there are several identified at-risk populations in the State who will see exceptional benefits from the features that NG9-1-1 offers. One at-risk area is the population that resides on the Pacific coast of Oregon. The tsunami risk along the coast makes emergency planning and communication challenging and extremely important. A tsunami has the possibility of taking out local telephone offices and multiple PSAPs in the same area. The NG9-1-1 digital network will be completely redundant and diversly located. If an event happens on the Pacific coast, equipment inland

can facilitate 9-1-1 emergency communications. While local telephone offices and landline communications may be down in a specific local area, the 9-1-1 network will still function for cell traffic where it is available in those areas. Emergency calls from the impacted area can be automatically re-routed to other operational PSAPs with a NG9-1-1 network. For this reason, PSAP backups, information transferring, and call re-routing in the event of a tsunami are a real concern. NG9-1-1 technology will improve the functionality of the 9-1-1 system to accomplish all of these goals.

Providing equal access to emergency services for people with disabilities continues to be a driving factor for the implementation of NG9-1-1 and Federal lawmakers have begun to address this issue. The Twenty-First Century Communications and Video Accessibility Act of 2010 (CVAA) required the FCC to take various steps to assure that individuals with disabilities have access to emerging communications technologies in the 21st century. The FCC established the Emergency Access Advisory Committee (EAAC) in accordance with the CVAA for the purpose of achieving equal access to 9-1-1 emergency services by individuals with disabilities as part of the migration to NG9-1-1. The EAAC recommended that features, functions and capabilities are implemented that enable individuals with disabilities to make multimedia NG9-1-1 emergency calls. Surveys of individuals with disabilities showed that those individuals would prefer to use familiar technologies and methods, such as text/ audio/video communication, when calling in an emergency and therefore want and need to be able to access NG9-1-1 from the same devices they will use every day.⁶

When a NG9-1-1 system is implemented, individuals with disabilities could have the capability to communicate with PSAPs via messaging and video once the solutions are commercially available. Advances in technology allow cell phone text messaging, but the individuals with disabilities cannot currently use any form of Smartphone messaging to PSAPs within Oregon; this could change in a NG9-1-1 environment.

Opportunity to Further Statewide Policies and Plans

The implementation of NG9-1-1 would align with Oregon statutes. It is the policy of the State of Oregon, as found in ORS 403.100, to; “Ensure that a secure conduit is available for emergency communications and public safety networks in all Oregon communities,” and to “Support redundancy of critical telecommunications assets in order to ensure homeland security protections in the state.”⁷ The opportunity exists for Oregon to transition to NG9-1-1 and further this policy. The implementation of NG9-1-1 would present the opportunity to further the goals of several State-level plans including Oregon’s April 2012 10-Year Plan for Oregon, the State of Oregon Consolidated Plan 2011-2015, the OEM 9-1-1 Five Year Strategic Plan and Oregon’s EIRM Strategy.

A NG9-1-1 network would allow for the Statewide sharing of emergency information and Statewide coordination that Oregon’s *Safety Policy Vision* seeks to implement. The *Safety Policy Vision* is set out in the Governor’s April 2012 10-Year Plan for Oregon Project (Plan). The strategy promotes the continuous improvement and coordination of information to enhance the management of public safety resources across the state. According to the Plan, this coordination will involve the development of modern, common communication system protocols focused on the ability to share information in real-time on a Statewide basis. Oregon’s current 9-1-1 system is fragmented just by the nature of the analog system on which it runs and the State recognizes in the Plan that coordinated data and communication investments are critical to breaking down fragmented and duplicative systems.⁸

⁶ *Emergency Access Advisory Committee Report and Recommendations*, Federal Communications Commission (Jan. 26, 2012).

⁷ ORS 403.100

⁸ Ten-Year Plan for Oregon Project, *Safety Policy Vision*, 15 (April 2012).

The transition to a NG9-1-1 network would implement portions of Strategy 3.2 of the Plan, which is to “Develop and coordinate shared public safety data and real time communication systems to increase the capability and responsiveness of all public services to protect citizens in their communities.” The State’s strategy includes the coordination of an effective and efficient 9-1-1 emergency response system that seamlessly integrates the most current technology and allows citizens to send text, images, video and data to PSAPs.⁹ OEM 9-1-1’s goals to implement a NG9-1-1 network would make the integration to current technologies possible in Oregon.

The Plan’s ten year outcome for Strategy 3.2 is to increase the ability to communicate by repairing and modernizing public safety communications systems Statewide and fostering interoperability between State and local systems.¹⁰ A NG9-1-1 network would modernize the current analog system and facilitate interoperability between PSAPs.

A NG9-1-1 network will provide improvements that align with the priorities of the OEM 9-1-1 Five-Year Strategic Plan including reliability, security, disaster recovery, cost efficiencies, information exchange and financial security. The following goals from the Five-Year Strategic Plan would be supported by an investment in a NG9-1-1 network:

- Goal A: Enhance the quality of the statewide 9-1-1 answering system to assure that all citizens and visitors have access to public safety answering services that are reliable, redundant, secure and diverse
- Goal B: Enhance network capabilities Statewide for emerging technologies, disaster recovery, and multi-jurisdictional cost efficiencies
- Goal C: Enhance the communication and information exchange between OEM 9-1-1 and public safety agencies and strengthen relationships with Oregon’s public safety communications community
- Goal D: Assure the financial stability of OEM 9-1-1 and public safety communications systems to sustain their long-term viability as state-of-the-art communications networks

The current analog network environment, which is currently the status quo in the State of Oregon, does not align with the goals as stated in the OEM 9-1-1 Five-Year Plan. The current analog network works against these goals in several ways. Goals A, B, and C speak to increased reliability of the network and the ability for enhancements to the network; the current analog network does not promote these ideas. Due to the nature of analog technology, there are not many opportunities for enhancements to its features or its reliability. Goal D discusses financial stability of OEM 9-1-1 and public safety communications system. In the long-term, the current analog network does not support this goal. The cost of the current network has increased on average 4.5 percent per year. This cost continues to rise every year. Chart 1 on page 19 depicts the current network costs continuing to rise as they have over the past several years. Once a NG9-1-1 network is implemented and the analog network is completely transitioned out, the State will realize cost savings over the next ten years, as discussed in the Alternatives section of this document. The funds for this NG9-1-1 project would come from the Emergency Communications Tax and are available for NG9-1-1 implementation. Today, the Enhanced 9-1-1 Subaccount is paying more money every year for fewer capabilities on the current system than what a NG9-1-1 network would provide for less money.

In the State of Oregon Consolidated Plan 2011 – 2015, the State is preparing to utilize social media, per Department of Justice (DOJ) recommendations, to cater to special needs populations and all citizens in the event of an emergency. There are many concerns revolving around the discussion of how to utilize social media to provide for public participation in public safety across the state. The NG9-1-1 environment aligns with the goals of this plan by allowing for these social media capabilities

⁹ *Ibid* 16.

¹⁰ *Ibid* 17.

once policies and procedures are in place identifying the most safe and effective use of social media in PSAPs to assist in an emergency.

Additionally, the implementation of NG9-1-1 in Oregon presents the opportunity to further the goals of the EIRM Strategy. The purpose of the 2010-2015 EIRM Strategy is to: Establish a shared vision to guide the use of information resources across state government, provide a roadmap for a productive, multi-agency approach to information resource management and assure stakeholders have a continuous understanding of the shared value that is derived from state government's use of information resources. The EIRM sets out goals to create efficiencies by strengthening strategic Governance, optimizing resources and innovating service delivery. The implementation of NG9-1-1 focuses on the same goals for the 9-1-1 system throughout Oregon. Sharing data between PSAPs and sharing a network across the State will strengthen the Governance of the system, optimize the resource investments by sharing services and provide an innovative, more efficient and effective means of providing public safety to the citizens of Oregon. All of these points directly align with the purpose and goals of EIRM.

Pursuant to OEM 9-1-1's mission and the State's policy to provide a secure conduit for emergency communications and to support redundancy of critical telecommunications assets,¹¹ OEM 9-1-1 is currently working toward implementing NG9-1-1 throughout the state of Oregon. OEM 9-1-1 has already taken many steps including working with Kimball to produce two studies: the phase one *Next Generation 9-1-1 Cost Analysis* and the phase two *Consolidation Analysis and Next Generation 9-1-1 Implementation Study*, as well as additional consultation for a NG9-1-1 Request for Proposal (RFP). Funding from the Emergency Communications Tax is available for this initiative and has been allocated to support the technology transition toward NG9-1-1. No further State-appropriated General Funds are necessary to fund this initiative. OEM 9-1-1 hopes to continue to garner approval to execute its plan to bring Oregon's 9-1-1 system into the next generation.

NG9-1-1 Presents the Opportunity to Consolidate

Consolidation may be a natural progression of NG9-1-1. A new digital NG9-1-1 network will not only give PSAPs more technology capabilities, but will also provide more options regarding their geographical location and the number of PSAPs needed throughout the State. Calls can be routed anywhere in the State on an IP network, regardless of the caller's location. Additional information and discussion can be found in the Alternative Two section of this analysis.

Assumptions and Constraints

Kimball assumed that all information collected from the State and PSAPs was correct and accurate.

There will be no change in the \$0.75 per device per month Emergency Communications Tax, positive or negative.

Budgetary pricing of the NG9-1-1 network was based on analysis of costs in three other similar sized states with similar sized networks and state contract pricing.

Specific assumptions for the NG9-1-1 network pricing based on implementation timelines of various components are spelled out within the Alternative Two NG9-1-1 Transition and Organic Consolidation section.

¹¹ See, ORS 403.100.

Kimball assumed that the cost of the current network would continue to increase 4.5 percent per year.

Within the *Report for Consolidation Analysis and Next Generation 9-1-1 Implementation Study* Kimball based the optimum number of PSAPs on the assumption that 9-1-1 call taking and dispatch functions would be kept together within each facility.

The Alternative Three analysis is based on the following best case assumptions:

- All regional call answering points are willing participants.
- A facility exists that can expand sufficiently to accommodate the new call center without extensive renovations.
- Either a neighboring regional call answering point can serve as the backup or a facility is available to establish a cold backup center.

The Alternative Three analysis is based on the following worst case assumptions:

- All regional call answering points are not willing participants.
- A facility does not exist that can expand sufficiently to accommodate the new regional call answering point. New construction is necessary.

Kimball assumed the following for the Alternative Three analysis:

- Political support to form these nine regions was present.
- A facility large enough to house each regional call answering point exists or could be built.
- Other critical technology and systems would be upgraded to accommodate a regional call answering point or an appropriate replacement would be procured.

Solution Selection Methodology and Criteria

Criteria

The solution for the State of Oregon must meet the following criteria:

1. Improve 9-1-1 service across the state
 - Increase data sharing capabilities (9-1-1 call takers and first responders)
A NG9-1-1 network will allow 9-1-1 call takers to forward information available to them such as photos, crash data and video to first responders.
 - More accurate caller location information
Calls can be routed to the correct PSAP based on their actual geographical location (X/Y routing). The routing moves away from a tabular database and becomes a GIS database.
 - Ability to reroute calls in the event of a local or regional disaster
A digital network would enable call delivery and backup to any PSAP in the state, and would allow the backup PSAP to receive the additional information needed to process the 9-1-1 calls.
2. Provide long term stability as future technologies emerge
 - Increased ability to access 9-1-1 through text, picture, video, etc.
 - Ability to share pictures and video with first responders while enroute to an incident
3. Meet public expectations of public safety such as texting to 9-1-1, video, photos and social networking access to 9-1-1
4. Provide cost efficiencies to allow for applications, such as mapping, to be shared by multiple agencies
5. Comply with the OEM 9-1-1 Five-Year Strategic Plan
 - Goal A: Enhance the quality of the statewide 9-1-1 answering system to assure that all citizens and visitors have access to public safety answering services that are reliable, redundant, secure and diverse
 - Goal B: Enhance network capabilities statewide for emerging technologies, disaster recovery, and multi-jurisdictional cost efficiencies

- Goal C: Enhance the communication and information exchange between OEM 9-1-1 and public safety agencies and strengthen relationships with Oregon’s public safety communications community
 - Goal D: Assure the financial stability of OEM 9-1-1 and public safety communications systems to sustain their long-term viability as state-of-the-art communications networks
6. Support Oregon’s Safety Policy Vision that is set out in the Governor’s State of Oregon April 2012 10-Year Plan for Oregon Project
 - Statewide sharing of emergency information
 - Statewide coordination that Oregon’s *Safety Policy Vision* seeks to implement
 7. Supports the policy of the State of Oregon, as found in ORS 403.100, to; “Ensure that a secure conduit is available for emergency communications and public safety networks in all Oregon communities,” and to “Support redundancy of critical telecommunications assets in order to ensure homeland security protections in the state.”

Table 8 located in the Recommendation and Conclusions section on page 42 of this document depicts how each alternative meets or does not meet the solution selection criteria of this Business Case Analysis.

Solution Selection Methodology

Each alternative was evaluated against the following set of goals for the State of Oregon.

1. A Next Generation digital interconnected network is implemented across the State. Call takers, first responders, and citizens are able to realize the immediate and long term benefits of a NG9-1-1 network as discussed in the alternatives section.
 - Enable calls to be re-routed in the event of a disaster
 - Call data delivered along with call in the event of alternative routing
 - Standardized call delivery formatting (text, photos, video, data)
 - System is fully redundant
 - System is scalable and adaptable to new technology
 - PSAP interoperability
2. Organic PSAP consolidation is encouraged and nurtured throughout the state to achieve an optimum number of PSAPs. The nine regional centers model discussed in this business case would provide an effective level of emergency communications and produce cost efficiencies. The final configuration may differ from the nine regional centers model once all variables at the local level are considered, however the state working with the locals and allowing organic consolidation, along with a transition to NG9-1-1 will yield an increased level of service and cost efficiencies.
3. Long term cost efficiencies

Alternatives Analysis

Alternatives Identification and Cost Benefit Analysis

OEM 9-1-1 has identified three alternatives for the implementation of NG9-1-1 and future PSAP consolidation within the State. As illustrated below, the three alternatives are: 1) status quo, 2) NG9-1-1 network implementation for 48 PSAPs prior to organic PSAP consolidation, and 3) mandated regional call answering point consolidation prior to NG9-1-1 implementation.

Figure 4 on the following page depicts the decision process of the phased three-alternative approach.

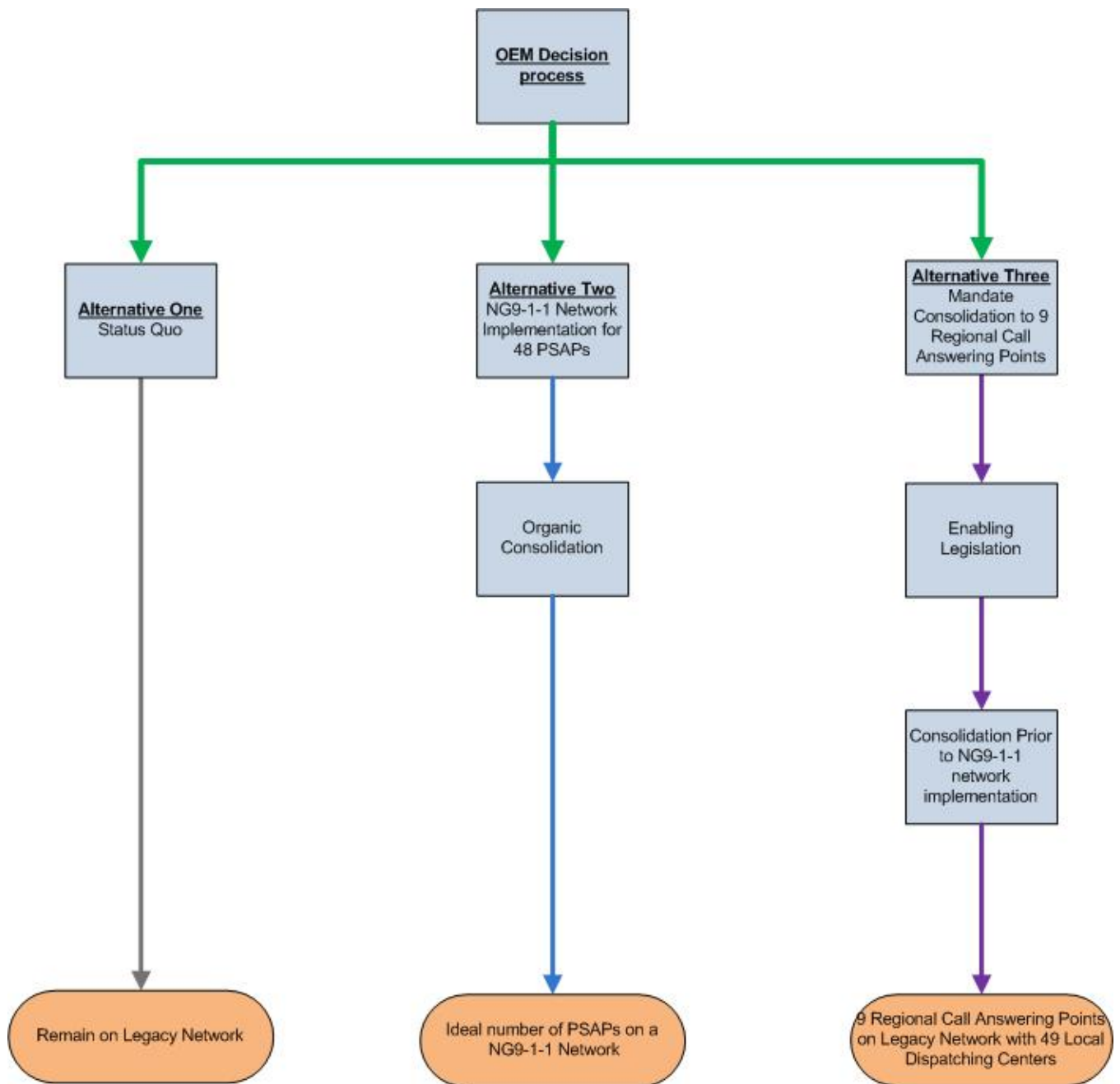


Figure 4—Decision Process

Alternative One – Status Quo

The Status Quo Alternative is offered to show the implications to the State if no action is taken to resolve the problems or embrace the opportunities introduced above.

Oregon’s 48 PSAPs provide emergency communications service to its residents. Each PSAP is connected to a Statewide frame relay network that provides the location data for 9-1-1 calls. This network is not designed to support 9-1-1 call transfer. Each PSAP is connected to the local telephone company using analog circuits provided by the telephone company. The current analog 9-1-1 call delivery model is being supported by the local telephone companies. The local telephone companies continue to increase costs for 9-1-1 services for both equipment and the network. Chart 1 depicts the

current network costs continuing to rise a predicted 4.5 percent as they have over the past several years.

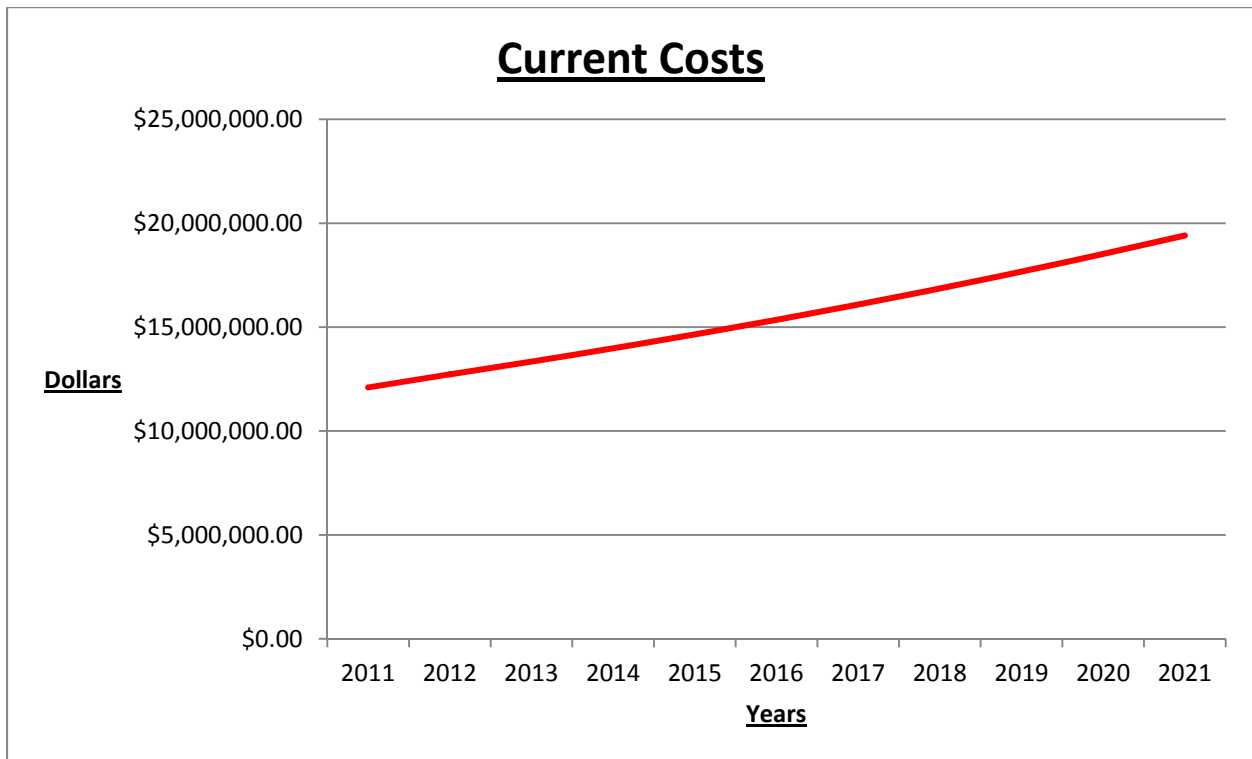


Chart 1—Current Cost

The equipment available from PSAP vendors is compatible with new digital systems and supports the analog connections to the local telephone companies. The equipment has the capability to provide a higher level of 9-1-1 service if it is utilized on digital networks. Additionally, many equipment vendors in the State have discontinued support for some of the outdated equipment currently in use on the analog network throughout Oregon’s PSAPs.

The functionality that is offered in a NG9-1-1 environment is not possible on Oregon’s current analog network. Features available today such as increased ability to handle and recover from a disaster, more accurate caller location information, and future applications such as text, video, and telematics are not feasible on an analog network. Remaining on the current network will cost the State financially and hinder the ability to offer these public safety services to the citizens and visitors of Oregon.

In addition to lesser functionality, remaining in the status quo has implications related to how 9-1-1 service is received and paid. Next Generation 9-1-1 services are not regulated (tariff) service offerings. Local telephone companies have historically chosen to offer these services using the unregulated section of their business. Next Generation 9-1-1 crosses traditional telephone service boundaries, such as local exchanges, so using the traditional regulated (tariff) model would have limited telephone companies’ ability to compete in the marketplace. As a result, local telephone companies will compete with other communications providers in the NG9-1-1 service marketplace. This transition from a regulated to an unregulated environment has the potential to drive NG9-1-1 network costs down, a contrast from the ever increasing current network costs such as PSAP circuits, wireless and network costs that the 9-1-1 system is burdened with today.

Cost/Benefit Analysis

Continuing with the status quo would mean that Oregon's public safety system would remain on the current analog network. As discussed in the Problem or Opportunity Statement, remaining on the current analog network does not meet the goals of the state as laid out in the Five-Year Strategic Plan. The cost of not transitioning to a NG9-1-1 network not only hinders the level of public safety service available within the State, but also costs more money to maintain than a NG9-1-1 system while providing less functionality.

Table 2 depicts the Enhanced 9-1-1 Subaccount's FY 2010-2011 expenditures by category. A detailed description of current 9-1-1 expenses paid from the Emergency Communications Tax through the Enhanced 9-1-1 Subaccount funds can be found in Appendix B.

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Expenditure	Cost
Administrative	\$220,567.59
CPE	\$1,335,869.98
CPE maintenance	\$1,058,436.20
GIS/Mapping equipment	\$57,592.59
MSAG/GIS maintenance	\$988,394.03
Network	\$642,330.67
PSAP circuits	\$4,972,552.86
PSAP facility	\$12,089.75
UPS and maintenance	\$48,678.37
Wireless needs	\$2,608,869.68
Services	\$175,061.87
Total	\$12,120,443.59

Table 2—Enhanced 9-1-1 Subaccount FY 2010-2011 Expenditures

The expenditures from the Enhanced 9-1-1 Subaccount fluctuate from quarter-to-quarter and from year-to-year. The total cost of maintaining the system has been steadily increasing for the past several years at an average of 4.5 percent per year and is predicted to continue to increase at a similar rate over the next ten years should the State remain on the current system. Additionally, there are fluctuations from quarter-to-quarter based on the equipment needs of the PSAPs across the state.

Chart 2 on the following page illustrates the breakout of costs that are currently paid from the Enhanced 9-1-1 Subaccount.

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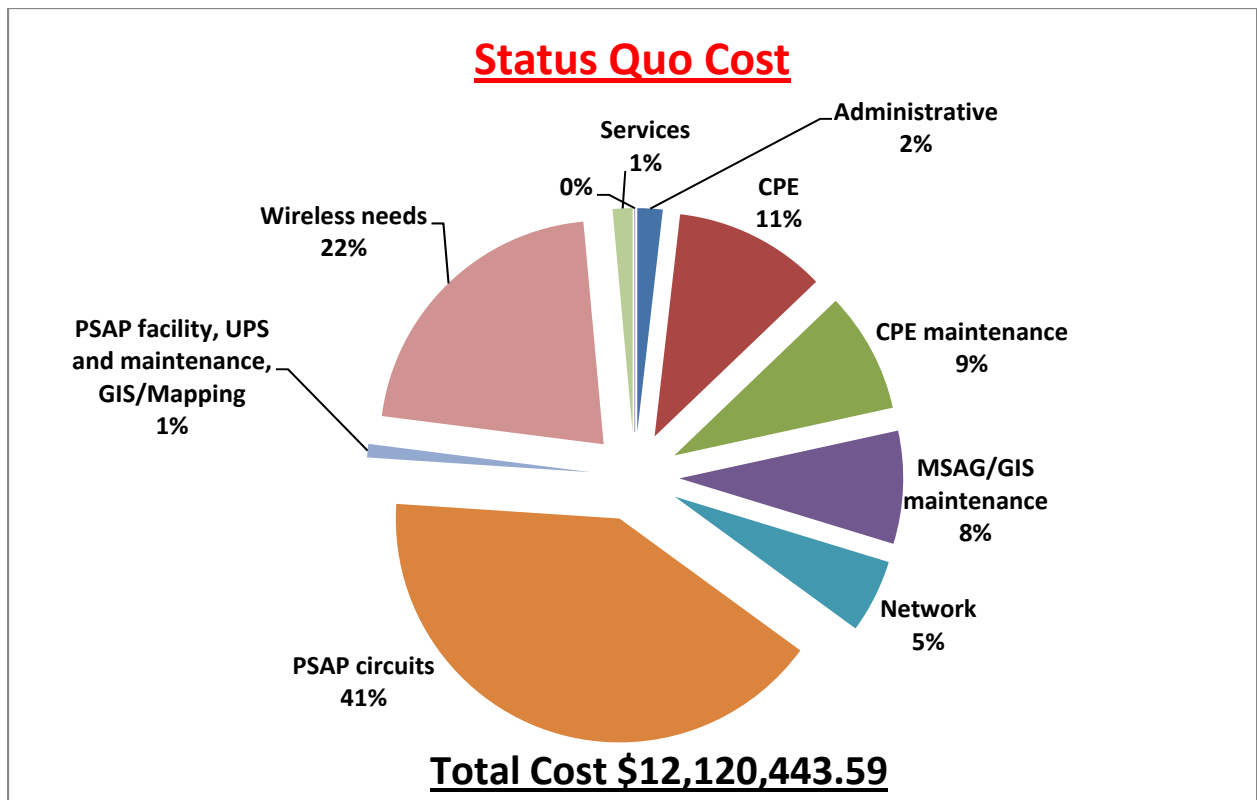


Chart 2—Status Quo Cost

The largest costs to the system are the PSAP circuit costs (41 percent), and wireless needs (22 percent). These charges along with network charges (5 percent) will be eliminated once the State has transitioned to a NG9-1-1 network.

If Oregon were to remain on the current analog network, this would mean status quo for the PSAPs as well. A benefit of remaining status quo is that the PSAPs would not be giving up their comfort level with the current system and PSAP configuration. However, as discussed in alternative two and three, the benefits of converting to a NG9-1-1 network, both financially and operationally, far outweigh the benefits of remaining status quo.

Risks

As described above, there are several risks associated with continuing on with the status quo and remaining on the current network. These risks are summarized below:

- Remaining on the current network will cost the State financially and hinder the ability to offer the best and most current public safety services to the citizens and visitors of Oregon
- The functionality that is offered in a NG9-1-1 environment and that will be expected by the public is not possible on Oregon’s current analog network
- Network and equipment costs from the telephone company have risen and will continue to rise if the State remains on the current network
- The services offered from the telephone companies on the current network are regulated (tariff) service offerings which keep costs high

Alternative Two –NG9-1-1 Transition and Organic Consolidation

Alternative Two describes the option of the State of Oregon to migrate to a NG9-1-1 system over the next two years eventually resulting in the organic consolidation of PSAPs across the State, which is already occurring in parts of Oregon.

In order to provide a level of service that is in agreement with the Five-Year Strategic Plan, provide the best level of public safety service technically available, meet the expectations of its citizens, and to keep up with technological changes, the 9-1-1 centers in Oregon are in need of an end-of-lifecycle technology replacement to convert the 9-1-1 system to NG9-1-1.

A NG9-1-1 network will allow PSAPs to share data easily and efficiently – saving time in the event of an emergency. The NG9-1-1 system will provide a backup system that will meet the needs of the State now and is scalable to meet future needs such as text, video and other data.

NG9-1-1 will address current system deficiencies when implemented and commercially available:

- More accurate caller location information delivered to 9-1-1 telecommunicators (available today)
- Ability to re-route calls in the event of a disaster that causes the local PSAP to become unavailable to receive calls (available today)
- Better access to 9-1-1 through text or video chat for persons with disabilities (available when vendors clear testing with 9-1-1 equipment)
- Improved first response based on crash data automatically delivered to 9-1-1 telecommunicators (available when vendors clear testing with 9-1-1 equipment)
- Increased amount of information available (photos and video) to field personnel while enroute to an incident (available when vendors clear testing with 9-1-1 equipment)
- May facilitate quicker identification and apprehension of suspects due to information available in photos or video (available when vendors clear testing with 9-1-1 equipment)
- Improved data sharing and mutual aid support (available today)

While some of these enhancements are not yet ready for market, most of them will become available within the next three years, which is in line with the amount of time it will take for Oregon to fully install a NG9-1-1 network. There will be many applications and system enhancements developed in the future and a NG9-1-1 system will allow Oregon to be ready to accept these applications and enhancements; none of which will be achievable over an analog network.

Policies and procedures for all media will have to be established to allow these technologies to be implemented effectively in PSAPs and decisions will have to be made on which technologies should be adopted. All such services would be deployed and available statewide at the same time so that the public can expect the same level of service anywhere in the state.

A Next Generation digital network merges the 9-1-1 emergency call delivery process, resulting in improved 9-1-1 service and new backup possibilities in the case of a local disaster. A digital network would enable call delivery and backup to any PSAP in the state resulting in life saving backup options in the event of emergency critical system failure. A digital network would enable the backup PSAP to receive additional information required for 9-1-1 call processing. Backup sites would be able to receive updated location data from moving cell phones and location data from wireline phones outside of their traditional jurisdiction. This is only one part of the 9-1-1 call handling process, however, and many other factors have to be evaluated when reviewing an optimum number of PSAP configurations. Other factors include:

- Ability to put local governance agreements in place
- Geography
- Existing radio coverage
- Existing PSAP partnerships and mutual aid agreements
- Facilities
- Balancing of 9-1-1 call volume and dispatch workload
- Dispatch of field personnel

Figure 5 below defines how the call flow process can work in a NG9-1-1 network. When an emergency call is placed, the local service provider receives the call, and then based on pre-determined routing policies; the call is then routed to the appropriate PSAP.

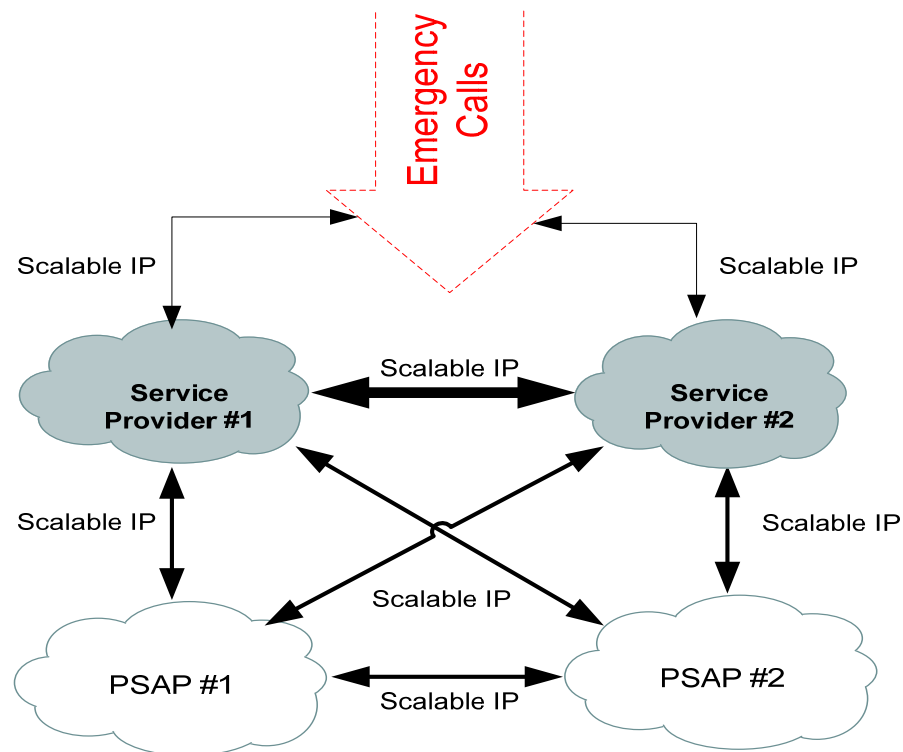


Figure 5—NG9-1-1 Call Flow with Redundancy

Organic Consolidation

Consolidation can be a natural progression of NG9-1-1. A new digital NG9-1-1 network will not only give PSAPs more technological capabilities, but will also provide more options regarding their geographical location and the number of PSAPs needed throughout the state. Calls can be routed anywhere in the state on an IP network, regardless of the caller's location. Consolidation is already occurring organically at the local level and will continue to do so as more decision-makers recognize the benefits that can be achieved by choosing to work together towards consolidation. OEM 9-1-1 can

encourage and incentivize consolidation as NG9-1-1 is implemented. In the *Consolidation Analysis and Next Generation 9-1-1 Implementation Study*, Kimball recommended that consolidation be allowed to occur organically at local levels for several key reasons including the following:

- When willing participants develop a consolidation plan at the local level, the buy-in of these participants is typically higher. Buy-in is essential to successfully navigating a complex process that requires cooperation, compromise, negotiation and a mind open to change. When participant buy-in is higher, the process is likely to be more efficient and successful with fewer roadblocks associated with political or personal agendas.
- Consolidations that are initiated at the local level tend to include participants that already have established working relationships and may already share public safety resources. Participants will be aware of the nuances and unique variables that exist in each community that need to be taken into consideration when planning to consolidate.
- Forcing municipalities and/or agencies to consolidate often reduces the probability of success. Even though all aspects of a consolidation can be well planned, political or personal agendas by those opposed to consolidation can undermine and eventually cause the new consolidation to fail. Often these agendas are manifested through direct and indirect resistance by field personnel and leadership, which creates an untenable environment internally in the PSAP and publically in the media. Often the only resolution is the dissolution of the agreement between the consolidated PSAP and the dissenting participant. In addition to the expense of reverting back to the status quo pre-consolidation, long-term damage to inter-agency relationships often occurs, which may impact the efficiency of field responses.

While PSAP consolidation is complex and difficult, correct implementation can yield improvements in service levels, regional interoperability, responder safety, employee retention, and potential cost savings at the local level. From a state perspective, consolidation encourages inter-agency cooperation, more effective use of local resources and large-scale incident management. It could also mean more efficient, streamlined, and cost effective technology Statewide and at the local level.

In Kimball's opinion, emergency communications Statewide would benefit from further consolidation efforts based upon a "perfect world" scenario. Kimball recommended a Statewide PSAP consolidation configuration (nine regional centers) that would provide the most effective level of emergency communications and produce cost efficiencies. Public Safety Answering Points across the state have already shown themselves to be forward thinking and interested in working with neighboring PSAPs towards greater interoperability and efficiency. The nine region model represents a perfect world solution that may or may not be achievable. However, it should be viewed as a flexible long-term goal to work towards, keeping in mind that the "final" configuration may well differ from the recommended model once all variables at the local level are considered. Allowing the 48 PSAPs to consolidate at their own pace is recommended.

In determining the recommended or "perfect world" number of PSAPs statewide, Kimball's approach focused on what best serves the emergency communications system as a whole rather than focusing on 9-1-1 calls only. In Kimball's opinion, keeping 9-1-1 call taking and the dispatch of field personnel together within each regional PSAP best serves the citizens, as well as the field personnel and is critical to establishing the best emergency communications system possible. Secondary to 9-1-1 call taking and dispatch functions remaining together, a balancing of call volume, where possible, the state's unique geography and maintaining existing or planned partnerships were taken into consideration. In Kimball's opinion, a PSAP configuration of nine regionally based PSAPs would provide the most equitable and efficient use of resources statewide. The following is a list of the criteria used in determining the regions.

- 9-1-1 call taking and dispatch functions remain together.

- 9-1-1 call volume – Where possible, the call volumes were balanced among the regions to assure the maximum number of redundancy or backup options.
- Back-up or redundancy planning – Multnomah was identified as its own region. Although consolidating with Washington and Clackamas Counties would make sense, redundancy planning would be much more complex in a PSAP that is so much larger than any other in the State.
- Existing partnerships – Survey results and on-site interviews indicate that sharing of systems and the exploration of potential consolidations are being discussed across the state. Therefore, it would be logical to group these PSAPs together.
- State geography – Equalizing the distribution of 9-1-1 calls among regions is desirable whenever possible. However, the unique geography present in Oregon prevents an across the board equal distribution. The call volume per region is much higher on the western coast of the State than it is in the central and eastern portion. In fact, the call volume in some central and eastern regions is low enough that, under different circumstances, placement of 9-1-1 workstations would not be cost effective. However, this set of circumstances illustrates that the number of PSAPs cannot be decided by call volume, or by extension, cost alone.

NG9-1-1 Technology Replacement Budgetary Assumptions

In March 2011, Kimball provided a cost analysis for the State of Oregon to reach and support a NG9-1-1 environment. The *Next Generation 9-1-1 Cost Analysis* report examined the current costs of the 9-1-1 system in Oregon and the anticipated cost of a NG9-1-1 network. In the report, Kimball outlined two options for Oregon to migrate to a NG9-1-1 system while maintaining the then 49 PSAPs in the State. Both options include a need to spend more funds initially in order to save money in the future. The State will need to further examine each option in order to determine the appropriate path for Oregon.

In February 2012, Kimball took the cost analysis a step further and examined the cost of implementing NG9-1-1 with the current number of PSAPs versus implementing NG9-1-1 in a consolidated environment. Kimball made certain assumptions in order to complete these studies, and, most importantly, assumed that all information collected from the State and PSAPs was correct and accurate.

Many details could impact the NG9-1-1 budgetary cost analysis and several assumptions were made in order to complete the conceptual design on which those costs were based. These assumptions were as follows:

- There will be no change in the \$0.75 per device per month Emergency Communications Tax, positive or negative.
- Costs were based on implementing the core network in the first year of the project and transitioning cellular and nomadic VoIP calls.
- New X, Y coordinate location protocols will be implemented in year two, either concurrently with wireline transition to NG9-1-1 or after.
- New equipment will be installed in year two and will be leased for ten years with zero down and 7 percent interest.
- Cost of network bandwidth was based on the number of workstations at each location.
- Budgetary pricing of the network was based on analysis of costs in three other states with state contract pricing.
- Commercial off-the-shelf equipment and retail pricing were used.
- Budgetary estimates for infrastructure were based on replacing the frame relay network that currently exists in Oregon and the need for more bandwidth to the larger PSAPs. Pricing was

based on a five-year build-out commitment, which is incorporated into the recurring line charges. Carrier fiber build-out pricing was incorporated into the estimate.

- Wireline carrier connections will occur in year two.
- Costs for staff to manage the system were not included as it was assumed full-time employees would not be added.
- In order to reach true NG9-1-1 capability, additional software may be needed in the future, which may increase the cost.
- Software maintenance was based on 15 percent of initial purchase prices.
- While it was unknown what the inflation rate will be moving into the future, Kimball used current dollar value as current technology costs have gone down at a similar rate to inflation in the past ten years.
- Budgetary estimates were based on an aggregate of similar sized states with similar sized networks.

Cost/Benefit Analysis

Under the current statutory structure, the end-of-lifecycle technology replacement and any resulting consolidation would not be funded with State-appropriated General Funds, but would be funded exclusively by the Emergency Communications Tax and local funds. The Emergency Communications Tax provides the Enhanced 9-1-1 Subaccount with available revenue of approximately \$13.9 million per year (based on an average over the last ten quarters). As shown previously in Table 2, State expenditures are approximately \$12.12 million per year from the Enhanced 9-1-1 subaccount. This leaves the Enhanced 9-1-1 Subaccount with approximately \$1.737 million per year for NG9-1-1 implementation. Again, these figures are a snapshot in time and will fluctuate from year-to-year. A fund balance is available in the Enhanced 9-1-1 Subaccount for the transition to NG9-1-1.

In Kimball's Phase Two report, all of the then existing 49 PSAPs and 279 workstations that were in place at the time of the study would transition to a NG9-1-1-capable network.

Table 3 displays Alternative Two pricing, which includes a completely new network and new equipment for each PSAP. Non-recurring installation costs for call access services would be spread out over the first two years. Centralized automatic message accounting (CAMA) gateways would not be needed until year two; therefore, the recurring charges begin in year two. Year one through three totals include non-recurring costs that would be encountered for installation of the core network. Recurring pricing for location protocol begins in year two. Non-recurring installation charges for PSAP equipment would be encountered in year two. The total for years four through ten includes recurring costs per year. Timeline considerations for this alternative are located in Appendix C.

The pricing was divided into three high level categories.

- **Call access services** includes the border control, gateways and location information services functions of the NG9-1-1 system. This category contains all services and equipment required by carriers to send emergency data and calls to the Oregon answering points. Circuits for these connections are also included.
- **Core connections** are the core of the Next Generation network, which contains the servers performing the call routing functionality as well as the data centers. Next Generation 9-1-1 services and databases are included in this section of the network. This section of the network correctly identifies where the emergency call is to be delivered and applies supplemental information to the call flow.
- **PSAP connections** category is all the equipment (hardware and software), connections to the network, and firewalls needed to allow the PSAP to receive NG9-1-1 traffic from the call processing section of the network. This includes workstations. The financial figures include the re-building of new Multiprotocol Label Switching (MPLS) network connectivity based on either

single or multiple groups of T1¹² circuits or DS-3¹³ access for core data centers. This includes system components such as routers and switches and PSAP hardware and software.

	Year 1	Year 2	Year 3	Annually Years 4 – 10
Call Access Services Non-recurring Costs	\$400,000	\$400,000	\$0	\$0
Call Access Services Recurring Costs	\$356,940	\$530,940	\$530,940	\$530,940
Core Connections Non-recurring Costs	\$500,000	\$500,000	\$500,000	\$0
Core Connections Recurring Costs	\$1,623,456	\$2,349,984	\$2,349,984	\$2,349,984
PSAP Connections Non-recurring Costs	\$0	\$1,925,000	\$0	\$0
PSAP Connections Recurring Costs	\$3,356,700	\$4,276,284	\$4,276,284	\$4,276,284
Total Non-Recurring Costs	\$900,000	\$2,825,000	\$500,000	\$0
Total Recurring Costs	\$5,337,096	\$7,157,208	\$7,157,208	\$7,157,208
TOTAL	\$6,237,096	\$9,982,208	\$7,657,208	\$7,157,208

Table 3—Alternative Two Cost Analysis

As shown in Table 3, system costs will increase during the transition phase; however, there is potential cost savings in migrating to NG9-1-1 versus the costs of maintaining the status quo current system if the State were not to transition to NG9-1-1. Once the transition period is over, OEM 9-1-1 should recognize a significant cost savings per year in a Next Generation environment that will be passed on to the PSAPs as part of the monthly distribution.

The total cost once the state is completely transitioned to a NG9-1-1 network is approximately \$7.1 million per year. In Table 2 in the status quo analysis above, the total cost of maintaining the current network is about \$12.12 million per year. The highest distribution of recurring costs in a NG9-1-1 environment is PSAP connections, which accounts for the connections to the PSAP centers and the leasing of the required hardware and software. The NG9-1-1 network connections recurring costs replaces the network costs in the current network, which represents the largest area of savings in a NG9-1-1 environment. Call access services recurring costs represent the costs of the call routing data centers with respective communications device configuration.

Chart 3 illustrates the breakdown of NG9-1-1 recurring costs.

¹² T1 is a digital transmission link operating at 1.544 Mbps and is a standard for digital transmission in the United States.

¹³ DS-3 is the equivalent of 28 T-1 channels.

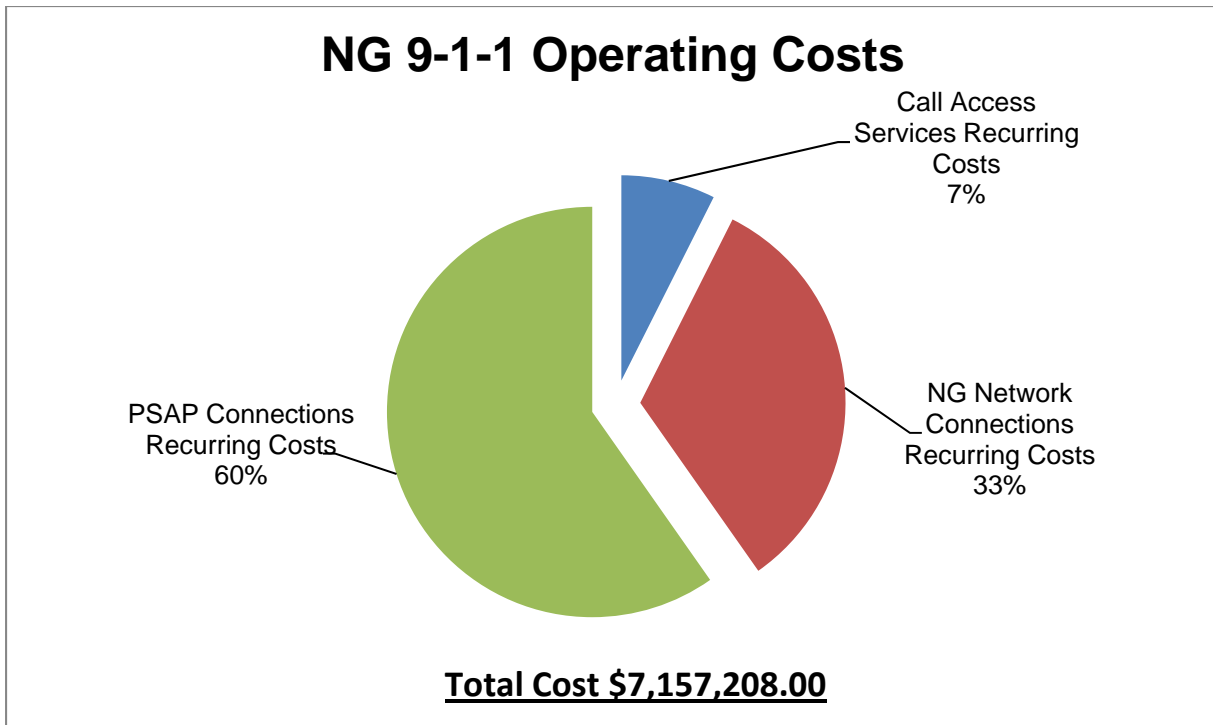


Chart 3—NG9-1-1 Operating Costs

Chart 4 on the following page illustrates the contrast in costs between the rising costs of remaining on the current network over the next ten years as opposed to the fund allocation projected for transitioning to a NG9-1-1 network. In Chart 4 the status quo percentage increase is due to an increase in network related costs.

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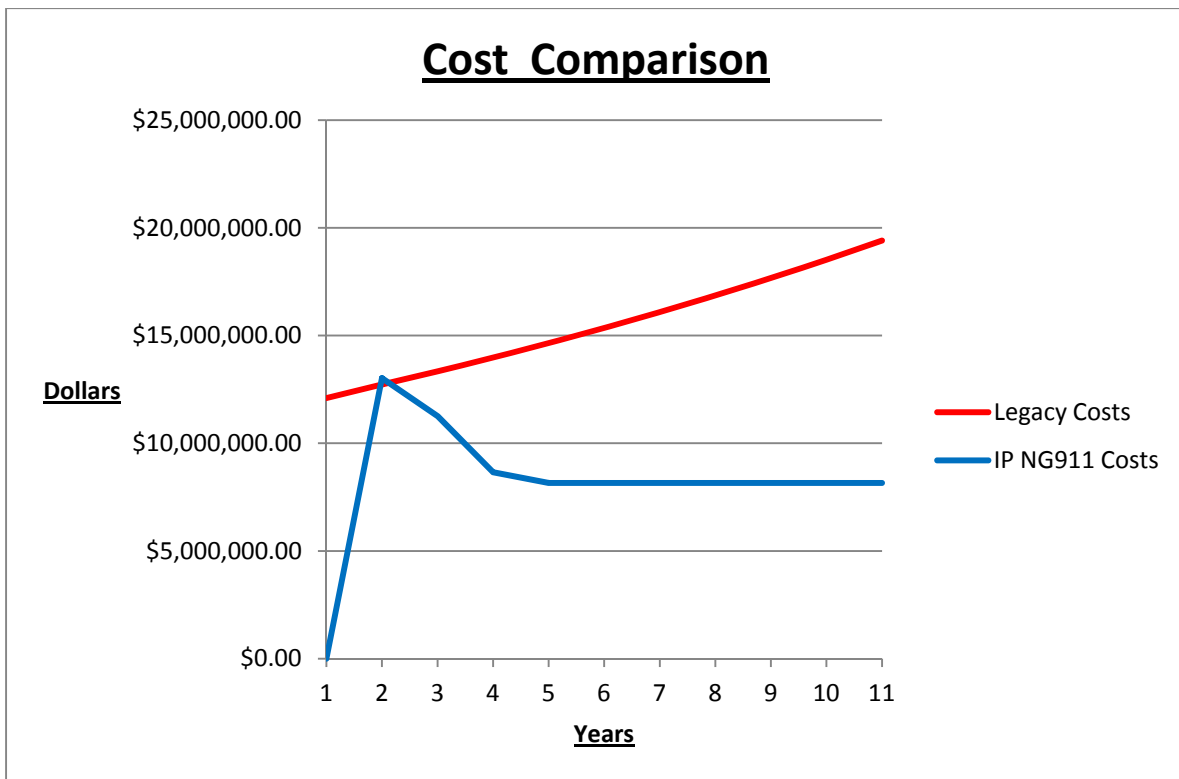


Chart 4—10-year Cost Analysis

The Cost Comparison chart above illustrates that current network. The cost of the current network has increased on average 4.5 percent per year. This cost continues to rise every year. Next Generation 9-1-1 costs are predicted to spike during the first two years of transition, then fall and remain stable at about \$7.1 million once the network is in place.

Risks

The operational impact of NG9-1-1 services is directly related to how the PSAP staff and systems manage the delivery of the new types of text, video, photos, data, and a substantial increase in information being delivered with a call. The impact will be felt most directly by PSAP management and frontline operational staff. This means that decision-makers and PSAP management will have to work closely together to determine how to develop or alter consolidated PSAP policies, procedures, protocols and training to accommodate NG9-1-1 capabilities and services. The human factor must be considered throughout so that staff is well-prepared for new or altered protocols and methods for locating callers, routing information, new equipment, services, functions, and features. Standards and specific training do not exist for operating in an IP environment.

The impact on call takers will be the increased complexity of the call taking process due to multi-media data. The call taking function will expand from locating wireline and wireless callers to real-time multi-media information from devices that text and transport pictures and streaming video. Internet Protocol-based systems will be expected to manage the complexity and increased quantity of data. However, the human component will need the training and skills to recognize and process calls from numerous communication devices, delivery methods, and caller location determination. Policy and training will need to focus on giving the staff the direction, knowledge, and decision-making skills needed to determine what information should be relayed to dispatchers and responders. Policy will also drive how supportive or supplemental information (for example, automatic crash notification data or patient allergies to certain medications) will be used, processed and stored or relayed.

In addition to the changes anticipated in processing calls and the development and implementation of appropriate training, there are operational areas that will be impacted by a Next Generation environment. In order to effectively share these new data forms and reap the full benefits of a NG9-1-1 system, response agencies at all levels (local, county and State) will need to work together to assure inter-agency policies and technology are in place. This may mean establishing new relationships and upgrading critical technology to enable effective “across-the-board” sharing of information.

Policies and procedures need to be developed in order to successfully implement a NG9-1-1 system Statewide. Local jurisdictions will need to work together, and with the State, to develop policies and procedures, as well as a governance model that will be used to administer the system.

An additional risk to NG9-1-1 implementation is the sunset of the 9-1-1 excise tax. A portion of the 9-1-1 excise tax is used for the administration of OEM 9-1-1 in order to carry out its duties under statute. Without that funding source, there will be no means to continue on with OEM 9-1-1 or any OEM 9-1-1 projects that are underway including the NG9-1-1 Implementation Project. A legislative concept was submitted that would revise current statute ORS 403.200 Sec 4. (1) to extend the date of the 9-1-1 tax to sunset prior to January 1, 2026.

Further risk analysis is outlined in Appendix D – Alternative Two Risk Analysis.

Security is a major concern moving from the current analog network to a digital NG9-1-1 network. NENA’s Next Generation Security Standard (NG-SEC) is a foundation for security in the NG9-1-1 emergency services environment. This standard addresses all areas of network security from physical to cyber activities. The process begins with an assessment of the environment to gain a thorough understanding of the elements in place including governance, authorities, and regulations specific to the state of Oregon’s network. Specific areas of interest are the Enterprise IT Standards and security documents published by the Department of Administrative Services. Careful consideration is given to assure these standards are followed. With this information, a compliance plan is drafted addressing the elements that must be created, updated and put into place to comply with the security standards as set forth by both NG-SEC and the Department of Administrative Services. The most secure directives of all standards are utilized.

Alternative Three – Mandating Consolidation of 9-1-1 Call Taking

Alternative Three describes an option of mandating consolidation of 9-1-1 call taking functions to nine regional call answering points while the existing PSAPs would stay in place, but function as local dispatching sites. Currently, no authority exists within the current statutory framework to mandate statewide consolidation of 9-1-1 call taking, although a legislative concept was recently put forth by the Senate Veterans and Emergency Preparedness Committee that would grant the authority needed to mandate it.

For the purposes of this alternative, existing PSAPs would handle only the dispatch of field personnel. They would no longer receive 9-1-1 calls directly, but via a call transfer from one of the nine regional call answering points.

When determining the optimal number of PSAPs for the State of Oregon, Kimball stressed the need to keep 9-1-1 call taking and dispatch functions together within each facility. The optimum number of recommended PSAPs within the Kimball *Consolidation Analysis and Next Generation 9-1-1 Implementation Study* was predicated on this assumption. If only 9-1-1 call taking functions are consolidated into regional call answering points, then *the recommended number of nine regional*

facilities no longer represents the most efficient or cost effective model. Estimating the optimal number of facilities that only process 9-1-1 calls would require a completely different set of baseline assumptions. However, Kimball was asked to examine an alternative that includes mandating call taking into nine regional call answering points. The following represents that examination.

Service level improvement is the single most important reason to consider consolidation. The “first responder on the scene” is truly the 9-1-1 telecommunicator and can substantially affect the outcome of an incident and the lives of the people involved. Service level and life safety improvements that have been achieved as the result of consolidation efforts across the country are noted below. However, it is important to note that many of these service level and life safety improvements are only possible if both call taking and dispatching functions remain together within each region. The impact on each of these benefits under Alternative Three is included.

- Reduction or elimination of the transfer of 9-1-1 calls between PSAPs improves response times and lowers the potential for human or technology errors. Best practices set forth by organizations such as NENA and APCO support the reduction of 9-1-1 call transfers. Implementation of Alternative Three will result in 100 percent of 9-1-1 calls being transferred at least once.
- Quicker call processing and dispatch times, which may result in faster on-scene times for field personnel due to the fact that calls may not need to be transferred or calls would most likely be handled by distinct call taker and dispatcher positions. Alternative Three eliminates this benefit completely by separating call taking and dispatch functions.
- Sharing of physical space facilitates communications between call takers, dispatchers, law enforcement, fire, and emergency medical services (EMS). Improved communications enables field personnel to receive information more quickly and accurately, which is particularly important in multi-jurisdictional incidents. Although this benefit is the least tangible or quantifiable, it is one of the most important. Alternative Three eliminates this benefit. If large enough, a consolidated PSAP can utilize a call taker/dispatcher organizational structure. This structure enables call takers to focus solely on the incoming call and obtain the best information possible. The dispatcher’s ability to focus solely on field personnel improves responder safety. This benefit may be achievable under Alternative Three in a modified form. The degree of benefit would depend on the organizational structure at the local dispatch site. Standardized training of all PSAP employees increases consistency of service delivery regionally. This benefit would be achievable for call takers only within each regional 9-1-1 answering point.
- A consolidated environment will offer the opportunity for smaller sized participants to benefit from state-of-the-art technology, improved training, and expanded career opportunities that would not be otherwise financially or organizationally feasible. This benefit would be achievable on a lesser scale for 9-1-1 call taking only.
- Consolidation of PSAPs allows sworn personnel to be redeployed to other law enforcement or fire department responsibilities. This benefit may be minimally achievable under Alternative Three.

As the following example illustrates, efforts to increase efficiencies and lower costs through mandated consolidation of only 9-1-1 call processing can result in unanticipated consequences. Several years ago, one state attempted to reduce the number of PSAPs (call taking and dispatching) by mandating a consolidation of the portion under their control – the 9-1-1 call processing portion. Due to confidentiality agreements, Kimball is not authorized to divulge which state went down this path. A goal number of regional 9-1-1 call answering points was established and existing PSAPs (including call taking and dispatch functions) were left to work out where the reductions would occur. While the goal number of regional call answering points was reached, consolidation efforts were primarily limited to the 9-1-1 portion of emergency communications. In other words, while the 9-1-1 call processing portion was consolidated in keeping with the State mandate, the dispatch of field personnel stayed within most municipalities. This consolidation methodology resulted in two key negative outcomes including:

- A decrease in the number of regional 9-1-1 answering points that receive 9-1-1 calls, thereby reducing costs managed by the State, but an **increase** in the number of local dispatching sites which increased costs at the local level. Pre-consolidation the same staff in each PSAP performed both call taking and dispatch functions. Post-consolidation, the staffing needs remained the same so personnel costs did not decrease. In addition, each local dispatch site was required to contract with a regional 9-1-1 answering point to receive and transfer their 9-1-1 calls. Local dispatching sites incurred additional costs by procuring necessary telephony equipment to receive location information for incoming 9-1-1 calls transferred by the regional 9-1-1 answer point.
- The number of times a 9-1-1 call is transferred has increased dramatically which increases call processing times and slows the response of field personnel.

The overall impact of consolidating only the 9-1-1 call function statewide is an emergency communications system that is fractured and less effective. Potential state-level mandates that only impact one component, 9-1-1 call processing, need to be carefully considered to avoid unintended degradation of the emergency communications system as a whole.

Separating the call taking and dispatching functions for 9-1-1 calls in a consolidated environment creates a risk to public safety. Minimizing the number of times a 9-1-1 call gets transferred is a key component to an effective system. When 9-1-1 call takers are located in a separate facility, the 9-1-1 call taker must conduct a preliminary interview to determine the nature and location of the emergency for each incoming 9-1-1 call. This preliminary interview serves two key purposes. First, it allows the call taker to identify the local dispatching site to which the call must be transferred. Second, and more importantly, the preliminary interview assures that the caller's location, at minimum, is received should the call be lost unexpectedly so help can be sent. The call must then be transferred to the appropriate local dispatching site for dispatch of field personnel. The dispatcher then must re-interview the caller to assure the call has been delivered to the correct dispatch point, that the address and call nature are correct, and to gather further details regarding the incident. At times, a second transfer is needed, that would include a third similar interview, to assure all needed services such as police, fire and EMS are dispatched. In addition to the frustration experienced by the 9-1-1 caller, this system creates unnecessary delays in the dispatch of emergency personnel. The average length of time added to a call during this process is 30 seconds for each transfer.

Implementation of any consolidation effort is a complex process with many variables. Although commonalities exist between consolidation efforts, there is no standard implementation template as each effort has unique components for which a customized approach is necessary. Should the State choose to mandate consolidation of the 9-1-1 call processing component, it will need to start by making basic decisions such as:

- What is the long-term goal of a mandated consolidation? Cost savings, improved service levels or both?
- Will the State mandate a specific number of regional 9-1-1 call answering points and what regions will be served by each or will existing consolidation efforts already underway be allowed to continue?
- Will the State choose which existing PSAPs will no longer directly receive 9-1-1 calls and therefore, will become local dispatching centers?
- If the regional call answering points are governed at the local level, will dispatch functions be allowed within the same facility?
- Should the existing PSAPs which currently provide call taking and dispatching services be allowed to decide how to best consolidate call taking functions under a State mandate?
- What facilities will be used and will the State financially support any construction or renovation needs that result from mandated consolidation?
- What technology costs will be State-supported that result from mandated consolidation?

Only after a direction has been determined at the state level can issues such as governance, facility and technology needs, training, organizational structure and cost estimates be developed. Once a direction has been determined, then a more detailed implementation plan(s) can be developed. An assessment of each specific potential consolidation will need to be done. For example, if the State mandated the consolidation of 9-1-1 call taking within pre-defined regions, each region would need to be assessed at a detailed level to determine what equipment, facilities and personnel exists and what would be needed. It is from this region-specific plan that an implementation plan and budget is developed based on the needs and variables of that region.

Consolidation Timelines

When consolidating 9-1-1 call taking functions, a multitude of subject areas must be addressed. Key areas include governance, funding, technology, staffing and facility needs. There is no single standard approach to managing a consolidation effort and each effort will have aspects unique to the specific participants involved. However, the following generic best and worst case scenarios illustrate potential timelines.

Best Case Scenario

Even under perfect world circumstances, it is not possible to provide timeline estimates since each regional call answering point consolidation effort has its own set of unique variables that must be evaluated before an implementation plan can be developed. Consolidations where perfect world circumstances are present are rare. Although possible, it is unlikely that all of these conditions will be present in any real-world consolidation effort.

Cost estimates are not possible without knowing the specific technology needs and workload of a specific potential regional call answering point.

Although the following does not list every factor in a PSAP consolidation effort, the assumptions listed below relate to those areas that typically take the longest to resolve. This scenario is based on the following best case assumptions:

- All PASPs are willing participants.
- A facility exists that can expand sufficiently to accommodate the new regional call answering point without extensive renovations.
- Either a neighboring regional call answering point can serve as the backup or a facility is available to establish a cold backup center. If necessary, calls would be temporarily routed to another answering point until the cold backup center can be activated.

A consolidation effort requires that many components be addressed. While most of these components are addressed concurrently, the following components will likely take the longest to complete.

Therefore, these components would be the primary drivers behind the length of the implementation timeline:

- The length of procurement processes for any critical systems such as computer aided dispatch (CAD), logging recorders and 9-1-1 answering positions. If existing systems can be expanded to accommodate the larger workload of a consolidated environment and is well within its useful life cycle, then new procurements may not be necessary. However, it would be unusual for no procurements to take place.
- The length of time it takes to get a governance agreement, in the case of local governance, in place between the participating agencies/municipalities or the length of time it takes for the state

to establish an organizational structure and governing body for the new regional call answering points.

Worst Case Scenario

In a worst case scenario, the components that typically take the longest to complete are construction of a new facility and the necessary assessment of disparate radio systems, radio coverage and the implementation of a solution. Other areas of the consolidation effort are addressed concurrently with these two tasks and would be completed in less time than construction or the build-out of a radio system so they are not considered key timeline drivers. As in the best case scenario, a timeline cannot be estimated given the specific set of variables unique to each consolidation effort.

As with the best case scenario, the following does not list every factor in a regional call answering point consolidation effort. The assumptions listed below relate to those areas that typically are the most difficult to resolve. This scenario is based on the following worst case assumptions:

- All regional call answering points are not willing participants.
- A facility does not exist that can expand sufficiently to accommodate the new regional call answering point. New construction is necessary.

Regional Call Answering Point Consolidation Assumptions

Each assumption is an obstacle in its own right to any consolidation effort. Kimball and OEM 9-1-1 recommended that regional call answering point consolidation project should occur after the implementation of NG9-1-1 and as a natural result of the shared environment of NG9-1-1. Kimball does not recommend that consolidation be implemented as a single project goal or mandated by the State.

In any high-level recommended configuration, a number of assumptions must be made. For this model Kimball assumed the following:

- Political support to form these regions was present.
- A facility large enough to house each regional call answering point exists or could be built.
- Other critical technology and systems would be upgraded to accommodate a regional call answering point or an appropriate replacement would be procured.

To re-emphasize what is perhaps the most critical aspect of this alternative, Kimball's recommendation for a nine regional PSAP model in the *Consolidation Analysis and Next Generation 9-1-1 Implementation Study* was predicated on keeping 9-1-1 call taking and dispatch functions integrated in the same operation as is strongly recommended by Kimball as well as industry best practices. Without this base premise, the recommendation for a nine region model is no longer valid as the most effective and cost efficient configuration. A full examination of all variables associated with consolidating only 9-1-1 call taking functions would be necessary to provide a recommended number of only 9-1-1 call answering points.

The costs associated with a regional consolidation effort of 9-1-1 answering points cannot be estimated within the scope of this document. Each regional consolidation brings its own set of variables to the process for which decisions must be made before costs can be determined. These variables include the following:

- The various decision points, listed earlier in this section, the State will need to address if it proceeds with a mandated consolidation of 9-1-1 call taking.
- Personnel costs (salaries and benefits), based on staffing estimates for a consolidated center and the decided upon pay scales.

- Technology costs will depend on whether specific technology, such as a CAD system can be expanded and re-used in the new call taking facilities or if new systems must be procured.
- Facility costs will depend on whether an existing facility is available or if renovation or new construction is necessary.
- One-time project costs identified, such as initial employee training, hiring of management staff, and professional services fees.
- Municipality-specific costs (how much each municipality will contribute each year) cannot be determined until a cost distribution model is agreed upon by all participants.
- Costs related to dispatch functions such as radio and/or records management systems that will need to be covered by municipalities operating a local dispatching site.

Cost/Benefit Analysis

The current system configuration justifies a transition to NG9-1-1 prior to call center consolidation (Alternative Two). The current analog 9-1-1 call delivery model severely limits the cost and service efficiencies that are afforded with consolidations that occur in the NG9-1-1 environment. Consolidating PSAPs on the frame relay network would take a toll on the Enhanced 9-1-1 Subaccount because of connection costs, equipment replacement, and crossing LATA boundaries as laid out by the telephone companies. Any money spent on consolidating PSAPs on the current network would reduce the funds available to transition the state to a NG9-1-1 system.

In a worst case scenario, the components that typically take the longest to complete are construction of a new facility and the necessary assessment of disparate radio systems, radio coverage and the implementation of a solution. Other areas of the consolidation effort are addressed concurrently with these two tasks and would be completed in less time than construction or the build-out of a radio system so they are not considered key timeline drivers. As in the best case scenario, a timeline cannot be estimated given the specific set of variables unique to each consolidation effort.

Analysis was performed on the PSAPs within one of the State's regions if they were to consolidate into a single site from a call delivery perspective. In order to deliver the 9-1-1 calls to that single site, the current 9-1-1 trunks (or communication paths) that deliver 9-1-1 calls into the PSAPs, would have to move to the single site. This would require the local automatic number identification (ANI)/automatic location identification (ALI) controller to be provisioned with 36 trunks. For budgetary considerations, Kimball assumed that one of the PSAPs would be able to house the regional call answering point site.

Transport of calls and associated information required to locate 9-1-1 emergency callers across LATA boundaries currently in place will require inter-LATA circuits. Local access and transport area boundaries are the geographical area within which a local telephone company offers service. The current configuration of trunking used to deliver emergency call information, as on the analog network, is also an issue. The cost to extend local trunks across LATA boundaries is mileage-based and may not even be possible with current tariffs in place. With multiple locations being routed to a single site, these costs will be extensive on a monthly basis. If a PSAP located in the eastern half of the state was selected to host the equipment, the mileage on each circuit would exceed 150 miles and cross many LATA boundaries. A realistic estimate will be \$30.00 per trunk and \$1.00 per mile (CenturyLink)—totaling \$6,480.00 per month. Monthly special access termination charges could also apply at \$20.00 per termination (two per trunk or another \$1,440.00 per month) depending on the carrier. These costs could change depending on the carrier and the ability for each carrier to cross individual LATA boundaries. If the incumbent local exchange carrier (ILEC) does not have an existing LATA crossing, an interexchange carrier (IXC) would have to be used and costs would escalate.

Inter-LATA circuits are priced much higher than circuits within the LATA. The additional expense of inter-LATA circuits reduces the financial viability of consolidation under the current model.

While the local telephone companies still support CAMA trunking within the LATA, they have very little experience configuring CAMA circuits between LATAs or between local exchange providers. The order processing systems in place do not support ordering these circuits across LATAs. When the order processing issues are resolved, technical staff has to implement non-standard provisioning processes and installation processes to support ordering circuits across LATAs. The local telephone companies have excellent technical staffs but the configuration of CAMA trunks across LATAs is analog technology that is used infrequently within modern networks. These installations can be accomplished but, in the experience of Kimball, take much longer to implement than standard telephone service offerings. An additional issue is that repair of these circuits is not standard procedure for the telephone companies.

Carriers currently have little incentive to establish CAMA trunks across LATA boundaries and it is not a standard service offering. Where these configurations have been implemented in other states, installation and repair processes for these types of circuits have experienced extensive time to implement and time to repair.

Carriers find it difficult to provide geographic diversity as the number of ILEC facilities that cross LATA boundaries have decreased.

Estimated charges for CAMA trunking would total about \$6,500 to \$10,000 a month. Customer premise equipment would also have to be configured for the regional call answering point. This new equipment would have to be capable of handling 36 9-1-1 trunks. Budgetary cost to install 9-1-1 call taking equipment would exceed \$300,000.

Table 4 provides a cost estimate for a single regional call answering point in one eastern region of Oregon. It should be noted that this is not a true comparison to Alternative Two as that included pricing to transition to a NG9-1-1 network and replace all equipment at all 48 of the PSAPs within the State. The costs provided are an estimate to implement a single regional call answering point; it is also important to note that all current carrier network charges, such as selective routers, would still be applicable in this environment.

	Year 1
CAMA Trunking (\$6,500 - \$10,000 monthly)	\$78,000 - \$120,000
CPE	\$300,000
Current Carrier Network Charges	Unknown
Total Non-recurring Costs	\$300,000
Total Recurring Costs	\$78,000 - \$120,000 +
TOTAL	\$378,000 - \$420,000

Table 4—Alternative Three Cost Analysis (Current Single Regional PSAP)

It is important to note that pricing for this option does not include the cost to build out facilities if needed for any of the regional PSAPs, or for a radio network or integration within a specific region – both of which could easily reach into the millions. New facility costs could range from approximately \$1.75 million to \$4.2 million depending on size, workstation needs and real estate prices. Reference Table 5 below for a cost breakdown of facility estimates.

One extremely important consideration to note in this alternative is that the benefits of PSAP consolidation would be eliminated by the effort required redesigning the current analog network if Oregon were to consolidate prior to converting to NG9-1-1. Also, Oregon’s current analog 9-1-1 call delivery model does not allow for future new digital services.

Kimball was also asked to provide estimated facility costs for new construction facilities within each of the nine recommended regions. Table 5 provides these cost estimates. The following points should be noted:

- The size of each regional facility is based on the number of physical 9-1-1 call taking workstations that each region would require based on 9-1-1- call volume.
- The estimated costs apply to the structure and building systems such as heating and air conditioning. Costs such as those associated with site procurement, professional services, furniture and the emergency communications system are not included.
- Construction costs will likely vary from region to region.
- The construction of a new facility for only a few workstations, as would be the case in some of the regions, is not practical.
- The cost per square foot can range from \$225 - \$550 or more depending on the local construction market.
- The number of workstations in the Table 5 below correlate to the recommended number of workstations in the Kimball *Consolidation Analysis and Next Generation 9-1-1 Implementation Study*.

Number of Workstations	Square Footage / Workstations	Building Square Footage	Cost/ Square Foot	Total Estimate
5	1000	5,000	\$350	\$1,750,000
7	1,000	7,000	\$350	\$2,450,000
9	1,000	9,000	\$350	\$3,150,000
12	1,000	12,000	\$350	\$4,200,000

Table 5—9-1-1 Regional Call Answering Point New Construction Cost Estimates

Risks

OEM 9-1-1 does not have statutory authority to mandate the consolidation of PSAPs in the State. The Senate Veterans and Emergency Preparedness Committee recently submitted a legislative concept to the Governor as a result of the budget note that required the creation of a consolidation plan. That legislative concept would provide the authority to mandate consolidation.

Oregon statutes need to be amended to facilitate consolidation. ORS 403.240(9) requires that each county receive a minimum of 1 percent of the balance of the Emergency Communications Account after amounts have been distributed per the statute. This 1 percent disbursement likely will not be equitable in a consolidated environment. A new funding structure should be developed based on a per 9-1-1 workstation basis per 9-1-1 call answering point region and allow each PSAP to spend the Emergency Communications Tax funds on any 9-1-1 related purpose necessary to operate a respective regional 9-1-1 call answering point.

Mandated PSAP consolidation comes with risks whether the mandate comes from the local, county or State level. As discussed earlier in this document, consolidation is a complex process that requires collaboration, cooperation, negotiation and compromise on the part of all participants to be successful. A difficult process is made much harder when municipalities and/or agencies are forced to participate, which can result in the following:

- Delays in resolving issues and roadblocks that naturally arise during consolidation. Decisions regarding facilities, staff, equipment and policy will all need to be made. Dissension created by unwilling participants can cause delays in getting these decisions made and implemented. A loss of staff productivity, construction and other project delays can be expensive.
- If a participant wishes for a consolidation to fail, typically it will. If a municipality or agency chooses to separate from a consolidated center, the costs associated with either completely or partially breaking up a consolidated PSAP can be substantial.
- When a consolidated PSAP separates either partially or in total, working relationships between the municipalities, public safety agencies and the PSAP staff are damaged. This can impact the efficiency of emergency responses. At times, this damage can take many years to repair.

As a result of the current statutory structure, neither OEM 9-1-1 nor the State has authority to recognize any of the cost savings achieved with consolidation.

If Oregon were to transition to a NG9-1-1 network after consolidation, there would be an additional expense to replace equipment and technology once again. The current analog network will cause roadblocks to consolidation plans throughout the State. The current system utilizes phone lines that are subject to tariffs implemented by the phone companies. Connection costs resulting from crossing LATA boundaries in order to connect consolidated regional call answering points to dispatch centers cause the cost of consolidation to increase dramatically. In addition to cost concerns, consolidating in the current analog environment causes a technology replacement that is not the most up-to-date.

Consolidation risks involve public expectations at the local level. These risks include, but are not limited to, the following:

- Perceived loss of control at the local level.
- If cost savings are achievable, it may be several years before they are realized at the local level.

Alternatives Comparison

Table 6 on the following page compares the costs, benefits, and risks of each alternative. Further discussion of these alternative comparisons and how they shape Kimball's recommendations can be found in the Conclusions and Recommendations section beginning on page 41.

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	Alternative 1 Status Quo	Alternative 2 End-of-life Technology Replacement (NG9-1-1)	Alternative 3 Current PSAP Consolidation (Single Regional PSAP)
Cost	Year 1 - \$12.12 million Year 2 - \$ 12.67 million Year 3 - \$13.24 million Year 4 - \$13.83 million	Year 1 - \$6.24 million Year 2 - \$9.98 million Year 3 - \$7.66 million Year 4+ - \$7.16 million	Year 1 (Implementation) - \$378,000 - \$420,000 Facility costs may range from \$1.75 million to \$4.2 million depending on size and workstation needs
Benefits	<ul style="list-style-type: none"> • Comfort level with current system • No transition costs for PSAPs • No staff training needs • No disruption of 9-1-1 service 	<ul style="list-style-type: none"> • Improved 9-1-1 service • Greater backup possibilities • Potential cost savings • Up-to-date technology • Meets the goals of the 5-year plan • Increased IT functionality • Information/data sharing capabilities • Greater caller location accuracy • More robust system • Ability to participate in national data sharing initiatives • Will eventually allow text, video, data, and images to be sent to PSAPs 	<ul style="list-style-type: none"> • Reduces number of PSAPs in the state • Less cost at the state level initially
Risks	<ul style="list-style-type: none"> • Outdated equipment • Costs will increase • Support has been discontinued in some cases • Limited functionality • Does not meet the goals of the 5-year plan • Hinders the level of public safety service • Less reliable • Impediment to PSAP consolidation due to line and call costs • Not designed for continuity of operations • OEM 9-1-1 paying for fewer capabilities 	<ul style="list-style-type: none"> • Transition could take longer than a year • PSAPs may decide not to consolidate • Local discontent • Development of policies and procedures • Maintaining security standards • Staff training and associated costs • Transition costs at the local level 	<ul style="list-style-type: none"> • Cost savings to the Enhanced 9-1-1 Subaccount related to transitioning to a NG9-1-1 network would not be realized • May take 3 to 5 years to accomplish – pushing NG implementation back to 5 to 7 years • OEM 9-1-1 has no authority to mandate consolidation • Some areas may consolidate, others may not • Lack of buy-in • Would be consolidating with outdated technology • Staff training and associated costs • Transition costs at the local level • Further research and analysis studies for consolidation initiatives
Meets Criteria	No	Yes	No

Table 6—Alternatives Comparison

Conclusions and Recommendations

Recommendation

Kimball recommends that the State of Oregon move forward with Alternative Two to transition to a NG9-1-1 network and foster organic consolidation of PSAPs across the state. In order to provide a level of service that meets the expectations of its citizens and to keep up with technological changes, Oregon PSAPs need an end-of-lifecycle technology replacement to convert the analog 9-1-1 system to an IP-enabled digital broadband network that will provide enhanced functionality throughout the state.

Public safety in Oregon relies upon its aging analog systems that can no longer keep pace with industry changes or meet the citizen's expectations. Emergency communications systems are quickly being converted to digital interfaces across the nation. National organizations and associations have developed visions for the systems of the future and they all utilize IP-based networks.

Once the NG9-1-1 Network is fully implemented and operational, the Statewide 9-1-1 System should recognize approximately \$5 million per year in savings in a Next Generation environment while costs would continue to rise in the current environment. The State will need to operate both the current and NG9-1-1 networks for a period of time while the transition to NG9-1-1 is in process. So, system costs will increase during the transition phase. However, once the transition period is over and the State NG9-1-1 network is fully implemented, most costs of maintaining the current network will be eliminated, providing more funds to maintain the NG9-1-1 network.

It is important to consider the potential cost savings in migrating to NG9-1-1 versus the costs of maintaining the current system if the State were not to transition to NG9-1-1. These are funds that will then become available for distribution to local PSAPs. The amount of these funds and the timeframe they will become available depends on the method of transition to Next Generation and the transition timeframe.

The Emergency Communication Tax provides the Enhanced 9-1-1 Subaccount with available revenue of approximately \$13.86 million per year average over the last ten quarters. In FY2010-11, costs paid from the Enhanced 9-1-1 Subaccount totaled approximately \$12.12 million which is the cost of the status quo defined in Alternative One of this analysis. Several costs currently paid from the Enhanced 9-1-1 Subaccount may be alleviated once the current network has been transitioned to a NG9-1-1 network and may be utilized in different ways in a Next Generation environment.

Based on the phase two analysis, Kimball estimates that approximately \$1 million in current costs will carry forward after the transition to NG9-1-1 has occurred.

Table 7 summarizes the costs of all existing Oregon PSAPs transitioning to an IP network in year one, allowing some of the current costs to become available to pay for Next Generation costs. The "Total Revenue" column reflects the amount collected each year from the emergency communication tax. The "Current Costs" column reflects the amount expended on the current network. "Available Funding" is a calculation of the amount of revenue available after paying for the current costs; this is funding available for implementing Alternative Two. The "Difference" column tracks the difference between the total cost for the year and the total revenue.

Year	Total Revenue*	Current Costs**	Alternative 2 End-of-life Technology Replacement (NG9-1-1)	Available Funding	Total Cost for Year	Difference
2011	\$13,857,395	\$12,120,444	0	\$1,692,021	\$12,120,444	
2012	\$13,857,395	\$6,782,660	\$6,237,096	\$7,074,735	\$13,019,756	\$837,639
2013	\$13,857,395	\$1,277,323	\$9,982,208	\$12,580,072	\$11,259,531	\$2,597,864
2014	\$13,857,395	\$1,000,000	\$7,657,208	\$12,857,395	\$8,657,208	\$5,200,187
2015	\$13,857,395	\$1,000,000	\$7,157,208	\$12,857,395	\$8,157,208	\$5,700,187
2016	\$13,857,395	\$1,000,000	\$7,157,208	\$12,857,395	\$8,157,208	\$5,700,187
2017	\$13,857,395	\$1,000,000	\$7,157,208	\$12,857,395	\$8,157,208	\$5,700,187
2018	\$13,857,395	\$1,000,000	\$7,157,208	\$12,857,395	\$8,157,208	\$5,700,187
2019	\$13,857,395	\$1,000,000	\$7,157,208	\$12,857,395	\$8,157,208	\$5,700,187
2020	\$13,857,395	\$1,000,000	\$7,157,208	\$12,857,395	\$8,157,208	\$5,700,187
2021	\$13,857,395	\$1,000,000	\$7,157,208	\$12,857,395	\$8,157,208	\$5,700,187

Table 7—Cost Estimate of All PSAPs Transitioning to NG9-1-1

*The revenue was assumed to remain consistent for the next ten years. Since the time of this study, the revenue has declined to \$13,788,460.

** Based on the phase two analysis, Kimball estimates that approximately \$1 million in current costs will carry forward after the transition to NG9-1-1 has occurred.

As discussed above, the current system configuration justifies a transition to NG9-1-1 prior to PSAP consolidation. It is important to reiterate that the current analog 9-1-1 call delivery model severely limits the cost and service efficiencies that are afforded with consolidations that occur in the NG9-1-1 environment. Consolidating PSAPs on the frame relay network would take a toll on the Emergency Communications account because of connection costs, equipment replacement, and crossing LATA boundaries as laid out by the telephone companies. Any money spent on consolidating PSAPs on the current network would reduce the funds available to transition the state to a NG9-1-1 system.

Alternative Two meets all of the selection criteria as described in the Solution Selection Methodology and Criteria section in this document. Table 8, below, shows how Alternative Two meets these criteria while Alternative One and Three do not.

Goals	Alternative 1	Alternative 2	Alternative 3
1 Improve 9-1-1 service	No	Yes	No
2 Provide long term stability as technologies emerge	No	Yes	No
3 Meet public expectations	No	Yes	No
4 Provide cost efficiencies	No	Yes	No
5 Comply with OEM 9-1-1 five-year strategic plan	No	Yes	No
6 Support Oregon’s Safety Policy Vision	No	Yes	No
7 Encourage data and resource sharing	Yes	Yes	Yes
8 Support ORS 403.100	Yes	Yes	Yes

Table 8—Solution Selection Criteria

Emergency communications Statewide would benefit from further consolidation efforts once a technology replacement to NG9-1-1 has occurred as recommended in Alternative Two. PSAPs across the state have already shown themselves to be forward thinking and interested in working with neighboring PSAPs towards greater interoperability and efficiency. The nine region model represents a perfect world solution, which may or may not be achievable. However, it should be viewed as a long-term goal to work towards statewide. This model provides the best balance of service level standards and cost efficiencies.

Alternative One does not meet the selection criteria and is not the recommended option for the State of Oregon

Alternative One, status quo, is also not recommended. Remaining on the current network does not meet the selection criteria as stated in this Business Case Analysis. Status quo is taking no action to improve public safety for the State. Not only will remaining on the current network cost the State more money over the next ten years, as outlined in the Alternative One analysis, but also would be choosing to remain on a network that does not meet public safety expectations now and into the future. As the rest of the country is taking steps toward NG9-1-1 implementation, Kimball also recommends that Oregon continue to plan for and migrate to a NG9-1-1 system.

Alternative Three does not meet the selection criteria and is not the recommended option for the State of Oregon

Kimball does not recommend Alternative Three. Mandating consolidation of 9-1-1 call taking is highly discouraged. Separating the call taking and dispatching functions for 9-1-1 calls in a consolidated environment creates a risk to public safety. Minimizing the number of times a 9-1-1 call gets transferred is a key component to an effective system. When 9-1-1 call takers are located in a separate facility, the 9-1-1 call taker must conduct a preliminary interview to determine the nature and location of the emergency for each incoming 9-1-1 call. This preliminary interview serves two key purposes. First, it allows the call taker to identify the dispatch-only site to which the call must be transferred. Second, and more importantly, the preliminary interview assures that the caller's location, at minimum, is received should the call be lost unexpectedly so help can be sent. The call must then be transferred to the appropriate dispatch-only for dispatch of field personnel. The dispatcher then must re-interview the caller to assure the call has been delivered to the correct dispatch point, that the address and call nature are correct, and to gather further details regarding the incident. At times, a second transfer is needed, which would include a third similar interview, to assure all needed services such as police, fire and EMS are dispatched. In addition to the frustration experienced by the 9-1-1 caller, this system creates unnecessary delays in the dispatch of emergency personnel. The average length of time added to a call during this process is 30 seconds for each transfer.

While 30 seconds seems like a short period of time, consider that 30 seconds may be the difference between:

- A person being rescued from a house fire or becoming a fatality
- A violent criminal being apprehended or escaping
- A heart attack victim being resuscitated or dying
- A drowning victim suffering brain damage or recovering fully
- A hunting accident victim bleeding to death or recovering

While these are dramatic examples, they are examples of real situations that occur daily in public safety. In emergencies, seconds do count.

It is essential that both call taking and dispatch be taken into consideration when consolidating to ensure an efficient and effective emergency communications system statewide. Although these components are interwoven with each other and, in small PSAPs, often performed simultaneously by the same person, funding is split between two entities, the State and the local PSAP. The State

manages the funding of the 9-1-1 equipment and network while costs associated with dispatch functions are considered the responsibility of the local municipalities. The method in which these costs are managed varies from state to state. However, across the country this split in control and/or funding has created an environment where the states may become focused on only the portion for which they are financially responsible rather than the whole emergency communications picture, as is happening presently in the State of Oregon.

Consequences of Failure to Act

It is imperative that Oregon keep its 9-1-1 system up-to-date with technology and move toward the Next Generation of 9-1-1. Updating technologies and implementing new networks now will assure that Oregon is prepared to support and participate in any national initiatives to share critical data in the future. The safety of Oregon's citizens is dependent upon providing the highest level of public safety available. Remaining on the current network is not consistent with the 9-1-1 Five-Year Plan and the vision of 9-1-1 moving forward. Oregon also needs to keep up with citizen expectations of the 9-1-1 system in order to adequately maintain the public's safety. Doing nothing and leaving the public safety of Oregon citizens to an antiquated analog system that is not compatible with modern communications technologies is not a viable option.

Cost benefit analysis has shown that it will be more expensive to remain on the current frame relay network and the phone companies' analog circuits over the next ten years than to transition and run on a NG9-1-1 network for the next ten years. It will also be more cost effective to consolidate PSAPs after a transition to a NG9-1-1 network is complete as opposed to consolidating in the current environment.

Citizens know to call 9-1-1 for help. In the case of an emergency seconds can mean the difference between life and death. The caller expects the telecommunicator on the other end of the line to know where they are and dispatch help quickly and correctly. A NG9-1-1 network will improve the public safety system for the citizens who call 9-1-1 and will eventually allow people in danger to reach help by other means such as text, video, social media, telematics, and more as new life saving technology is introduced. NG9-1-1 technology is available and attainable in the state of Oregon. Choosing to remain on the current network would be depriving the citizens and visitors of Oregon the highest level of public safety possible today.

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Glossary

ALI

Automatic Location Information is the address of the person placing the 9-1-1 call.

ANI

Automatic Number Identification is the telephone number of the person calling 9-1-1.

CAD

Computer Aided Dispatch

Call Access Services

All services and equipment required by carriers to send emergency data and calls to the Oregon answering points. Circuits for these connections are also included.

CLEC

Competitive Local Exchange Carrier

Circuit

A circuit is a connection between two points that can be made through various media, such as fiber and coaxial cable.

Core Connections

The core of the Next Generation network, which contains the servers performing the call routing functionality as well as the data centers. NG9-1-1 services and databases are included in this section of the network. This section of the network correctly identifies where the emergency call is to be delivered and applies supplemental information to the call flow.

Emergency Services IP Network (ESInet)

ESInet is an IP-based inter-network (network-of-networks) shared by all agencies that may be involved in any emergency.

Geographic Information System (GIS)

GIS is a computer software system that enables one to visualize geographic aspects of a body of data. It contains the ability to translate implicit geographic data (such as a street address) into an explicit map location. It has the ability to query and analyze data in order to receive the results in the form of a map. It also can be used to graphically display coordinates on a map (i.e. latitude/longitude) from a wireless 9-1-1 call.

ILEC

Incumbent Local Exchange Carrier

Internet Protocol (IP)

IP is the method by which data is sent from one computer to another on the Internet or other networks. IP is part of the Transmission Control Protocol (TCP)/IP family of protocols describing software that tracks Internet addresses of nodes, routes outgoing messages, and recognizes incomplete messages. IP is used in gateways to connect networks to the Open Systems Interconnection (OSI) network level 3 and above.

LATA

Local Access and Transport Area is the geographical area within which a local telephone company offers service.

Master Street Address Guide (MSAG)

MSAG is a database of street names and house number ranges within their associated communities defining Emergency Service Zones (ESZs) and their associated Emergency Service Numbers (ESNs) to enable proper routing of 9-1-1 calls.

Multi-protocol Label Switching (MPLS)

MPLS is a data-carrying mechanism that belongs to the family of packet-switched networks. MPLS operates at an OSI Model layer that is generally considered to be between traditional definitions of Layer 2 (Data-Link Layer) and Layer 3 (Network Layer), and thus is often referred to as a "Layer 2.5" protocol. MPLS was designed to provide a unified data-carrying service for both circuit-based clients and packet-switching clients that provide a datagram service model.

PSAP

Public Safety Answering Point receives and processes 9-1-1 calls for a defined geographic area.

PSAP Connections

All the equipment (hardware and software), connections to the network, and firewalls needed to allow the PSAP to receive NG9-1-1 traffic from the call processing section of the network. This includes workstations.

Router

A router is a device that connects like and unlike Local Area Networks (LANs).

Service Provider

SP is an entity providing one or more of the following 9-1-1 elements: network, CPE, or data base service.

Switch

A switch is a device that opens or closes circuits, completes or breaks electrical paths, or selects paths or circuits. Switches look at incoming data to determine the destination address.

T1

T1 is a digital transmission link with a signaling speed of 1.544 Mbps; it is a standard for digital transmissions in North America. T1 is part of the progressive digital transmission pipes commonly referred to as DS or Digital Signal.

Transmission Control Protocol (TCP)

TCP is the end-to-end reliability protocol that recognizes and corrects lower layer errors caused by connectionless networks. TCP provides reliable byte stream communication between pairs of processes in hosts attached to interconnected networks. It is the portion of the TCP/IP protocol suite that governs the exchange of sequential data.

Voice over Internet Protocol (VoIP)

VoIP is a general term for a family of transmission technologies for delivery of voice communications over IP networks such as the Internet or other packet-switched networks. The IP address assigned to the user's telephone number may be static or dynamic.

Appendices and References

Appendix A—Funding History Overview

The 1981 statute that established OEM 9-1-1 included a mandate for statewide 9-1-1 services and instituted a 3 percent surcharge on subscriber's telephone lines. In June 1991, the Legislature amended the law to require the implementation of E9-1-1 in all of Oregon by the year 2000, and increased the 9-1-1 tax rate from 3 to 5 percent. The additional 2 percent was dedicated for Statewide enhancement of existing 9-1-1 systems and to establish a telecommunicator standards and certification program. In June 1995, the Legislature changed the structure of the tax from 5 percent of the local access bill to a flat rate of \$0.75 on any retail subscriber who has telecommunication services capable of accessing the 9-1-1 network. Reasons for this adjustment included actions by the Oregon Public Utilities Commission (PUC) that sharply reduced 9-1-1 revenues, and revolutionary changes occurring in the telecommunications industry, including the increase in wireless phone usage and the FCC Phase II mandate. In July 2007, the Legislature extended the 9-1-1 tax sunset date to January 1, 2014.¹⁴

The Emergency Communications Tax rate has not changed since 1995. The tax is \$0.75 per device per month for retail subscribers who have telecommunication services capable of accessing the 9-1-1 network. If adjusted for inflation, the \$0.75 being collected in 1995 would equal \$1.15 per device per month today according to the Bureau of Labor Statistics Inflation Calculator. However, the Tax remains at \$0.75 per device per month.

Funding Mechanisms

Emergency Communications Tax

In Oregon, 9-1-1 is funded by an Emergency Communications Tax of \$0.75 per device per month. The tax is imposed on a per instrument basis on subscribers who have telecommunication services with access to the 9-1-1 system. Subscribers are responsible for paying the tax. Communications providers collect the tax from their subscribers on a monthly basis and remit it to the Department of Revenue each quarter.¹⁵ The Department of Revenue pays the moneys received to the State Treasury, which credits the Emergency Communications Account.

Thirty-five percent of the amount in the Emergency Communications Account on the date of credit is then credited to the Enhanced 9-1-1 Subaccount. All monies in both accounts are continuously appropriated to OEM 9-1-1. The funds are administered in compliance with the Oregon Administrative Rules (OAR) for E9-1-1 Emergency Telephone Systems,¹⁶ which establishes the allowable expenditures at the primary PSAP.

The Department of Revenue is then paid their actual cost or up to one-half of 1 percent for their cost of collecting the tax, whichever is less. Up to 4 percent is used by OEM 9-1-1 to provide administration. OEM 9-1-1 is charged with distributing the entire amount of money in the Emergency Communications Account every quarter.

After the appropriate amounts are paid to the Enhanced 9-1-1 Subaccount and the administrative costs have been paid to the Department of Revenue and OEM 9-1-1, then OEM 9-1-1 distributes the remaining balance to the 9-1-1 jurisdictions on a per capita basis. Each county is allocated at least 1 percent of the account balance.

¹⁴ Oregon Emergency Management State 9-1-1 Program, Five-Year Strategic Plan 2010-2014, page 7

¹⁵ ORS 403.215

¹⁶ Oregon Administrative Rules 104-080

According to the State and some local PSAP managers, the distribution of the Emergency Communications Tax to the 9-1-1 jurisdictions is approximately 25 percent of the total resources available to operate a PSAP. The remainder of 9-1-1 funding for a respective PSAP is funded through various local sources depending on the locality.¹⁷ No State General Fund or other monies are used to pay for 9-1-1 costs, only Emergency Communications Tax and local money.

The figure below illustrates the distribution breakdown of the Oregon Emergency Communications Account for one quarter, assuming the account holds \$13 million on the day of distribution.

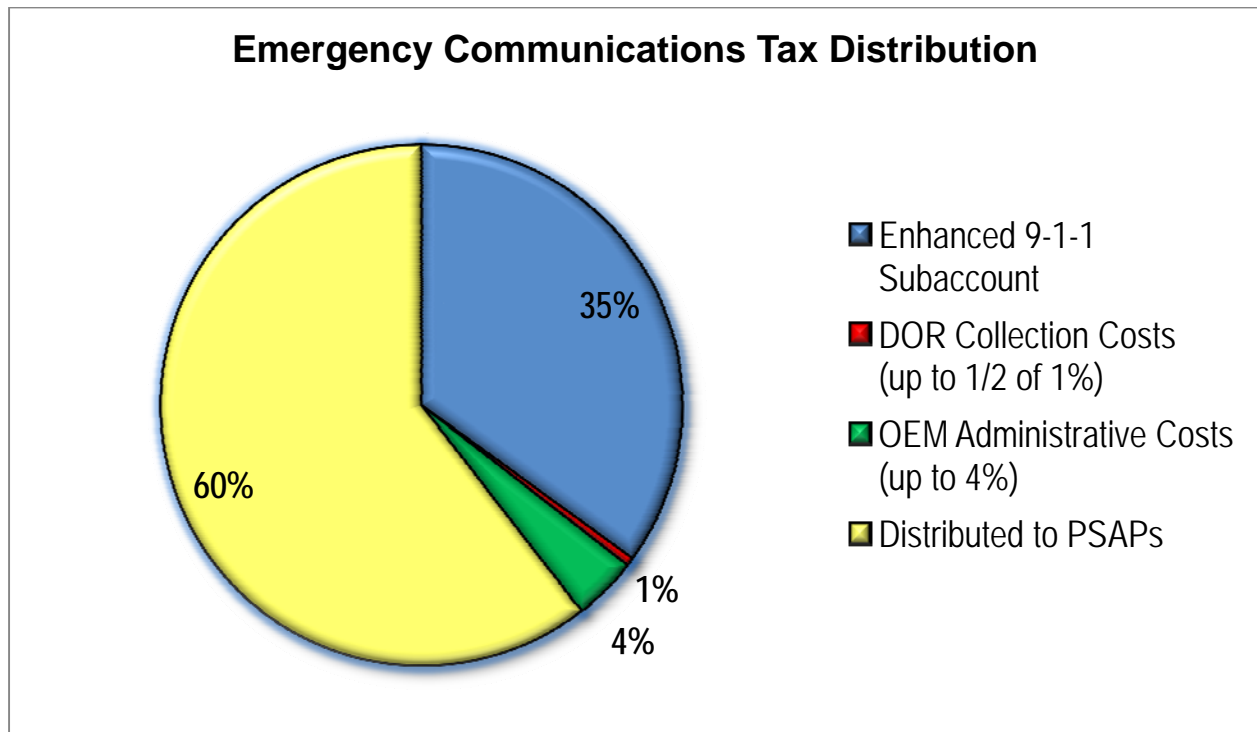


Figure 6—Breakdown of Oregon Emergency Communications Account for One Quarter

Enhanced 9-1-1 Subaccount

The Enhanced 9-1-1 Subaccount pays for costs incurred for E9-1-1 telephone service established pursuant to ORS 403.115. Funds are distributed on a request for reimbursement basis. A 9-1-1 jurisdiction may request reimbursement for recurring and non-recurring charges necessary to provide E9-1-1 telephone service only if the jurisdiction has an approved final plan as required in section 7, chapter 743, Oregon Laws 1991.¹⁸ OEM 9-1-1 is required to limit the disbursements for costs incurred before the last quarter to database development, network and on-premises equipment.¹⁹

Eligible Costs

Funds from the Emergency Communications Account can only be used to pay for:

planning, installation, maintenance, operation and improvement of a 9-1-1 emergency reporting system as it relates to getting the call from the member of the public to the

¹⁷ Ibid, 403.235

¹⁸ Ibid, 403.240(3)

¹⁹ Ibid, 403.240(4)

primary Public Safety Answering Point and in transmitting the information from the primary PSAP to the secondary PSAP or responding police, fire, medical or other emergency unit by telephone, radio or computerized means.²⁰

The majority of PSAPs use most of this funding to pay for 9-1-1 call taking personnel.

The Enhanced 9-1-1 Subaccount has specific eligible costs. From this subaccount, a 9-1-1 jurisdiction can request reimbursement for recurring and non-recurring charges necessary to provide E9-1-1 telephone service. Reimbursable costs are only those incurred for the following items:

- Modification of central office switching and trunking equipment
- Network development, operation and maintenance
- Database development, operation and maintenance
- On-premises equipment procurement, maintenance and replacement
- Conversion of pay station telephones
- Collection of the tax
- Addressing, if the reimbursement request is consistent with rules adopted by the Office²¹

Eligible costs related to both the Emergency Communications Account and the Enhanced 9-1-1 Subaccount are further developed in the OAR for E9-1-1 Emergency Telephone Systems Program, Funding Considerations 104-080-0060.

Accounting Reports

An accounting report to OEM 9-1-1 is required to be submitted by all 9-1-1 jurisdictions annually.²² Public Safety Answering Points are responsible for self-reporting their budgetary information; this is a requirement for every PSAP, with the exception of the Warm Springs Police Department, which is located within tribal territory. PSAPs must provide information regarding how much Emergency Communications Tax money they received. PSAPs must also indicate the percentage of their total funds that came from the Emergency Communications Account and how the funds were used. OEM 9-1-1 compiles the information into a summary budget report for all PSAPs each fiscal year, but does not conduct an audit of PSAP financial records.

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²⁰ Ibid, 403.245

²¹ Ibid, 403.240(3)

²² Ibid, 403.240

Appendix B—Enhanced 9-1-1 Subaccount Fund Expenditures

The Emergency Communications Tax through the Enhanced 9-1-1 Subaccount funds all costs associated with the statewide network, databases and PSAP CPE. In 2011, the State identified the 9-1-1 expenses listed below, which were paid from the Enhanced 9-1-1 Subaccount and totaled approximately \$12.12 million. The costs associated with following categories are listed in Table 2—Enhanced 9-1-1 Subaccount Expenditures.

- **Administrative costs** – This includes a variety of costs, such as consultative fees, separate from the up to 4 percent account to fund OEM 9-1-1 operations.
- **CPE** – This includes purchasing, replacing or upgrading PSAP equipment.
- **CPE maintenance** – This includes recurring charges for PSAP CPE annual maintenance.
- **GIS/Mapping equipment** – This includes 9-1-1 PSAP hardware and software, as well as purchasing replacements and upgrades.
- **MSAG²³/GIS maintenance** – This includes software and the personnel to maintain the data, specifically:
 - Recurring charges for PSAP software upgrades, annual maintenance, and technical support
 - Development costs for new GIS data layers
 - PSAP reimbursements for work completed to ensure GIS data layers and MSAG databases are up to date
- **Network recurring and nonrecurring costs** – This includes the frame relay network currently in place. The cost is divided evenly among 49 PSAPs (at the time of the study) and specifically includes the following:
 - 9-1-1 PSAP call reporting contract
 - Frame relay equipment
 - Frame relay maintenance
 - Frame relay monthly access
 - 9-1-1 terminal lines
- **PSAP circuits** – This includes the 9-1-1 PSAP phone bills for recurring charges for circuits from the selective routers to carry 9-1-1 service.
- **PSAP facility** – This includes replacement or upgrades based on PSAP facility needs for CPE.
- **UPS²⁴ equipment and maintenance** – This includes UPS hardware purchases and recurring maintenance costs.
- **Wireless needs** – These costs are divided evenly among 49 PSAPs (at the time of the study) and include the items listed below, which are not all inclusive:
 - Wireless accuracy testing
 - Wireless equipment
 - Wireless service charges
 - Database charges
 - Pseudo automatic number identification (pANI) charges

²³ Master Street Address Guide

²⁴ Uninterruptible power supply

Appendix C—Technology Upgrade to NG9-1-1 Timeline Considerations

A request for proposal (RFP) process will need to be performed prior to the start of implementation. This process will need to be very thorough in order to transition successfully within the current funding structure. Once the RFP is complete and contracts have been signed, the actual transition timeline can begin. Kimball estimates this part of the project could take 18 to 24 months to complete.

Kimball believes that transition to the new network will take at least three years after a vendor has been selected and contracts signed. It is possible once CPE equipment has been upgraded to transition the PSAPs on a PSAP-by-PSAP basis.

Timeline

Prior to the beginning of the transition timeline, OEM 9-1-1 will need to make decisions regarding the ALI databases, such as the following:

- Location and providers of ALI databases
- Access methodologies
- Integration into ESInet

The figure on the following page illustrates a sample timeline.

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Figure 7—Sample Timeline

*Note: The timeline for year one begins once the RFP is complete, vendors have been selected, and a contract signed. It is possible (and quite probable) that year one would not actually happen in 2012, but rather 2013.

+Note: This can happen on a PSAP-by-PSAP basis.

**Note: The network will still be IP selective routing at this point.

In the phase two report, Scenario Three pricing includes a completely new network and new equipment for all nine PSAPs. It is important to note that Scenario Three does not include the cost to build out facilities if needed for any of the nine regional PSAPs.

Appendix D—Alternative Two Risk Analysis

Risk Weighting

Every risk has with it three variables that can be used to measure the importance of the risk.

Severity - This is the effect on the project in the event that the risk occurs. This is rated on a scale of 1 to 5 with 1 being minimal impact and 5 being catastrophic impact.

Probability - This is the measure of the likelihood of the risk occurring. This is rated on a scale of 1 to 5 with 1 being unlikely and 5 being almost a sure thing.

Exposure - Exposure is the measure of how long this risk is present during the project. If the risk is only present during a single phase, it may be low. This is rated on a scale of 1 to 4 with 1 being a short time and 4 being almost the entire project.

Severity		Probability		Exposure	
Score	Explanation	Score	Explanation	Score	Explanation
1	Little impact	1	20 percent likely	1	Less than 25 percent
2	Some Impact	2	40 percent likely	2	26 to 50 percent
3	Moderate Impact	3	60 percent likely	3	51 to 75 percent
4	Severe Impact	4	80 percent likely	4	76 to 100 percent
5	Catastrophic Impact	5	100 percent likely		

The ratings in these various categories are multiplied to develop a rating for each risk defined. These risk ratings can be used to mitigate the risks that have the most impact first or to set a priority for addressing the risk.

Caution must be used as all risks should be reviewed even if they have a low priority. Even low priority risks are still risks to successful project completion

Risk	Severity 1 to 5	Probability 1 to 5	Impact Score	Exposure 1 to 4	Exposure Timeframe	Score	Mitigation Method
Standards and specific training do not exist for operating in an IP environment with new types of media such as text, video, phones, data, and a substantial increase in information being delivered with a call.	5	5	● 25	4	Deployment	● 100	Provide standards and training prior to the deployment of the services.
The impact on call takers will be the increased complexity of the call taking process due to multi-media data.	5	5	● 25	4	Deployment	● 100	Policy and training will need to focus on giving the staff the direction, knowledge, and decision-making skills needed to determine what information should be relayed to dispatchers and responders. Policy will also drive how supportive or supplemental information (for example, automatic crash notification data or patient allergies to certain medications) will be used, processed and stored or relayed.
There are operational areas that will be impacted by a next generation environment Working together to share new data forms will necessitate new forms of cooperation and agreements.	4	4	● 16	3	Ongoing	● 48	Response agencies at all levels (local, county and state) will need to work together to ensure inter-agency policies and technology are in place. This may mean establishing new relationships and upgrading critical technology to enable effective "across-the-board" sharing of information.
NG9-1-1 implementation is impacted by the sunset of the 9-1-1 excise tax. A portion of the 9-1-1 excise tax is used for the administration of OEM in order to carry out its duties under statute.	5	1	● 5	4	Until the statute is renewed	● 20	A legislative concept was submitted that would revise current statute ORS 403.200 Sec 4. (1) to extend the date of the 911 tax to sunset prior to January 1 , 2026.
Standards for security in a NG9-1-1 environment will change from the security needs on the current network.	5	4	● 20	4	Ongoing	● 80	Oregon can be proactive in going through their security process to apply NENA's Next Generation Security Standard (NG-SEC).

Appendix E—Legislative Concepts

Agency Legislative Concept Request

Agency #/Concept #:

Placeholder? Yes No

Date: 7/9/12

(TEXT BOXES EXPAND AS NEEDED)

Agency: Oregon Military Department

Division/Program: Oregon Emergency Management/9-1-1 Program

Concept Subject or Title: 9-1-1 \$0.75 Excise Tax Extension

Concept Contact Person: Martin Plotner

E-Mail: Martin.Plotner@state.or.us

Phone: 503-378-2911

Agency Legislative Coordinator: Mike Caldwell

E-Mail: Mike.Caldwell@mil.state.or.us

Phone: 503-584-3884

1. Impact to Outcome Area(s)

- Education Healthy People Economy and Jobs Housekeeping Only
 Healthy Environment Safety Improving Government

2. Problem (Completely describe the problem you propose to solve.)

There is imposed on each paying retail subscriber who has telecommunication services with access to the 9-1-1 emergency reporting system a tax equal to 75 cents per month. Taxes imposed under ORS 401.792 [renumbered 403.200] apply to subscriber bills issued on or after January 1, 2002, and before January 1, 2014. [2002 s.s.1 c.5 §4(1); therefore the 9-1-1 excise tax sunsets prior to January 1, 2014. This tax helps support Oregon's statewide 9-1-1 system.

3. Proposed Solution (Completely describe what the concept does to fix the problem. Do not include proposed statute changes here.)

Revise current statute ORS 403.200 Sec 4. (1) to extend the date of the 911 tax to sunset prior to January 1, 2026.

4. Has this been introduced in a prior session? No Yes Years(s) Bill#(s)

Does this amend current law or programs? No Yes (Specify) ORS 403.200 Sec 4. (1)

Is this related to a legal decision? No Yes (Case cite, AGO No. date, etc. – *attach copies*)

5. Proposed Changes to Statute (Please attach your best attempt at proposing changes to statute to accomplish your goal; however Legislative Counsel may draft alternate language.)

6. Stakeholders and/or Other Affected Agencies who are Aware of Your Concept

Agency:	Contact Person:	Phone:
Willamette Valley Comm. Ctr.	Mark Buchholz	503-763-3333
Clackamas County Comm.	Mark Spross	503-655-8882

7. Known Support or Opposition (Please elaborate.)

Support of the Oregon chapter of the Association of Public Safety Communications Officials & National Emergency Number Association

8. **Increases fees or assessments?** No Yes Provide Form

Concept has other fiscal, revenue or position (FTE) impacts? No Yes Provide Form

9. **For PLACEHOLDERS – ALL additional substantive information is due to DAS no later than July 13. This concept is a PLACEHOLDER.** No Yes (approximate delivery date)

10. **Additional Information or Attachments (Briefly describe attachments - draft language, opinions, etc.)**

11. **Approved for Drafting:**

Governor's Office

Date

Department of Administrative Services

Date

Agency Legislative Concept Request

Agency #/Concept #:

Placeholder? Yes No

Date: 7/9/12

(TEXT BOXES EXPAND AS NEEDED)

Agency: Oregon Military Department

Division/Program: Oregon Emergency Management/9-1-1 Program

Concept Subject or Title: 9-1-1 Prepaid Telecommunications Tax Collection

Concept Contact Person: Martin Plotner

E-Mail: Martin.Plotner@state.or.us

Phone: 503-378-2911

Agency Legislative Coordinator: Mike Caldwell

E-Mail: Mike.Caldwell@mil.state.or.us

Phone: 503-584-3884

1. Impact to Outcome Area(s)

- Education Healthy People Economy and Jobs Housekeeping Only
 Healthy Environment Safety Improving Government

2. Problem (Completely describe the problem you propose to solve.)

Current statutes provide for the collection of 9-1-1 emergency communications tax on any device capable of accessing the 9-1-1 system with a reference to Federal law that excludes prepaid services. An estimated 20% of wireless customers are classified as "prepaid" and do not pay into the 9-1-1 tax. These customers are provided the same level of service without the added revenue for the operation and support of Oregon's 9-1-1 system. Per the Department of Revenue the Governor's office has requested a stand alone AG's opinion regarding statutory language and its applicability to Pre-Paid Cellular devices. The outcome of this new opinion will have a direct impact on whether or not we move forward with this Pre-Paid Legislative Concept. The new AG opinion is due to be released by the end of this month, but the deadline to submit attachments for placeholder LC's is July 13th.

We will submit this LC, while waiting to review the new AG opinion and make a determination if we need to move forward with our LC or drop it.

3. Proposed Solution (Completely describe what the concept does to fix the problem. Do not include proposed statute changes here.)

Revise current statutes to include definitions of and collection mechanisms for the recovery of the existing 9-1-1 tax on prepaid customers through providers of such services

4. Has this been introduced in a prior session? No Yes Years(s) 2011 Bill#(s) HB 2075

Does this amend current law or programs? No Yes (Specify) ORS 403.105

Is this related to a legal decision? No Yes (Case cite, AGO No. date, etc. – *attach copies*)

5. Proposed Changes to Statute (Please attach your best attempt at proposing changes to statute to accomplish your goal; however Legislative Counsel may draft alternate language.)

6. Stakeholders and/or Other Affected Agencies who are Aware of Your Concept

Agency:

Contact Person:

Phone:

Department of Revenue

Debra L. Buchanan

503-945-8653

Public Utility Commission

Jon Cray

503-373-1400

7. Known Support or Opposition (Please elaborate.)

Support of the Oregon chapter of the Association of Public Safety Communications Officials & National Emergency Number Association and the Public Utility Commission

8. Increases fees or assessments? No Yes Provide Form

Concept has other fiscal, revenue or position (FTE) impacts? No Yes Provide Form

9. For PLACEHOLDERS – ALL additional substantive information is due to DAS no later than July 13. This concept is a PLACEHOLDER. No Yes (approximate delivery date) 7/11/12

10. Additional Information or Attachments (Briefly describe attachments - draft language, opinions, etc.)

11. Approved for Drafting:

Governor's Office

Date

Department of Administrative Services

Date

D R A F T

SUMMARY

Requires moneys in Emergency Communications Account, including Enhanced 9-1-1 Subaccount, to be used for purposes of 9-1-1 emergency communications unless statutory exception is made during state of fiscal emergency. Defines "fiscal emergency."

Declares emergency, effective on passage.

A BILL FOR AN ACT

1
2 Relating to 9-1-1 emergency communications; creating new provisions;
3 amending ORS 403.235; and declaring an emergency.

4 **Be It Enacted by the People of the State of Oregon:**

5 **SECTION 1.** ORS 403.235 is amended to read:

6 403.235. (1) The Emergency Communications Account is established sepa-
7 rate and distinct from the General Fund in the State Treasury. All moneys
8 received by the Department of Revenue pursuant to ORS 403.200 to 403.230
9 and interest thereon must be paid to the State Treasurer to be held in a
10 suspense account established under ORS 293.445. After payment of refunds,
11 the balance of the moneys received must be paid into the State Treasury and
12 credited to the Emergency Communications Account. All moneys in the ac-
13 count are continuously appropriated to the Office of Emergency Management
14 and must be used for the purposes described in ORS 403.240.

15 (2) The Enhanced 9-1-1 Subaccount is established as a subaccount of the
16 Emergency Communications Account. Thirty-five percent of the amount in
17 the Emergency Communications Account on the date of distribution must be
18 credited to the Enhanced 9-1-1 Subaccount. All moneys in the [*account*]
19 **subaccount** are continuously appropriated to the Office of Emergency

1 Management and must be used for the purposes described in ORS 403.240 (3),
2 (4) and (5).

3 **(3) Moneys in the Emergency Communications Account, including**
4 **the Enhanced 9-1-1 Subaccount, may be used only as described in**
5 **subsections (1) and (2) of this section unless this section and ORS**
6 **403.240 are modified to allow a different use or eliminated by amend-**
7 **ment or repeal during a state of fiscal emergency.**

8 **(4) As used in this section, "fiscal emergency" means a projected**
9 **deficit for the biennium, as most recently projected by the Oregon**
10 **Department of Administrative Services under ORS 291.261 (1), of at**
11 **least 12 percent below the amounts estimated to be received for the**
12 **biennium, as estimated after adjournment sine die of the odd-**
13 **numbered year regular session of the Legislative Assembly pursuant**
14 **to ORS 291.349 (1).**

15 **SECTION 2. The amendments to ORS 403.235 by section 1 of this**
16 **2013 Act apply to moneys deposited in the Emergency Communications**
17 **Account on or after the effective date of this 2013 Act.**

18 **SECTION 3. This 2013 Act being necessary for the immediate pres-**
19 **ervation of the public peace, health and safety, an emergency is de-**
20 **clared to exist, and this 2013 Act takes effect on its passage.**

21
