



*Report for*

# Next Generation 9-1-1 Cost Analysis

*prepared for*

## State of Oregon Office of Emergency Management

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**ARCHITECTURE • ENGINEERING • COMMUNICATIONS TECHNOLOGY**

AVIATION | CIVIL | CONSTRUCTION SERVICES | DATA SYSTEMS | ENVIRONMENTAL  
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## EXECUTIVE SUMMARY

L.R. Kimball respectfully submits this Next Generation 9-1-1 (NG9-1-1) Cost Analysis Report to the State of Oregon Office of Emergency Management (State OEM).

In the past 15 years there have been dramatic changes in the telecommunications industry, and public safety and emergency communications systems have had to change to keep pace. However, the aging systems that public safety has relied on can no longer keep pace with industry changes. National agencies and associations such as the National Emergency Number Association (NENA) and the U.S. Department of Transportation (USDOT) have developed their visions of the systems needed to operate in the future. The central theme throughout all of the major visions of the next generation is an Internet Protocol (IP)-enabled broadband network that can share voice, video, and data. This network must be a mission critical, secure, and fail-safe public safety system.

With this vision in mind and looking towards the future and NG9-1-1, the OEM contracted L.R. Kimball to provide an analysis of NG9-1-1 options. In Phase 1 of this project, L.R. Kimball conducted a cost analysis of NG9-1-1 options to determine the cost of transitioning the current OEM program to an NG9-1-1 system. Phase 2 will provide a more in-depth analysis of transitioning Oregon public safety answering points (PSAPs) to NG9-1-1 based on available funding.

Throughout the process, L.R. Kimball worked closely with OEM staff to gather information for this analysis. The State provided technical and financial information. L.R. Kimball performed the data analysis based on its industry experience and expertise and similar project experience in other states.

Areas of analysis included an examination of the background of 9-1-1 funding in the State. In 1981, the Oregon Legislature (Legislature) established the 9-1-1 Program within the OEM of the Oregon State Police. The statute that established the 9-1-1 Program included a mandate for statewide 9-1-1 services. The 9-1-1 Program is responsible for the coordination and management of the 9-1-1 call delivery network, as well as overseeing the distribution of 9-1-1 telephone tax revenue. In Oregon, 9-1-1 is funded by an Emergency Communications Tax of 75 cents 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. Carriers remit the tax from their subscribers to the Department of Revenue, which pays the moneys received to the State Treasury, which in turn credits the Emergency Communications Account. The OEM is charged with distributing the entire amount of money in the Emergency Communications Account every quarter. 9-1-1 jurisdictions are required to submit an accounting report to the OEM annually.

This funding allows the 9-1-1 system in Oregon to serve 3.8 million residents from 49 PSAPs in 36 counties. Combined, the PSAPs have 279 call taker workstations. The 9-1-1 system in Oregon was built on a core infrastructure that is unable to support new communications technologies. The 9-1-1 Program Office is currently planning for the evolution of the legacy 9-1-1 system to one capable of delivering IP-based data elements, digital voice communications and associated location information. This process is positioning Oregon for a seamless integration into the next generation of 9-1-1 and emergency communications. This NG9-1-1 system infrastructure will enable communications utilizing voice, data, and video. The system's purpose is to provide seamless data exchange and information/intelligence sharing for responding to and managing emergencies of any type and scale.

To complete the cost analysis, L.R. Kimball developed two options for implementing NG9-1-1 statewide. *Option One* is a complete replacement of all current call taking equipment in each of the 49 PSAPs, regardless of where the current legacy equipment is in its lifecycle. *Option Two* analyzes and determines the current call taking equipment throughout the state that is upgradeable to handle NG9-1-1 technologies. In each of the 49 PSAPs, only the equipment that cannot be upgraded would be replaced.

L.R. Kimball estimates the cost for *Option One* at \$11,286,208 USD in year 2012 and \$7,061,208 USD per year for years 2013 - 2021. The year 2012 total includes non-recurring costs that will be encountered at system installation. The total for years 2013 – 2021 includes recurring costs per year.

L.R. Kimball estimates the cost for *Option Two* at \$10,823,503 USD in year 2012 and \$7,115,976 USD per year for years 2013 - 2021. The year 2012 total includes non-recurring costs that will be encountered at system installation. The total for years 2013 – 2021 includes recurring costs per year.

Through *Option One* and *Option Two*, the State will need to sustain both the legacy and NG9-1-1 networks for a period of time while the transition to NG9-1-1 is in process. However, once the transition period is over and the State NG9-1-1 network is fully implemented, some costs of maintaining the legacy network will be eliminated, providing the availability of more funds to maintain the NG9-1-1 network. The amount of these funds and the timeframe they will become available depends on the method and timeframe of the transition to the NG9-1-1 network.

To determine what the State can afford in terms of NG9-1-1 with their current funding environment, L.R. Kimball examined what Oregon currently spends. The Emergency Communications Tax provides the State with available revenue of approximately \$13,857,395 per year to be placed in the Enhanced 9-1-1 Account for maintaining the current system. In 2010, the State identified \$12,165,375 in expenditures paid from the Enhanced 9-1-1 account. If the State fully maintains the current network while transitioning to NG9-1-1, only \$1.692 million per year will be available for the NG9-1-1 transition.

**Phase 1 of this report indicates that the State cannot afford to transition all 49 PSAPs (279 workstations) to NG9-1-1 based upon current levels of revenue and expenditures of the legacy system.**

In the Phase 1 analysis, L.R. Kimball found that both *Option One* and *Option Two* describe an environment where more funds would have to be expended initially to save money in the future. The options describe a short transition period to minimize the amount of money being spent to support both networks. There are ways in which the State could complete the transition to NG9-1-1 over a longer period of time, but these options would need to be examined in further detail with the State of Oregon in Phase 2 of the project.

## 1. INTRODUCTION

Legacy 9-1-1 systems developed using 1960s technology and designed to handle landline calls have worked quite well for the last four decades. In the past 15 years, however, there has been a dramatic change in the communications technologies used to call 9-1-1.

The traditional wired home phone has been and continues to be replaced by Voice over IP (VoIP) phones and wireless cellular 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.<sup>1</sup> To deliver 9-1-1 calls from the new services, a work-around had to be developed, which added expense and created additional steps for the PSAPs.

In the 1990s, texting was added to the wireless phone. This technology is rapidly becoming the communication method of choice for the hearing impaired and the younger population. Current 9-1-1 networks cannot deliver text calls to PSAPs. Recent incidents, including the 2007 Virginia Tech shootings where students tried to text 9-1-1 for help, underscored the technology limitations of the current 9-1-1 system and the need for a more robust and flexible 9-1-1 communications system.

In December 2005, the FCC's National Reliability and Interoperability Council VII published a report describing the future 9-1-1 system at a high level. Since then, NENA has worked with 9-1-1 professionals in the PSAP and technology industries to determine the needs, solutions and standards for what has become known as NG9-1-1. NG9-1-1 will allow "calls" from multiple devices and technologies, and provide a mission critical, redundant, yet flexible system to serve 9-1-1 now and into the future.

With an eye toward NG9-1-1 and an understanding of current and future costs and funding issues, the State OEM selected L.R. Kimball to provide an analysis of the most cost effective way of reaching and supporting an NG9-1-1 environment. L.R. Kimball examined the current costs of E9-1-1 in Oregon and the anticipated cost of an NG9-1-1 network and has provided two options based on the analysis for consideration.

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<sup>1</sup> [www.fcc.gov/Daily\\_Releases/Daily\\_Business/2010/.../FCC-10-200A2.doc](http://www.fcc.gov/Daily_Releases/Daily_Business/2010/.../FCC-10-200A2.doc)

## 2. METHODOLOGY

### 2.1 Data Collection

L.R. Kimball worked closely with OEM staff to gather information for this analysis. The State provided the following technical and financial information:

- Revenue and cost information regarding the state's 9-1-1 tax
- Expenditures at the state level to the PSAPs over the last five years
- PSAP call volume in the state over the past five years
- Technology used at the PSAPs regarding 9-1-1 equipment
- Expenditures at the state level to local exchange carriers (LECs) that service the state

L.R. Kimball compiled information into charts and tables to further understand the current conditions in the state and to facilitate analysis. L.R. Kimball staff worked on-site at the Anderson Readiness Center in Salem, Oregon to maximize communications and held conference calls with OEM staff to discuss data collection and analysis.

L.R. Kimball assumes that all information collected from the State is correct and accurate. An assessment of the accuracy of the information provided is not within the project scope.

### 2.2 Data Analysis

L.R. Kimball performed the data analysis based on its industry experience and expertise and similar project experience in other states.

Primary areas of analysis included:

- State revenue from 9-1-1 tax
- State distributions to PSAPs
- Current PSAP technology
- Available options in the state for preliminary conceptual design of NG9-1-1 system
- Budgetary pricing for statewide NG9-1-1 implementation
- Potential cost savings at the state level

L.R. Kimball made assumptions during the analysis. These assumptions are found throughout the report.

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### 3. BACKGROUND

#### 3.1 9-1-1 Program

In 1981, the Legislature established the 9-1-1 Program within the OEM of the Oregon State Police. In 2007, the Legislature moved the OEM and its 9-1-1 Program to the Military Department.

The mission of the 9-1-1 Program is “to provide administration of the legislative mandate for statewide Enhanced 9-1-1 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.”<sup>2</sup>

The 9-1-1 program:

- Coordinates and manages the 9-1-1 call delivery network
- Provides the customer premise equipment (CPE) used by the PSAPs to process 9-1-1 calls
- Oversees the distribution of the state 9-1-1 telephone tax revenue
- Provides information and resources to the local 9-1-1 jurisdictions
- Assists local 9-1-1 jurisdictions in the administration and operations of Enhanced 9-1-1 (E9-1-1)
- Provides quarterly 9-1-1 training meetings
- Stays informed of technological advancements relative to emergency reporting systems

The 9-1-1 Program involves stakeholders in initiatives that impact the system. Additionally, each calendar quarter, 9-1-1 Program staff coordinates meetings to address issues facing public safety communications professionals in the state. These meetings are held in cooperation with the state chapters of NENA and the Association of Public-Safety Communication Officials (APCO).

A 9-1-1 Advisory Committee (Committee) was established to provide the 9-1-1 Program with input from the 9-1-1 community. The Committee consists of regional PSAP representatives, LEC representatives, and representatives from Oregon NENA and APCO. While the State 9-1-1 Program is responsible for final decisions on program issues, the Program takes Committee opinions into consideration when planning and implementing the Program’s projects, creating and reviewing the Program’s policies, and creating and revising Program objectives.<sup>3</sup>

#### 3.2 Funding History Overview

The 1981 statute that established the 9-1-1 Program 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 75 cents on any retail subscriber who has telecommunication services capable of accessing the 9-1-1 network. Reasons for this adjustment included actions

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

<sup>3</sup> Ibid, [http://www.oregon.gov/OMD/OEM/OR911/911\\_advisory\\_committee.shtml](http://www.oregon.gov/OMD/OEM/OR911/911_advisory_committee.shtml) (last accessed 2/3/2011)



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.<sup>4</sup>

The Emergency Communications Tax rate has not changed since 1995 and, according to the State, is not anticipated to change over the next ten years. The tax is 75 cents on each retail subscriber who has telecommunication services capable of accessing the 9-1-1 network; as such, one factor that can have an impact on the revenue collected by the State each year is population. More people residing in the state mean potentially more devices that can reach 9-1-1, therefore, more tax revenue.

Based on official state population information for 2010, Oregon has 3,844,195 permanent residents.<sup>5</sup> According to the numbers collected by Portland State University, the population has increased an average of 1.46 percent per year for the past 20 years. Figure 1 illustrates the rate of increase from 1991 to 2010.

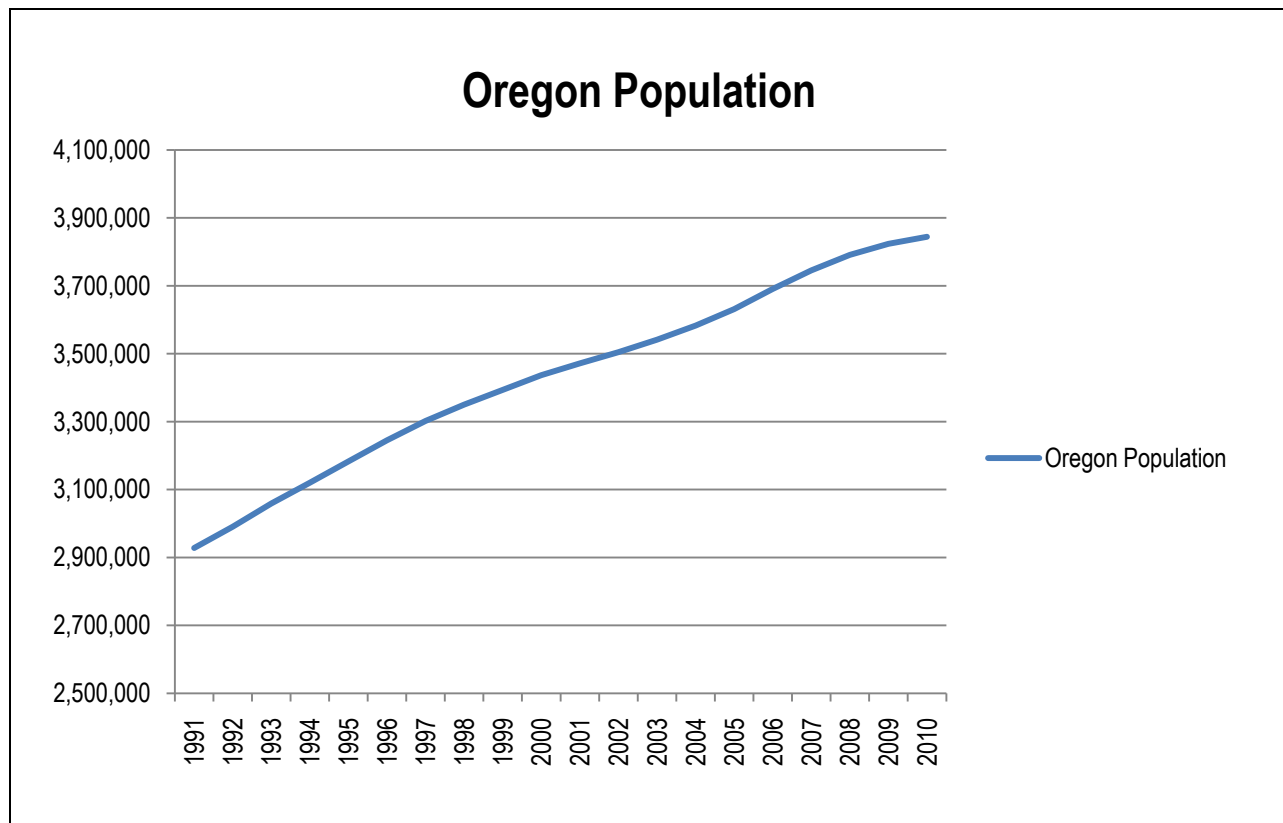


Figure 1 – Population

<sup>4</sup> Oregon Emergency Management State 9-1-1 Program, Five-Year Strategic Plan 2010-2014, page 7

<sup>5</sup> <http://www.pdx.edu/prc/> (Last accessed 2/23/2011)

With this population rate increase projected into the future, Oregon may realize an increase in revenue from the Emergency Communications Tax of approximately 1.46 percent per year.

According to the Office of Management and Budget (OMB) and the Congressional Budget Office (CBO), it is estimated that the inflation rate will increase the cost of doing business over the next nine years. Table 1 depicts the inflation predictions as listed on the Oregon State website.<sup>6</sup>

**Table 1 – Projected Inflation**

Year	Estimated Inflation Rate
2010	1.60%
2011	1.15%
2012	1.75%
2013	1.80%
2014	1.85%
2015	2.15%
2016	2.20%
2017	2.20%
2018	2.20%
2019	2.20%
2020	2.20%

Based on these projections, the average inflationary increase per year through year 2020 is approximately 2.13 percent. For the cost analysis in this report, the projected inflation rate over the next ten years is factored with the rate in which prices are projected to decrease over the same time frame, as circuit costs are projected to decrease.

### 3.3 System Overview

The E9-1-1 network in Oregon serves 3.8 million residents from 49 PSAPs in 36 counties. When the system went live in 1999, there were 56 PSAPs.

Figure 2 depicts the PSAP locations.

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<sup>6</sup> <http://oregonstate.edu/cia/polisci/sahr/sahr> (Last accessed 2/22/2011)

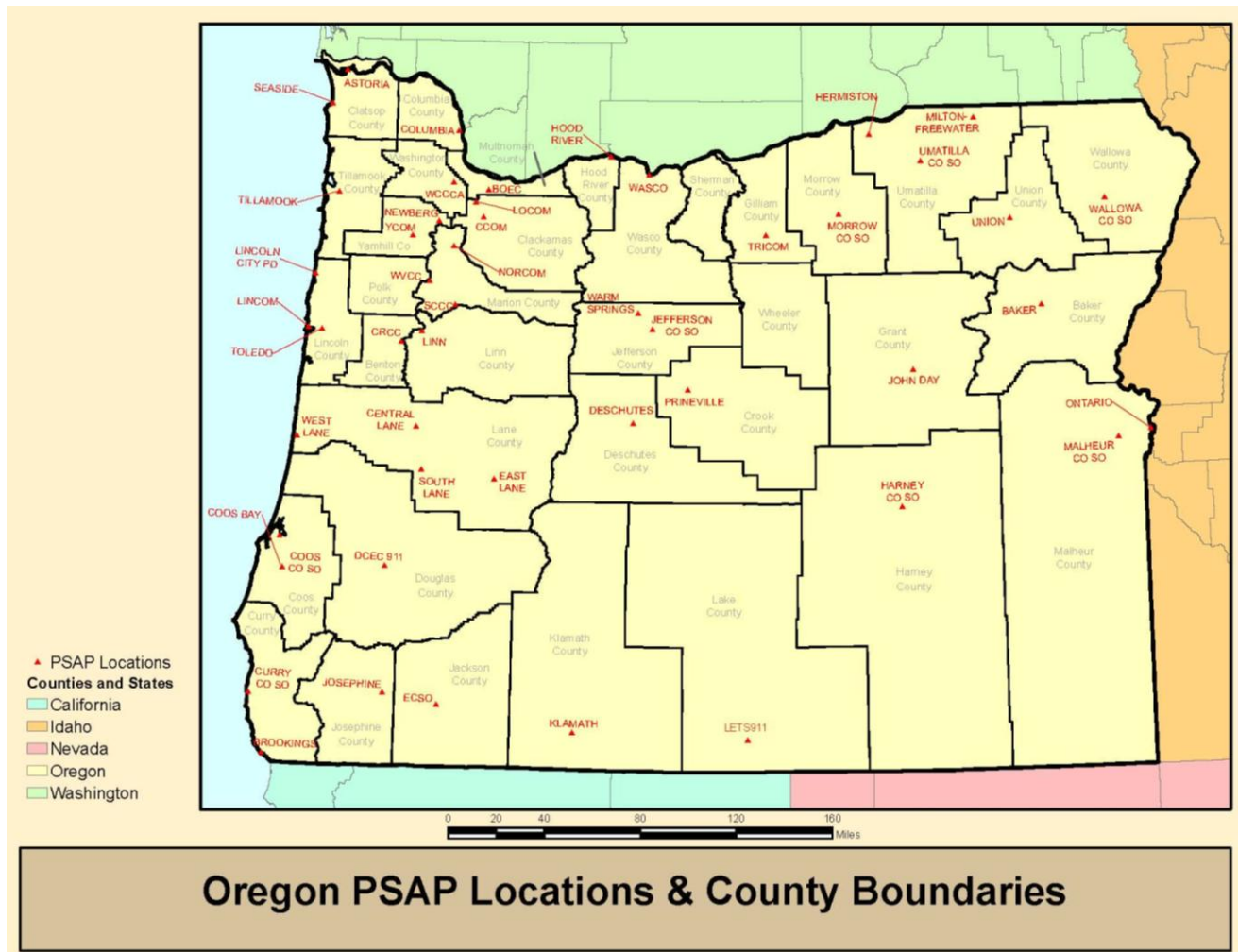


Figure 2 – PSAP Locations

Each PSAP is connected to a statewide frame relay network for the delivery of automatic location identification (ALI). The frame relay network also delivers Law Enforcement Data Systems (LEDS) and National Criminal Information Center (NCIC) information over the same circuit, resulting in significant cost savings to the PSAPs.

The 9-1-1 Program Office is currently planning the evolution of the frame relay network to one capable of delivering IP-based data elements, digital voice communications, and associated location information. This process is positioning Oregon for a seamless integration into the next generation of 9-1-1 and emergency communications.

Each PSAP is capable of receiving wireless Phase II location information, and the 9-1-1 Program continues to work with wireless service providers for the infrastructure and network necessary to deliver this data. The 9-1-1 Program Office partnered with representatives from PSAPs, wireless service providers and Oregon's LECs to create the Oregon ALI Standard, a standardized ALI stream that can accommodate Phase II data elements.

## 4. CURRENT CONDITIONS

### 4.1 Technology

Oregon's 49 PSAPs provide emergency communications service to its residents. Each PSAP is connected to a statewide frame relay network, a technology developed in the 1980s. The network delivers ALI data at faster speeds than conventional methods.

Wireless technology was implemented in two phases. Phase I delivers the wireless 9-1-1 call to the correct PSAP with the caller's phone number. Phase II includes the longitude and latitude (X, Y coordinates) of the caller's location with the Phase I data. Each PSAP in Oregon receives wireless Phase II data.

Combined, the PSAPs have 279 call taker workstations. Figures 3 and 4 detail the distribution of positions.

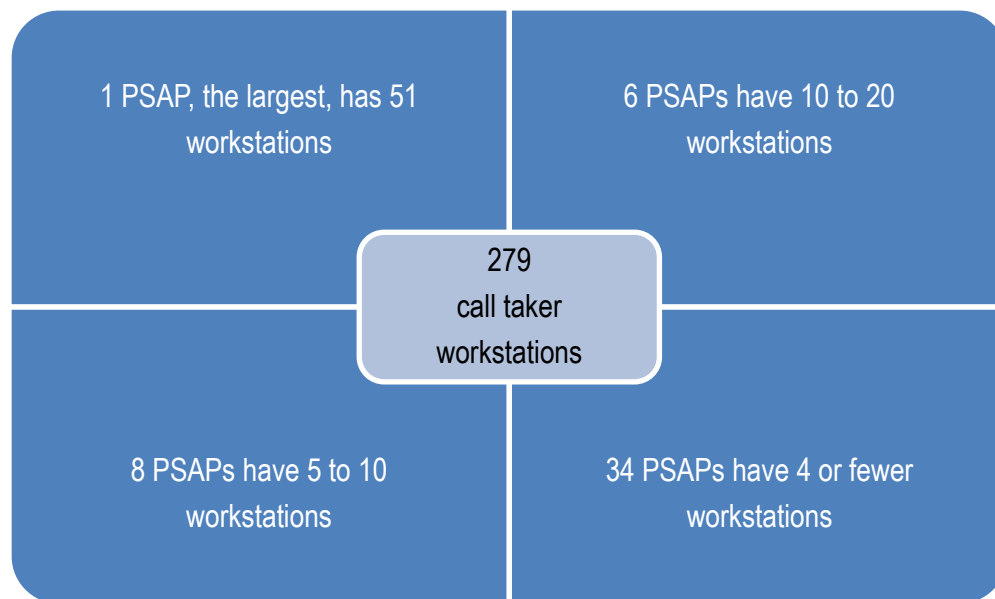
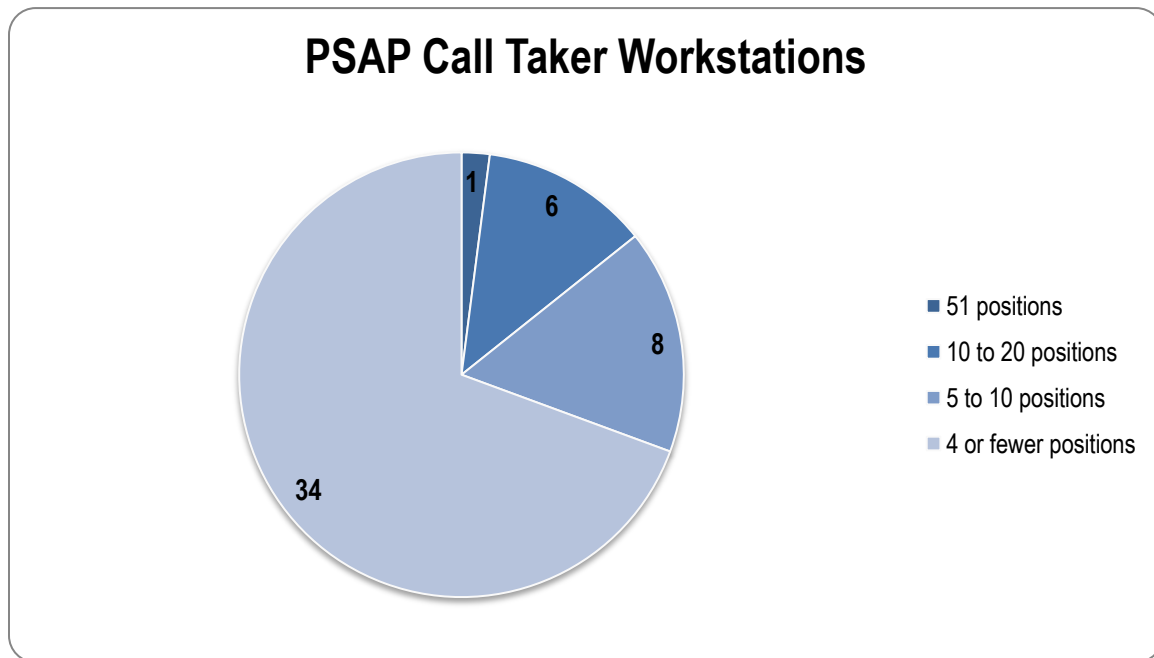


Figure 3 – Call Taker Position Distribution

Of the 34 PSAPs with fewer than four workstations, 12 have two workstations each. No PSAP has only one call taker workstation.



**Figure 4 – Call Taker Workstations**

At a minimum, each call taker workstation has the equipment listed below:

- Telephony equipment
- Computer aided dispatch (CAD)
- Mapping software
- Call management software/equipment, including voice recorders

Each PSAP has other ancillary equipment (call loggers and instant recall recording) and emergency backup power capability.

The equipment varies in age from PSAP to PSAP, although most was purchased before 2007. Based on L.R. Kimball's industry knowledge, equipment installed before 2007 will require replacement or an upgrade before the NG9-1-1 network is fully deployed. The maintenance costs to support this older equipment will continue to increase over the next ten years and in some cases manufacturers will discontinue maintenance support altogether. Table 2 depicts the equipment status.

**Table 2 – Workstation Equipment Status**

Capability	Number of Workstations
NG-capable	75
Needs replacement	204

Oregon has three incumbent local exchange carriers (ILECs) and more than 20 competitive local exchange carriers (CLECs). Qwest, Frontier and CenturyLink provide E9-1-1 service. Collectively, these carriers supply the selective routing, LEC interface, frame relay, and switching office enabling to all PSAPs. The E9-1-1 Program Office pays for these statewide services; the total cost for fiscal year (FY) 2010 was \$12,165,374.

## 4.2 Funding

### 4.2.1 Emergency Communications Tax

In Oregon, 9-1-1 is funded by an Emergency Communications Tax of 75 cents 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.<sup>7</sup> The Department of Revenue pays the moneys received to the State Treasury, which credits the Emergency Communications Account. 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 to provide administration of the 9-1-1 Program. The OEM is charged with distributing the entire amount of money in the Emergency Communications Account every quarter.

The OEM pays the Department of Revenue for administrative costs incurred during the previous quarter. These costs equal either the actual expenses incurred by the Department or an amount not to exceed one-half of 1 percent of the amount of the account on the day of distribution, whichever is less. The OEM may receive up to 4 percent of the amount of the account for costs to be incurred during the quarter. 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 moneys in both accounts are continuously appropriated to the OEM. The funds are administered in compliance with the Oregon Administrative Rules (OAR) for E9-1-1 Emergency Telephone Systems,<sup>8</sup> which establishes the allowable expenditures at the primary PSAP.

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 the OEM, OEM distributes the remaining balance to the 240 cities on a per capita basis and to the 36 counties on a per capita basis of each county's unincorporated area. Each county receives at least 1 percent of the account balance, but may get more based on the population of the county itself. Counties and cities receive these funds regardless of whether they have a PSAP within their borders. Within 45 days of receiving the funds, the counties and cities must distribute the funds to each 9-1-1 jurisdiction whose 9-1-1 service area includes all or part of the city or county.

According to the State, the distribution of the Emergency Communications Tax to the Cities and Counties offsets approximately 25 percent of the total cost to operate a PSAP. The remainder of 9-1-1 funding for a respective PSAP is through various local sources depending on the locality.<sup>9</sup>

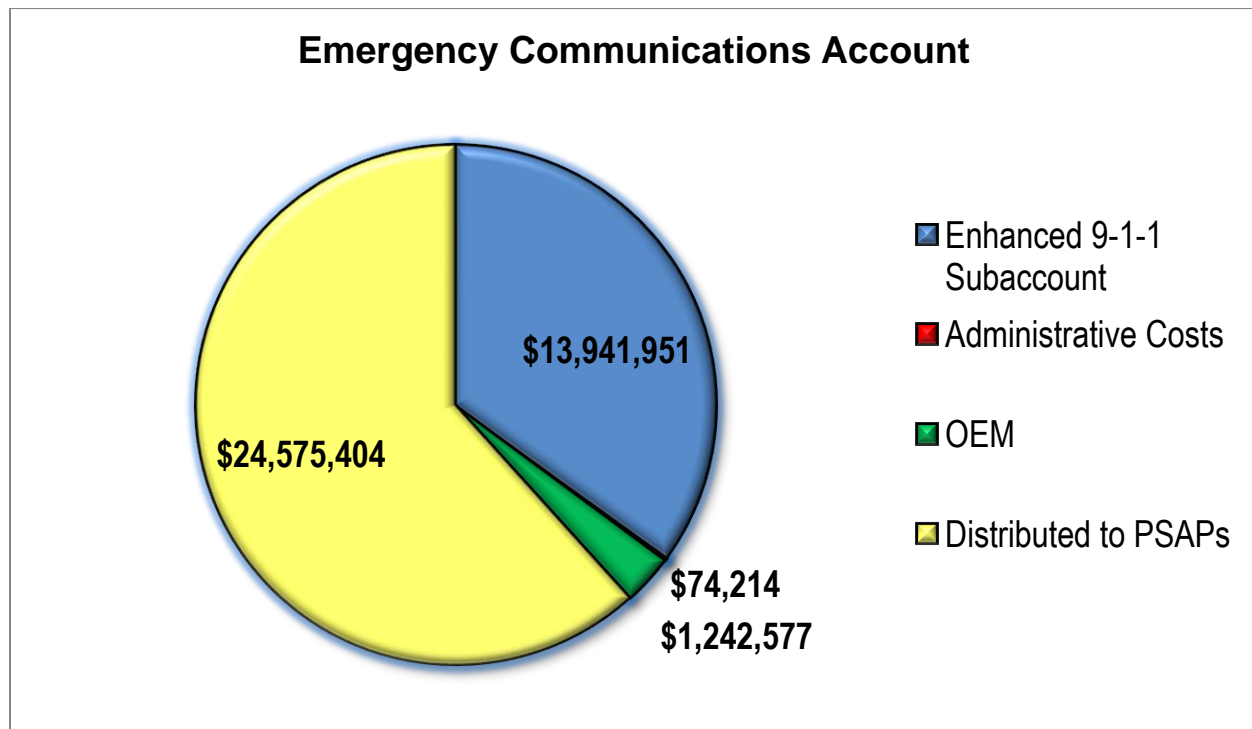
Figure 5 illustrates the distribution breakdown of the Oregon Emergency Communications Account for FY2010.

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<sup>7</sup> ORS 403.215

<sup>8</sup> Oregon Administrative Rules 104-080

<sup>9</sup> Ibid, 403.235



**Figure 5 – Emergency Communications Account Breakdown**

On the day of fund distribution, 35 percent of the account is credited to the Enhanced 9-1-1 subaccount. For FY2010, this percentage equaled \$13,941,951. In addition, the OEM pays the Department of Revenue for administrative costs incurred during the previous quarter. The OEM shall pay the actual expenses incurred by the Department or up to one-half of 1 percent of the Emergency Communications account, whichever is less. For FY2010, this amounted to \$74,214. The OEM may retain up to 4 percent of the account for costs to be incurred during the quarter, which equaled \$1,242,577 for FY2010. After the appropriate amounts are paid to the Enhanced 9-1-1 subaccount, the Department of Revenue and the OEM, the balance of the account is distributed to the Cities and Counties to be turned over to their respective PSAPs. For FY2010, this amount equaled \$24,575,404.

#### **4.2.1.1 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.<sup>10</sup> The OEM is required to limit the disbursements for costs incurred before the last quarter to database development, network and on-premises equipment.<sup>11</sup>

<sup>10</sup> Ibid, 403.240(3)

<sup>11</sup> Ibid, 403.240(4)



#### 4.2.1.2 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 primary public safety answering point and in transmitting the information from the primary public safety answering point to the secondary public safety answering point or responding police, fire, medical or other emergency unit by telephone, radio or computerized means.<sup>12</sup>

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 Office<sup>13</sup>

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. Those rules can be found in the **Appendix** of this document.

#### 4.2.2 Accounting Reports

9-1-1 jurisdictions are required to submit an accounting report to the OEM annually.<sup>14</sup> PSAPs 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 money they received from the counties and cities for which they answer calls. PSAPs must also indicate the percentage of their total funds that came from the State's Emergency Management Account and how the funds were used. The OEM compiles the information into a budget report for all PSAPs each fiscal year.

### 4.3 Costs

The Emergency Communications Tax funds all costs associated with the statewide network, databases and PSAP CPE. In 2010, the State identified the 9-1-1 expenses listed below, which were paid from the Enhanced 9-1-1

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<sup>12</sup> Ibid, 403.245

<sup>13</sup> Ibid, 403.240(3)

<sup>14</sup> Ibid, 403.240

subaccount and totaled \$12,165,374.94. The costs associated with following categories are listed in Table 3 – State Expenditures.

- **Administrative costs** – This includes a variety of costs incurred at the state level.
  - Telco tax collection fees
  - Training, including associated facilities, travel, and meals
  - Public education
  - Memberships, dues and subscriptions (e.g., APCO and NENA)
  - Conference registration in and out of state
  - Professional development
  - Recognition awards
  - Voice and data communication tools including computers, wireless air card/mobile and cell phone usage
- **CPE** – This includes purchasing, replacing or upgrading PSAP equipment.
- **CPE maintenance** – This includes recurring charges for PSAP CPE annual maintenance.
- **GIS<sup>15</sup>/Mapping equipment** – This includes 9-1-1 PSAP hardware and software, as well as purchasing replacements and upgrades.
- **MSAG<sup>16</sup>/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 the 49 PSAPs and specifically includes the following:
  - 9-1-1 PSAP call reporting contract
  - Frame relay equipment
  - Frame relay maintenance
  - Frame relay monthly access
  - OEM 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.

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<sup>15</sup> Geographic Information System

<sup>16</sup> Master Street Address Guide

- **UPS<sup>17</sup> equipment and maintenance** – This includes UPS hardware purchases and recurring maintenance costs.
- **Wireless needs** – These costs are divided evenly among the 49 PSAPs 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

Table 3 depicts the State's 2010 expenditures by category.

**Table 3 – State 2010 Expenditures**

Expenditure	Cost
Administrative	\$190,965.62
CPE	\$2,110,737.48
CPE maintenance	\$1,123,185.58
GIS/Mapping equipment	\$53,319.66
MSAG/GIS maintenance	\$803,390.44
Network	\$454,588.69
PSAP circuits	\$4,893,651.98
PSAP facility	\$6,375.00
UPS and maintenance	\$42,560.74
Wireless needs	\$2,486,599.75
<b>Total</b>	<b>\$12,165,374.94</b>

Individual localities are responsible for the remaining costs to operate their PSAPs.

#### **4.3.1 Available Funds for Next Generation Expenditure**

The Emergency Communications Tax provides the State with available revenue of approximately \$13,857,395 per year. As shown in Table 3, above, the State expends \$12,165,374.94 per year from the Enhanced 9-1-1 subaccount. This leaves the State approximately \$1.692 million per year for NG9-1-1 implementation.

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<sup>17</sup> Uninterruptible power supply

## 5. EVOLUTION TO NEXT GENERATION 9-1-1

### 5.1 Next Generation 9-1-1 Overview

Communications technology is constantly evolving and in the 9-1-1 world these changes greatly affect the functionality of the 9-1-1 system and the public's expectation of the system. The widespread adoption of communications technologies such as wireless phones, texting, video messaging, VoIP, and telematics have changed people's expectations of 9-1-1 services. Texting and video messaging are the favored means of communication for many young people and members of the Deaf and hard of hearing community. In many cases, these groups are unaware of the limitations of today's 9-1-1 system.

The 9-1-1 system in Oregon was built on a core infrastructure that is unable to support these new communications technologies. As such, the State is pursuing the transition to NG9-1-1 proactively. This migration will provide increased accessibility to 9-1-1 because it is based on IP technology rather than the telephony-based platform on which the legacy system was built. NG9-1-1 will enhance the current 9-1-1 system by supporting new forms of multi-media and should also allow for easier migration to future technologies.

Some enhancements that would be provided by NG9-1-1 include the following:



- More accurate location information delivered to call takers
- Improved first response based on crash data delivered from telematics providers to call takers
- Better access to 9-1-1 through text or video chat with 9-1-1 for persons with disabilities
- Ability to re-route calls in the event of a disaster
- Fail-safe and redundant system that will meet the needs of the state now and is scalable to meet the needs well into the future

Additionally, NG9-1-1 would allow for information sharing among multiple entities. For example, 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. PSAPs could also have the ability to share crash data with emergency responders and send that information to nearby hospitals.

Figure 6 compares the capabilities of the 9-1-1 system in today's environment and the 9-1-1 system in the next generation environment.

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Today's 9-1-1	Next Generation 9-1-1
Virtually all calls are voice callers via telephones over analog lines.	Voice, text, or video information, from many types of communication devices, sent over IP networks
Most information transferred via voice	Advanced data sharing is automatically performed
Callers routed through legacy selective routers, limited forwarding / backup ability	Physical location of PSAP becomes immaterial, callers routed automatically based on geographic location, enhanced backup abilities
Limited ability to handle overflow situations, callers could receive a busy signal	PSAPs able to control call congestion treatment, including dynamically rerouting callers

 United States Department of Transportation
 

**US DOT: Comparing 9-1-1 to NG9-1-1**

Figure 6 – 9-1-1 / NG9-1-1 Comparison

## 5.2 Next Generation Conceptual Design

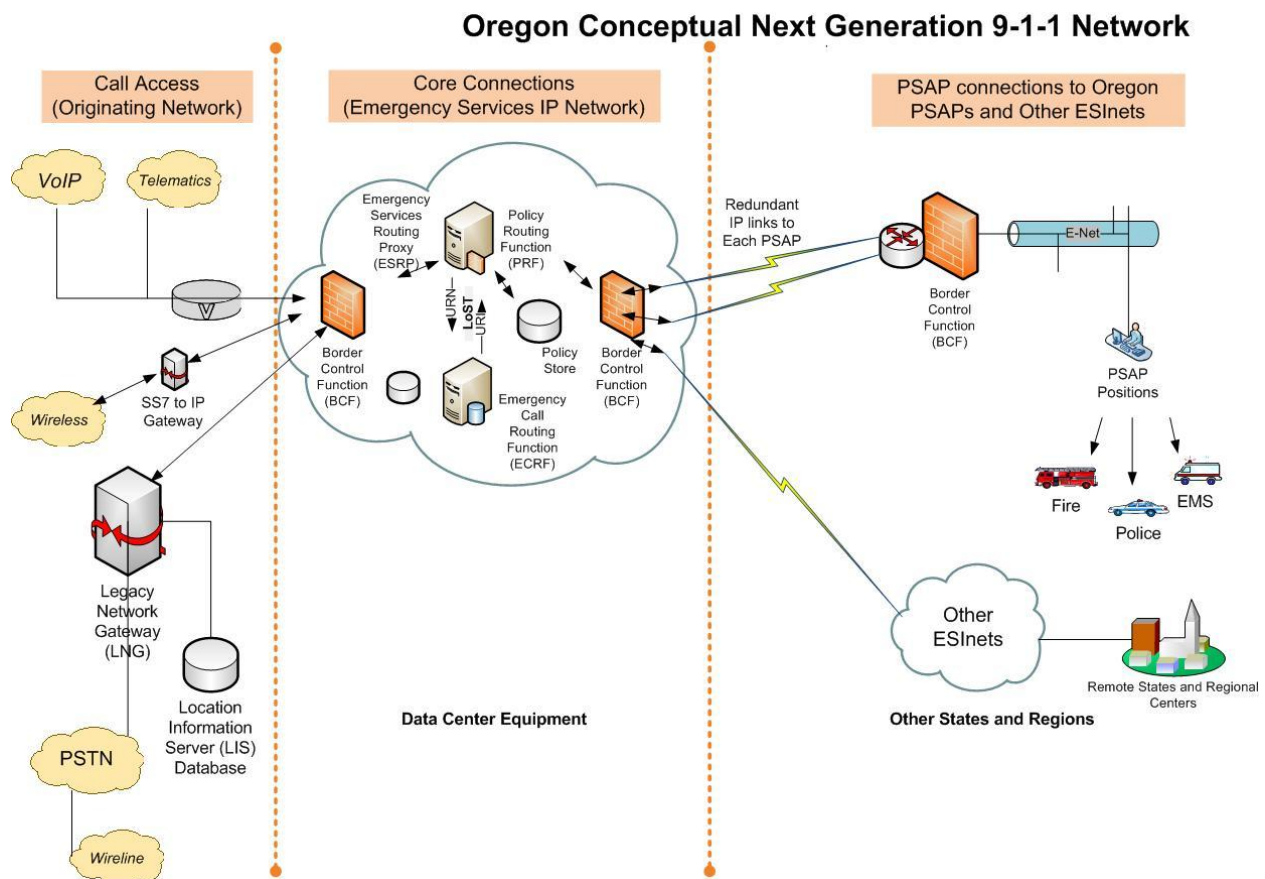
An NG9-1-1 network is an open standards-based robust system of systems designed to allow the public to utilize any device to request assistance and/or to send information to the appropriate public safety agency. It contains the functions of a legacy 9-1-1 system, while allowing for greater data sharing, and better utilization of financial and human resources in a secure environment.

Oregon's NG9-1-1 system infrastructure will enable communications interoperability and redundancy utilizing voice, data, video (as standards are established), and CAD applications. The system's purpose is to provide seamless

emergency communications and information/intelligence sharing for responding to and managing emergencies of any type and scale. The system infrastructure can be designed to provide the resiliency and redundancy to share data and provide PSAP backup if required.

For the purpose of cost analysis, multi-protocol label switching (MPLS) technology is used in the conceptual design. MPLS is a data-carrying mechanism that belongs to the family of packet-switched networks. The most important advantages to MPLS are its ability to promote any-to-any (multi-point) IP connectivity and its ability to classify data by type (i.e. voice, data, and video).

Oregon is in the early stages of NG9-1-1 planning and, as such, has not yet developed a system design. A conceptual design is necessary to perform an in-depth budgetary cost analysis. Figure 7 illustrates a conceptual design for an NG9-1-1 system and is the basis for L.R. Kimball's cost analysis.



**Figure 7 – Conceptual System Design**

Note: For cost analysis, the drawing is separated into “call access,” “core connections,” and “PSAP connections;” this is done to separate costs associated with carrier interconnections, call processing and delivery of calls to PSAP locations. Each vendor depicts these processes differently. Some vendors show all network connections and do not differentiate if the connection is to a carrier or the PSAP. Some vendors price and configure all hardware as a single cost element.



L.R. Kimball developed two options for implementing NG9-1-1 statewide in the most cost effective manner.

- *Option One* is a complete replacement of all current call taking equipment in each of the 49 PSAPs, regardless of where the current legacy equipment is in its lifecycle.
- *Option Two* analyzes and determines the current call taking equipment throughout the state that is upgradeable to handle NG9-1-1 technologies. In each of the 49 PSAPs, only the equipment that cannot be upgraded would be replaced.

L.R. Kimball based the conceptual design on primary functions needed to deliver NG9-1-1 “calls” to a PSAP workstation. Many details could affect budgetary costs in a system design and several assumptions were made in order to complete the conceptual design. These assumptions are as follows:

- Costs are based on incurring all non-recurring costs in the first year and ten years of operation.
- New equipment, when necessary, will be leased for ten years with zero down and 7 percent interest.
- Budgetary circuit size for a provider MPLS network are based on the number of workstations at each location.
- Budgetary pricing of the MPLS network was based on analysis of costs in two 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 fiber connections at the larger PSAPs. Pricing is based on a five-year build out commitment, which is incorporated into the recurring line charges. Carrier fiber build out pricing is incorporated into the pricing estimate.
- Costs for staff to manage system are not included as it was assumed full time employees would not be added.
- In many cases, software is new or still in development; additional features may be needed in the future, which may increase the cost
- Software maintenance is based on 15 percent of initial purchase prices.
- Additional costs associated with generating an NG9-1-1 system are not quantified in the pricing table. (See Section 5.2.1 – Oregon NG9-1-1 Cost Considerations.)

### **5.2.1 NG9-1-1 Non-recurring Cost Considerations**

There are many costs associated with transition from a legacy 9-1-1 system to an NG9-1-1 system. The costs described in this section are not included in L.R. Kimball's analysis, but are significant and must be considered in the decision-making process. In most cases, these costs are non-recurring. During the initial transition phase from the legacy system to the NG9-1-1 system, there will be a period during which it will be necessary to pay current legacy system costs, while also paying for the NG9-1-1 system. It is difficult to estimate the length of time necessary to maintain the two systems simultaneously as there are many factors that contribute to this timeframe. L.R. Kimball assumes that the transition period would be tightly managed to minimize the time the two systems would operate in parallel, thereby minimizing transition costs.

Another consideration is the cost of public education and outreach needed for the transition to NG9-1-1. It will be necessary to educate the public on new services available as a result of NG9-1-1 and on the appropriate use of these services. Public education campaigns can be as basic as creating an informational brochure or as extensive



as creating and airing public service messages. The costs associated with these efforts vary widely. Oregon will need to determine the level of outreach and factor the associated costs into its NG9-1-1 transition plan.

Outreach to stakeholders, PSAPs and other entities will be necessary during the NG9-1-1 planning and transition phases. The State will need to coordinate an effort, possibly through focus groups meetings, to address the following concerns:

- System participation
- Interconnection to other entities within the system
- Governance planning
- Other regional needs based on the new system

In the transition to NG9-1-1, PSAP telecommunicators may be faced with changing job responsibilities. Training will be needed on new data, new protocols, equipment, and other media that expand traditional functions within the PSAP. Consistent training standards and implementation will require planning and uniform implementation statewide. There may also be a need for additional staff in the PSAPs.

There will be administrative costs involved with planning and implementing the transition to NG9-1-1. For example, developing a request for proposal (RFP) for the procurement of system components will require extensive time and effort. It will be necessary to study call volume statistics to plan for future needs. In addition, managing the actual transition will be a time consuming task. Finally, there will be future costs that are unforeseen at this time, but must be taken into consideration.

## 5.3 Next Generation 9-1-1 System Cost Analysis Options

### 5.3.1 Option One – 49 PSAPs

As defined by the State, *Option One* is a complete overhaul of the 9-1-1 system as it currently exists. This design assumes that legacy call taker equipment in all 49 PSAPs will be replaced with new equipment. *Option One* assumes a ten-year lease option for replacing each PSAP workstation hardware and software.

Several factors were used to calculate the costs outlined in the tables below. The cost analysis factors in the following:

- PSAP connections
- Call processing
- Call access services

Pricing for the connectivity to the PSAPs, connectivity to the carriers and the IP network equipment was derived from the average of contracted prices for several states. All IP network equipment, services and core network functionality were priced using a managed services model that would require vendor responsibility for all hardware and software upgrades through the life of the contract.

The network redesign replaces the current frame relay network with an MPLS network. This system must be connected to all PSAP locations involved in the NG9-1-1 system. PSAP connection figures include the re-building of new MPLS network connectivity based on either single or multiple groups of T1<sup>18</sup> circuits or DS-3<sup>19</sup> access for core data centers. This includes system components such as routers and switches. The pricing per T1 is based on an average from other states and carriers, with an allowance for infrastructure build out that may be required in the state. Historically, these charges have been going down due to the decreasing cost of bandwidth.

Call processing servers were designed to be in two geographically diverse locations with redundant connections between them. Each was configured to provide call processing to all PSAPs in the state, should one fail.

Call access services includes the border control, gateways and location information services functions of the NG9-1-1 system.

*Option One's* system configuration is completely redundant; any single circuit outage will not create downtime in any PSAP.

### 5.3.1.1 Option One Cost Analysis

Table 4 displays *Option One* pricing, which includes a completely new network and new equipment for each PSAP. The year 2012 total includes non-recurring costs that will be encountered at system installation. The total for years 2013 – 2021 includes recurring costs per year.

Table 4 – Option One Cost Analysis

	2012	2013 - 2021
Call Access Services – Non-recurring	\$800,000	-
Call Access Services – Recurring	\$434,940	\$434,940
Core Connections – Non-recurring	\$1,500,000	-
Core Connections – Recurring	\$2,349,984	\$2,349,984
PSAP Connections – Non-recurring	\$1,925,000	-
PSAP Connections - Recurring	\$4,276,284	\$4,276,284
<b>Non-recurring Costs – Total</b>	<b>\$4,255,000</b>	<b>-</b>
<b>Recurring Costs - Total</b>	<b>\$7,061,208</b>	<b>\$7,061,208</b>
<b>TOTAL</b>	<b>\$11,286,208</b> for 2012	<b>\$7,061,208</b> per year

L.R. Kimball estimates the cost for *Option One* at \$11,286,208 USD in year one and \$7,061,208 USD per year for years two through ten.

### 5.3.2 Option Two – Some Upgradeable Equipment

As defined by Oregon, *Option Two* takes into account that some call taker equipment in the PSAPs is upgradeable to NG9-1-1 capabilities and a complete equipment replacement is not necessary. This option assumes that all information given to L.R. Kimball regarding upgradeable equipment is accurate and complete. In this option, PSAP

<sup>18</sup> T1 is a digital transmission link operating at 1.544 Mbps and is a standard for digital transmission in the United States.

<sup>19</sup> DS-3 is the equivalent of 28 T-1 channels.

equipment is upgraded where applicable and equipment not compatible with NG9-1-1 is replaced. *Option Two* assumes a ten-year lease option for equipment that needs to be replaced.

For consistency, the same factors were used to calculate the costs as outlined in *Option One*: PSAP connections, call processing, and call access services.

As listed in *Option One*, PSAP connections for *Option Two* include the re-building of a new MPLS network connectivity based on either single or multiple groups of T1 Circuits or DS3 access for core data centers including communication devices such as routers and switches. Because *Option Two* utilizes existing PSAP equipment, there are fewer leased hardware portions in the price estimate for PSAP connections.

*Option Two* relocates mapping functions into the core of the network. PSAPs will still control their mapping data, but the data itself will be located on a remote server. Logging remains at each PSAP location.

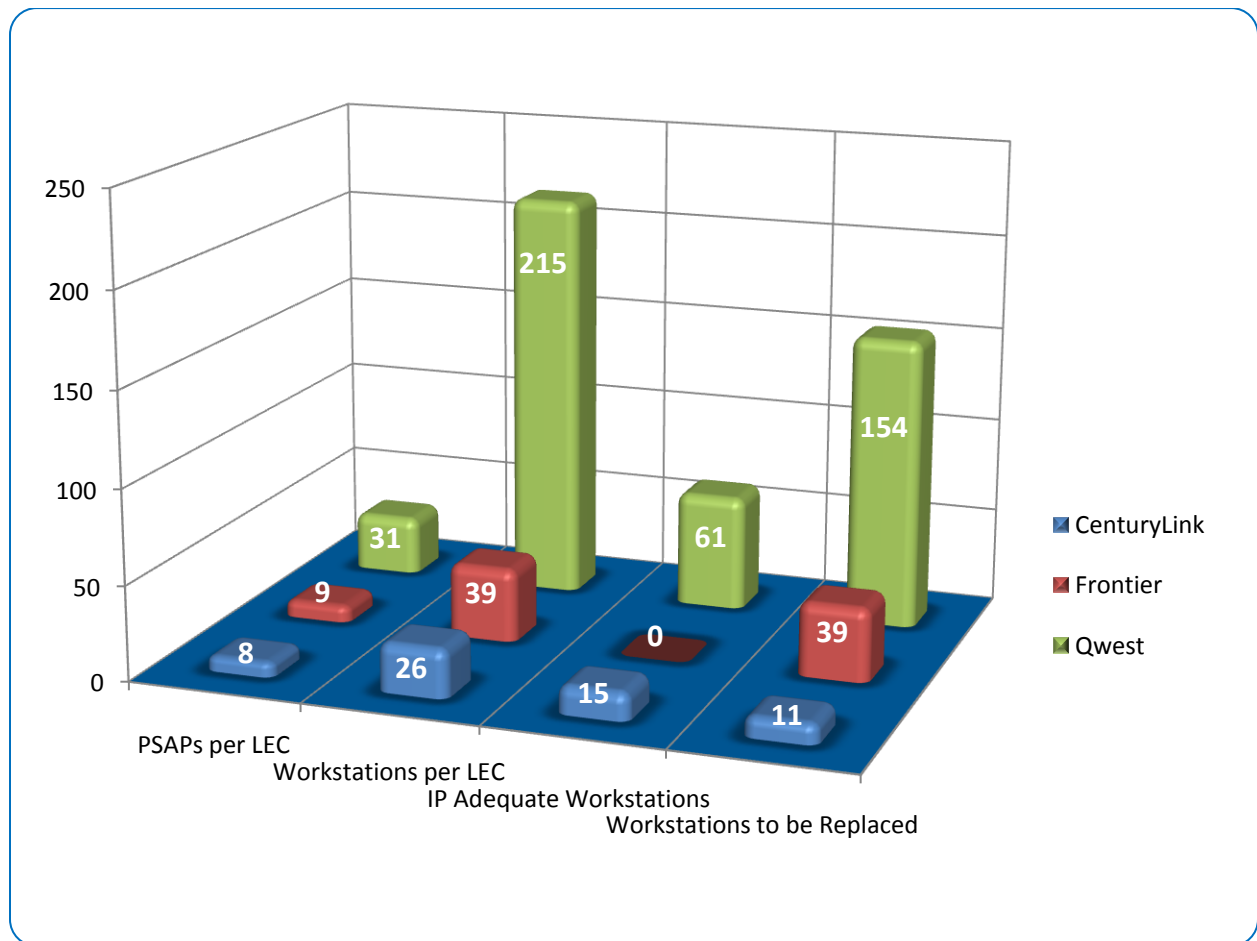
The system configuration for *Option Two* is completely redundant; any single circuit outage will not create downtime in any PSAP.

The transition to an NG9-1-1 network will take several years and there are many ways to approach equipment replacement. Some current equipment may need to be replaced prior to the installation of an IP network. Further detail and study would be needed to determine the best method for transitioning to the NG9-1-1 network.

#### **5.3.2.1 Option Two Cost Analysis**

Oregon has three major LECs that provide service to the 49 PSAPs. Figure 8 illustrates the carriers and equipment status within the state.

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**Figure 8 – PSAP Equipment Status**

As depicted above, 204 workstations will require replacement in order to be Session Initiation Protocol (SIP)<sup>20</sup>-capable. The cost for the new equipment is approximately \$24,000 per workstation with a ten-year lease. Note: Although 48 PSAP are served by these three major ILECs, one PSAP is served by another ILEC.

Table 5 illustrates the costs by CLEC.

**Table 5 – Replacement Costs**

CLEC	Quantity	Cost
CenturyLink	11	\$264,000
Frontier	39	\$936,000
Qwest	154	\$3,696,000
<b>TOTALS</b>	<b>204</b>	<b>\$4,896,000</b>

<sup>20</sup> SIP is a standard for setting up telephone calls, multi-media conferencing, instant messaging and other real-time communications on the Internet.

L.R. Kimball prepared the cost analysis for *Option Two* with the following assumptions:

- Maintenance for workstations is \$4,000/year
- Budgetary pricing of new equipment is \$24,000 per workstation with a ten-year lease
- All equipment upgraded between 2008 - 2010 is IP-compliant and will integrate into the NG9-1-1 system
- Transition of equipment will take several years
- Current Frontier equipment, while reliable, will not integrate into an NG9-1-1 network

Table 6 displays *Option Two* pricing, which includes a completely new network with full redundancy and replacement of equipment that cannot be integrated into an NG9-1-1 system for 49 PSAPs. The year 2012 total includes non-recurring costs that will be encountered at system installation. The total for years 2013 – 2021 includes recurring costs per year.

**Table 6 – Option Two Cost Analysis**

	2012	2013 - 2021
Call Access Services – Non-recurring	\$800,000	-
Call Access Services – Recurring	\$434,940	\$434,940
Core Connections – Non-recurring	\$1,500,000	-
Core Connections – Recurring	\$2,349,984	\$2,349,984
PSAP Connections – Non-recurring	\$1,407,527	-
PSAP Connections - Recurring	\$4,331,052	\$4,331,052
<b>Non-recurring Costs – Total</b>	<b>\$3,707,527</b>	<b>-</b>
<b>Recurring Costs - Total</b>	<b>\$7,115,976</b>	<b>\$7,115,976</b>
<b>TOTAL</b>	<b>\$10,823,503</b> for 2012	<b>\$7,115,976</b> per year

L.R. Kimball estimates the cost for *Option Two* at \$10,823,503 USD in year one and \$7,115,976 USD per year for years two through ten.

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## 6. FUNDING ANALYSIS CONCLUSION

The Emergency Communications Tax provides the State with available revenue of approximately \$13,857,395 per year for the Enhanced 9-1-1 subaccount. In 2010, the State identified costs paid from their Enhanced 9-1-1 account totaling \$12,165,374.94. Several costs currently paid by the State may be alleviated once the state has transitioned to NG9-1-1. Some of these costs may be utilized in different ways in a next generation environment. These costs include:

- Wireless charges - \$2,486,599
- PSAP circuit charges - \$4,893,651
- Frame relay network charges - \$454,588

In addition to the above charges, the State also pays \$803,390 for MSAG maintenance, some of which may not exist in NG9-1-1. L.R. Kimball estimates that at least \$200,000 will no longer need to be paid out by the State for MSAG maintenance. Finally, the State paid \$2.110 million for new equipment and \$1.123 million for equipment maintenance in 2010, which is included in the Option 1 & 2 costs below. Together, these costs total \$11,267,838, which will be available to contribute to future costs in a next generation environment once the transition to NG9-1-1 has been completed. L.R. Kimball estimates that approximately \$1,000,000 in legacy costs will carry forward after the transition to NG9-1-1 has occurred.

While there are potential costs savings associated with the migration to an NG9-1-1 network, system costs will increase during the transition phase. It is important to consider the potential cost saving in migrating to NG9-1-1 versus the costs of maintaining the legacy system if the State were not to transition to NG9-1-1. Once the transition period is over, the State will recognize about \$5 million per year in savings in a next generation environment.

The State will need to sustain both the legacy and NG9-1-1 networks for a period of time while the transition to NG9-1-1 is in process. However, once the transition period is over and the State NG9-1-1 network is fully implemented, most costs of maintaining the legacy network will be eliminated, providing more funds to maintain the NG9-1-1 network. 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.

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Tables 7 and 8 summarize costs of *Option One* and *Option Two* where the legacy network is transitioned to the NG9-1-1 network in the year 2012 and 2013 (years one and two). The tables demonstrate an environment where legacy costs become available for the costs to maintain the NG9-1-1 network over the eight years following the transition.

Note: The negative amounts shown in red for both *Option One* and *Option Two* are the costs needed in addition to the costs for maintaining the legacy system during the two year transition to NG9-1-1.

**Table 7 – Option One Costs**

Year	Total Revenue	Legacy Costs	Available Funding	Option One	Difference
2012	\$13,857,395	\$12,165,375	\$1,692,020	\$11,286,208	-\$9,594,188
2013	\$13,857,395	\$12,165,375	\$1,692,020	\$7,061,208	-\$5,369,188
2014	\$13,857,395	\$1,000,000	\$12,857,395	\$7,061,208	\$5,796,187
2015	\$13,857,395	\$1,000,000	\$12,857,395	\$7,061,208	\$5,796,187
2016	\$13,857,395	\$1,000,000	\$12,857,395	\$7,061,208	\$5,796,187
2017	\$13,857,395	\$1,000,000	\$12,857,395	\$7,061,208	\$5,796,187
2018	\$13,857,395	\$1,000,000	\$12,857,395	\$7,061,208	\$5,796,187
2019	\$13,857,395	\$1,000,000	\$12,857,395	\$7,061,208	\$5,796,187
2020	\$13,857,395	\$1,000,000	\$12,857,395	\$7,061,208	\$5,796,187
2021	\$13,857,395	\$1,000,000	\$12,857,395	\$7,061,208	\$5,796,187

**Table 8 – Option Two Costs**

Year	Total Revenue	Legacy Costs	Available Funding	Option Two	Difference
2012	\$13,857,395	\$12,165,375	\$1,692,020	\$10,823,503	-\$9,131,483
2013	\$13,857,395	\$12,165,375	\$1,692,020	\$7,115,976	-\$5,423,956
2014	\$13,857,395	\$1,000,000	\$12,857,395	\$7,115,976	\$5,741,419
2015	\$13,857,395	\$1,000,000	\$12,857,395	\$7,115,976	\$5,741,419
2016	\$13,857,395	\$1,000,000	\$12,857,395	\$7,115,976	\$5,741,419
2017	\$13,857,395	\$1,000,000	\$12,857,395	\$7,115,976	\$5,741,419
2018	\$13,857,395	\$1,000,000	\$12,857,395	\$7,115,976	\$5,741,419
2019	\$13,857,395	\$1,000,000	\$12,857,395	\$7,115,976	\$5,741,419
2020	\$13,857,395	\$1,000,000	\$12,857,395	\$7,115,976	\$5,741,419
2021	\$13,857,395	\$1,000,000	\$12,857,395	\$7,115,976	\$5,741,419

Both *Option One* and *Option Two* describe an environment where more funds will have to be expended initially to save money in the future. The options describe a short transition period to minimize the amount of money being spent to support both networks. There are ways in which the State could complete the transition to NG9-1-1 over a longer period of time, but these options would need to be examined in further detail with the state of Oregon in Phase Two.



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## GLOSSARY

### **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.

### **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.

### **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.

### **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 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 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.

### **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.

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## **APPENDIX–E9-1-1 EMERGENCY TELEPHONE SYSTEMS PROGRAM, FUNDING CONSIDERATIONS 104-080-0060**

### **104-080-0060**

#### **Funding Considerations**

(1) Emergency Communications Account:

- (a) Telephone tax funds shall be distributed in January, April, July and October of each year;
- (b) Cities and Counties shall determine the appropriate E9-1-1 jurisdiction to which their distribution shall be directed;
- (c) E9-1-1 jurisdictions shall receive telephone tax funds directly from their respective city(s) and county(s) within 45 days from the date city(s) and county(s) receive tax funds from the division unless prior arrangements have been made and approved by the Division;
- (d) The Division shall maintain a current listing of recognized E9-1-1 jurisdictions eligible to receive and expend E9-1-1 telephone tax funds;
- (e) Allowable Emergency Communications Account expenditures at the primary PSAP include only:
  - (A) E9-1-1 call taking personnel;
  - (B) E9-1-1 telephone line charges;
  - (C) E9-1-1 telephone system for call processing of 9-1-1 calls;
  - (D) Transfer and relay telephone line charges to secondary PSAPs;
  - (E) Fifty percent funding of radio base stations necessary to notify responders of a 9-1-1 call for service;
  - (F) E9-1-1 telephone system maintenance costs;
  - (G) Receive only pagers if this is primary means of notifying responders of 9-1-1 call for service;
  - (H) Fifty percent funding of transmit/receive pagers, portable or mobile radios and repeater stations when used as primary means of notification of responding agencies of a 9-1-1 call for service;
  - (I) Training expenses for E9-1-1 call takers;
  - (J) 9-1-1 answering contracts for primary PSAPs;

(K) Telephone and radio recording equipment used to record 9-1-1 telephone calls and notifications of responding agencies of 9-1-1 calls for service;

(L) Uninterruptible power supply systems for E9-1-1 telephone systems;

(M) Electrons and encoders if this is the primary means of notifying responding agencies of a 9-1-1 call for service;

(N) Public education regarding 9-1-1 use and availability;

(O) Computer data links to responding agencies if this is the means used to notify responding agencies of 9-1-1 calls for service;

(P) Rural addressing;

(Q) Base rate charges for seven or ten digit emergency and non-emergency PSAP reporting numbers.

(R) Emergency Notification System or "reverse 9-1-1 systems".

(f) The following items are allowed on a percentage basis of funding with Emergency Communications Account funds with prior approval of the Division as to the percentage allowed:

(A) Computer aided dispatch systems that handle E9-1-1 call processing and notification of responding agencies of 9-1-1 calls for service;

(B) Telephone and radio consoles;

(C) Administration and overhead (rent, utilities, and maintenance) of a multi-use PSAP that includes dispatching of public safety services;

(D) Backup power systems (generators);

(E) Alternate PSAP sites and circuit routing when used for disaster recovery;

(F) Planning costs for the preliminary and final plan preparation for E9-1-1 Plans required in Section 6 and 7, chapter 743, Oregon Laws 1991.

(g) Any other items not covered by these rules that after application by the primary PSAP and concurrence of the Division are necessary in providing E9-1-1 services in the primary PSAP service area;

(h) Secondary PSAPs are not eligible for funding from this account.

(2) Enhanced 9-1-1 Sub-Account: The following costs of providing E9-1-1 telephone service shall be reimbursed from the Enhanced 9-1-1 Sub-Account of the Emergency Communications Account, subject to available funds and the following requirements, to those 9-1-1 Planning Committees that have been issued an E9-1-1 Service Plan Approval by the Division:

(a) Costs of the Network Exchange Services necessary to provide the minimum grade of service defined in ORS 401.720(4)(d);

(b) Costs for on-premises equipment:

(A) Allowances for Customer Owned and Maintained on-premises equipment will be limited to the estimated cost of the primary utility supplied solution or actual costs, whichever is less;

(B) Integration of Automatic Number Identification and Automatic Location Identification into a Computer Aided Dispatch system in use by a primary PSAP may be compensated in lieu of on-premise display equipment with the exception that one Automatic Number Identification display and one Automatic Location Identification display must be actively in use on-site. Compensation will be limited to the cost of such displays as provided by the primary utility;

(C) On-going maintenance costs following the warranty period, if any, for on-premises equipment;

(D) Payment of costs for on-going maintenance of the on-premises equipment following the expiration of the warranty period for the equipment shall be made by submitting a copy of the maintenance contract with an itemized listing of hourly labor rates and equipment costs to the Division for approval;

(E) The Division shall make payment directly to the vendor upon verification that the charges are for the E9-1-1 on-premises equipment and services originally contracted for and that the vendor's hourly labor rate does not exceed the prevailing labor rate for similar communication equipment and services.

(c) Database, MSAG, GIS development and maintenance based on the hourly wage including benefits of employee(s) doing this work for the primary PSAP and the number of hours the employee(s) devotes to this process as approved by the Division;

(d) Payment of costs for consulting related to E9-1-1 shall be made by the Division directly to the consultant, but only after verification that:

(A) The need and proposed cost of consulting services were identified in either the original E9-1-1 Service Plan; and

(B) A copy of the consultant's contract and fees have been submitted and approved by the Division.

(C) Units of local government not directly providing PSAP operation and having investments as defined in Chapter 533, Section 20(2) of Oregon Laws 1981 as amended shall first expend such investments.

(3) Equipment Replacement Sub-Account: The Equipment Replacement Sub-Account was established to replace E9-1-1 customer premises equipment currently in service that does not accomplish the functional requirements for processing E9-1-1 calls as determined by the Division and may include:

(a) Maintenance issues based on the age of the equipment, and the availability of the parts;

(b) Ability to meet open systems requirements of the State of Oregon;

- (c) Ability to migrate to new technologies developed for E9-1-1 services.
- (4) The Division shall work with a PSAP that has requested CPE replacement to determine the need for equipment replacement and will make the final determination whether or not to replace the CPE.
- (5) The process for provisioning replacement CPE will follow the same process outlined in OAR 104-080-0050(6), and is required to have Division approval.
- (6) Funding from the Equipment Replacement Sub-Account will only be authorized for those PSAPs that comply with these rules.

Stat. Auth.: ORS 401.730(1)(a)

Stats. Implemented: ORS 401.710 - 401.790

Hist.: EMD 2-1992, f. & cert. ef. 4-17-92; EMD 1-1997, f. & cert. ef. 8-15-97 ; OEM 1-2003, f. & cert. ef. 1-15-03; OEM 2-2010, f. & cert. ef. 2-5-10