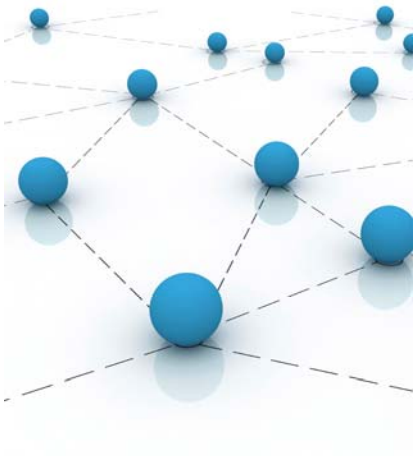

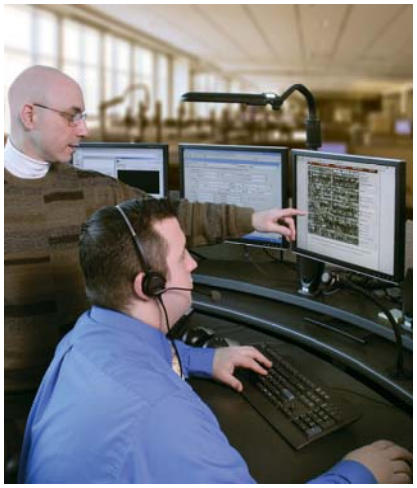

Draft Report for

Ohio Next Generation 9-1-1 Transition Planning Study

Prepared for

Ohio Department of Administrative Services

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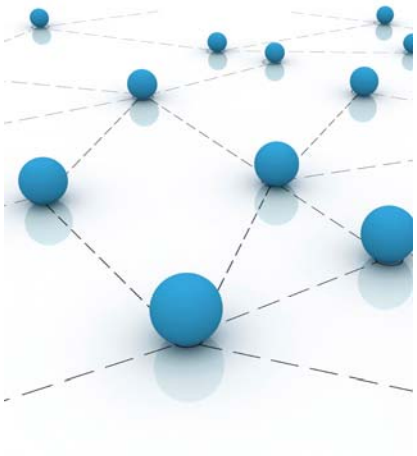

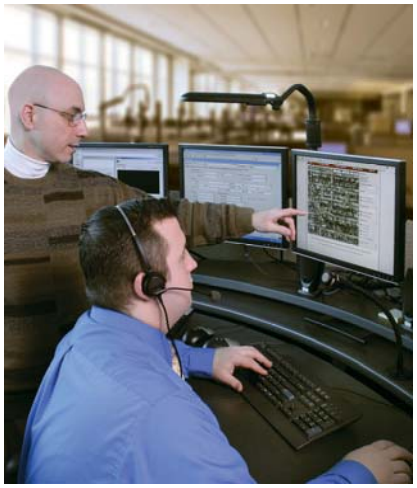

Draft Report for

Evaluation and Recommendations

Prepared for

Ohio Department of Administrative Services

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TABLE OF CONTENTS

EXECUTIVE SUMMARY 1

1. INTRODUCTION 2

2. OVERVIEW AND CURRENT 9-1-1 ENVIRONMENT 3

2.1 The Current E9-1-1 System in Ohio 3
2.2 Preparation for NG9-1-1 in Ohio 3

3. INITIATING AN IMPLEMENTATION PLAN 6

3.1 Initiation Phase 6
3.1.1 Overview 6
3.1.2 Tasks 6
3.1.3 Key Decision Points 10
3.1.4 Critical Dependencies 11
3.1.5 Work Products 11
3.2 Assessment and Analysis Phase 11
3.2.1 Overview 11
3.2.2 Tasks 11
3.2.3 Key Decision Points 16
3.2.4 Critical Dependencies 16
3.2.5 Work Products 16
3.3 Requirements Design and Planning Phase 16
3.3.1 Overview 16
3.3.2 Tasks 16
3.3.3 Key Decision Points 22
3.3.4 Critical Dependencies 23
3.3.5 Work Products 23
3.4 Proof of Concept Phase 23
3.4.1 Overview 23
3.4.2 Tasks 23
3.4.3 Key Decision Points 24
3.4.4 Critical Dependencies 24
3.4.5 Work Products 24
3.5 Implementation Phase 25
3.5.1 Overview 25
3.5.2 Tasks 25
3.5.3 Key Decision Points 27
3.5.4 Critical Dependencies 27
3.5.5 Work Products 27
3.6 Maintenance and Management Phase 28
3.6.1 Overview 28
3.6.2 Tasks 28
3.6.3 Key Decision Points 29

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3.6.4 Critical Dependencies 29
3.6.5 Work Products 29

4. TIMEFRAME 30

5. CONCLUSION 31

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EXECUTIVE SUMMARY

L.R. Kimball respectfully submits this draft Next Generation 9-1-1 Evaluation and Recommendations Report to the Ohio Department of Administrative Services (DAS).

The State of Ohio public safety network is currently operating on an outdated, analog technology which in many Public Safety Answering Points (PSAPs) across the state is near its end-of-life. The State has been perusing a transition to a NG9-1-1 network that will allow for digital communications as well as interconnections between PSAPs, regions, and states. NG9-1-1 technology will allow for the transmission of text messages, data images (pictures and videos), and telematics (automatic crash notification). The Ohio Statewide Emergency Services Internet Protocol Network (ESInet) Steering Committee and its subcommittees and working groups have provided leadership to this effort within the state and have done a considerable amount of research and expended a considerable amount of effort in preparing for this transition.

This Evaluation and Recommendations Report is a roadmap for the State to understand where they are and what still needs to be done to assure a successful transition to a statewide NG9-1-1 system. This report will lead to a more comprehensive, tactical State NG9-1-1 Plan as Ohio moves forward. This document is the vehicle for developing such a plan.

It is important to understand that the transition to NG9-1-1 will not occur overnight and that there is still much work to be done in Ohio. One has only to look to other states to comprehend what a serious and lengthy undertaking this is. Next Generation 9-1-1 will need to be phased in over a period of years – assuming adequate funding can be identified. The priority of the Committee is assuring 9-1-1 service is maintained at the highest possible level through the transition period and beyond.

One goal of this Report is to identify the overarching steps and tasks necessary to assess, plan, design, test, implement and maintain a comprehensive NG9-1-1 System in Ohio. It describes the steps that need to be taken, the decisions that need to be made and the dependencies among it all.

This Report utilizes a comprehensive methodology for the implementation of NG9-1-1 in Ohio. The following phases are outlined in this plan:

- Initiation
- Assessment and analysis
- Requirements, design and planning
- Proof of Concept
- Implementation
- Maintenance and management

In each phase there are studies, reports, requirements, designs and plans related to the following tasking areas:

- Regulatory, legislative and funding
- Governance
- Technology
- Operations
- Security

Kimball recommends that the State use this report as a guide in taking the steps outlined herein and that the State continue and expand stakeholder engagement in this process.

1. INTRODUCTION

The Ohio Statewide Emergency Services Internet Protocol Network (ESInet) Steering Committee (Committee) has been hard at work over the past several months to prepare Ohio for the transition towards Next Generation 9-1-1 (NG9-1-1). In response to a Legislative directive, the Committee initiated several studies necessary to properly plan for a NG9-1-1 transition. Proper planning requires the State of Ohio (State) to have a roadmap of where it wants to go and the steps it needs to take to get there.

The State of Ohio contracted with Kimball to assist with these necessary and important studies. Kimball incorporated into this report the body of work that was accomplished by the ESInet Steering Committee and its subcommittees prior to our engagement. Information from the documents Kimball utilized is cited throughout this report.

This Evaluation and Recommendations Report is intended to be a roadmap for the State of Ohio as it plans for NG9-1-1 system implementation. It identifies the steps and tasks necessary for successful planning and implementation of NG9-1-1. Based on Kimball's experience conducting similar studies in other states and helping other states to implement their NG9-1-1 systems, a successful transition from the current 9-1-1 environment to the NG9-1-1 environment involves adhering to a sequential methodology for the planning, preparation and implementation of NG9-1-1. That methodology is set forth in this document.

The State of Ohio will be able to utilize this report as an actionable and sustainable checklist for statewide NG9-1-1 implementation. This report identifies high-level tasks, a high-level timeline, critical decisions points, dependences and work products; all of which are important in developing a formal statewide NG9-1-1 Plan for Ohio. The NG9-1-1 Evaluation and Recommendations Report is not the end of the planning process. It is only the beginning of what will be a multi-year process to fully prepare for the transition and then commence the transition. It is a roadmap, not a blueprint. Although the ESInet Steering Committee and its subcommittees have accomplished a lot in a short period of time, there is considerably more that needs to be done. This document will enable them to undertake that activity.

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2. OVERVIEW AND CURRENT 9-1-1 ENVIRONMENT

2.1 The Current E9-1-1 System in Ohio

The current Enhanced 9-1-1 (E9-1-1) network in Ohio is a patchwork of separate networks that were a result of the way landline 9-1-1 service was implemented nationally in the 1960s and 1970s. Ohio's legacy E9-1-1 systems and its technical standards are based on circuit-switched or analog technology and are maintained by multiple telephone company 9-1-1 service providers known as local exchange carriers (LECs). These legacy systems have served the State of Ohio well over the last five decades, but as with most forms of technology, upgrades are inevitable. Communications technologies that are used to call 9-1-1 have changed dramatically over the years and continue to change at a rapid pace.

For example, the introduction of cellular and other wireless technologies in the late 1980s and early 1990s made it necessary for the landline E9-1-1 systems to include wireless E9-1-1. The technological challenge was mitigated by modifications made by the 9-1-1 service providers to their landline 9-1-1 systems to enable wireless/cellular 9-1-1 calls to be delivered to and processed by PSAPs. Unfortunately, the wireless system is not as reliable as the landline system due to the nature of radio signals, the laws of physics and, at the end of the day, the fact that the landline 9-1-1 system was designed for traditional telephones.

Voice over Internet Protocol (VoIP), text messaging, picture and video messaging, and other technologies have appeared on the market in the last decade, adding a host of new issues and challenges for 9-1-1. Increasingly mobile consumers have adopted these technologies for their everyday communications and expect to be able to use them to communicate with 9-1-1. Ohio's legacy E9-1-1 systems (and those of the rest of the nation) are unable to adapt to newer modes of communication because they are based on Internet Protocol (IP) or require greater capacity to transmit the rich data streams and content so integral to modern communications. The Legacy 9-1-1 system must be modernized or the result will be highly publicized tragedies – avoidable loss of life and property – such as occurred before 9-1-1 systems were modified to enable the location of callers using cell phones. This is driving the need to transition to NG9-1-1.

Planning for NG9-1-1 networks has been in discussion at the national level for many years. In December 2005, the Federal Communications Commission's (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 NG9-1-1. With NENA adoption of the "NENA i3 Standard" for NG9-1-1 in 2012, the standards exist to begin the replacement of the current E9-1-1 network with an IP-based network solution. An ESInet will allow for the delivery of additional data necessary for an effective public safety response to 9-1-1 calls, improve call set up time and increase the speed at which voice and data arrive at the PSAP.

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 them to work together on intra-state and inter-state levels towards NG9-1-1.

2.2 Preparation for NG9-1-1 in Ohio

The ESInet Steering Committee and its subcommittees have undertaken an intensive process to plan for the implementation of NG9-1-1 in Ohio. The Committee's definition of NG9-1-1 is, "an IP-based system comprised of managed IP-based

networks, functional elements (applications) and databases that replicate traditional E9-1-1 features and functions and provide additional capabilities. Next Generation 9-1-1 is designed to provide access to emergency services from all connected communications sources, and provides multimedia data capabilities for PSAPs and other emergency service organizations".[1] Communication sources through which data are shared include smart phones, tablets, vehicle telematics, personal computers (PCs), and more continue to arise as technology evolves. Ohio's 9-1-1 centers cannot currently accept data from these devices, even though some public perception believes that they can. The deaf and hearing impaired depend on some of these devices and technology for communication, yet they cannot connect to 9-1-1 with them. "The primary goal of the NG9-1-1 System is to save lives, health and property by improving emergency services access and response"[2] for users of common technologies that aren't presently able to gain access to the 9-1-1 system. The NG9-1-1 functions and improvements shown in the figure below will help to accomplish this goal.

Figure 1, below compares the 9-1-1 system currently in place with a NG9-1-1 system.

9-1-1 Today	NG9-1-1
Primarily voice calls via telephone handsets	Voice, text, or video information available from many different types of communication devices
Minimal data available	Advanced data sharing is available
Access to services are locally provided, backup is local, usually not enhanced	Enhanced capabilities; physical location of PSAP becomes less important
Routing based on phone number / MSAG	Ability to route "calls" more accurately

Figure 1—9-1-1 Today versus NG9-1-1

Ohio's vision is for a statewide IP network to replace Ohio's existing patchwork of analog networks and provide for the centralization of equipment and services. This will improve efficiencies and reduce overall system costs while allowing counties to retain local control over how 9-1-1 calls are handled. The Committee developed the following statements of principle for what Ohio's NG9-1-1 system must do:

- Ensure Ohio's NG9-1-1 system exceeds the existing E9-1-1 system in the areas of: security; speed of delivery; reliability; and redundancy

1 State of OH NG911 Steering Committee.pdf, page 2
2 ibid, page 2

- Ensure the NG9-1-1 system has the ability to receive voice and data from any device or service that can access 9-1-1, anytime and anywhere in the State. The Committee will recommend changes that will ensure both efficiency and the most economical operation of the statewide system.[3]

In January 2013, the Committee conducted a survey of all County 9-1-1 boards and PSAPs in Ohio. This survey was essential because transition planning for NG9-1-1 requires a thorough and detailed understanding of Ohio's current environment in terms of technology, operations, funding, and governance. All Counties responded, but only about 50 percent of the PSAPs responded. In addition, the 'bill and keep' nature of funding for 9-1-1 infrastructure means it is not known how much the 9-1-1 system costs LECs or how much the 'bill and keep' charge raises in revenues. Although much information has been gathered, there is still a great deal that is not known to the State at this time. Planning cannot proceed without taking the time to gather and analyze the needed information, and without providing the resources necessary to enable it to occur.

A statewide consolidation study is among the many initiatives that are part of this project. NG9-1-1 transition planning and coordination will likely lead to organic consolidation as PSAPs share technologies and services and redundant costs are eliminated. The next round of surveys is intended obtain necessary information that PSAPs did not provide during the Steering Committee's initial data-gathering effort. The consolidation study will be completed by January 1, 2014.

It is important to understand that the transition to NG9-1-1 will not occur overnight. One has only to look to other states to comprehend what a serious and lengthy undertaking this is. Next Generation 9-1-1 will need to be phased in over a period of years – assuming adequate funding can be identified. It will require extensive planning. It will require State-level coordination and oversight, something that does not effectively exist in Ohio at present. It will require expensive changes to technology and the temporary co-existence of NG9-1-1 with the existing legacy network. Before a PSAP can take advantage of additional capabilities, all PSAP equipment, including E9-1-1 call-taking equipment will need to be upgraded. Computer-Aided Dispatch (CAD), mapping and other support equipment may need to be upgraded or replaced. That is, all equipment currently associated with a 9-1-1 call must be capable of receiving, displaying and storing the data. In addition, call-takers will need extensive training to process and manage all the additional data.

The priority of the Committee is assuring 9-1-1 service is maintained at the highest possible level through the transition period and beyond. The primary goal of the NG9-1-1 system in the State of Ohio "is to save lives, health and property by improving emergency services access and response."[4] The sections that follow are the roadmap to that end.

3 Tech Committee Recommendations v0.1.docx
4 ibid, page 2.

3. INITIATING AN IMPLEMENTATION PLAN

3.1 Initiation Phase

3.1.1 Overview

This statewide NG9-1-1 Plan commences the Initiation Phase of the Ohio's NG9-1-1 implementation project. The Initiation Phase comprises tasks that will be the first steps in the transition towards an NG9-1-1 environment. Each task is set forth in the following sections.

3.1.2 Tasks

The description of each task is a detailed explanation of the importance of the task, expected outcomes of each task and any dependencies associated with the task.

3.1.2.1 Statutory and Regulatory Environment

The Ohio Department of Administrative Services (DAS) has contracted with L.R. Kimball to review the current statutes, regulations and tariffs to identify roadblocks to the transition to and eventual implementation of NG9-1-1.

3.1.2.1.1 *Obtain executive sponsorship*

ORC 5507 created an ESInet Steering committee to advise the State on the implementation, operation and maintenance of a Statewide ESInet. This committee is tasked with presenting reports to the General Assembly on funding models, technology infrastructure, legislative authority and governance, PSAP consolidation, ESInet governance, and designating a NG9-1-1 statewide coordinator. This coordinator will be a part of the NG9-1-1 state coordinating entity. In addition, 5507.54 created a funding account for NG9-1-1 and gave the ESInet Steering Committee authority to establish policies for distribution of the funds. The ESInet Steering Committee will need to establish a plan to obtain executive sponsorship for the duration of the NG9-1-1 project which will likely take three to five years to complete.

3.1.2.2 Governance

3.1.2.2.1 *The Need for NG9-1-1 Governance*

The 9-1-1 system in Ohio is made up of independent and unconnected systems with varying levels of capability. This is a result of the way 9-1-1 and E9-1-1 has evolved throughout the years. Because of the independent nature of the 9-1-1 systems, the questions of "who is responsible for what", and "who owns what" at what level of system operations has not been an issue. However, Ohio is embarking on a transition and these systems will no longer be isolated from each other. Technological advancements, consumer expectations and the need for greater interoperability and data sharing capabilities are changing the way in which 9-1-1 systems need to be governed. Institutional governance structures in place today are facing their own transition into the Next Generation of 9-1-1.

Local governance for 9-1-1 is as diverse as the locally based 9-1-1 systems it serves. Historically, a state's 9-1-1 authority is the governance group at the state level concerned with planning and preparation for 9-1-1 service evolution. Across the country, regardless of the degree to which the state-level or statewide entity exercises authority over 9-1-1 service, 9-1-1 largely continues to be governed at the sub-state level and each local jurisdiction governs 9-1-1 differently than any other jurisdiction. This is the current landscape in the State of Ohio.

Kimball recommends establishing ESInet Governance at the state-level in order to effectively coordinate the various stakeholders at all levels of government, including the ESInet user community. An ESInet governance framework can take many forms and should always include a process for stakeholder input. Specific planning for Ohio's ESInet Governance Framework will occur over the next year to determine the appropriate approach for Ohio. The State has already begun to initiate governance planning for a State-level governance model for the NG9-1-1 network. With the understanding that the 9-1-1 environment becomes more complex with the transition to NG9-1-1, Ohio is in the process of creating a governance structure that will require collaboration among all the stakeholders in a way that was not necessary in the past. Policy and governance issues cannot be addressed by individual PSAPs or individual 9-1-1 authorities.[5] Governance for 9-1-1 at the sub-State level is focused on stakeholder groups such as county 9-1-1 authorities, regional 9-1-1 authorities, PSAP host local governmental agencies and the PSAPs themselves. While those stakeholder groups will continue to be central to the transition to NG9-1-1, NG9-1-1 is not intended to reflect closed systems that are unique to the delivery of 9-1-1 calls, or local sets of emergency responders. Next Generation 9-1-1 is designed around shared, interconnected systems potentially involving a wide variety of public and private stakeholders in a position to facilitate emergency response and incident management.

The ESInet in the State of Ohio will connect many stakeholders who come together in the interest of public safety and emergency service. This ESInet will provide the opportunity to interact and share data, resources and functions beneficial to emergency incident outcome. One key feature that potentially impacts governance is the fact that application platforms are independent of the ESInet and could stand on their own. The entity who owns, deploys and/or manages an ESInet may not be the same stakeholders that own, deploy and manage the applications utilizing the ESInet for transport and connectivity. The delivery of a 9-1-1 call may represent only one application of many. Other applications may include first responder communications, additional incident data providers and incident management functions. The FCC's Network Reliability and Interoperability Council VII suggested that such connectivity could extend well beyond the traditional public safety community, and include the following:

- Traditional public safety agencies: law enforcement, fire services, emergency medical services (EMS), 9-1-1
- Citizens and businesses: connections between them and agencies (e.g.; E9-1-1, truck fleet management systems)
- Business safety providers (e.g.; telematics, alarm monitoring systems, hazmat service providers)
- Hospitals/clinics
- Public health
- Emergency management
- Transportation departments
- Different transportation modes (e.g.; railroads, ports, trucking)
- Non-governmental organizations: Red Cross, Salvation Army, Cleary Emergency Restoration Trailer (CERT), mountain rescue groups, etc.
- Mental health organizations

[5] Next Generation Partner Program, Next Generation 9-1-1 Transition Policy Implementation Handbook, March 2010, 2.

- National Guard
- United States Department of Defense (US DoD)
- Utilities, public works, recreation departments
- Media
- Schools
- Critical infrastructure companies[6]

Coordination between these stakeholders provides an opportunity to share data and processes that would ultimately benefit emergency response and incident outcome. However, NG9-1-1 networks, applications and enhanced data availability by themselves will not bring Ohio's 9-1-1 system into the next generation. Human processes must also be addressed and planned for in order to realize the full potential and benefit that a NG9-1-1 system can provide including management, policy, institutional and governance considerations.

3.1.2.2.2 *Define and engage the Stakeholder community*

Although Ohio has already begun the Governance planning process, there is much work to be done. The Committee will need to engage the stakeholder community from across the state to get input and buy-in from the local PSAPs.

The State has already identified the stakeholder community that will be participating in NG9-1-1 planning and execution. This is the first step in initiating NG9-1-1 governance. These stakeholders should be involved throughout the Ohio NG9-1-1 Initiative. It is imperative to the success of the NG9-1-1 deployment that a wide range of stakeholders interact and work together. The stakeholders identified by the state include:

- Wireline or wireless service providers that participate in the state's 9-1-1 system
- Ohio Academic Resources Network
- Ohio Multi-Agency Radio Communications System steering committee
- Ohio Geographically Referenced Information Program
- The Ohio Telephone Association
- The Division of Emergency Management of the Department of Public Safety
- The State Highway Patrol
- The County Commissioners' Association of Ohio
- The Ohio Municipal League that are managers of PSAPs
- The Buckeye State Sheriffs' Association
- The Ohio Association of Chiefs of Police
- The Ohio Association of Fire Chiefs
- The Ohio chapter of the Association of Public-Safety Communications Officials (APCO)
- The Ohio chapter of the National Emergency Number Association (NENA).[7]

Stakeholders should be able to come together in a focus group environment. This will assure all participants are engaged and understand the process. The State can plan and host these meetings and make it as easy as possible for stakeholders to

6 FCC NRIC VII FG1D, 62, *available at* http://www.nric.org/fg/index.html (Last visited2/22/13).
7 Ohio Rev. Code Ann. § 5507.02.

participate face to face. These meetings should also have a mediator. The number of focus group meetings depends on how much can be accomplished at each meeting.

With the involvement of the above listed stakeholders, Ohio has already begun the process of coordinating with existing statewide initiatives and associations that are interested and can assist the transition to NG9-1-1.

With a solid vision of where they are heading, the State is moving down the right path for a successful governance plan.

3.1.2.3 Technology

Ohio is currently in process of planning their technology transition to an ESInet. The State is examining to what extent it has the authority to manage the technology and interconnections between multiple local and regional ESInets. Emergency Services Internet Networks are the IP-enabled backbone networks over which NG9-1-1 services are delivered. They host numerous hardware and software application layer services that support interoperability among diverse regional/local networks and agency applications. The ESInet Technical Standards Subcommittee (Subcommittee) has drafted a document entitled Tech Committee Recommendations v0.1 which seeks to "examine the readiness of the state's current technology infrastructure for a Statewide ESInet to support NG9-1-1"[8]. The Subcommittee has looked at the following network infrastructure items:

- ESInet Requirements
- State Network, Services, and Data Centers
  - Availability and Capacity
  - Redundancy and Diversity
  - Security and Threat Prevention
- Geographic Information System (GIS) Data Requirements
  - Maintenance/Updates
  - Change Control/Versioning
- Customer Premise Equipment (CPE)
  - Standalone/Hosted/Centralized
  - Mapping[9]

The ability and authority to coordinate the technology employed is an essential State-level function in a NG9-1-1 environment. Ohio will need to plan for an adequate mechanism to effectively coordinate the activities of local 9-1-1 authorities and other public safety or government stakeholders who may share the ESInet backbone (including interconnections with ESInets in neighboring states, or federal entities). The State is currently in the process of researching and establishing minimum technology requirements and processes for the PSAPs. This process should involve prospective vendors and suppliers to validate products are available to meet the defined requirements. Once those have been identified, the State should develop a list of "approved technology" that can provide the needed delivery of service, as well as any interoperability requirements.

8 Tech Committee Recommendations v0.1
9 Tech Committee Recommendations v0.1

3.1.2.4 Operations

In the initiation phase of NG9-1-1 planning, education is important to gain support and manage expectations. A Statewide education and awareness plan should be created while keeping the target audiences in mind. First responders, 9-1-1 call takers, dispatchers and citizens will all be greatly affected by the implementation of a NG9-1-1 system. Taking steps to educate them from the very beginning will help to gain and maintain support throughout the project. A robust education and awareness campaign should include (but is not limited to) the following:

- Targeted messaging
- Conference appearances
- Presentations
- A list of talking points for PSAP leaders to use to educate stakeholders in their individual communities
- Media policies

A well-planned education program will help garner support throughout the 9-1-1 community in Ohio, as well as other stakeholders throughout the State. This effort should begin in the Initiation Phase and be carried out throughout the entire NG9-1-1 project.

3.1.2.5 Security

The migration to NG9-1-1 involves going from Ohio's current 9-1-1 systems which are dedicated, closed systems that exist solely for transmitting 9-1-1 calls and data such as a caller's phone number and address. This is typical for 9-1-1 systems nationwide. Because 9-1-1 call recordings and data in Ohio are stored at the PSAP that received and dispatched the call, preserving the confidentiality of this information and retaining appropriate records as required by local or State law is a fairly straightforward process. In an NG9-1-1 environment, 9-1-1 voice and data will be aggregated, shared, transferred and perhaps stored in more than one location (including remote, off-site locations).

A major security challenge that Ohio faces moving forward is ensuring information delivered over the new NG9-1-1 system can:

- Be shared with federal, State and local emergency response organizations appropriately
- Conform to applicable federal, State, and/or local confidentiality
- Follow disclosure and information retention statutes and rules

Ohio is currently in the process of assessing all regulations and statutes at a federal, State and local level to determine potential application to NG9-1-1.

3.1.3 Key Decision Points

The Ohio General Assembly created an ESInet Steering Committee to develop the State's vision for a Statewide NG9-1-1 system.[10] Part of this study includes assessing existing statewide networks that could be potential candidates for the ESInet. The careful and calculated planning of the NG9-1-1 system is critical to an efficient and effective transition of NG9-1-1. The state should also designate a state 9-1-1 coordinator to provide leadership and coordination to the NG9-1-1 planning and transition. Additionally, the State has identified key stakeholders and should identify how the NG9-1-1 vision aligns with these stakeholders. The State should determine how, when and what kind of involvement they will have over the life of the project.

10 Ohio Rev. Code Ann. § 5507.02

Also, decisions will need to be made regarding an educational awareness campaign including scope, scale and financial impact.

3.1.4 Critical Dependencies

Gaining support for the NG9-1-1 project will depend heavily on the support of the Ohio General Assembly and support of stakeholders across the State.

Creating an education and awareness program will also hinge on support from the Ohio General Assembly and stakeholders, as well as financial backing from appropriate organizations.

3.1.5 Work Products

The following work products are outputs of this phase:

- Updated stakeholder list
- Stakeholder involvement criteria
- Educational awareness campaign plan

3.2 Assessment and Analysis Phase

3.2.1 Overview

An assessment is an important step in a NG9-1-1 project. Ohio should asses its current 9-1-1 system to fully understand the capabilities of the current system and what equipment is currently in use. This assessment will help Ohio to plan and prepare for a transition to an upgraded NG9-1-1 system. The tasks below identify important areas that need to be assessed in order to plan for a successful transition to NG9-1-1.

3.2.2 Tasks

The following sections describe each task, why they are important and expected outcomes.

3.2.2.1 Statutory and Regulatory Environment

The State of Ohio is currently in the process of conducting an assessment and analysis of current laws, regulations and tariffs that impact 9-1-1 service in Ohio to determine whether changes are necessary to support their NG9-1-1 effort. Ohio's assessment and analysis includes a review of the following areas as they relate to 9-1-1 and NG9-1-1:

- Statutes, regulations, tariffs and interconnection agreements
- Funding
- Establishing Statewide ESInets

3.2.2.1.1 *Review Statutes, Regulations, Tariffs and Agreements*

L.R. Kimball was contracted to conduct a review of legislation and regulations to identify any provisions that may impede the implementation of NG9-1-1. The attached Ohio Regulatory Review Report is the product of that analysis and is attached to this Plan. As the technical specifics of Ohio's NG9-1-1 system are determined, it will be important to review the regulatory environment to assure that the technical plan for the system can be accomplished within Ohio's regulatory framework.

3.2.2.2 Governance

Ohio has begun the processes of creating a governance model. Necessary analysis is being performed by the ESInet Steering Committee regarding governance frameworks in existence today and what will be needed in order to get a NG9-1-1 system up and running and keep it running smoothly. This requires an analysis of State, county and local decision making and authority that will shed light on how decisions are made with regard to 9-1-1 in Ohio.

Along with the assessment of governance models, an assessment of the State statutory environment and policies is being performed to assure that they support these new and evolving arrangements, and institutional structures. NENA has observed that "[t]ransitioning our nation's legacy 9-1-1 system to a modern IP-based Next Generation 9-1-1 (NG9-1-1) system must be a major policy objective at all levels of government."[11]

The ESInet Steering Committee has already identified a potential state-level governance structure. Kimball has offered feedback on it, but the full assessment and analysis must wait for the Governance Framework Report that will be delivered in the fall of 2013.

3.2.2.3 Technology

In order for the Ohio to properly identify the technology requirements and steps needed to migrate from their current 9-1-1 system to a NG9-1-1 system, a detailed assessment of the current technology systems and providers across the State. Ohio is currently in the process of beginning this assessment step. In January, 2013, the Committee orchestrated a survey that was distributed to all of the counties in the State that they were required to complete per section 5507.02 D (1) of the Ohio Revised Code. The main function of this survey was to collect the following items:

- Statistics detailing the number of 9-1-1 calls received by each PSAP
- Identification of geographic extents and populations served by each PSAP
- Expenditures of disbursements from the wireless 9-1-1 government assistance fund
- An inventory of and the technical specifications for current 9-1-1 hardware and software requirements
- Other information specifically requested by the Committee[12]

Ohio will be conducting an additional survey as part of their technology assessment later this year. There are two important focuses of this assessment. One important aspect is to gather information necessary to examine consolidation possibilities within Ohio. Results from that study will be delivered by January 1, 2014. Another important aspect is to identify technology and systems that may need to be replaced and upgraded. The assessment will enable the Ohio to:

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11 National Emergency Number Association (NENA), "Next Generation 9-1-1 Transition Policy Implementation Handbook," March 2010, 1, *available at*, http://www.nena.org/?NGPPPolicyTransHndbk.

12 State of OH NG911 Steering Committee PDF

- Identify technical functions that are important to the current systems
- Identify current infrastructure components that can be used with the NG9-1-1 system
- Assist in determining the conceptual design of the system

The following technologies and systems will be assessed:

- Call volumes
- Call flow
- Location of serving offices/selective routers
- Automatic location identification (ALI) provider information
- Current bandwidth capacity
- Current redundancy levels
- Geographic coverage area
- Facility locations
- Current plans for interoperability
- Operational infrastructure
- Regional connectivity options
- Hardware
- CPE
- Hardware (e.g. Private Branch Exchanges [PBXs], switches, servers, workstations, trunks)
- Software
- CPE software (e.g. call taking applications,)
- CAD systems,
- Emergency Notification Systems,
- Management Information Systems (MIS) Databases
- Data
- GIS

Through all of these assessment and survey activities, Ohio will need to identify opportunities for network diversity and redundancy.

3.2.2.4 Operations

The transition to NG9-1-1 may necessitate some adjustments in the roles and responsibilities of PSAP staff. An NG9-1-1 system utilizes technology that has greater capacity to make additional media available to PSAP call-takers, dispatchers and management staff. This technology will make employee training more important than ever. PSAP personnel will need to be trained to handle these new forms of "calls" coming into the PSAP such as text, video and telematics. The USDOT's "A National Plan for Migrating to IP-enabled Systems" notes:

> "The increased quantity of available multimedia data will enhance and expand existing call-taking functions. It may also extend the time it takes to process 9-1-1 calls, increase the workload of the call taker, and significantly change the call taker's experience (e.g., seeing the incident versus hearing the incident)."[13]

[13] National 9-1-1 Implementation Coordination Office: A National Plan for Migrating to IP-Enabled 9-1-1 Systems, September 2009, 1-4.

Another benefit of a NG9-1-1 system is the potential for increased resource and data sharing across multiple PSAPs. Public Safety Answering Point personnel must be prepared to handle this data and know what to do with it. This may present a new challenge to some PSAPs once an NG9-1-1 system is fully operational. Training and staffing concerns should be assessed and operational standards and policies should be created or updated to account for these changes in the PSAPs' operational models. The following operational models should be assessed in Ohio PSAPs to help achieve the goals of a successful NG9-1-1 transition:

- Operational management
- Policies and standards
- Staffing
- Training

3.2.2.4.1 *Operational Management*

Ohio PSAPs will need to determine how to handle new types of challenges resulting from a NG9-1-1 transition such as standards for connecting to the IP network. The State has already taken steps toward assessing where Ohio PSAPs stand in terms of management through the Committee's statewide survey effort. Establishing a management model that may be used throughout the State prior to the transition will help prepare PSAPs and also allow for a smoother transition. An operation management assessment includes the following:

- Interoperability across many jurisdictions
- Change management
- Rules adoption
- Application installation management
- Standards for interconnection

Ohio is continuing their assessment process and part of that process should be determining what management mechanisms are in place and assess whether and how they will handle these operational challenges moving forward into an NG9-1-1 environment. The results of the assessment will enable PSAPs to make the proper adjustments in advance of the technological changes that are coming in the next few years.

3.2.2.4.2 *Policies and Standards*

The State of Ohio has recognized through research and planning that NG9-1-1 will necessitate changes in existing operational policies and standards. Although several national standards development organizations are working on standards for the technologies and systems involved with NG9-1-1, the State will need to work with PSAP managers to implement operational policies and standards to promote coordination, resource sharing and manage confidentiality issues. The State, in cooperation with its local government and PSAP stakeholders, needs to determine which existing policies and procedures will remain in the NG9-1-1 environment and which will need to be adjusted moving forward. The State, in conjunction with its local-government and PSAP stakeholders, should adopt a minimum set of operational policies, procedures and standards for NG9-1-1. To accomplish this, Ohio will need to assess what is in place today, determine whether existing provisions are still applicable to the NG9-1-1 environment and how they can be adjusted to assure a smooth transition.

3.2.2.4.3 *Staffing*

While PSAP staffing is and will remain a local issue in Ohio, staffing models should be assessed in preparation for the changes NG9-1-1 will bring within the PSAP. The staffing models currently in place may not be appropriate in a NG9-1-1 environment.

Job descriptions and job requirements will also change during the migration in order to appropriately staff a PSAP. Each staff position will need to be assessed to appropriately fill the positions during and after the transition period. PSAPs can expect to make changes incrementally as everyday tasks become more intricate and perhaps require a more specialized skill set. New positions may need to be added depending on the PSAP. Increased demands on staff may be expected during the transition. Staff turnover historically has been an issue for most PSAPs throughout the nation. Turnover will continue to be a challenge in the NG9-1-1 environment. As part of the transition, PSAPs should be prepared to monitor staffing levels to determine the appropriate number of staff to fill necessary positions.

A Statewide assessment of PSAP staffing should be coupled with stakeholder input to create a staffing plan that will be part of an operations plan in preparing for the NG9-1-1 environment. That staffing plan may not look much different from current operations initially. Understand that as new NG9-1-1 capabilities are implemented over time, the impact on staffing will need to be considered.

3.2.2.5 Security

Traditionally 9-1-1 has been a closed system which minimized the risk and effectiveness of cyber attacks. However, the IP-enabled, interconnected nature of NG9-1-1 radically changes the potential for attacks on the local PSAP and the overall NG9-1-1 system. This risk is magnified by the attractiveness 9-1-1 systems offer cyber attackers. As a result, it is critically important to ensure that cyber security controls are planned for and built into the system from the outset and over the course of the project. Cyber security should be architected into the Ohio NG9-1-1 System.

In early 2010, NENA released the NG9-1-1 Security Standards (NG-SEC), which provide detailed requirements on how to secure NG9-1-1 systems. Presently, several states, cities and counties have adopted, or are considering adopting NG-SEC standards as the core foundation of their security program. Next generation 9-1-1Security, when coupled with any additional customization of security controls necessary for the state of Ohio can become a useful framework to build an effective security program. In addition to considering the use of NENA security standards, the State may be required or choose to comply with additional federal and/or state security requirements.

Ohio's current 9-1-1 system comprises a wide variety of telecommunications companies, CPE vendors, implementations and local policy constraints. This broad spectrum of systems has likely created a wide ranging approach to mitigating security risks across the state. In order to gauge current risk levels an assessment is necessary. In order to integrate cyber security into the Ohio NG9-1-1 System it is necessary to establish a security baseline of the current system. As an alternative to assessing each individual PSAP (a task that would be both cost and time prohibitive), a statistical sampling that is representative of Ohio's PSAPs should be used (e.g. large/small, small, vendor A, vendor B, etc.). The security assessment should be based on the NG-SEC standards and any other applicable framework Ohio is required to comply with or that it intends to leverage in the Ohio NG9-1-1 System.

3.2.3 Key Decision Points

There are several important assessments that comprise the assessment and analysis phase of a NG9-1-1 project. Ohio must plan appropriately for these assessments by determining what must be assessed, how these assessments will be performed and who will perform each assessment. Additional funding may be needed to ensure resources are available to conduct these assessments.

3.2.4 Critical Dependencies

The assessments discussed in this section will each depend on the resources available to conduct the assessments. Additionally, the technology, operations and security assessment will depend upon PSAP participation across the State. Examining related Statewide projects will be dependent upon cooperation of agencies representing those projects.

3.2.5 Work Products

The following work products are outputs of this phase:

- Regulatory, Legislative, Tariff and Funding Study (underway)
- Governance Study (underway)
- Technology Assessment (underway)
- Operations Study
- Security Assessment
- Related Projects Study (underway)

3.3 Requirements Design and Planning Phase

3.3.1 Overview

Ohio is in the process of conducting some of the recommended assessments as described in the assessment and analysis section of this document. Upon completion of all of the necessary assessments, Ohio should fully understand the status of 9-1-1 throughout the State. The State should have a clear picture of what is needed to prepare for the transition to NG9-1-1. Once a clear direction has been determined, Ohio should begin to define the requirements for its NG9-1-1 system. In this phase, the ESInet Steering Committee and its subcommittees and stakeholders will, based on Kimball's recommendations, work with the Legislature to make necessary changes to laws, regulations, tariffs and other enforcement mechanisms based on the completed assessments. In conjunction with requirements definition, the State should also begin to define deployment options, create deployment plans and refine governance plans.

3.3.2 Tasks

3.3.2.1 Statutory and Regulatory Environment

3.3.2.1.1 *Update Statutes, Regulations, Tariffs and Agreements*

As discussed in section 3.2, Ohio has begun the process of assessing statutory and regulatory requirements. The next critical step will be to amend necessary provisions to make way for the implementation of NG9-1-1. Requirements should be identified based on the results of the Ohio Regulatory Review Report, attached to this Plan.

In the design and planning phase, Ohio will begin the process of making necessary changes to laws, regulations, tariffs and other enforcement mechanisms based on the completed assessments.

3.3.2.1.2 *Define Funding Model*

As noted, it is imperative to ensure that sufficient funding will be available to cover the increased costs that will be incurred during the transition from the current E9-1-1 system to the NG9-1-1 system. Ohio is in the process of conducting a funding study to address the following issues:

- Assess reasonable and equitable fees on all end user devices or services capable of accessing 9-1-1.[14]
- Assess prepaid fees.
- Define distribution methods for the 9-1-1 funds
- Define the eligible uses of 9-1-1 funds and establish penalties to deter misuse of funds.
- Ensure statutes, regulations and tariffs enable system components to be shared among the agencies and entities that use it and that there is a mechanism for these agencies and entities to share the costs.
- Audit service provider fee remittances annually to ensure accuracy and compliance with legislative intent.
- Audit State and local use of 9-1-1 revenues annually.[15]

Additionally, the funding model that will ultimately be selected must provide incentives for further consolidation, regionalization, transitioning to NG9-1-1, and must allow PSAPs to take advantage of shared services.

Once this study is complete, the ESInet Steering Committee, its subcommittees, and stakeholders should review Kimball's recommendations and work with the Legislature to make necessary changes to Ohio's various 9-1-1 funding provisions as necessary.

3.3.2.1.3 *Establish Statewide Emergency Services IP Networks*

Ohio is in the process of establishing an ESInet and is working on developing requirements that consider legislating and funding State-wide ESInets (or regional, interconnected ESInets) and the NG9-1-1 services hosted on or accessed by them.[16] The Technical Subcommittee's vision of a state-run ESInet is one that would interconnect with local and regional ESInets throughout the state and also be able to connect directly with standalone PSAPs which are not affiliated with a local/regional ESInet.

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14 Ohio should view this as a relatively short-term step. At some point in the future, an entirely different funding model may be more appropriate. *See* NENA publication, "Funding 9-1-1 Into the Next Generation: An Overview of NG9-1-1 Funding Model Options for Consideration," March 2007.

15 National Emergency Number Association Next Generation Partner Program *Next Generation 9-1-1 Transition Policy Implementation Handbook,* March 2010, 9-10.

16 Ibid, 16-17.

Emergency service agencies are already considering sharing infrastructure with other governmental entities within Ohio. There is currently a Statewide network infrastructure in place in the state of Ohio. The Ohio Academic Resources Network (OARnet) backbone network features more than 1,850 miles of fiber-optic cable, currently featuring six major rings that extend across the state to most of Ohio's population. The Ohio Academic Resources Network provides Ohioans with one of the nation's most advanced, Statewide telecommunications networks dedicated to research, education and economic competitiveness. The Ohio Academic Resources Network's network backbone of more than 1,850 miles of highly scalable, fiber-optic cable serves Ohio's colleges and universities, K-12 schools, medical centers, public broadcasting stations and State and local government.[17] Ohio is in the process of determining whether OARnet could serve as the public safety backbone for the NG9-1-1 system.

3.3.2.2 Governance

The complexities involved in managing the interconnections between state, regional and local NG9-1-1 systems requires a defined governance model that clearly identifies the roles, responsibilities, and authority by which decisions are made. Ohio has already begun to develop their vision of NG9-1-1 governance. It is important that they continue to develop this vision by leveraging the results of the governance initiation and assessment and continue to identify the requirements necessary to support a collaborative vision of NG9-1-1 throughout the state. These requirements should be comprehensive and representative of the stakeholder community and applicable regulations and/or statutes.

The Ohio NG9-1-1 governance model will also be based on the outcome of the requirements definition phase and will be the framework for the management of the NG9-1-1 system. In order to create a consensus-based governance model that can be implemented Statewide, Ohio must prepare the stakeholders that were identified in the initiation phase to contribute in an effective way to the development of the governance plan. These stakeholders should have expertise in their field and an understanding of what is involved and expected of them in creating a governance model. It is important to train these stakeholders in NG9-1-1 to ensure they have a unified understanding of what NG9-1-1 is and how it presents a need for effective governance. Once these stakeholders gain an understanding of the task they will be able to provide input and gain ownership of the governance model. Their ownership will promote an atmosphere of acceptance of the model throughout the State. A governance model that is established using the feedback and consensus of those stakeholders that are impacted by the system will avoid roadblocks during the implementation of the NG9-1-1 governance model. USDOT's NG9-1-1 System Initiative noted that the "…deployment of NG9-1-1 will require increased coordination and partnerships among government and public safety stakeholders, 9-1-1 Authorities, service and equipment providers, and PSAP Administrators in planning and implementing NG9-1-1."[18]

The State together with its governance stakeholders will create a governance framework in the form of a charter or other mechanism that describes the governance structure in clear terms. An effective NG9-1-1 governance model will enable critical stakeholders to enter into complex service arrangements that insure the utility and quality of the services. The governance model for a shared system defines decision making processes and policies (such as change management) that will be responsive to PSAP needs and allow local participation. Roles must be assigned, security maintained, and every change managed. It will set forth policies and procedures and explain why they are in place. The governance framework will address but is not limited to:

17 Ohio Academic Resources Network, www. Oarnet.net
18 USDOT NG9-1-1 Transition Plan, February 2009, 43.

- Scope
- Authority
- Roles and responsibilities
- Membership
- Stakeholder representation
- Components
- Agreements
  - Interlocal agreements
  - Interstate agreements
- Plans that need to be developed and maintained
- Reporting procedures
- A tiered system of governance *may* consist of a board or council that uses standing committees with specific responsibilities such as a Technology Committee, an Operational Committee and a Training Committee. The Technology Committee may be made up of technical staff from both state and local entities with responsibilities for reviewing new applications, keeping up with security standards, and providing technical recommendations for the governance leadership.

Along with requirements definition and planning, this phase should include the active elimination of roadblocks to NG9-1-1 governance.

The same new relationships and service arrangements must also be facilitated and institutionalized by formal agreements between the governmental agencies, units of public safety and other stakeholders involved. The necessary agreements should be identified and planned for during this phase. "Who is responsible for what," and "who owns what" at what level of system operations will need to be determined in the new NG9-1-1 environment. For example, NG9-1-1 involves network and system functions that may not be operated at the PSAP level, but might be the responsibility of a regional or state level entity in this new environment. Those arrangements and institutional design functions will have to be strategically addressed during the planning phase. People and entities in current public safety roles may be required to take on roles and responsibilities outside of their current scope in order to facilitate NG9-1-1. The FCC's NRIC VII suggested that "*... the roles of the PSAPs, responders, and related entities are expected to expand beyond traditional 9-1-1 services with higher levels of interaction, managed situational intelligence, enhanced capabilities, and more comprehensive communication and coordinated response services.*"[19] While the local nature of 9-1-1 is not likely to change, the full vision of NG9-1-1 will depend upon the development of new and more complex interrelationships and governing environments.

3.3.2.3 Technology

As part of its project with L.R. Kimball, the Ohio ESInet Steering Committee will create detailed technical and functional requirements. As work continues down that path over the remainder of this year, the State needs to use the results from the technology assessment and analysis phase. Other factors that will be considered in the technical requirements are the unique factors present within the state of Ohio, the needs of the stakeholder community, and lessons learned from other states migrating to NG9-1-1. The technical requirements should address the key issues of redundancy, availability and incident response or disaster recovery as applicable.

19 FCC NRIC VII FG1b, *available at* http://www.nric.org/fg/index.html> (Last visited 2/19/13).

Technical requirements should address the domains noted in Table 1, below:

	Hardware Network: Routers, Switches, LANs: Workstations, Servers, etc
	Software Applications: CPE, etc Protocols: ECRF, etc
	Data Analytics: Enterprise Data Gathering, Reporting GIS: Mapping requirements, etc

Table 1—Technical Requirement

Ohio will need to gather information from stakeholder groups across the State in order to properly develop requirements that will meet the needs of the entire State. Not only should this information be gathered, but the State should also work with the stakeholders to prioritize the requirements as they stand today. The following information should be acquired from stakeholders:

- Known standards
- Best practices
- Technical solutions available today in the market

Reaching out to stakeholders to determine what is important to them will help to garner support for the NG9-1-1 system during and after deployment. This support is critical to the system's success and operation. The Ohio State 9-1-1 Office and its stakeholders must create a comprehensive and holistic support plan that addresses fault management, maintenance and monitoring. It should address desired service levels, Key Performance Indicators (KPIs) and other performance criteria. This support plan should clearly identify who is responsible for each aspect of support, and provide detailed escalation paths. It should also synchronize with change management policies across the enterprise.

3.3.2.4 Operations

3.3.2.4.1 *Define Operational Requirements*

Ohio will also need to define operational requirements that will need to be implemented for a successful NG9-1-1 system implementation and maintenance. These operational requirements should be described in an Ohio NG9-1-1 Operations Plan that should draw from the stakeholder input and information gathered in the assessment phase. This plan is extremely important in the transition to NG9-1-1. Not only will the plan enable Ohio to transition to NG9-1-1 successfully but will also help maintain effective operations during the transition and once the transition is complete. This plan will be consensus-based with mechanisms built in for updates and changes as the 9-1-1 environment inevitably progresses in the future. By going through the process of defining these operational requirements, the State will have an understanding of what needs to be in

place to successfully operate the new system and what is important to the stakeholder community. The following is a non-inclusive list of items that Ohio may want to consider when defining their operational requirements:

- Operations Management
- Change management
- Rule adoption for new applications
- Interconnection standards
- Access management
- New users
- New technologies
- Policies and standards
- Statewide coordination
- Resource sharing
- Determine how "calls" will be handled
- Determine how new technologies and increased access will be handled
- Managing an influx of data into the PSAP
- New types of data for telecommunicators
- Training
- Determine the training that is necessary to support the changing system environment
- Training for new job requirements and expectations
- New skill sets in the PSAP
- There will be an increase in data and types of data
- New training standards and training assessments
- Staffing
- Determine the staff needed to implement policies
- Analyze the need for additional positions and increased staff in the PSAP
- Determine what types of staff expertise is needed to operate the new system
- Work with Peace Officer Standards and Training (POST) for hiring standards and training requirements of staff

3.3.2.5 Security

During this phase, the Ohio State 9-1-1 Office, with involvement of key stakeholders, will begin to define its security requirements. The definition process may incorporate the following activities or items:

- Security industry best practices
- Stakeholder survey/focus groups
- Goals from the Ohio Strategic 9-1-1 Plan
- Consensus based standards
- Vendor specifications
- NG9-1-1 standards (e.g. NG-SEC)
- Ohio preference
- Interconnectivity constraints
- Security controls and safeguards.
- Frameworks, standards, regulations, compliance issues such as NG-SEC, National Institute for Standards and technology (NIST), Health Insurance Portability and Accountability Act (HIPAA), etc)

A security plan provides the overarching strategy and vision for securing the Ohio NG9-1-1 system and is the foundation of an effective security program. Ideally, it should come before an organization starts to select or implement security technology, managed services vendors, etc. It may be advisable for PSAPs across the State to create their own security plans as well.

A security plan is the starting point for securing an NG9-1-1 system and formally documents the goals and objectives regarding the security of the NG9-1-1 system. Typically, a security plan accomplishes the following:

- Documents the goals, objectives and intentions regarding cyber security within the NG9-1-1 system
- Exercises due care by managing the risk of security exposure or compromise within the NG9-1-1 system
- Promotes and increases awareness of security across the NG9-1-1 system
- Identifies the standards and frameworks applicable by legislative, regulatory, policy, or choice with which the Ohio NG9-1-1 system shall comply (e.g. NG-SEC, NIST, Criminal Justice Information Services [CJIS], Ohio law/policy, etc.)
- Identifies the security policies necessary to implement and enforce objectives and goals
- Clarifies the security aspects of the management governance structure, as it applies to the Ohio NG9-1-1 system
- Identifies order of magnitude estimates for implementation of security across the Ohio NG9-1-1 system

The security plan must find the appropriate balance between cost, the limitations and restrictions imposed by the plan, and the risks to public safety.

3.3.2.6 NG9-1-1 Detailed Planning

The following plans should be in place as Ohio takes steps toward implementing their NG9-1-1 system:

- NG9-1-1 Master Plan
- Update legislation, regulations and funding model(s)
- Update procurement vehicles / contracts
- Create governance model
- Create technology support plan
- Create an operations plan
- Create a GIS guide
- Create a security plan

3.3.3 Key Decision Points

For the Requirements, Design and Planning Phase, a NG9-1-1 coordinating entity will have to decide who will contribute to determining the requirements for the Ohio NG9-1-1 System. This entity does not yet exist at the State level; however, that is one of the goals of the Committee. There are also many technical decisions that need to be made at this point including what existing infrastructure will be used for the NG9-1-1 system, what elements will be included (e.g. calls, texts, video, telematics, sensors, etc.) and what transport methodologies will be used.

3.3.4 Critical Dependencies

The conceptual system design and detailed plans will depend on the successful and thorough completion of the preceding phases and tasks, as well as available funding. All requirements definition tasks will depend on the cooperation and existence and input of the 9-1-1 program staff and other stakeholder involvement.

3.3.5 Work Products

The following work products are outputs of this phase:

- Conceptual System Design
- Conceptual Design Document
- Regulatory, Legislative and Funding Requirements
- Governance Plan
- Technology Requirements Document (Hardware, Software, Data)
- Operations Requirements
- Security Requirements
- NG9-1-1 Master Plan
- Detailed Planning
- Updated Regulation/Legislation
- Governance Model
- Technology Support Plan
- GIS Guide
- Operations Plan
- Security Plan

3.4 Proof of Concept Phase

3.4.1 Overview

Performing a pilot or proof of concept project will test and validate the NG9-1-1 design concept on a smaller scale before being deployed Statewide. A proof of concept may also help to encourage local PSAPs to participate in and buy into the NG9-1-1 planning and implementation. The following tasks details a proof of concept project, why it is important, and expected outcomes.

3.4.2 Tasks

3.4.2.1 Governance

The proof of concept phase will allow the State to take many of the items from the assessment and planning phase and test them out in a relatively controlled environment. The chosen governance model, currently being defined, is one aspect of the NG9-1-1 system that can be tested in a pilot project. Detailed lessons learned should be documented for the governance portion of the proof of concept in order to update the master plan and develop a final system design.

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3.4.2.2 Technology

Proof of concept or pilot projects can begin to roll out based on the conceptual design completed in the requirements design and planning phase. Counties and PSAPs throughout the State of Ohio have shown great interest in participating in pilot projects to test the functionality of ESInets. Several such projects are currently underway and being managed at a county or multi-county level. Pilot projects should be coordinated in conjunction with the State to validate the NG9-1-1 Implementation plan and to test the chosen solution. These types of pilot projects should involve several PSAP types that currently utilize different equipment. This PSAP sampling should reflect the various systems currently deployed or expected to be used in the NG9-1-1 system.

Examples of initiatives that are in progress include Morgan County, Cincinnati, Franklin County, Butler County, Mahoning County and Cuyahoga County to implement IP-based 9-1-1 systems. Additionally, Hamilton County hosts a pilot site for Intrado's NG91-1 solution and the Toledo area hosts a Regional Integrated Command Center (RICC), which is a converged, IP-decentralized, next generation wide area network supporting the Department of Defense and regional public safety.

Each proof of concept/pilot project should use the requirements defined Ohio's implementation plan completed in the planning phase. When the implementation plan is tested, the pilot can be used to validate selected portions or all of the requirements. The State of Ohio, in conjunction with the pilot PSAPs and involved vendors should develop detailed project plans for each proof of concept/pilot project to include the equipment or process being validated, expected results, and testing processes. Detailed lessons learned should be documented for each proof of concept/pilot project for use in updating the implementation plan and developing a final system design.

3.4.3 Key Decision Points

Although several independent ESInet projects are already underway throughout the State, it is important that the State take a leadership role in coordinating a proof of concept/pilot project effort. The State must decide how it will lead the participating PSAPs in testing the plans and technical requirements that have been determined through the NG9-1-1 planning process. The goals and success measurements for the proof of concept/pilot projects must be consistent throughout the process. This will be critical in the evaluation of the project upon completion and moving forward with NG9-1-1 deployment. Once the results of the proof of concept are clear, the State can update the planning documentation and, most importantly, the requirements that were determined and documented in the design and planning phase.

3.4.4 Critical Dependencies

The success of the pilot project(s) depends heavily on the quality of the NG9-1-1 plan and how closely the participants adhere to that plan throughout the process. The conceptual design determined in the planning phase should be in place with the proper technology and standards. This scenario also depends on the statutory and regulatory changes that will need to take place in order to carry out the project. These projects also need sufficient funding in order to be carried out correctly and thoroughly.

3.4.5 Work Products

The following work products are outputs of this phase:

- Proof of concept project plans
- Proof of concept test results
- Lessons learned documentation

3.5 Implementation Phase

3.5.1 Overview

The implementation phase is where the NG9-1-1 network will actually be deployed. Once the State completes the pilot project(s) and all the results and documentation are analyzed, Ohio can move into implementation phase. This phase can take several years depending on planning and transition strategies.

3.5.2 Tasks

3.5.2.1 Governance

The governance process that was established in previous planning phases will be used to develop the policies and procedures for operation of the NG9-1-1 network.

3.5.2.2 Operations – Transition Planning

This phase also refers to the implementation of processes, policies and procedures that must be updated to migrate to NG9-1-1. An important step in the implementation phase is creating a detailed transition plan that will take the State from the pilot phase into actual NG9-1-1 deployment. There are many possible transition options and strategies that Ohio can choose for their network when the time comes to transition from the legacy system to the NG91-1 system. Ohio will need to develop and follow a transition plan which identifies and outlines the specific steps needed to deploy or transition the 9-1-1 system and PSAPs to the NG9-1-1 system. This plan should be developed utilizing Ohio's NG9-1-1 plans creating in the planning phase, along with the lessons learned from the proof of concept/pilot project. This transition plan should account for not only Statewide deployment, but for regional deployments as well. Because it must account for Statewide and regional deployments, it is very important to have stakeholder input when developing this plan. Local PSAPs and regions should have their own transition plans that are in line with and complement the Statewide transition plan. The transition plan should include the following:

- A list of providers for each PSAP
- A detailed order of the tasks in the transition
- Roles, responsibilities, and authority of the stakeholders involved
- Detailed procedures and checklists
- Change control plan
- Testing procedures and checklists
- Acceptance criteria
- Communication plan
- Technology
- Schedule

A transition plan at the State level will be instrumental in deploying NG9-1-1 across the State, however, this State-level plan will also help PSAPs and regions to plan and carry out the transition. The NG9-1-1 transition plan should be highly detailed and involve many stakeholders which may cause transition planning to be a lengthy process.

3.5.2.3 Technology

Full participation in NG9-1-1 requires PSAP systems that can accept an IP connection and properly handle NG9-1-1 protocols in accordance with the NENA i3 standards. The implementation phase is comprised of all the steps necessary to implement the NG9-1-1 system in Ohio based on the determined transition plan. This phase should include the specific processes associated with installing needed equipment, testing the equipment, any related services, interconnecting PSAPs, and the call origination network to the NG9-1-1 system. At completion of the deployment, detailed as-built documentation of equipment and configurations should be created for each PSAP and the complete system. These as-built documents should be maintained on an on-going basis to reflect the actual system architecture.

Ohio needs to be aware and diligent when working with vendors. Some vendors' state that their IP-based equipment is "NG9-1-1 compliant" or "NG9-1-1 ready," when, in fact, the equipment satisfies only some aspects of NG9-1-1. For example, the system may accept Session Initiation Protocol (SIP) calls, but not the ALI data in the Presence Information Data Format Location Object (PIDF-LO). While such partial compliance with NG9-1-1 may be an asset, it may also be the source of many interoperability problems with equipment from other vendors. Ideally, a PSAP would replace its existing equipment with a fully NENA i3 compliant system. Such an approach would offer the maximum interoperability and achieve the goals of the State of Ohio 9-1-1 Office in a timely manner.

Migration to NG9-1-1 is very time and labor intensive and in order to transition properly may take a number of years. It may be some time before the entire Ohio 9-1-1 system migrates to NG9-1-1. It is likely that a NG9-1-1 PSAP may have to continue to accept calls on legacy trunks and use legacy ALI systems. Ohio can accomplish this by installing Legacy Network Gateways (LNGs) at the PSAP in "front" of the NG9-1-1 equipment. Some vendors are implementing this sort of solution relatively inexpensively. This is often referred to as a "dual mode" PSAP, able to receive calls from both the legacy and the NG9-1-1 networks

There may be some PSAPs in Ohio that choose to wait until their equipment reaches its end of life-cycle prior to transitioning to NG9-1-1 equipment. This may be a financial or timing decision, but regardless of the reason there are several options for the State. Table 2 on the following page outlines those options and the effects of each.

Option	Effect(s)
Wait until the PSAP is ready before migrating.	This may delay migration of call originating networks to the ESInet infrastructure.
Install a LNG converting NG9-1-1 signaling back to traditional trunking for the existing PSAP CPE.	This limits PSAP functionality and may cause interoperability issues. Of particular concern is the functionality of the NG9-1-1 to legacy gateway with respect to functions such as call transfer.
Operate limited new and old equipment side-by-side.	This presents cost and operational challenges.

Table 2—Options and Effects(s) for Transitioning to NG9-1-1 Equipment

There are many factors that can accelerate or delay a PSAP's ability to transition to the NG9-1-1 system such as consolidation or funding. Ohio can set up incentive programs to help PSAPs along the path if possible.

The initial deployments of NG9-1-1 are not expected to present serious challenges to call takers; from their perspective the operations of the old and new systems may not be significantly different. As new technologies become available and new forms of media are coming into the PSAPs, this is where they will start to experience more significant challenges.

Components such as infrastructure, service and support issues may be more difficult to adjust to in a new environment. Some PSAPs may have limited IP expertise in-house, and may have to seek assistance from local outside vendors. While there are many IP vendors, many have limited SIP, IP-telephony, and, especially, limited NG9-1-1 experience. Support may not come from traditional sources in Ohio PSAPs, such as the local telephone company where many PSAPs in Ohio turn to for support in today's environment. However, IP networks enable remote support in ways not previously possible. In the eyes of the PSAPs, this means that less on-site support may be needed and vendors may contract with local computer vendors for items like hardware support while providing NG9-1-1 software support remotely. This is made possible by the open standards nature of NG9-1-1 with one of the goals being to make use of Commercial Off-the-Shelf (COTS) hardware.

3.5.3 Key Decision Points

During the transition phase, several key decision points must be considered. The State must decide on and define a transition methodology that works for all of the stakeholders. This will require communication and stakeholder feedback. Ohio must also decide on a transition strategy that works with the decided funding structure, technology across the State, and stakeholders. The procurement process will also occur during this phase. Procurement methodologies must be decided upon taking into consideration the financial impact of those decisions. Additionally, a deployment schedule must be coordinated with local PSAPs and regions. The deployment schedule must be specific and agreed upon by the stakeholders. This will better assure that the appropriate steps to be taken at the appropriate time during the transition.

3.5.4 Critical Dependencies

The creation of a transition plan is dependent upon the successful completion and documentation of the pilot project. Additionally, communication throughout the State at the state, regional, and local levels will determine the functionality of the transition plan.

NG9-1-1 deployment is dependent upon available funding and on whether the statutory and regulatory environment allows for this deployment to take place in the manner that the state plans for it.

3.5.5 Work Products

The following work products are outputs of this phase:

- Transition Plan(s)
- Project Plan(s)

3.6 Maintenance and Management Phase

3.6.1 Overview

System management activities will be important to maintain the system and help assure that the NG9-1-1 system meets its full potential into the future. As technology grows and changes, the network will need to adapt. Users of the network may also shift once it is in place. All of these network maintenance issues must be planned for and managed in order to assure the network is being used to its full potential and remains secure and functional. Once implementation is complete, this phase will continue on into the future.

3.6.2 Tasks

3.6.2.1 Technology

When Ohio's NG9-1-1 system is fully deployed, traditional lifecycle management activities of the system can commence. For example, these activities include:

- Fault management (technical support, break/fix, etc). Detect, isolate, notify and correct State-level and regional ESInets' incidents and problem in the network
- System management and maintenance. The State-level and regional ESInets' management and maintenance strategies must align to reduce the risk of unplanned failure in the ESInet. This strategy combines both Network Policy/Governance with Operations and the deployment of operational tools that provide oversight of the Ohio NG9-1-1 System. After coupling the IT Infrastructure Library (ITIL) with the International Organization for Standardization (ISO) the State recognizes eight specific areas as a foundation of the fundamental State-level and Regional strategy for the ESInet hierarchy.
- Configuration management (changes, Upgrades, Improvements). Configuration Management verifies the impact of changes and the relationship to other configuration items (CI) before updating the change management database (CMDB) for the State-level and regional ESInets.
- KPIs/performance management. Monitor and measure various aspects of performance so that overall performance can be maintained at an acceptable level for the State-level and regional ESInets.
- Managed services (monitoring). Managed services should perform oversight functions as the State's agent. The contracted service should administer all aspects of interconnection, configuration, security, use and maintenance of NG 9-1-1 by all service providers, by PSAPs, by PSAP vendors and by any other stakeholder interconnected with the State of Ohio NG9-1-1.
- Security management. Once the design has been implemented, monitoring must be put into place to ensure that pre-set thresholds are not exceeded for capacity of all security elements. When thresholds are close to being reached, then processes should be in place for adding additional resilient security components and services. The State-level ESInet and regional ESInet could potentially be at risk of security breaches such as spoofing. Policies should be followed that includes testing all products and services in a lab before implementation. Policies will be followed for patch management to ensure that security patches are kept up-to-date.
- Incident response/management. There is a potential risk of PSAP isolation or CPE failure in the new network. Contingency plans should be developed for the regional ESInet re-directing calls to a pre-determined PSAP along with a contingency plan for recovering services to and at the PSAP.
- Dashboards/portals. The State-level ESInet and regional ESInets need to be aware of service failure or termination, independent of the service interactions they initiate. To facilitate this requirement, the State-level

ESInet and the regional ESInet will need to create a dashboard/portal for notification best practices regarding service awareness that allow service requestors and providers deal with these cases in a consistent fashion.

3.6.3 Key Decision Points

There are several decisions that need to be made in order to manage the network effectively. Many of these decisions need to be made prior to the implementation of the network. One of the big advantages of NG9-1-1 will be the ability to add new forms of technology to the network. The State of Ohio needs to determine how new forms of technologies, data and information will be allowed to use the NG9-1-1 network.

Another decision that will need to be made is regarding the policies and procedures for the network. These policies and procedures will need to be determined during the planning phase of this process, and will need to be reexamined and updated as the network is maintained.

3.6.4 Critical Dependencies

System management will depend largely on the following issues:

- Monitoring
- Fault Management
- Configuration Management
- Change Management
- Incident Response/Management

3.6.5 Work Products

Work products for the maintenance and monitoring phase will be ongoing throughout the day to day activities of maintaining a network. Through network maintenance and monitoring, plans and other network documentation should be maintained as well.

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4. TIMEFRAME

There are many considerations that factor into a timeframe for transition to NG9-1-1. At this point in time, Ohio is not far enough into the planning process to determine how long the transition is going to take. Each task outlined in this document can take a great deal of time and requires much attention and detailed work. Aside from the time it takes to plan and walk through these tasks, there are things that the State cannot control that can impact the timeframe. Dependencies, such as funding cycles, regulatory changes, CPE readiness and facility preparedness will impact timelines. As a result, every PSAP will require a unique view of the specific dependencies and deliverables at each stage or phase.

It is a well-known fact that each state is different and will require a different timeframe to transition to NG9-1-1. Additionally, every PSAP is different and will require different equipment, funding, connections, etc. in order to complete a transition to NG9-1-1. Some PSAPs will be forming into regions via ESInets. The formation of each region will require time to go through the entire cycle of initiation, assessment, planning and implementation. Beyond that, each region or ESInet will have different requirements which will affect how long it will take for a Statewide NG9-1-1 system to come together in Ohio.

Additionally, there are many services on a NG9-1-1 network that may be provided by the State or through a vendor or multiple vendors. Examples of these services include GIS, CAD and mapping. If Ohio purchases a Statewide CAD system, the individual PSAPs would not have to purchase their own. However, this may lead to pushback if all PSAPs were mandated to have the same CAD.

Another factor that affects NG9-1-1 timeframes is planning. Planning is extremely important in a NG9-1-1 transition. While detailed planning takes time upfront, it can save the State later in the implementation phases. Poor planning may lead to mistakes which may lead to putting certain aspects of the project on hold or even having to start from scratch depending on the problem. Having a solid, well thought out plan that has buy-in from the stakeholders is the key to making a NG9-1-1 transition successful.

One advantage Ohio has in terms of timeframe is the infrastructure for a Statewide network is already in place. If the State chooses to use OARnet for the NG9-1-1 public safety network backbone, they will save a significant amount of time in the time it would take to procure a network.

5. CONCLUSION

PSAPs throughout Ohio are relying on aging, analog public safety systems that are out of synch with the pace of technological change; if they have not already, they will soon reach the point where they no longer meet the expectations of people who live in, visit, or do business in the State. Across the nation, emergency communication systems are being converted to digital interfaces and the process of migration to NG9-1-1 is underway in a majority of states.

This report is a snapshot in time. It represents where Ohio stands in terms of progress and planning at the time of submission. Although the ESInet Steering Committee and its subcommittees have done a great deal of hard work already, much more work will need to be done to develop a comprehensive tactical plan for the State and thereby assure a successful transition to a statewide ESInet and ultimately to statewide NG9-1-1. This document is the vehicle for developing such a plan. It describes the steps that need to be taken, the decisions that need to be made and the dependencies among it all.

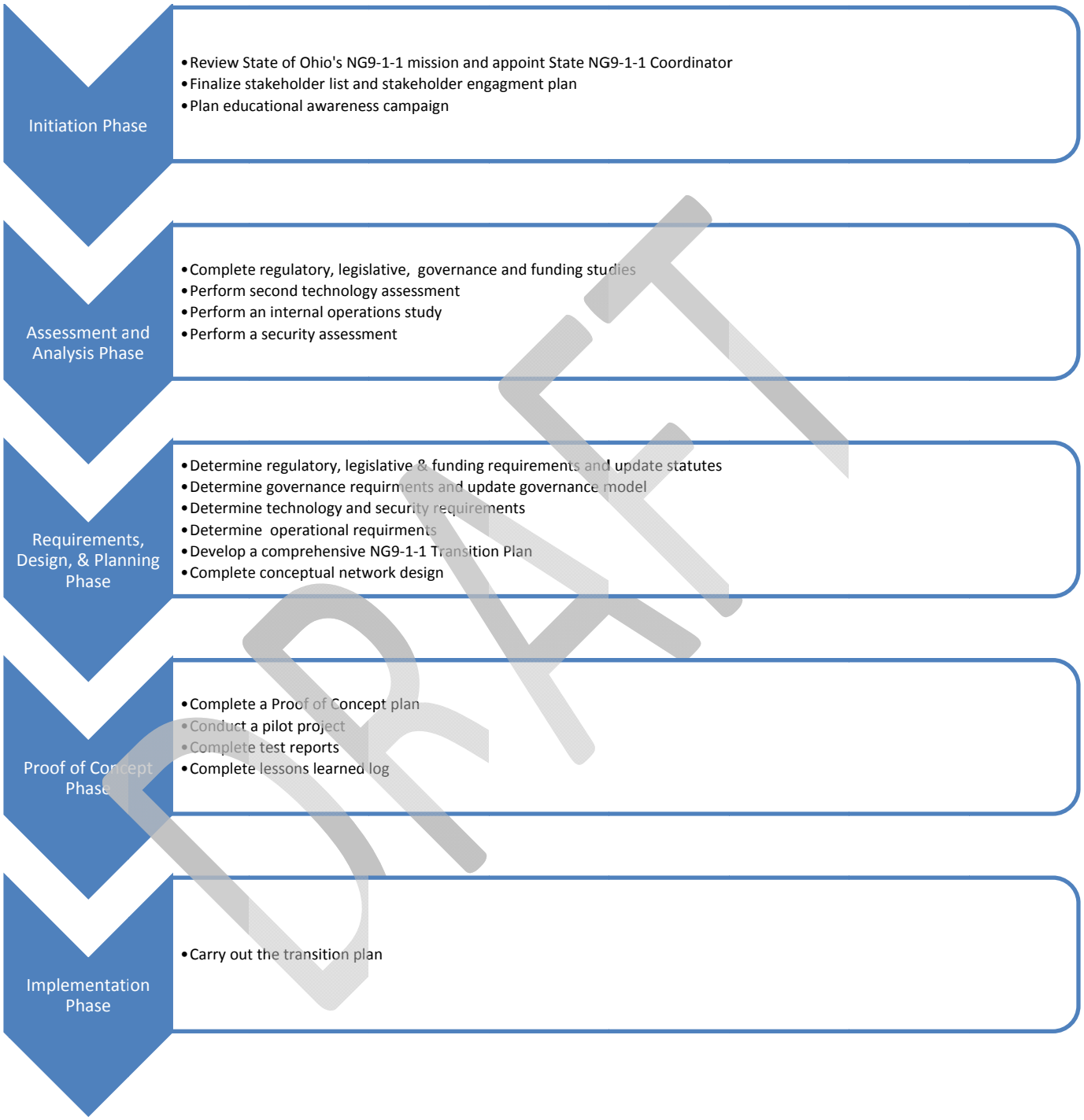
Kimball recommends that the State use this report as a guide in taking the steps outlined herein. PSAPs may also use this report to help navigate the path towards their own transitions. Many of the concepts, plans and action items can be used by PSAPs and/or regions to plan for regional ESInets. This will help to promote coordination and interconnectivity throughout Ohio.

In the new NG91-1 world, states and PSAPs are no longer islands; they are interconnected within systems and systems of systems. The national vision is for seamless, interconnected state NG9-1-1 systems extending across the nation.
The next step for the State is to consider and digest this Evaluation and Recommendations Report and take action on each recommendation. As Ohio moves through the phases described in this report, it may need to be updated or adjusted as there are many factors that could cause slight or major changes in plan along the road to NG9-1-1. Kimball recommends that Ohio revisit this report occasionally in order to update or make sure it is still on track with the vision of NG9-1-1 transition.

Kimball recommends that the State continue and expand stakeholder engagement in this process. It is extremely important that someone at the State level provides leadership and a forum for the counties and PSAPs to come together and participate in the continuing planning process. As part of this, the State needs know what activities are taking place at the local level so that they can facilitate a unified effort as county-wide or regional ESInets begin to be deployed within Ohio.

Kimball also recommends that Ohio analyze the topic of PSAP consolidation separately from the NG9-1-1 study. Strong state-level coordination on a statewide basis and NG9-1-1 coordination will likely lead to organic consolidation as PSAPs share technologies and services and redundant costs are eliminated. This may be done by physically consolidating centers or by virtual consolidation where PSAPs share key technology such as CAD or 9-1-1 answering equipment but remain independent of each other from an organizational perspective. Regardless of how it occurs, consolidation is a completely separate exercise from NG9-1-1. Incentives to consolidate should be considered seriously and provided if the legislature grants the resources to do so.

As stated clearly throughout this report, transitioning to a NG9-1-1 system is a huge undertaking. While Ohio has started down the path and is on the right track, there is still much work to be done. Kimball recommends that Ohio considers the recommendations set forth in this report and continue down the path towards transitioning to a statewide NG9-1-1 system. Ohio's NG9-1-1 stakeholders should use the framework expressed in this report to work systematically through Kimball's recommendations and develop a comprehensive statewide NG9-1-1 transition plan. As part of this recommendation, the diagram below outlines the high level next steps as described in this report for the State of Ohio:


Initiation Phase
• Review State of Ohio's NG9-1-1 mission and appoint State NG9-1-1 Coordinator
• Finalize stakeholder list and stakeholder engagment plan
• Plan educational awareness campaign
Assessment and Analysis Phase
• Complete regulatory, legislative, governance and funding studies
• Perform second technology assessment
• Perform an internal operations study
• Perform a security assessment
Requirements, Design, & Planning Phase
• Determine regulatory, legislative & funding requirements and update statutes
• Determine governance requirments and update governance model
• Determine technology and security requirements
• Determine operational requirments
• Develop a comprehensive NG9-1-1 Transition Plan
• Complete conceptual network design
Proof of Concept Phase
• Complete a Proof of Concept plan
• Conduct a pilot project
• Complete test reports
• Complete lessons learned log
Implementation Phase
• Carry out the transition plan

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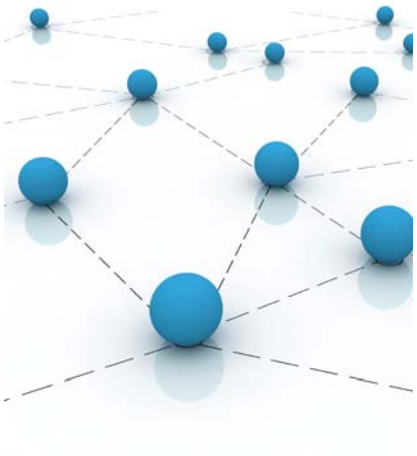

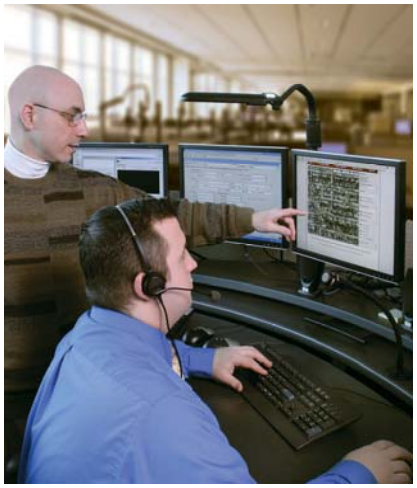

Draft Report for

Regulatory Review Report

Prepared for

Ohio Department of Administrative Services

April 2013 ©

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TABLE OF CONTENTS

EXECUTIVE SUMMARY 1
1.1 STATUTORY PROVISIONS 1
1.1.1 Authority *1*
1.1.2 Funding *1*
1.1.3 Definitions *2*
1.1.4 Enforcement and penalties *2*
1.1.5 Confidentiality *2*
1.1.6 Liability *2*
1.2 REGULATORY ENVIRONMENT 3
1.2.1 Statewide ESInet *3*
1.2.2 Competitive NG9-1-1 Environment *3*
1.3 NEXT STEPS 4
2. INTRODUCTION 6
2.1 BACKGROUND 6
2.2 REGULATORY CONSTRAINTS AND ROADBLOCKS 7
2.3 REGULATORY CONSIDERATIONS FOR THE MIGRATION TO NG9-1-1 7
3. METHODOLOGY 8
4. POTENTIAL ROADBLOCKS TO AND REGULATORY CONSTRAINTS ON NG9-1-1 9
4.1 STATUTORY PROVISIONS 9
4.1.1 Authority *9*
4.1.2 Funding *11*
4.1.3 Definitions *11*
4.1.4 Enforcement and Penalties *13*
4.1.5 Confidentiality *13*
4.1.6 Liability *14*
4.2 REGULATORY ENVIRONMENT 15
4.2.1 Statewide ESInet *15*
4.2.2 Competitive NG9-1-1 Environment *19*
5. CONCLUSION AND NEXT STEPS 25

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EXECUTIVE SUMMARY

The Ohio Legislature has recognized the need to prepare the State of Ohio for Next Generation 9-1-1 (NG9-1-1) when it passed HB 360 in December. There is a potential for existing laws, regulations and tariffs to hinder the implementation of and transition to NG9-1-1 since most were adopted when the technological capabilities of NG9-1-1 did not exist and as a result make specific reference to older technologies or system capabilities. Such references may inadvertently inhibit the implementation of the technologies and services required to implement NG9-1-1.

L.R. Kimball was contracted by the Ohio Department of Administrative Services to conduct a review of legislation and regulations to identify any provisions that may impede the implementation of NG9-1-1. L.R. Kimball recommends that the Ohio General Assembly consider the recommendations in this Report for amendments and modifications to the 9-1-1 Regulatory Framework in Ohio. The ESInet Steering Committee should evaluate the regulatory impacts of specific technical specifications once they are established since that information was not available at the time of this Report.

1.1 Statutory Provisions

1.1.1 Authority

Ohio 9-1-1 Statutes do not provide for a statewide coordinating entity for 9-1-1 that has the authority to operate, procure and facilitate the NG9-1-1 system. The new environment requires centralized coordination, because seamless statewide and interstate NG9-1-1 interconnectivity and interoperability simply will not be possible without it.

L.R. Kimball recommends that the statewide 9-1-1 coordinating entity be housed within a state level agency and be given the statutory authority to coordinate the system with related state entities that have authority for GIS, public safety, radio systems and public safety networks such as FirstNet because all of these systems will require the need to interconnect and interoperate in the NG9-1-1 environment. In addition the statewide coordinating entity should be given statutory authority to coordinate the interconnection of local and regional ESInets with the state backbone to ensure seamless statewide coverage.

L.R. Kimball recommends that Ohio designate a state-level 9-1-1 coordinator and establish the roles, responsibilities and authority of that Coordinator in the Statute. The coordinator should have adequate professional and technical staff to support the coordinating entity's mission.

Chapter 5507 currently provides for two 9-1-1 advisory boards, the ESInet Steering Committee (Chapter 5507.02) and the Ohio 9-1-1 Council (Chapter 5507.65). While the ESInet Steering Committee has a more specific charge related to the planning for NG9-1-1, the scope of duties of both committees overlap substantially and should either be consolidated or eliminated based on the form and needs of the recommended State-level 9-1-1 Coordinating entity.

1.1.2 Funding

Funding recommendations are provided in a separate report. The funding provisions of the statute will need to be entirely reconceived based on the final technical and operational configuration and requirements of the system.

1.1.3 Definitions

Numerous definitions require elimination or change. The overarching principle is to make them technology neutral. A clear definition of a PSAP is required for the efficient management of the system, the technology and the funding.

This example from another state may be useful[1]: "Public Safety Answering Point" means a facility with enhanced 9-1-1 capabilities, operated on a 24-hour basis, assigned the responsibility of receiving 9-1-1 calls and dispatching, transferring or relaying emergency 9-1-1 calls to other public safety agencies or private safety agencies.

1.1.4 Enforcement and penalties

Chapter 5507.34 is presently limited in the scope of its provisions. It should be amended to include proceedings against any 9-1-1 service provider or 9-1-1 authority for the enforcement of Chapter 5507. It should remove specific references to telephone companies and render the language technology neutral. Additional detail is contained in the report.

1.1.5 Confidentiality

The current 9-1-1 system is dedicated, closed and has a single purpose. The information delivered over the system is limited and is generally stored in a single, restricted location. In contrast, the NG9-1-1 system will be a shared system and 9-1-1 will likely be just one part of a network shared with other public safety services and agencies – and perhaps with other entities unrelated to public safety. There will be changes in the amount and type of data available to be shared, including video, images, telematics and medical records. Chapter 5507.32(G) should be expanded to include any type of data associated with any type of 9-1-1 call and an exception should be added for the aggregation and analysis of general call data. Chapter 5507 should also provide for access restrictions to network stored data and require 9-1-1 authorities to establish policies and procedures that set access rights, controls and processes. Additional detail is contained in the report.

1.1.6 Liability

NG9-1-1 call delivery is more complex than it is today and involves many entities and vendors that will deliver individual components of 9-1-1 service at any point in the call process. It is important that all players in Ohio's NG9-1-1 system are assured that their good faith efforts to deliver 9-1-1 service will not expose them to liability. Lack of legal clarity on the issue of liability can lead to significant issues, including delays in provisioning critical NG9-1-1 services, just as it did with wireless E9-1-1.

[1] It would need to be updated for NG9-1-1, but the basic principle is clearly set forth.

The statutory liability protection provided in Chapter 5507.32 should be amended to cover all NG9-1-1 services and be broad enough to encompass all players involved in provisioning NG9-1-1. Additional detail is contained in the report.

1.2 Regulatory Environment

1.2.1 Statewide ESInet

Currently, Ohio's statutes lack provision for a statewide ESInet to be implemented and to operate. Authority to operate an ESInet at the state level and to coordinate interconnections with county, regional and interstate ESInets is an essential component that must be addressed.

Rulemaking authority for technical and operational standards is currently split between the ESInet Steering Committee and the Ohio 9-1-1 Council. There should be only one such authority. L.R. Kimball recommends authorizing the recommended Ohio 9-1-1 Coordinating Entity with the sole rulemaking authority for 9-1-1, including technical and operational standards for NG9-1-1.

As part of its standards setting authority, the recommended Ohio 9-1-1 Coordinating Entity should establish a consensus based training standard for Ohio 9-1-1 operators and have statutory authorization to do that by rule.

L.R. Kimball recommends the State engage the regulated incumbent local exchange carriers (ILECs) in discussions regarding future plans for the ESInet as soon as possible in order to expedite and simplify interconnection negotiations once a network provider is identified.

The State should also ask the selective router providers to amend tariff language as necessary, or otherwise enter into permitted agreements to allow for interconnection so that term language can be addressed up front.

The technical transition to NG9-1-1 will require the legacy network to work parallel to and in concert with new network components during the transition period. Current tariffs may not be broad enough to allow selective routers to route calls to transitional network components such as a Legacy Network Gateway instead of directly routing to a PSAP. Existing tariffs suggest that regulated ILECs will connect to PSAPs; thus, there is potential for regulated ILECs to resist interconnecting with the new network components. Additional important information and concerns about existing tariffs associated with specific companies is contained in the report.

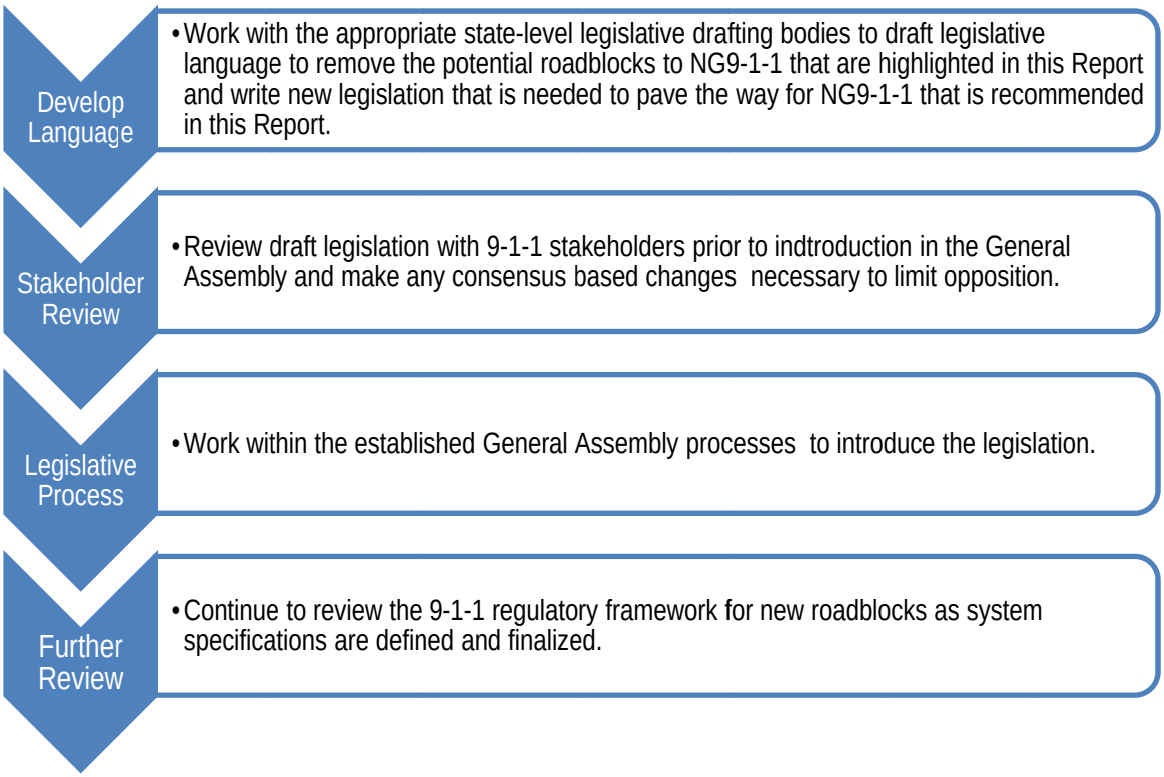
1.2.2 Competitive NG9-1-1 Environment

Statutes need to be added or amended to allow for the competitive environment that is necessary for the transition to NG9-1-1. Today, ILECs are typically the 9-1-1 System Service Providers (SSP), but in the NG9-1-1 environment, competitive alternatives to existing services will be available – indeed, are already available – from non ILEC providers. This transition is already underway elsewhere in the nation and has already encountered legal and regulatory roadblocks. Ohio can avoid this pitfall by addressing the matter up front and establishing a competitively neutral and technologically neutral marketplace.

The transition to NG9-1-1 will not occur with the flip of a switch. There will be a transition period, perhaps lengthy, when some Ohio PSAPs will be fully NG9-1-1 capable, others will not be, and some will have a mix of legacy and NG9-1-1 components. Ohio's regulatory environment should allow 9-1-1 authorities to replace legacy 9-1-1 functions component by component by unbundling all tariffed 9-1-1 services and pricing them reasonably so that 9-1-1 authorities have the freedom to transition component by component. Unbundling 9-1-1 services will prevent 9-1-1 authorities from bearing legacy costs that are no longer needed during the transition. Further information and recommendations regarding specific statutes may be found in the report.

1.3 Next Steps

L.R. Kimball recommends that the ESInet Steering Committee work with the appropriate state-level legislative drafting bodies to draft legislative language to remove the potential roadblocks to NG9-1-1 that are highlighted in this Report and write new legislation that is needed to pave the way for NG9-1-1 as recommended in this Report. L.R. Kimball recommends that Ohio review draft legislative language with 9-1-1 Stakeholders before it is introduced in the General Assembly so that varying views on the legislation can be raised and aired. There is potential for consensus based changes to be made at this stage so as to avoid opposition to the introduced legislation. The initial legislative amendments will go far to pave the way for NG9-1-1 implementation in Ohio, however, unforeseen roadblocks can be expected based on the specific system specifications and plans that are ultimately adopted. Ohio should continue to review the 9-1-1 regulatory framework for new roadblocks as system specifications are defined and finalized.



2. INTRODUCTION

2.1 Background

The Ohio Legislature has recognized the need to prepare the State of Ohio for Next Generation 9-1-1 (NG9-1-1) when it passed HB360 that created a Statewide ESInet Steering Committee and assigned responsibility to generally advise the state on the implementation, operation, and maintenance of a statewide emergency services internet protocol network that would support state and local government NG9-1-1 and the dispatch of emergency service providers.[2] The ESInet Steering Committee was tasked with the following:

(1) On or before May 15, 2013, deliver an initial report to the speaker of the house of representatives, the president of the senate, and the governor providing recommendations for the state to address the development of a statewide emergency services internet protocol network, which recommendations shall include a review of the current funding model for this state's 9-1-1 systems and may include a recommendation for a reduction in wireless 9-1-1 charges;
(2) Examine the readiness of the state's current technology infrastructure for a statewide emergency services internet protocol network;
(3) Research legislative authority with regard to governance and funding of a statewide emergency services internet protocol network, and provide recommendations on best practices to limit duplicative efforts to ensure an effective transition to next-generation 9-1-1;
(4) Make recommendations for consolidation of public-safety-answering-point operations in this state, including recommendations for accelerating the consolidation schedule established in section 5507.571 of the Revised Code, to accommodate next-generation 9-1-1 technology and to facilitate a more efficient and effective emergency services system;
(5) Recommend policies, procedures, and statutory or regulatory authority to effectively govern a statewide emergency services internet protocol network;
(6) Designate a next-generation 9-1-1 statewide coordinator to serve as the primary point of contact for federal initiatives;
(7) Coordinate with statewide initiatives and associations such as the state interoperable executive committee, the Ohio geographically referenced information program council, the Ohio multi-agency radio communications system steering committee, and other interested parties.[3]

There is a potential for existing laws, regulations and tariffs to hinder the implementation of and transition to NG9-1-1 since most were adopted when the technological capabilities of NG9-1-1 did not exist and as a result make specific reference to older technologies or system capabilities. Such references may inadvertently inhibit the implementation of the technologies and services required to implement NG9-1-1.

L.R. Kimball was contracted by the Ohio Department of Administrative Services to conduct a review of legislation and regulations to identify any provisions that may impede the implementation of NG9-1-1.

[2] ORC Chapter 5507.02.
[3] ORC Chapter 5507.02.

2.2 Regulatory Constraints and Roadblocks

In this Report, L.R. Kimball identifies and cites provisions in Ohio rules, statutes and tariffs that have the potential to impede the transition to and implementation of NG9-1-1. There is a potential for existing laws, regulations and tariffs to hinder the implementation of NG9-1-1 since most were adopted when the technological capabilities of NG9-1-1 did not exist and make specific reference to older technologies or system capabilities that may inadvertently inhibit the migration to NG9-1-1. The manner in which a statute is organized and the authority provisioned in it can largely impact the State's ability to smoothly transition to the NG9-1-1 environment. The likelihood and merits of many of the identified roadblocks largely hinge on the ability of the involved parties to agree. To the extent that Network interconnection agreements and configurations are currently occurring outside of a strict reading of regulatory provisions, this could be interpreted to indicate that some regulatory provisions may not pose roadblocks when parties are willing to agree.

Regulatory language needs to be broad enough to allow calls to be routed to through the new NG9-1-1 technical components. Current tariff provisions and statutory definitions may not be broad enough to allow for the new types of routing mechanisms necessary for the transitional stages prior to full NG9-1-1 implementation or the those interconnections necessary once NG9-1-1 is deployed. L.R. Kimball recommends that the State engage the regulated incumbent local exchange carriers (ILECs) in discussions regarding future plans for the ESInet as soon as possible in order to expedite and simplify interconnection negotiations once a network provider is identified. The Client should also ask the selective router providers to amend tariff language as necessary, or otherwise enter into permitted agreements to allow for interconnection so that term language can be addressed up front. Another potential roadblock to the implementation of NG9-1-1 may be certain contractual constraints placed on customer premises equipment (CPE). Such contractual constraints could prohibit changes to the CPE and could prevent the receipt of 9-1-1 calls from a state-level ESInet.

2.3 Regulatory Considerations for the Migration to NG9-1-1

Some provisions do not directly impede the implementation of NG9-1-1 but certain modifications should be considered to pave the way for or reduce uncertainty regarding NG9-1-1. NG9-1-1 entails the complex delivery of 9-1-1 calls involving many entities and vendors that deliver individual components of 9-1-1 service at any point in the call process. It is important that all players in NG9-1-1 systems are assured that their good faith efforts to deliver 9-1-1 service will not expose them to liability. Specifically providing all potential players liability protection will cause more entities to participate in the migration to NG9-1-1. This report analyzes federal and state initiatives to assure that liability protection covers all potential players in the NG9-1-1 environment.

The migration to NG9-1-1 will be more efficient if it is a collaborative effort between governmental entities and NG9-1-1 service providers. Many carriers are developing their own versions of NG9-1-1 services and networks. L.R. Kimball recommends that the Client converse with carriers about their development of NG9-1-1 technologies and how they might fit into the plans for NG9-1-1 in the state. In the least, the State and carriers should keep each other apprised of NG9-1-1 plans and developments in order to assure that all of the individual components and plans will be able to work together to deliver NG9-1-1.

3. METHODOLOGY

L.R. Kimball methodically analyzed the following laws and tariffs by conducting a detailed line-by-line review of the content to identify potential roadblocks to the transition and eventual implementation to NG9-1-1. The L.R. Kimball team leveraged their knowledge of the regulatory roadblocks experienced by other states to identify the potential for similar roadblocks in Ohio. We reviewed the documentation from a regulatory perspective only.

The following documents were analyzed for the legislative and regulatory review:

- ORC Chapter 5502
- ORC Chapter 5507
- ORC Chapter 4927
- ORC Chapter 307.63
- Ohio Administrative Code Chapter 4901:1-8
- AT&T Tariff, P.U.C.O. No. 20, Part 8, Section 3
- Windstream Tariff, P.U.C.O. No. 9, Section 11
- CenturyTel of Ohio, Inc., P.U.C.O. NO. 12, Section 6
- Cincinnati Bell Telephone Company, LLC, P.U.C.O. No. 1, Section 9
- Frontier North, Inc., P.U.C.O. No.11, Section 6

4. POTENTIAL ROADBLOCKS TO AND REGULATORY CONSTRAINTS ON NG9-1-1

4.1 Statutory Provisions

4.1.1 Authority

Ohio 9-1-1 Statutes do not provide for a coordinating entity for 9-1-1 in the State that has the authority to operate, procure and facilitate the NG9-1-1 system. The new environment requires centralized coordination, because seamless statewide and interstate NG9-1-1 interconnectivity and interoperability simply will not be possible without it. The NG9-1-1 environment will be a system of interoperable systems where resources are shared in order to provide the highest level of emergency response. This new environment will require centralized coordination at the State level of local, regional and interstate systems.

National public safety Agencies and the Federal government are encouraging State-level coordination for NG9-1-1.[4] A state-level coordinating entity will be necessary to plan, coordinate and implement NG9-1-1 and monitor uniform statewide adherence to established technical and operational standards for the system. L.R. Kimball recommends that the state-level 9-1-1 coordinating entity be housed within a state level agency and be given the statutory authority to coordinate the system with related state entities that have authority for GIS, public safety, radio systems and public safety networks such as FirstNet because all of these systems will require the need to interconnect and interoperate in the NG9-1-1 environment. In addition, the statewide coordinating entity should be given statutory authority to coordinate the interconnection of local and regional ESInets with the state backbone to ensure seamless statewide coverage.

L.R. Kimball recommends that Ohio designate a State Level 9-1-1 Coordinator and establish the roles, responsibilities and authority of that Coordinator in the Statute. Whether a person, a board or a state agency, the Coordinator should be recognized as the authority for 9-1-1 in the State. The Coordinator should be given the statutory authority to:

- Facilitate the 9-1-1 System across the State
- Operate state-level functional components of the 9-1-1 system
- Procure state-level 9-1-1 components
- Promulgate regulations related to the operation of the 9-1-1 System (discussed at length in 3.2.1.2)
- Promulgate training standards for Ohio telecommunicators
- Coordinate the interconnection of local and regional ESInets with the state backbone to ensure seamless statewide coverage
- Coordinate with Federal 9-1-1 initiatives

[4] Legal and Regulatory Framework for Next Generation 911 Services, Report to Congress and Recommendations, February 22, 2013, Federal Communications Commission, Sections 2 and 4.1.

The ESInet Steering Committee was charged with designating a next-generation 9-1-1 statewide coordinator to serve as the primary point of contact for federal initiatives. L.R. Kimball recommends that the 9-1-1coordinator's responsibilities should not be limited to federal initiatives, but should include the broad range of responsibilities outlined in this section. It will be important for the 9-1-1 Coordinating Entity to have control over the coordination of all aspects of NG9-1-1 implementation so that order can be maintained and efficiencies can be maximized.

In addition to the statutory authority to carry out its roles and responsibilities, the 9-1-1 Coordinating Entity will need an adequate level of dedicated staff to carry out its mission. Whatever form the 9-1-1 Coordinating entity takes in Ohio, L.R. Kimball urges the State to include a statutory provision that provides for an adequate level of dedicated staff to carry out the day to day functions of the 9-1-1 Coordinating Entity.

Currently, Chapter 5507 provisions two 9-1-1 advisory boards, the ESInet Steering Committee (Chapter 5507.02) and the Ohio 9-1-1 Council (Chapter 5507.65). While the ESInet Steering Committee has a more specific charge related to the planning for NG9-1-1, the scope of duties of both committees overlap substantially and should either be consolidated or eliminated based on the form and needs of the recommended State-level 9-1-1 Coordinating entity. Both entities have authority to establish technical and operational standards, it is imperative that standards be consensus based and uniform across the state. This will require the coordination by one entity of all of the standards for the 9-1-1 system.

Coordination of NG9-1-1 implementation could be difficult with the large number of state, regional, countywide and municipal level systems that have statutory authority over pieces of the 9-1-1 system. It will be important for these various entities to be involved in NG9-1-1 planning to the extent that their systems will be impacted by the deployment of NG9-1-1. It is possible that the diverse authority related to the operation of the 9-1-1 system that is spread across these countywide systems could present a roadblock to NG9-1-1. While 9-1-1 systems established under Chapter 5507 deal specifically with the delivery of wireless and wireline 9-1-1, public safety communications systems established under Chapter 307 includes communications facilities, equipment, and services that helps to provide immediate field exchange of police, fire, and emergency medical services information between the county and participating states, political subdivisions, and other public entities, without regard to which jurisdiction holds title to real or personal property used in the system or employs the persons responsible to dispatch emergency personnel using the system. Emergency Management agencies established in Chapter 5502 are charged with coordinating, organizing, administering, and operating emergency management and coordinating the development of an all-hazards emergency operations plan with all agencies, boards, and divisions having emergency management functions within the political subdivision.

- Chapter 5507.03 Countywide 9-1-1 system.
- Chapter 5507.09 Municipal corporations or townships establishing own system.
- Chapter 307.63 Establishing countywide public safety communications system.
- Chapter 5502.26 Countywide emergency management agency.
- Chapter 5502.27 Regional authority for emergency management.
- Chapter 5502.271 Program for emergency management.

4.1.2 Funding

Funding recommendations are provided in the companion Fund Analysis Report. The funding provisions of the statute will need to be entirely reconceived based on the final technical and operational configuration and requirements of the system.

4.1.3 Definitions

Outdated terminology in existing 9-1-1 legislation is proving to be a roadblock to the implementation of NG9-1-1 in states across the country. Definitions of outdated terminology prove to be even larger roadblocks when specific technologies referenced in definitions represent a snapshot of time that will soon be outdated. It is suggested that all definitions in 5507.01 be amended to be technology neutral and "timeless" so that regulatory overhauls are not required each time a new NG9-1-1 technology is introduced.

With the advent of NG9-1-1, types of requests for help will likely evolve to include data requests like texts, photographs and videos that come from devices other than traditional telephones. The definition of "9-1-1 system" should be amended to remove "telephone number" with a technology neutral term or terms that does/do not limit the type of service that NG9-1-1 might involve. The definition currently limits the type of request to a telephone call. The definitions for "9-1-1 system," and "Basic 9-1-1," should be combined to address the request for service and the receipt of the request while keeping the definitions technology neutral.

- (A) "9-1-1 system" means a system through which individuals can request emergency service using the telephone number 9-1-1.
  (B) "Basic 9-1-1" means a 9-1-1 system in which a caller provides information on the nature of and the location of an emergency, and the personnel receiving the call must determine the appropriate emergency service provider to respond at that location.

It is important for Ohio's 9-1-1 Statutes to be technology neutral and include a broad definition of "call" that includes other types of communications, in addition to voice calls, that could be used to request 9-1-1 service. L.R. Kimball recommends adding a strong definition of 9-1-1 that covers all potential technologies and removing those technology specific definitions that will not require individual statutory treatment in the NG9-1-1 environment. Those definitions include, "Enhanced 9-1-1," Enhanced wireline 9-1-1," "Wireless Enhanced 9-1-1," Wireless 9-1-1," "Wireline 9-1-1."

- (C) "Enhanced 9-1-1" means a 9-1-1 system capable of providing both enhanced wireline 9-1-1 and wireless enhanced 9-1-1.
  (D) "Enhanced wireline 9-1-1" means a 9-1-1 system in which the wireline telephone network, in providing wireline 9-1-1, automatically routes the call to emergency service providers that serve the location from which the call is made and immediately provides to personnel answering the 9-1-1 call information on the location and the telephone number from which the call is being made.
  (E) "Wireless enhanced 9-1-1" means a 9-1-1 system that, in providing wireless 9-1-1, has the capabilities of phase I and, to the extent available, phase II enhanced 9-1-1 services as described in 47 C.F.R. 20.18(d) to (h).
  …
  (H) "Wireless 9-1-1" means the emergency calling service provided by a 9-1-1 system pursuant to a call originating in the network of a wireless service provider.

(I) "Wireline 9-1-1" means the emergency calling service provided by a 9-1-1 system pursuant to a call originating in the network of a wireline service provider.

A general definition of 9-1-1 service provider should be established instead of limiting the types of service providers by calling out individual providers by technology, which is how the Ohio Statute is currently structured. L.R. Kimball recommends removing the current definitions, "Wireless service provider," "Wireline Service Provider" and "Provider of a prepaid wireless calling service," and adding a technology neutral definition that would include any type of provider that provisions request for help to Public Safety Answering Points.

- (G) "Wireless service provider" means a facilities-based provider of wireless service to one or more end users in this state.

  …

  (J) "Wireline service provider" means a facilities-based provider of wireline service to one or more end-users in this state.

  …

  (Y) "Provider of a prepaid wireless calling service" means a wireless service provider that provides a prepaid wireless calling service.

All references to older technologies and their components should be removed from definitions so that all definitions could apply to any technology. Once the 9-1-1 system transitions and is operating over a statewide ESInet, selective routers will no longer be used to route 9-1-1 calls and the type of technology that sends an emergency request will not matter in the NG9-1-1 environment. L.R. Kimball suggests removing the definition for "Wireline telephone network" because it refers to specific technology components that will not apply in the NG9-1-1 environment.

- (L) "Wireline telephone network" means the selective router and data base processing systems, trunking and data wiring cross connection points at the public safety answering point, and all other voice and data components of the 9-1-1 system.

The definition of "Public safety answering point" limits a PSAP to a facility and should be modified to allow for virtual PSAPs that will allow 9-1-1 calls to be answered anywhere IP access to an ESInet is available once an authorized person logs in with the proper user ID and password.

- (P) "Public safety answering point" means a facility to which 9-1-1 system calls for a specific territory are initially routed for response and where personnel respond to specific requests for emergency service by directly dispatching the appropriate emergency service provider, relaying a message to the appropriate provider, or transferring the call to the appropriate provider.

The definitions that are outlined above pose a potential roadblock to the implementation of NG9-1-1. It is likely that other definitions may need to be added once other provisions in Chapter 5507 are added or amended to facilitate the implementation of NG9-1-1. Many of the current definitions that do not impede the implementation of NG9-1-1 (and thus are not discussed above) may no longer be pertinent to Chapter 5507 after amendments are made. The following definitions should be reviewed for relevancy after the Statute is amended, "Wireless service," "Wireline Service, "Telephone Company" and "Pre-paid wireless calling service."

4.1.4 Enforcement and Penalties

Chapter 5507.34 should be amended to include proceedings against any 9-1-1 service provider or 9-1-1 authority for the enforcement of Chapter 5507 and should remove specific references to telephone companies.

- (A) The attorney general, upon request of the department of public safety, or on the attorney general's own initiative, shall begin proceedings against a telephone company that is a wireline service provider to enforce compliance with this chapter or with the terms, conditions, requirements, or specifications of a final plan or of an agreement under section 5507.09 of the Revised Code as to wireline or wireless 9-1-1. (B) The attorney general, upon the attorney general's own initiative, or any prosecutor, upon the prosecutor's initiative, shall begin proceedings against a subdivision or a regional council of governments as to wireline or wireless 9-1-1 to enforce compliance with this chapter or with the terms, conditions, requirements, or specifications of a final plan or of an agreement under section 5507.09 of the Revised Code as to wireline or wireless 9-1-1.

4.1.5 Confidentiality

Today's 9-1-1 system is dedicated, closed and has a single purpose. The information delivered over the system is limited and is generally stored in a single, restricted location. In contrast, the NG9-1-1 system will be a shared system and 9-1-1 will likely be just one part of a network shared with other public safety services and agencies. There will be an influx of the amount and type of data shared in the NG9-1-1 environment. Video, pictures, telematics and medical information are a few of the new data types that will be shared on the NG9-1-1 network. Much of this data will reside in the network rather than localized databases. It will also be important for call takers to access shared information at remote answering locations (virtual PSAPs). Access controls and data rights management will be used to limit access to authorized personnel.[5]

Not only will this data be useful in emergency situations, but the aggregated data will allow governmental entities to research and analyze trends in emergency response in order to improve it. It will be important for Chapter 5507 to allow for this analysis of aggregate data while protecting sensitive information that is specific to a particular emergency. Confidentiality provisions should not limit the use of these new types of data in emergency situations. NG9-1-1 applications will allow for the sharing of data from all kinds of devices such as medical monitors and automotive telematics. These new types of data have the potential to improve emergency response and should be readily available to emergency response agencies during real time emergency response and not limited by confidentiality provisions[6]

Ohio's current confidentiality provisions do not contemplate this type of information sharing or the types of data that will be shared. Chapter 5507.32(G) should be expanded to include any type of data associated with any type of 9-1-1 call and a provision should be added for the aggregation and analysis of general call data. Chapter 5507 should also provision for access restrictions to network stored data and require 9-1-1 authorities to establish Policies and Procedures that set access rights, controls and processes.

[5] NENA, Next Generation 9-1-1 Transition Policy Implementation Handbook, March 2010, 18.
[6] NENA, Next Generation 9-1-1 Transition Policy Implementation Handbook, March 2010, 19.

- (G) No person shall disclose or use any information concerning telephone numbers, addresses, or names obtained from the data base that serves the public safety answering point of a 9-1-1 system established under this chapter, except for any of the following purposes or under any of the following circumstances:

  (1) For the purpose of the 9-1-1 system;

  (2) For the purpose of responding to an emergency call to an emergency service provider;

  (3) In the circumstance of the inadvertent disclosure of such information due solely to technology of the wireline telephone network portion of the 9-1-1 system not allowing access to the data base to be restricted to 9-1-1 specific answering lines at a public safety answering point;

  (4) In the circumstance of access to a data base being given by a telephone company that is a wireline service provider to a public utility or municipal utility in handling customer calls in times of public emergency or service outages. The charge, terms, and conditions for the disclosure or use of such information for the purpose of such access to a data base shall be subject to the jurisdiction of the department of public safety.

  (5) In the circumstance of access to a data base given by a telephone company that is a wireline service provider to a state and local government in warning of a public emergency, as determined by the department of public safety. The charge, terms, and conditions for the disclosure or use of that information for the purpose of access to a data base is subject to the jurisdiction of the department of public safety

4.1.6 Liability

NG9-1-1 involves the complex delivery of 9-1-1 calls involving many entities and vendors that deliver individual components of 9-1-1 service at any point in the call process. It is important that all players in NG9-1-1 systems are assured that their good faith efforts to deliver 9-1-1 service will not expose them to liability. Specifically providing all potential players liability protection will cause more entities to participate in the migration to NG9-1-1. Lack of legal clarity on the issue of liability can lead to significant issues, including delays in provisioning critical NG9-1-1 services.

While Federal Laws have addressed liability recently, those provisions are still based on the liability protections that are provisioned in state statute. In 2008, Congress passed the New and Emerging Technologies 911 Improvement Act of 2008 (Net 911 Act).[7] Section 201(a) of the NET 911 Act extends state-law liability protection afforded local exchange companies to all communications services that are required by the FCC to provide 9-1-1/E9-1-1. Additionally, the Act extends liability protection to new types of service enabled by NG9-1-1 where there is state 9-1-1 liability protection. The NG9-1-1 Advancement Act of 2012 went further to extend immunity from liability to NG9-1-1 service providers specifically and to PSAPs; however, it is still important to provide for liability protection within state statute.

[7] New and Emerging Technologies 911 Improvement Act of 2008, Pub. L. No. 110-283, 122 Stat. 2620 (2008) (codified at 47 U.S.C. §§ 615a and 615b)).

The statutory liability protection provided in Chapter 5507.32 should be amended to cover all NG9-1-1 services and be broad enough to encompass all players involved in provisioning NG9-1-1. The current provisions do not clearly cover all services and information that may be delivered over NG9-1-1 systems.

Amendments to Chapter 5507 should specifically extend liability protection beyond the PSAP environment to all entities involved in the emergency response and make clear that the liability protection extends to persons and entities providing NG9-1-1, including,

- All 9-1-1 SSPs and their third party vendors, regardless of whether that SSP is a traditional regulated local exchange carrier (LEC) or an unregulated competitive SSP.
- Providers of external data sources that support or supplement the normal information sent with a 9-1-1 call.

Amendments to Chapter 5507 should also apply the liability protections to NG9-1-1 service providers generally and define NG9-1-1 service provider broadly as a person or entity that is merely involved in providing 9-1-1 service and only needs to utilize NG9-1-1 in whole or in part in order to gain protection in order to adequately provide liability coverage to all applicable entities to assure that new types of providers will be comfortable about providing NG9-1-1 services and components.

4.2 Regulatory Environment

4.2.1 Statewide ESInet

4.2.1.1 Statutes

Currently, Ohio's statutes lack provision for a statewide ESInet to be implemented and to operate. Authority to operate an ESInet at the state level and to coordinate interconnections with county, regional and interstate ESInets is an essential component that must be addressed.

In addition to the need for a state-level 9-1-1 coordinator with the authority to operate, procure and facilitate NG9-1-1 in the State as discussed in Section 3.1.1 of this report, Ohio's 9-1-1 Statutes should include additional provisions to facilitate the efficient implementation of NG9-1-1. Chapter 5507 should provide for inter local cooperation of 9-1-1 planning and operation, authorize public and private cooperation in providing 9-1-1 services and provide contractual authority to procure and/or operate statewide 9-1-1 components.

Make sure statute is broad enough to allow authorized sharing of automated data sources (e.g. telematics, health sensors) with PSAPs and other emergency response agencies. Allow these new services to share the network and access the 9-1-1 system. Allow for non-location based routing and the sharing of IP networks to route calls for other public services such as poison control and other N-1-1 numbers.

The ESInet Steering Committee and its subcommittees have already started the process of identifying the eligible uses of funds. While the statute may set forth general categories for what is eligible or ineligible, the State-Level Coordinating Entity should be able to establish rules and guidelines with more granular detail for the eligible and ineligible uses of funds that incorporate NG9-1-1 costs as eligible. Statutes from other states typically authorize use

of funds for network, database and routing components; customer premises equipment (CPE) including management information systems (MIS) and mapping; training and public education. A few states allow funds to be used for computer aided dispatch (CAD), records management systems (RMS), and radio technology. Statutes from other states typically authorize use of funds for network, database and routing components; customer premises equipment (CPE) including management information systems (MIS) and mapping; training and public education. A few states allow funds to be used for computer aided dispatch (CAD), records management systems (RMS), and radio technology. Specific recommendations are included in the companion Funding Analysis Report.

Chapter 5507.571 incentivizes the consolidation of PSAPs by limiting payable costs incurred to a specified number of PSAPs that decreases over time.

- (A) Payment of costs specified in divisions (A) to (D) of section 5507.57 of the Revised Code from a disbursement under section 5507.55 of the Revised Code shall be limited to those specified and payable costs incurred for a specified number of public safety answering points of the particular 9-1-1 system as follows:

  (1) For the period beginning on March 1, 2009, and ending on December 31, 2015, a countywide 9-1-1 system may use disbursements for not more than five public safety answering points per calendar year.

  (2) Except as provided in division (B) of this section:

  (a) For the period beginning on January 1, 2016, and ending on December 31, 2017, a countywide 9-1-1 system may use disbursements for not more than four public safety answering points per calendar year.

  (b) For the period beginning on January 1, 2018, and thereafter a countywide 9-1-1 system may use disbursements for not more than three public safety answering points per calendar year.

  (B) If within a county there is a municipal corporation with a population of over 175,000 according to the most recent federal decennial census, that county may use disbursements for one public safety answering point in addition to the number of public safety answering points allowed under division (A)(2) of this section.

  (C) If a county exceeds the allowable number of public safety answering points under this section, disbursements to countywide 9-1-1 systems made to the county from the wireless 9-1-1 government assistance fund and the next generation 9-1-1 fund shall be reduced by fifty per cent until the county complies with the public safety answering point limitations established under this section.

The companion Funding Analysis Report addresses recommended funding models. The funding model that is ultimately adopted in statute should incentivize (1) consolidation of PSAPs beyond what is currently in statute, (2) migration to NG9-1-1, (3) PSAP utilization of a shared services model, and (4) regionalization.

4.2.1.2 Regulations

New uniform standards for the operation of the 9-1-1 system that apply to all PSAPs will need to be promulgated to maintain the level playing field that is required for the interconnections and interoperation required for system operation in the NG9-1-1 environment. Standardization will become increasingly important to enable the seamless interconnectivity between networks and NG9-1-1 will spur the need for operational changes in PSAPs to prepare for the processing of new types of 9-1-1 calls. Any technical or operational standards that are developed or adopted should be consensus based and industry accepted.

L.R. Kimball recommends authorizing the recommended Ohio 9-1-1 Coordinating Entity with the sole rulemaking authority for 9-1-1, including technical and operational standards for NG9-1-1. Rulemaking authority for the system is currently split between The Emergency Services Internet Protocol Network Steering Committee and the Ohio 9-1-1 Council. L.R. Kimball recommends authorizing the recommended Ohio 9-1-1 Coordinating Entity with the sole rulemaking authority for 9-1-1 in the State.

Currently, 5507.021 provides the Emergency Services Internet Protocol Network Steering Committee with the authority to adopt rules that establish technical and operational standards for PSAPs, but only for PSAPs that are eligible to receive wireless disbursements. It also directs the rules to incorporate industry standards and best practices for wireless services specifically. L.R. Kimball recommends that any rulemaking authority authorized under Chapter 5507 apply to every PSAP in the state and not be limited to wireless technology standards.

- 5507.021 Adoption of rules establishing technical and operational standards for public safety answering points.
  Not later than January 1, 2014, and in accordance with Chapter 119. of the Revised Code, the statewide emergency services internet protocol network steering committee shall adopt rules that establish technical and operational standards for public safety answering points eligible to receive disbursements under section 5507.55 of the Revised Code. The rules shall incorporate industry standards and best practices for wireless 9-1-1 services. Public safety answering points shall comply with the standards not later than two years after the effective date of the rules adopting the standards.

Chapter 5507.65(D)(1) provides the Ohio 9-1-1 Council with authority to arbitrate or establish technical and operational standards for the 9-1-1 systems in the State.

- (D) The duties of the council shall consist of both of the following:
  (1) Arbitrating or establishing relative to 9-1-1 systems in this state nondiscriminatory, competitively neutral, and uniform technical and operational standards consistent with recognized industry standards and federal law. This authority does not include authority to prescribe the technology that a telephone company or reseller uses to deliver 9-1-1 calls.

As part of its standards setting authority, the recommended Ohio 9-1-1 Coordinating Entity should establish a consensus based training standard for Ohio Emergency Telecommunicators. Currently, ORC 4742 recommends Training Standards for Emergency Services Telecommunicators, however, no funding has been dedicated to the training program and no classes have been offered since 2005. L.R. Kimball recommends removing ORC 4742 from statute and vesting the 9-1-1 Coordinating entity with authority to promulgate new Training Standards as regulations

so they can be amended as needed to keep pace with evolving industry standards. In addition to adopting standards, the Ohio 9-1-1 Coordinating entity should oversee, enforce and set a periodic review to update standards.

Similar to the definitions in the Statutes, definitions in Public Utilities Commission Rules may not be broad enough to allow for the new types of routing and interconnections that will be needed for the transition to and eventual implementation of NG9-1-1. It will be important to assure that all definitions for 9-1-1 are consistent across all statutes and regulations. This will require the coordination of agencies and the legislature to align all 9-1-1 related laws. The P.U.C.O's 4901:1-8-01 (M) definition of PSAP may be too specific to allow for the new routing paths that may be required for the transitional period before the full implementation of NG9-1-1. These new paths may require routing calls to network components rather than PSAPs.

- (M)"Public safety answering point (PSAP)" means a facility to which 9-1-1 system calls for a specific territory are initially routed for response and where personnel respond to specific requests for emergency service by directly dispatching the appropriate emergency service provider, relaying a message to the appropriate provider, or transferring the call to the appropriate provider.

4.2.1.3 Tariffs

L.R. Kimball recommends that the State engage the regulated incumbent local exchange carriers (ILECs) in discussions regarding future plans for the ESInet as soon as possible in order to expedite and simplify interconnection negotiations once a network provider is identified. The State should also ask the selective router providers to amend tariff language as necessary, or otherwise enter into permitted agreements to allow for interconnection so that term language can be addressed up front.

The following roadblocks are potential roadblocks generally, but actual roadblocks can't be identified until the transitional network components and then permanent network components and interconnection arrangement s are technically specified. The technical transition to NG9-1-1 will require the legacy network to work parallel to and in concert with new network components. Current tariffs may not be broad enough to allow selective routers to route calls to potential transitional network components such as a Legacy Network Gateway instead of directly routing to a PSAP. Existing tariffs suggest that regulated ILECs will connect to PSAPs. There is potential for regulated ILECs to refuse to interconnect to the new network components based on the tariff provisions that specify a PSAP as the call termination point.

The following tariffs are identified by L.R. Kimball as potential roadblocks to NG9-1-1 implementation.

- AT&T Tariff, P.U.C.O. No. 20, Part 8, Section 3, 2nd Revised Sheet No. 3-5.

The AT&T Tariff includes very specific definitions that direct how a call and call data are routed through the current 9-1-1 system. The Tariff specifically defines Selective Routing as, "A feature which allows 911 calls to be routed to the

designated primary PSAP…"[8] The remainder of the tariff is consistent with that definition and limits the receipt of calls to PSAPs in other service offerings and definitions.

The AT&T Tariff also limits the type of information that can be extracted from the 911 database to the source number, depending on the future types of data housed there and their utility during a 911 call, this provision may pose a roadblock to necessary data access.[9]

The Windstream Tariff also directs 9-1-1 calls to be routed to PSAPs; however, it directs customers to determine the location of PSAPs so this could be interpreted broadly for PSAPs to assign a NG9-1-1 component as a PSAP location, but it could still be a roadblock.[10]

The CenturyTel of Ohio Tariffs also only provide for the routing of calls to PSAPs.[11]

The Cincinnati Bell Tariff also specify that calls are routed to PSAPs but allows customers to designate PSAP locations, so that ability to designate could be useful in routing to other network components, but it could still pose a roadblock if read strictly.[12] Cincinnati Bell also has specific trunking requirements for Wireless Emergency Number Service Access that may need to be modified for new network configurations.[13]

Frontier tariffs also direct 9-1-1 calls to be routed to PSAPs based on phone numbers.[14]

In addition to tariffs, L.R. Kimball has experienced in its work with other states that certain contractual constraints placed on CPE could pose as a roadblock to NG9-1-1 implementation. Such contractual constraints could prohibit changes to the CPE and could prevent the receipt of 9-1-1 calls from a state-level ESInet.

4.2.2 Competitive NG9-1-1 Environment

The legacy environment of today differs substantially to the shared network environment of NG9-1-1. Statutes will need to be added or amended that allow for the competitive environment that is necessary for the transition to NG9-1-1. Today, ILECs are the primary 9-1-1 System Service providers, but in the NG9-1-1 environment, competitive alternatives to existing services will be available, and are already available, from new types of system service providers. 9-1-1 authorities will have choices from variety of new services and options offered by a large number of service providers. Ohio statutes, regulations and tariffs need to be updated to facilitate the transition to this open and competitive environment.

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[8] AT&T Tariff, P.U.C.O. No. 20, Part 8, Section 3, 2nd Revised Sheet No. 3-5.
[9] AT&T Tariff, P.U.C.O. No. 20, Part 8, Section 3, 2nd Revised Sheet 13.
[10] Windstream Tariff, P.U.C.O. No. 9, Section 11, Original Sheet 7.
[11] CenturyTel of Ohio, Inc, P.U.C.O. NO. 12, Section 6, Original Sheet 2.
[12] Cincinnati Bell Telephone Company, LLC, P.U.C.O. No. 1, Section 9, Original Page 1.
[13] Cincinnati Bell Telephone Company, LLC, P.U.C.O. No. 1, Section 9, Original Page 24.
[14] Frontier North, Inc., P.U.C.O. No.11, Section 6, Original Sheet No. 5.

The transition to NG9-1-1 will not occur with the flip of a switch. There will be a transition period when some Ohio PSAPs will be fully NG9-1-1 capable, while others will not be and some will have a mix of legacy and NG9-1-1 components. Ohio's regulatory environment should establish a competitively neutral marketplace that allows 9-1-1 authorities to replace legacy 9-1-1 functions component by component.[15] This transition is already underway elsewhere in the nation and has already encountered legal and regulatory roadblocks. Ohio can avoid this pitfall by addressing the matter up front and establishing a competitively neutral and technologically neutral marketplace.

4.2.2.1 Statutes

Statutes that specify that role of a 9-1-1 SSP can only be performed by a specific type of entity limit competition. Chapter 5507.03(B) limits countywide 9-1-1 systems to wireline and wireless 9-1-1. Section 5507.03 will need to be amended and generalized to provide 9-1-1, in all of its current and future forms.

- (B) A countywide 9-1-1 system may be a basic or enhanced 9-1-1 system, or a combination of the two, and shall be for the purpose of providing both wireline 9-1-1 and wireless 9-1-1.

Chapter 5507.03(A)(2) establishes a mechanism to assure that wireline service providers are capable of meeting the technical and economic requirements for the countywide 9-1-1 system. This Section should be amended to establish requirements that are functional and performance based without reference to any specific technologies or service providers.

- (2) The system shall exclude any territory served by a wireline service provider that is not capable of reasonably meeting the technical and economic requirements of providing the wireline telephone network portion of the countywide system for that territory. The system shall exclude from enhanced 9-1-1 any territory served by a wireline service provider that is not capable of reasonably meeting the technical and economic requirements of providing the wireline telephone network portion of enhanced 9-1-1 for that territory. If a 9-1-1 planning committee and a wireline service provider do not agree on whether the provider is so capable, the committee shall notify the department of public safety, and the department shall determine whether the wireline service provider is so capable. The committee shall ascertain whether such disagreement exists before making its implementation proposal under division (A) of section 5507.07 of the Revised Code. The department's determination shall be in the form of an order. No final plan shall require a wireline service provider to provide the wireline telephone network portion of a 9-1-1 system that the department has determined the provider is not reasonably capable of providing.

Enable competitive 9-1-1 SSPs to connect to other competing 9-1-1 SSP networks in a nondiscriminatory, technically feasible, and economical manner to ensure interoperability among 9-1-1 SSPs.

Chapter 5507.07 will also need to be amended to cover 9-1-1 generally and remove references to specific technologies. Currently, Chapter 5507.07(B) provides for final plans to be based on the telephone companies that

[15] NENA, Next Generation 9-1-1 Transition Policy Implementation Handbook, March 2010, 11-12.

provide service in the county and requires counties to show how PSAPs will connect to the telephone network. It also limits 9-1-1 service to wireline or wireless. L.R. Kimball recommends that a similar countywide plan mechanism be established for planning the implementation for NG9-1-1, the related interconnections and cost allocation for network components and connections.

- (B) The proposal and the final plan adopted by the committee shall specify:
- (1) Which telephone companies serving customers in the county and, as authorized in division (A)(1) of section 5507.03 of the Revised Code, in an adjacent county will participate in the 9-1-1 system;
- (2) The location and number of public safety answering points; how they will be connected to a company's telephone network; from what geographic territory each will receive 9-1-1 calls; whether basic or enhanced 9-1-1 service will be provided within such territory; what subdivisions will be served by the answering point; and whether an answering point will respond to calls by directly dispatching an emergency service provider, by relaying a message to the appropriate provider, or by transferring the call to the appropriate provider;
- (3) Which subdivision or regional council of governments will establish, equip, furnish, operate, and maintain a particular public safety answering point;
- (4) A projection of the initial cost of establishing, equipping, and furnishing and of the annual cost of the first five years of operating and maintaining each public safety answering point;
- (5) Whether the cost of establishing, equipping, furnishing, operating, or maintaining each public safety answering point should be funded through charges imposed under section 5507.22 of the Revised Code or will be allocated among the subdivisions served by the answering point and, if any such cost is to be allocated, the formula for so allocating it;
- (6) How each emergency service provider will respond to a misdirected call.

Chapter 5507.09 should also be updated to include any type of 9-1-1 service and not just wireline. If the State chooses to leave municipal corporations or townships with the authority to establish their own systems, L.R. Kimball recommends that they be subject to the same functional and performance based requirements as countywide systems. The State should encourage, to the extent possible, the regionalization of IP 9-1-1 systems in order to facilitate the efficient transition to NG9-1-1 by minimizing the number of systems that need to interconnect.

- (A) If a final plan is disapproved under division (B) of section 5507.08 of the Revised Code, by resolution, the legislative authority of a municipal corporation or township that contains at least thirty per cent of the county's population may establish within its boundaries, or the legislative authorities of a group of municipal corporations or townships each of which is contiguous with at least one other such municipal corporation or township in the group, together containing at least thirty per cent of the county's population, may jointly establish within their boundaries a 9-1-1 system. For that purpose, the municipal corporation or township may enter into an agreement, and the contiguous municipal corporations or townships may jointly enter into an agreement with one or more telephone companies.

  (B) If no resolution has been adopted to convene a 9-1-1 planning committee under section 5507.06 of the Revised Code, by resolution, the legislative authority of any municipal corporation in the county may establish within its boundaries, or the legislative authorities of a group of municipal corporations and townships each of which is contiguous to at least one of the other such municipal corporations or townships in the group may jointly establish within their boundaries, a 9-1-1 system. For that purpose, the municipal

corporation, or contiguous municipal corporations and townships, may enter into an agreement with one or more telephone companies.

(C) Whenever a telephone company that is a wireline service provider and one or more municipal corporations and townships enter into an agreement under division (A) or (B) of this section to provide for the wireline telephone network portion of a basic 9-1-1 system, the telephone company shall so notify the department of public safety, which shall determine whether the telephone company is capable of reasonably meeting the technical and economic requirements of providing the wireline telephone network for an enhanced system within the territory served by the company and covered by the agreement. The determination shall be made solely for the purposes of division (C)(2) of section 5507.18 of the Revised Code…

Chapter 5507.12 should be amended to cover 9-1-1 updates generally and remove references to specific technologies as in 5507.12(A)(2) and (6). This section could be amended to plan for new 9-1-1 Service Providers wanting to provide service in a territory in lieu of 5507.12(A)(7) which only provides for the entrance of telephone companies as new participants. The plan amendments provisioned for in Chapter 5507.12 could also be used to upgrade systems to NG9-1-1. L.R. Kimball recommends that a similar countywide plan amendment mechanism be established for planning for and upgrading the system to NG9-1-1 including, the related interconnections and cost allocation for network components and connections.

- (A) An amended final plan is required for any of the following purposes:
  …
  (2) Upgrading any part or all of a system from basic to enhanced wireline 9-1-1;
  …
  (6) Providing for wireless enhanced 9-1-1;
  (7) Adding a telephone company as a participant in a countywide 9-1-1 system after the implementation of wireline 9-1-1 or wireless enhanced 9-1-1;

Chapter 5507.15 should be amended to cover 9-1-1 updates generally and remove references to specific technologies and types of providers as in 5507.15(A).

- (A) Within three years from the date an initial final plan becomes effective under division (B) of section 5507.08 of the Revised Code, the wireline service providers designated in the plan shall have installed the wireline telephone network portion of the 9-1-1 system according to the terms, conditions, requirements, and specifications set forth in that plan.

4.2.2.2 Tariffs

The likelihood and merits of many of the identified roadblocks largely hinge on the ability of the involved parties to agree. To the extent that network interconnection agreements and configurations are currently occurring outside of a strict reading of regulatory and tariff provisions could be interpreted to indicate that some regulatory provisions may not pose roadblocks when parties are willing to agree. L.R. Kimball understands from the Technology Infrastructure Evaluation compiled by the Technical Standards Sub-Committee of the ESInet Steering Committee that agencies have the right to buy telecommunications utilities at tariff rates or under Ohio Information Technology contracts and

that contract rates are normally half the cost of tariff rates and services are negotiated a service level agreement based on the needs of the customer rather than the needs of the regulatory entity and company as with tariffed services.[16] L.R. Kimball recommends that authorities use the more flexible contracts for necessary services, though 9-1-1 services will be necessary during the transition period and none of those services are listed as available services in the Technology Infrastructure Evaluation document provided to us for review.

The current regulated environment is likely to pose as a roadblock to achieving a competitive marketplace for NG9-1-1 services. L.R. Kimball recommends that the State engage the regulated incumbent local exchange carriers (ILECs) in discussions regarding future plans for NG9-1-1 as soon as possible in order to expedite and simplify necessary tariff modifications to the extent that the necessary services are only available by means of tariffs. We understand that these entities are already engaged, but our point is to start discussions with them on this particular point.

All tariffed 9-1-1 services should be unbundled and priced reasonably so that 9-1-1 authorities have the freedom to transition component by component. ORC Chapter 4927.15(b) gives the Ohio Public Utilities Commission the authority to order rate changes for 9-1-1 services as long as they are consistent with Federal law. It may be necessary to coordinate with the Public Utilities Commission in order to work out roadblocks related to bundling and high costs of services in order to facilitate the transition to NG9-1-1.

- (B) The public utilities commission may order changes in a telephone company's rates for carrier access in this state subject to this division. In the event that the public utilities commission reduces a telephone company's rates for carrier access that are in effect on September 13, 2010, that reduction shall be on a revenue-neutral basis under terms and conditions established by the public utilities commission, and any resulting rate changes necessary to comply with division (B) or (C) of this section shall be in addition to any upward rate alteration made under section 4927.12 of the Revised Code.
  (C) The public utilities commission has authority to address carrier access policy and to create and administer mechanisms for carrier access reform, including, but not limited to, high cost support.

Additionally, tariffs should be modified to allow for 9-1-1 authorities or new 9-1-1 SSPs to receive relevant routing, location and other related 9-1-1 information from the incumbent SSPs at reasonable, cost-based rates and terms. Unbundling 9-1-1 services will prevent 9-1-1 authorities from bearing continued legacy costs that are no longer needed during the transition.[17] In tariff modifications and discussions with ILECs it will be important to account for the responsibility for cost distribution for the decreasing use of shared legacy components like selective routers to prevent increased costs to PSAPs that still relay on legacy components.

The Ohio AT&T Tariff, P.U.C.O. NO. 20, Part 8, Section 3, 4th Revised Sheet 19 does not unbundle all available 9-1-1 services. L.R. Kimball recommends the unbundling of all service components and negotiating reasonable cost based pricing for each component.

- Exchange service
- Additional (optional) E911 exchange line terminating at PSAP Service
- Automatic number identification, per 1000 main stations served

[16] Technology Infrastructure Evaluation, Technical Standards Sub-Committee of the ESInet Steering Committee, 4-5.
[17] NENA, Next Generation 9-1-1 Transition Policy Implementation Handbook, March 2010, 12, 14.

- Selective routing, per 1000 main stations served
- Combined automatic number identification and selective routing, per 1000 main stations served
- Combined automatic number and location identification, per 1000 main stations served
- Combined automatic number and location identification and selective routing per 1000 main stations served

Windstream services are offered on a component by component basis and it provides for special service arrangements for requirements that cannot be met with regular service arrangements, however, the costs associated with those arrangements should be negotiated to assure reasonableness.[18]

CenturyTel only provides routing and utilizes the databases of other telephone companies so arrangements would have to be made for with all parties for routing changes.[19]

Not all of Cincinnati Bell's 9-1-1 services are offered on a component by component basis.[20]

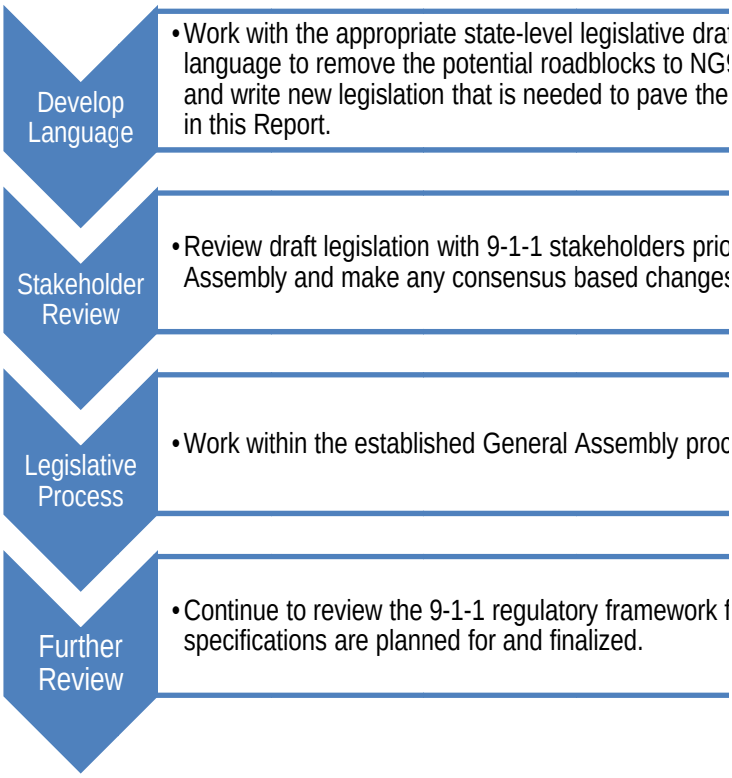
Not all of Frontier's 9-1-1 services are offered on a component by component basis.[21]

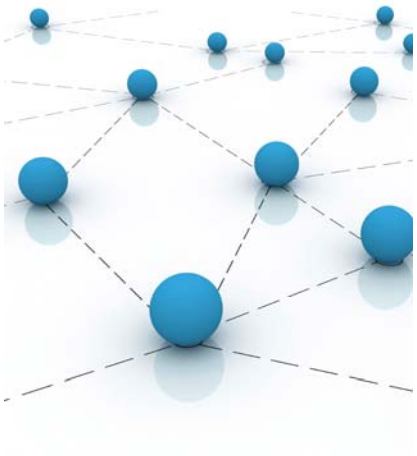
[18] Windstream Tariff, P.U.C.O. No. 9, Section 11, Original Sheet 8.
[19] CenturyTel of Ohio, Inc, P.U.C.O. NO. 12, Section 6, Original Sheet 3.
[20] Cincinnati Bell Telephone Company, LLC, P.U.C.O. No. 1, Section 9, Original Page 11.
[21] Frontier North, Inc., P.U.C.O. No.11, Section 6, Original Sheet No. 11.

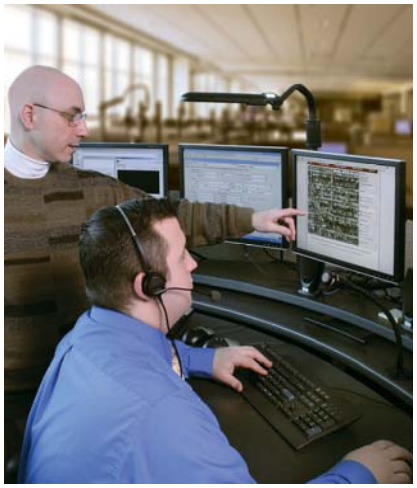
5. CONCLUSION AND NEXT STEP

L.R. Kimball recommends that the Ohio General Assembly consider modifications to the 9-1-1 regulatory framework in Ohio. The ESInet regulatory impacts of specific technical specifications once they are available at the time of this Report.

L.R. Kimball recommends that the ESInet Steering Committee work drafting bodies to write legislative language to remove the potential r Report. L.R. Kimball recommends that Ohio review draft legislative introduced in the General Assembly so that all perspectives on the le potential for consensus based changes to be made at this stage, an success of the introduced legislation. The initial legislative amendm implementation in Ohio, however, unforeseen roadblocks may occur developed. Ohio should continue to review the 9-1-1 regulatory fram specifications are developed and finalized.







Draft Report for

Existing Infrastructure Review

Prepared for

Ohio Department of Administrative Services

April 2013 ©

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TABLE OF CONTENTS

EXECUTIVE SUMMARY 1

1. EXISTING TECHNOLOGY INFRASTRUCTURE 3

1.1 NETWORK PROVIDER SUMMARY 3
1.1.1 Ohio Office of Information Technology 3
1.1.2 Ohio Academic Resources Network - OARNET 4
1.1.3 Multi-Agency Radio Communications System – MARCS 11
1.1.4 Location Based Response System – LBRS 12
1.1.5 Ohio Middle Mile Consortium - OMMC 13

2. READINESS OF CURRENT TECHNOLOGIES 14

2.1 ESINET HIGH-LEVEL REQUIREMENTS 14
2.1.1 Recommended Media 14
2.1.2 Availability and Reliability 15
2.1.3 Network Security 15
2.1.4 Network Management and Monitoring 16
2.1.5 Performance Requirements 16
2.1.6 Hardware and Network Elements 16
2.1.7 Service Level Agreements 17
2.1.8 Traffic Engineering 18
2.1.9 Network Architecture 18

3. SUMMARY 20

4. TIME LINE TO DEVELOP ESINET REQUIREMENTS 21

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EXECUTIVE SUMMARY

The State of Ohio contracted L.R. Kimball to conduct a review of existing state Internet Protocol infrastructure as part of the larger NG9-1-1 Transition Planning project. Kimball collaborated with the ESInet Steering Committee and its subcommittee stakeholders to analyze information provided to us, evaluate that information in the context of Ohio's expressed vision for NG9-1-1 and provide recommendations for a state-wide ESInet. Due largely to the Technology Infrastructure Evaluation document provided to us, the background of existing network providers and contracting vehicles were quickly understood. With this valuable and in-depth information, team members were able to focus on the finer details of ESInet requirements to offer an informed opinion regarding the feasibility of using any of these existing network infrastructures as the backbone ESInet for Ohio.

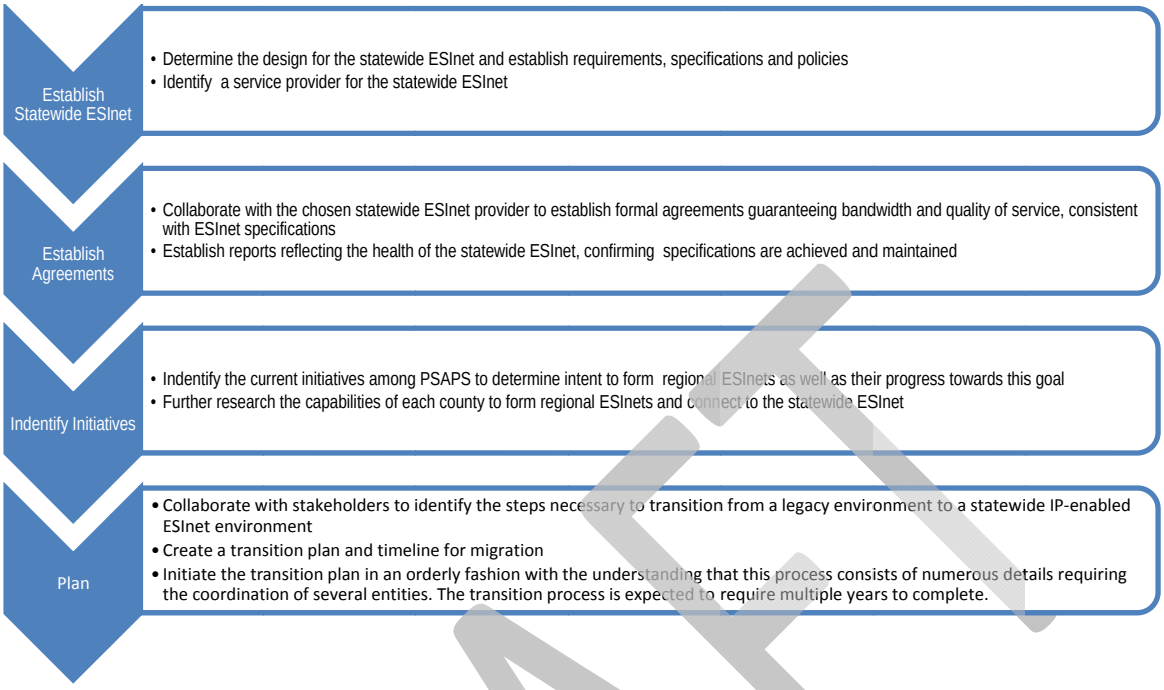
The State of Ohio has a wide variety of network options. Through multiple sources, an extensive network infrastructure is available throughout Ohio. If the state does not want to bear direct responsibility for interconnecting the PSAPs, numerous options to contract for these services exist and could cost-effective.

This report incorporates the Technology Infrastructure Evaluation document the ESInet Steering Committee developed and includes L.R. Kimball's assessment of the readiness of these existing networks. Kimball assessed the existing technology infrastructure against NENA standards to demonstrate the ability to provide ESInet requirements.

The main focus of the existing infrastructure review is to identify a viable candidate for the statewide ESInet. Kimball finds the Ohio Academic Resources Network (OARnet) to be the ideal candidate as a network transport capable of supplying bandwidth, quality of service and overall capabilities required to host an ESInet of this magnitude. From the most highly recommended network media, namely fiber optics, to the geographical reach, quality of service and the ability to provide 24x7x365 support, OARnet checks all the NENA boxes for capabilities.

Kimball recommends the State of Ohio work toward a formal understanding with OARnet to establish services meeting ESInet specifications. Future tasks will focus on statewide ESInet design, requirements and specifications, taking into consideration the ability of PSAPs either to connect directly to the statewide ESInet or to collaborate with other PSAPs forming regional ESInets, which in turn would connect to the statewide ESInet. Ohio should identify current IP-enabled PSAPs and any initiatives planned or underway to form regional ESInets. ESInet specifications, once developed, may be utilized by all PSAPs regardless of the mode for IP connection. Ohio should also formally identify the Ohio 9-1-1 Coordinating Entity to undertake these activities.

Kimball recommends the following next steps:


Establish Statewide ESInet
• Determine the design for the statewide ESInet and establish requirements, specifications and policies
• Identify a service provider for the statewide ESInet
Establish Agreements
• Collaborate with the chosen statewide ESInet provider to establish formal agreements guaranteeing bandwidth and quality of service, consistent with ESInet specifications
• Establish reports reflecting the health of the statewide ESInet, confirming specifications are achieved and maintained
Indentify Initiatives
• Indentify the current initiatives among PSAPS to determine intent to form regional ESInets as well as their progress towards this goal
• Further research the capabilities of each county to form regional ESInets and connect to the statewide ESInet
Plan
• Collaborate with stakeholders to identify the steps necessary to transition from a legacy environment to a statewide IP-enabled ESInet environment
• Create a transition plan and timeline for migration
• Initiate the transition plan in an orderly fashion with the understanding that this process consists of numerous details requiring the coordination of several entities. The transition process is expected to require multiple years to complete.

DRAFT

1. EXISTING TECHNOLOGY INFRASTRUCTURE

Within Ohio there are several technology initiatives serving state and local government agencies that could be leveraged to support the development of or be a component of an enterprise level ESInet. The State of Ohio Department of Administrative Services (DAS) Office of Information Technology (OIT), the Ohio Academic Resources Network (OARnet), the Multi-Agency Radio Communications System (MARCS), the Location Based Response System (LBRS) and the Ohio Middle Mile Consortium (OMMC); each provides significant opportunity to coordinate activities in support of a state-wide ESInet as well as regional ESInets and directly connected PSAPs.

1.1 Network Provider Summary

The following sections focus on the existing options and vehicles available to establish both a state-wide ESInet as well as options for PSAPs and regional ESInet to connect to a state-wide ESInet. The information contained within this section is derived directly from the ESInet Steering Committee's document entitled Technology Infrastructure Evaluation.

1.1.1 Ohio Office of Information Technology

The DAS Office of OIT delivers statewide information technology and telecommunication services to state government agencies, boards and commissions as well as policy and standards development, lifecycle investment planning and privacy and security management.

1.1.1.1 Infrastructure Services

Infrastructure Services operates the IT infrastructure, which includes hardware, software and telecommunications for the state. The division consists of the following business units:

- Enterprise Open Systems (EOS) provides a shared IT infrastructure and resources through offering an array of traditional datacenter services across UNIX and Windows/Open platforms.
- Enterprise Shared Services (ESS) focuses on efficient use of technologies in support of enterprise and multi-agency initiatives by providing services that include electronic forms filing, secure data interchange and exchange, e-Payment engine, business intelligence and reporting, collaborative tools, GIS, and Ohio Geographically Referenced Information Program (OGRIP) services.
- Multi-Agency Radio Communications System (MARCS) provides statewide voice and data communications for public safety first responders. The data communication service provides the backbone for the state-level law enforcement's Computer Aided Dispatch (CAD) suites and in-car mobile computer terminals for the State Highway Patrol, the Department of Natural Resources, and the Ohio Emergency Management Agency.
- Unified Network Services (UNS) is a provider of voice and data solutions to state and local governments, functions as the state's Internet service provider, and administers Telecommunication Contract Services.
- The Office of Information Security & Privacy works with internal and external agency customers to lead the creation, implementation and management of enterprise efforts for information assurance, security, privacy and risk management.

1.1.1.2 OIT Telecommunications

Network Contract Management Services procures computer network-delivered information services, including but not limited to, voice, data, and video cloud services for state and local government. The unit assists DAS in superintending service providers' contracted services under ORC 125.04. By combining all the service needs of Ohio's public agencies, Network Contracts lowers or avoids rising costs of telecommunications and cloud computing delivery for governments, schools, libraries, and higher education institutions. Any agency interested in procuring new telecommunications services may do so via the established OIT procurement process.

1.1.1.3 DAS Network Contract Management Services

Following are the responsibilities of the OIT Telecommunications Contract Management team:

- Consultation on telecommunications needs and participate in IT planning
- Provide technical expertise for procurement process to OIT and customers
- Develop service level agreements with performance measurements/penalties for contracts
- Work with legal counsel in development of contract language
- Negotiate contracts with vendors
- Monitor contract compliance and take appropriate actions upon non-compliance
- When possible, maintain a database of all expenditures from each contract
- Report all performance measurements
- Liaison between the vendor and management

The following services are available:

- ATM
- Cloud Services
- Conferencing
- Data Center
- Dedicated Transport
- Long Distance
- Managed Services
- Paging
- Software as a Service (SaaS)
- Ethernet
- Hosted Interactive Voice Response
- Internet
- ISDN
- Voice
- Voice over IP (VoIP)
- Wireless Communications
- Wireless Management Service

1.1.2 Ohio Academic Resources Network - OARNET

The Ohio Board of Regents created OARnet as a consortium, which conducts its affairs under the administrative supervision of The Ohio State University. The Ohio State University is the legal entity, which is responsible for all contractual obligations of OARnet.

The OARnet is a 100 Gbps network. OARnet was created in 1987 through legislation by the Ohio General Assembly [ORC section 3333.04(V)]. Its purpose is to provide Ohio researchers with access to high performance computing resources.

Demand for statewide connectivity and increased bandwidth led to the acquisition of dark fiber to create a highly scalable, fiber-optic infrastructure in November 2004. The new network was referred to as the Third Frontier Network and, later, Ohio Super Computer Net (OSCnet). Today, OARnet covers much of the state, providing connectivity to Ohio's colleges and universities, K-12 schools, public broadcasting stations, academic medical centers, and state, federal and partnering research organizations.

In 2007 the Ohio Broadband Council and Broadband Ohio Network were established [Executive Order 2007 24S] to extend the reach of Ohio's broadband resources, further Ohio's leadership in network innovation and improve technology access for all citizens throughout the state. OARnet operates as the backbone for the Broadband Ohio Network, carrying the *NextGen*[1] Network traffic for state and local government.

OARnet provides Ohioans with one of the nation's most advanced, statewide telecommunications networks dedicated to research, education and economic competitiveness. OARnet's network backbone of more than 1,850 miles of highly scalable, fiber-optic cable serves Ohio's colleges and universities, K-12 schools, medical centers, public broadcasting stations, and state and local government.

In March 2010, OARnet brought three competing organizations – Com Net, Inc., Horizon Telcom and OneCommunity – together as the Ohio Middle Mile Consortium. The goal: to improve broadband infrastructure in Ohio's rural and underserved areas. The three partners were awarded a total of $141.3 million in federal grants through the American Recovery and Reinvestment Act (ARRA); OARnet is a sub-recipient in all three grants.

The projects complement OARnet's statewide network by increasing the connection points from the current 14 to 68. This expansion reduces the "last mile" costs for broadband services to anchor institutions throughout the state. This infrastructure will support new initiatives for reaching unserved and underserved Ohioans, as well as initiatives promoting the retention and creation of jobs in economically distressed areas of the state. Visit www.ohiomiddlemile.org for more detailed information.

[1] In this instance *NextGen* does not refer to NG9-1-1 directly, but references new and emerging technologies and network communications advancements.

1.1.2.1 Reach

The OARnet backbone network features more than 1,850 miles of fiber-optic cable, currently featuring six major rings that extend across the state to most of Ohio's population.

One network ring circles the Columbus metropolitan area, another connects several communities just northwest of Columbus, and another reaches northwest to Lima and Toledo. A fourth ring drops down to Dayton and Cincinnati, a fifth stretches up to Cleveland, Youngstown and Akron, and a sixth circles southeast through Athens and Portsmouth. In addition to the backbone, OARnet operates several local, Sonet-based networks that support research and education, including rings in Toledo, Springfield, Central Ohio, Cleveland, Northeast Ohio, Youngstown and Tuscarawas County.

Beyond the in-state reach of the OARnet network, partnerships with other Regional Optical Networks (RONs) extend OARnet connectivity to Michigan's Merit research and education network, the Pittsburgh Supercomputing Center, the Oak Ridge National Laboratory in Tennessee and the OmniPoP research collaboration network in Chicago. OARnet also maintains a global reach through its Cleveland connection to Internet2, the United States' most advanced nationwide research and education network. Internet2 is a non-profit, advanced networking consortium of U.S. universities, corporations, government agencies, research laboratories and international organizations that brings together research and academia with technology leaders in industry, government and international communities.

Across the state, the OARnet backbone uses 31 Points of Presence (PoPs); facilities that house servers and routers to provide an interface point for other networks and 16 Regeneration Sites (places where the optical signals are re-amplified and reshaped for optimum long-distance transmission).

1.1.2.2 Capacity

The network backbone lines to Akron, Cincinnati, Cleveland, Columbus, Dayton and Toledo provide those communities with Ethernet capacity of 10 gigabits per second (Gbps), while the remainder of the network backbone provides bandwidth of one Gbps.

1.1.2.3 Architecture

Unlike traditional networks, the OARnet network can support many networks. With the newest hardware and software upgrades in progress, the updated rings will be capable of supporting 40 independent networks on separate lambdas[2] up to OC-192 (Sonet)[3] transport or 10-gigabit Ethernet speeds. The transport technology Dense Wavelength Division Multiplexing[4] (DWDM) with International Telecommunications Union [5](ITU) Grid frequencies, as well as ITU G.709 transport protocol specification, serves as the core technology for the network.

[2] Lambda – A type of switch which is capable of switching light signals.
[3] SONET – Synchronous Optical Network
[4] DWDM – a means of increasing the capacity of fiber-optic data transmission systems through sending many wavelengths of light down a single strand of fiber.

At the transport layer, the network is based on the Cisco ONS 15454 multiservice transport platforms (MSTP). The reconfigurable optical add/drop multiplexer (ROADM) optic input/output multiplexers with adaptive configuration are part of the solution. Such multiplexers allow creating 40 optical channels per one optical pair. Each of these optical channels can be of 2-, 5- or 10-Gpbs data transmission speeds, depending upon the transponder modules installed in the multiplexer. With the 40-SMR2-C card the network provides multi-degree switching capabilities at the individual wavelength level. Mesh and multi-ring network topologies can now be deployed using the complete flexibility of service routing at all nodes in the network. At the network layer, OARnet employs Juniper M320 "core" routers.

Although "IP everywhere" is the expectation for networks, the OARnet network can transport alternate network protocols, to control remote data storage facilities and support native High-Definition Television (HDTV).

The network uses MPLS to allow a level of granularity in routing that was previously unavailable. In traditional MPLS environments, P route, Provider Edge (PE), and customer premises equipment (CPE) routers are needed for MPLS operation. OARnet has successfully collapsed the P & PE Function onto a single platform. By using MPLS in the core, packets are routed to their correct destinations. Intra-state and commodity traffic uses traditional IP while Internet2 traffic uses Label Switching to identify Internet2-eligible traffic.

1.1.2.4 Ohio's 100 Gbps Network

The State of Ohio, led by the Ohio Board of Regents and the Ohio Academic Resources Network (OARnet), invested $13 million in equipment to “open the faucet” of its current broadband network—increasing the speed of its former bandwidth of 10 Gigabits per second (Gbps) to an impressive 100 Gbps. It connects to Internet2’s international 100 Gbps network backbone at data hubs in Cleveland and Cincinnati.

Statewide Broadband Speeds That Far Exceed the Rest of the Nation
Ohio has long been a leader in its broadband fiber network and speeds. Ohio recently deployed data at 10 Gbps, which is on par with the national average. While a few states have limited deployments of 100 Gbps, no other state has as far-reaching a network at these speeds benefitting as many sectors.

These almost unfathomable speeds will open the doors to many opportunities for Ohio. At 100 Gbps:

- Data equivalent to 80 million file cabinets filled with text can be transferred daily
- Every one of Ohio's 1.8 million enrolled K-12 students could download an eBook simultaneously in just over two minutes
- 300,000 X-rays be transmitted in just one minute
- 8.5 million electronic medical records can be transmitted in 1 minute
- Smartphone data can be sent 50,000 times faster than current average speeds

Harnessing the Full Potential of Ohio’s Statewide Broadband Network

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[5] ITU – The ITU, an organization based in Geneva, Switzerland, is the most important telecom standards-setting body in the world.
Reference: Newton’s Telecom Dictionary 26th Expanded and Updated Edition

Ohio already has more fiber optical broadband installed per capita than any other state in the nation, connecting all of its major cities and research institutions. OARnet acquired dark fiber in 2001-02 and then lit its high-speed fiber-optic backbone with scalable architecture in 2004. This state-of-the-art network was designed so that it could be easily upgraded to higher bandwidths, such as 100 Gbps.

1.1.2.5 Networking Initiatives

OARnet is more than just a statewide network with massive bandwidth. OARnet, sometimes autonomously and often in partnership with other local, state and federal organizations, actively participates in network-related initiatives that serve to aid and educate. This is accomplished through programs to expand broadband access, enhance community development, advance networking technologies, promote cross-cultural education and improve healthcare.

1.1.2.6 Connecting Rural Ohio

OARnet plays a leading role in the extension of Internet technology services to rural Ohio Appalachian communities through the Connecting Rural Ohio Wireless Neighborhood Project. OARnet and The Ohio State University Office of the CIO, with major funding from the American Distance Education Consortium (ADEC), the Governor's Office of Appalachia and the Ohio Community Computing Network (OCCN), are helping underserved communities achieve broadband Internet connectivity through wireless technologies.

1.1.2.7 ITEC-Ohio

OARnet plays a major role in the national effort to develop and deploy the next generation of Internet technologies through its leadership of the Internet2 Technology Evaluation Center (ITEC-Ohio). Run by and funded by OARnet, ITEC-Ohio is a consortium of Ohio universities, government agencies, and corporate partners. Its mission is to examine critical new applications and infrastructure problems in order to meet the emerging academic, engineering, and industrial needs in research, education, government and commerce.

1.1.2.8 Regional Desktop Possibilities

Virtualization of user desktops along with their applications and data using thin clients has numerous benefits. The benefits include: (i) reduction in hardware procurement budgets, (ii) reduction in operational and maintenance costs, and (iii) "Green IT" due to lower use of energy and space. In this project, Ohio has developed the "VMLab" test bed at OARnet in collaboration with VMware, IBM and Ohio campus partners to evaluate desktop virtualization performance and savings. The VMLab test bed features a 50+ users virtual desktop infrastructure (VDI) built using VMware View 3 at the server side and thin clients that use remote desktop protocols such as Microsoft RDP, HP RGS, Teradici PC-over-IP, and VNC RFB. OarNET IS conducting experiments in the VMLab test bed on VDI scalability/reliability, remote desktop protocols performance, and virtualization bandwidth-and-power savings. The VMLab test bed experiment workloads comprise of a range of different user application (e.g. Matlab simulation, MS Word, Windows Media Video) tasks, network health conditions, and system conditions that occur in campus network environments. OARnet is also enhancing the VMLab test bed to study other cutting-edge desktop virtualization technologies and their benefits.

1.1.2.9 State and Local Government

From state agencies to county offices, these public entities can connect to OARnet's backbone through a partnership with the State of Ohio Office of Information Technology.

Local Governments

- City of Columbus
- City of Dayton
- City of Dublin
- City of Portsmouth
- City of Worthington
- Clark County Municipal Court
- Cuyahoga County
- Delaware County
- Erie County
- Franklin County Data Center
- Franklin County Veterans Memorial
- Tuscarawas County
- WCNet (Wood County)

State Agencies

- Department of Development
- Department of Natural Resources
- Department of Transportation
- Department of Youth Services
- Department of Veterans Services
- Environmental Protection Agency
- Office of Information Technology
- OPLIN (Ohio Public Library Information Network)
- Rehabilitation Services Commission
- Secretary of State

1.1.2.10 Governance, Boards & Committees

1.1.2.10.1 Advisory Board

OARnet is advised by a committee of 10 members: the Chancellor of the Ohio Board of Regents or his designee, who serves as chair; a representative from the Ohio Department of Development ; a representative of the Governor's Office; the Chief Information Officer for the State of Ohio's Office of Information Technology; a representative from the Ohio Department of Education; the executive director of the Ohio Supercomputer Center; and four members appointed by the Chancellor. Of the four, one member will be selected from among Ohio's public four-year universities, one from Ohio's public two-year community and technical colleges and one from Ohio's nonprofit institutions of higher education holding a Certification of Authorization pursuant to ORC Chapter 1713. This committee recommends broad policy guidelines for OARnet and periodically reviews its program and operations, with special attention to ensuring that the management and operation of the network supports the State of Ohio's goals for higher education, P-12 education, economic development, and the goals of its state agencies. The advisory committee meets at least semiannually.

All meetings are at the Ohio Board of Regents office. The Ohio Board of Regents announces the meetings. Information can be found at http://regents.ohio.gov

1.1.2.10.2 Board of Regents CIO Advisory Board

Member institutions are encouraged to participate on the Board of Regents CIO Advisory Board, as representation ensures that member institutions are given a voice in the future direction of the network, shared services and evolving technologies. The Chancellor of the Board of Regents appoints members of the committee to advise him/her on the development and direction of the integrated technology infrastructure needed to support the Board of Regents education and technology programs. The members of this committee includes chief information officers or equivalent

senior administrative officials responsible for information technology from Ohio's public and private not-for-profit universities and community colleges, as well as representatives from private industry.

Three advisory board subcommittees are co-chaired by representatives from the BOR-CIO Advisory Board, with members representing public and private four-year institutions and public two-year institutions. The subcommittees are:

- IT Efficiency and Strategic Capacity. This subcommittee's charge is to create efficiencies by identifying opportunities for virtualization and consolidation and evaluating outsourcing.
- Technology and Security. This subcommittee promotes the continual development of OARnet's services, including identity management.
- Budget and Finance. This subcommittee searches for cost saving opportunities. It also reviews financial practices involving the Chancellor's plan.

1.1.2.10.3OARtech

OARtech provides a forum for technology staff from OARnet's member institutions to exchange ideas and share best practices. Attendees also provide OARnet with advice and suggestions on technical issues germane to the organization. All OARnet clients are invited to attend the bi-monthly meetings.

1.1.2.10.4Federated Identity Access Management of Ohio (IAMOhio)

1.1.2.10.4.1 Overview

Federated Identity makes it possible for students and faculty to access resources at multiple campuses through a single account. With federated identity:
The existing academic login becomes a single, trusted, enabling, passport to education, research, and collaboration opportunities throughout Ohio.

- Single ID to use and remember
- Trusted to protect privacy and security
- Enabling access to academic services
- Passport that's accepted throughout the University System of Ohio

The use of Federated Identity should be carefully considered for other customers. Each environment offers unique requirements and should guard against cross-system access and is further addressed in the security section of this report.

1.1.2.10.4.2 Use Cases

Shared wireless access

- Students, faculty and staff can get Internet access not only at their own campus, but when visiting other member institutions – simply by opening their laptop

Example: Two institutions share a campus and a wireless network, but provide appropriate services to their own users based on identity.

1.1.2.10.4.3 Collaborative research

Authorized researchers from multiple institutions can securely share access to systems and data sources – without an extra credentialing and authentication process. Example: Cancer researchers from across the state share study data with each other, while preventing unauthorized access and complying with federal regulations.

Web single-sign on

- Users can easily move between applications at their own institution or at other member institutions – using a single login

Example: A consortium of colleges and universities provides a unified web portal for prospective students to select the 'best fit' academic program from among all the members of the consortium.

1.1.3 Multi-Agency Radio Communications System – MARCS

MARCS (Multi-Agency Radio Communication System) is an 800 MHz radio and data network that utilizes state-of-the-art trunked technology to provide statewide interoperability in digital clarity to its subscribers throughout Ohio and a 10 mile radius outside of Ohio. The MARCS system provides statewide, secure, reliable public service wireless communication for public safety and first responders.

The MARCS development contract required 97.5% mobile voice and data in street coverage. 99.71% aggregate voice coverage was realized and 98.13% aggregate data coverage was achieved. This allows maximum statewide interoperability and enhanced safety and protection for public safety service providers through secure digital transmissions.

The MARCS network operates on three system components:

- Mobile Voice – operating on the 800 MHZ digital trunked technology
- Mobile Data – allowing data transmissions, LEADS inquiries, reformatting of data from Mobile Data Terminals (MDT)
- Computer Aided Dispatch - providing GPS-based auto vehicle location, resource recommendation and map display

There are currently over 47,500 voice units and over 1,800 mobile data units on the MARCS system with over 1200 public safety/public service agencies statewide. This includes local, state and federal agencies.

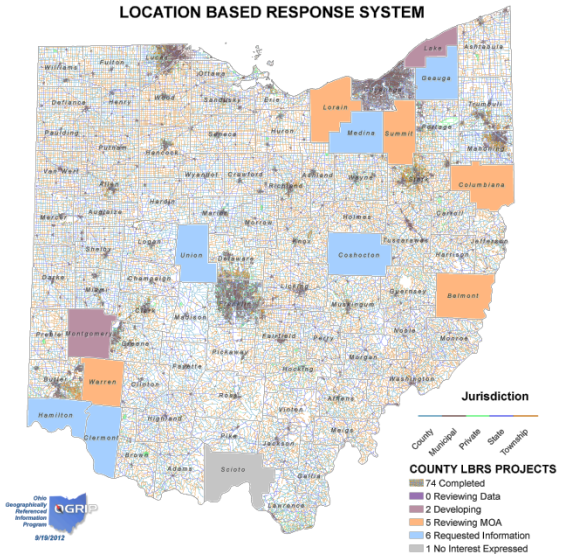
The State of Ohio Office of Information Technology has implemented the Multi-Agency Radio Communications System (MARCS), an 800 MHz trunked radio system for use by State agencies, as well as local municipalities who choose to subscribe to the system. The MARCS system provides effective mobile level radio coverage throughout the State of Ohio. Currently, in addition to the State users, all sheriffs' dispatch centers within the state have MARCS radios, as well as all county Emergency Management Agency EOCs, many emergency medical services providers, hospitals and health departments. The MARCS system in its current form provides an excellent platform for interoperability among sheriff's offices, local law enforcement, health departments, EMA/Homeland Security, fire/EMS agencies, hospitals and other agencies having the capability of accessing the system. Local and other agencies are encouraged to use MARCS for interoperability purposes, and the MARCS program office has developed a policy defining the guidelines for emergency use operation. To encourage interoperability usage and the

use of MARCS as a back-up communications resource, the State does not charge user fees for emergency and interoperability use. Furthermore, it is recognized MARCS will provide the foundation for an expanded communications network in the future.

If the need for redundant assets arises, the Ohio EMA maintains a remote deployable site (site on wheels) that can be deployed during an emergency situation. This site, called the Transportable Communications System (TCS), is housed within the Ohio EMA mobile communications vehicle. The TCS contains a 5-channel trunked voice and single-channel data capability as well as two NPSPAC Mutual Aid repeaters; VHF, UHF and other radio capability along with patching equipment and deployable radios. The TCS was designed to serve as a replacement to a failed MARCS tower site, to serve as a supplemental site providing extra capacity to serve as a stand-alone site, linked to the state EOC dispatch center by satellite for radio coverage in areas where land-line infrastructure has either been destroyed or does not exist. Additionally, the State Highway Patrol, Department of Natural Resources, State Fire Marshall, Ohio Army & Air National Guard, and many individual counties maintain mobile communications/command vehicles that can be deployed in case of emergency. A recent survey has identified 38 mobile communications/command vehicles maintained by local entities, over 1200 MARCS capable deployable radios, over 4200 radios in local radio caches, and approximately 20 fixed gateway devices as well as 20 mobile gateways.

1.1.4 Location Based Response System – LBRS

The Ohio Location Based Response System (LBRS) is an initiative of the Ohio Geographically Referenced Information Program (OGRIP) built in response to the need for coordinated intelligent transportation and location information access between state agencies. The LBRS is a current, accurate, and accessible street centerline and addressing system that is collaboratively maintained as an Ohio asset by local and state resources.



The LBRS program establishes partnerships between State and County government for the creation of spatially accurate street centerlines with address ranges and field verified site-specific address locations. Once established, maintenance of the data is performed by the county using local knowledge and expertise to ensure accuracy and completeness of the data. Through the collaborative efforts of State and Local government the LBRS program is producing highly accurate field verified data that is current, complete, consistent, and accessible. LBRS data is maintained as an Ohio asset by local resources and is provided to the state as part of a coordinated long-term effort by OGRIP to reduce redundant data collection by developing data that meets the needs of several levels of government. The LBRS supports a multi-jurisdictional approach to protecting the health, safety and welfare of the state's constituents.

The LBRS positions Ohio to comply with NG9-1-1 requirements for a single, unambiguous, site-specific civic address to be matched to every 9-1-1 call – including those coming from apartment complexes, office buildings and mobile home parks. Having precise locally developed and maintained data will be critical to the operation of NG9-1-1 Location Information Services. With the field-verified data already included in Ohio's LBRS, the vast majority of

counties in the Buckeye State are already prepared for the NG9-1-1 rollout. LBRS will become the cornerstone for reliable mapping and, in turn, building emergency routing databases.

1.1.5 Ohio Middle Mile Consortium - OMMC

The Ohio Middle Mile Consortium (OMMC) was formed as a public-private partnership to create a comprehensive statewide plan to expand broadband infrastructure to the underserved and unserved areas of the state. This plan focuses on community anchor institutions and includes hospitals, public safety and local governments to ensure the development of an affordable and sustainable broadband program to provide Ohioans with statewide IP, Ethernet and fiber wavelength broadband services.

OMMC partners Com Net, Inc., Horizon Telcom, OneCommunity and OARnet formed a public-private partnership to create a comprehensive statewide plan to expand broadband infrastructure to the underserved and unserved areas of the state. OMMC member organizations are collaborating to provide Ohioans with statewide IP, Ethernet and fiber wavelength broadband services. OMMC-related projects will reach the following community anchor institutions:

- 83 private and public universities and colleges
- 34 community colleges
- 2,356 K-12 and career training centers
- 1,300+ health care facilities
- 2,200 state and local government offices
- 1,500 public safety operations
- 429 libraries
- 207 industrial parks

The OMMC today is comprised of more than 4,300 miles of optical fiber using state-of-the-art switches, routers and Ethernet switches, providing Ohio with an advanced, statewide telecommunications network dedicated to research, education and economic competitiveness. The grants, collectively, will add more than 3,600 fiber miles.

The OMMC will support an advanced packet-based architecture using Internet protocol (IP) to create one of the most flexible, scalable and cost-effective infrastructures in the country. The new infrastructure will be equipped for middle mile and statewide capacity to support new initiatives with a focus on serving the economically disadvantaged, bringing broadband to unserved and underserved areas in Ohio.

OARnet will provide 10 Gbps wave service, as capital indefeasible rights-to-use (IRUs), to its OMMC partners, while the partners will provide OARnet with dark fiber IRUs. This will allow OMMC to extend its geographic reach to economically distressed, and unserved and underserved areas of the state. This will increase the much-needed capacity to provide advanced applications and services at an affordable cost.

2. READINESS OF CURRENT TECHNOLOGIES

Kimball finds the existing technology infrastructure and resources available as summarized in section 1 of this report could be utilized to provide ESInet connectivity for the state's 9-1-1 centers. Viable options are available for both a state-wide as well as future connection options for regional ESInets. Detailed design, requirements and specifications will be discussed during future tasks.

Addressing Ohio's current technology infrastructure capabilities regarding its feasibility for use as a state-wide ESInet, the main areas of concern revolve around how well it meets, or could easily be made to meet, high-level ESInet requirements. When these requirements are understood and compared to existing network options, informed decisions can be reached to select a candidate for further investigation. Kimball's objective was to identify a network infrastructure that met the most requirements necessary for success. High-level requirements for ESInets include:

- Recommended Media
- Availability and Reliability
- Network Security
- Network Management and Monitoring
- Hardware and Network Elements
- Service Level Agreements
- Traffic Engineering
- Network Architecture

Upon reviewing the state network options available in Ohio, Kimball finds OARnet to be excellent choice for the state-wide ESInet. Ohio also has a variety to middle-mile options that could provide PSAP interconnectivity to OARnet. It is expected that some areas may choose to form regional ESInets and some PSAPs may choose to connect directly to OARnet.

For example, initiatives are in progress for Morgan County, Cincinnati, Franklin County, Butler County, Mahoning County and Cuyahoga County to implement IP-based 9-1-1 systems. In addition, Hamilton County hosts a pilot site for Intrado's NG91-1 solution and the Toledo area hosts a Regional Integrated Command Center (RICC), which is a converged, IP-decentralized, next generation wide area network supporting the Department of Defense and regional public safety. Kimball recommends Ohio makes every effort to identify any other NG9-1-1 initiatives and take into consideration their presence when designing the state-wide ESInet. Local IP network options available to regional ESInets and PSAPs for connectivity to OARnet should be addressed on a case-by-case basis.

The remainder of this report compares the capabilities of OARnet with ESInet Design for NG9-1-1 NENA 8-506, Version 1, December 14, 2011.

2.1 ESInet High-level Requirements

2.1.1 Recommended Media

Fiber optic circuits provide the advantage of:

- Fast transmission rates

- High band width
- Long transmission distances
- High Resistance to Interference/electromagnetic noise
- Low Maintenance

As demonstrated in section 1 of this report, OARnet supplies fiber optic circuits radiating from the center of the state that could provide a backbone for the state-wide ESInet.

2.1.2 Availability and Reliability

Emergency calls command a high level of availability and reliability. OARnet has a documented record of nearly zero down time, exceeding the NENA i3 standard of 99.999% availability. Although it may be difficult for PSAPs to procure this level of service from local provider, OARnet is able to meet this requirement for the state-wide ESInet.

2.1.3 Network Security

There are a host of recommended security policies found in NENA Security of Next-Generation 9-1-1 Standard, NENA 75-001, Version 1, February 6, 2010. It is recommended that a security plan be established at the highest level of authority governing those who connect to the state-wide ESInet. A security plan provides the overarching security strategy and defines the requirements to effectively implement a comprehensive state-wide security program. This includes the creation of an executive level statement of policy, and codification of key objectives and goals. Activities include but are not limited to:

- Identification of standards the State wishes to comply with, including NG-SEC and others such as state/local IT security standards or policies.
- Identification of the person(s) responsible for cyber security within the organization as well key roles and responsibilities of cyber security personnel (e.g. security administrator, auditor, consultant)
- Identification of security policies necessary to implement and enforce the client's objectives
- Identification of the security management governance structure

This presents the opportunity to consider the use of Federated Identity as mentioned in section 1.1.2.10.4. Use of any process to accommodate ease of access must be weighed against strong security. The use of such systems must align with the security requirements specifically designed for and agreed upon by the stakeholders for acceptable use within the ESInet environment. Careful consideration must be afforded to the possibility of unintentionally creating the ability for one system to access another system, creating a gap in security.

From the state-wide ESInet security plan, security policies and procedures are authored. Policies and the manner in which they are communicated, implemented, maintained and enforced, mark the difference between effective ESInet management and constant chaos. The activities outlined below support the development of effective policies and set the stage by which additional policies and procedures may be created and implemented to assure that all entities follow a common practice.

It is understood that creating a comprehensive portfolio of policies is a daunting task. The complete list of policies in lengthy. Kimball recommends creating the following policies first, then expanding the set of polices over time.

- Emergency Services IP Network (ESInet) Operations Policy
- Change Management Policy

- Acceptable Use Policy
- Network Security Policy

The four recommended primary policies provide a security framework for the state-wide ESInet. Collectively they address at a high level the authority structure as it applies to daily operations of the ESInet and connected devices; provides a vehicle to request, approve and implement changes to the ESInet; and activities that are both expected and accepted while interfacing with the network either as an end-user or from a more technical standard. It is expected that the network providers, device and service providers must support and not circumvent the security policies once established.

Session border control will primarily be the responsibility of the PSAPs. All PSAPs connecting to a regional ESInet or the state-wide ESInet must provide firewall-like security for call signaling and call media streams. In most cases it will be necessary to place a firewall in parallel with the SBC in order to process all traffic. It is recommended to include session boarder control requirements when designing the state-wide ESInet as this represents the boundary between PSAPs and connected entities. All emergency services traffic traversing the state-wide ESInet must be protected in the same manner to assure traffic is segmented and safeguarded from malicious activity and disclosure.

2.1.4 Network Management and Monitoring

With a 24x7x365 Network Operations Center (NOC) in place, OARnet has the capability to manage and monitor the OARnet network. It is recommended that the ESInet authority collaborate with OARnet to establish monitoring levels and reports consistent with i3 standards.

2.1.5 Performance Requirements

The performance requirements of particular concern to the delivery of emergency calls lie with packet loss, jitter and latency. The following chart compares NENA standards and OARnet standards.

Performance Measure	NENA Standard	OARnet Standards
Packet Loss	<1%	.01%
Jitter	<20ms	20ms
Latency	<15 to 20ms	18ms

OARnet's performance is near or meets the recommended NENA requirements. Meeting these requirements directly affects the voice quality during emergency calls. It is imperative that these requirements are in place.

2.1.6 Hardware and Network Elements

NENA standards list the following considerations regarding the suitability of hardware and network elements:

- Highly reliable
- Proven track record
- Warranty
- An abundance of qualified/trained engineers to provide support
- Vendor provided 24/7 support
- Acceptable Meant Time to Repair (MTTR)

- Scalable

OARnet has the ability to meet these requirements and provides customized solutions to meet client needs. Service level agreements are addressed in the next section and agreements should be put in place to assure Ohio's expectations are clearly understood. Kimball recommends a documented level of service be approved by the ESInet authority and OARnet.

2.1.7 Service Level Agreements

OARnet provides Service Level Objectives (SLO). The difference between a SLO and a Service Level Agreement (SLA) is the ability to apply penalties to the service provider. Due to their funding structure, penalties are not directly applicable to OARnet. Kimball recommends that local network providers supply the same level of service per the appropriate agreement vehicle. Penalties should accompany SLAs when applicable to other network providers.

Examples of OARnet Transport SLOs are as follows:

Service Level Objective for Network Availability is: 99.999% for Protected Service and 99.99% for Unprotected Service. (Note: Service is considered unavailable when there is a complete loss of use.)

Service Level Objective for Mean Time to Repair (MTTR) is: Yearly average of two (2) hours per occurrence with no single occurrence lasting more than four (4) hours from the time a trouble ticket is opened.

Service Level Objectives for Mean Time to Response (MTTRe) is: Yearly average for response to call – five (5) minutes to enter trouble ticket, and one (1) hour for updates if needed.

Service level Objective for Latency is: 18 ms one way/ 36 ms round trip. Latency objective is measured as the average sample taken during a 30 day period between network terminating equipment to which the ports are assigned.

Service Level Objective for Packet Delivery Rate is: 99.9% with the Packet Delivery Rate objective calculated as the total number of effective Ethernet frames, per port that successfully traverse the network divided by the total number of effective Ethernet frames per port offered to the network within a 30 day period.

Service Level Objective for Jitter is: 20ms with Jitter calculated as the delay variance of the packets transported across the network or delta of delay between two consecutive packets by averaging sample measurements taken during a 30 day period between network terminating equipment.

Service Level Objective Protocol's Supported are: IPV4 and IPV6

OARnet does meet the spirit of a SLA which NENA recommend are in place to establish mutually agreed upon levels of service. SLAs also provide an accompanying metric to demonstrate acceptable service is provided. OARnet is able to provide metrics detailing the network. Kimball recommends that the ESInet authority request OARnet provide metrics.

2.1.8 Traffic Engineering

NENA standards recommend ESInets are designed to optimize and provide emergency calls with high priority, specifically – the call must always be delivered. To this end, Kimball provides NENA's suggestions to optimize traffic flow.

Dimensioning ESInet Data Circuits - Although bandwidth requirements are traditionally based according to average usage; the peak usage of circuits designated for 9-1-1 call delivery is the suggested threshold. Consideration should also be given the ability to support future bandwidth requirements to meet the growing use of multi-media by the public, such as texting and video capabilities.

It is understood that each PSAP could be subjected to malicious activity such as Distributed Denial of Service Attacks (DDOS). The local networks and PSAPs bear the burden of preparing for such events. However, the state-wide ESInet should also have safeguards in place and mitigation strategies to minimize these events.

Traffic Policing – Care should be given to prevent packet loss due to over utilization of established bandwidth. Even with every effort to properly size bandwidth, during emergencies the peak call volume may exceed previously established peak rates. Strategies should be put in place to avoid any call being dropped due to unexpected network traffic volume.

Quality of Service – Is the ability the designate priority to data flows. The Detailed Functional and Interface Standards for the NENA i3 Solution – Stage 3, NENA 08-003 Version 1, June 14, 2011 provides the following guidance:

- Routers must respect code points
- Functional Elements must mark packets they create with appropriate code points
- The BCF must police code points for packets entering the ESInet
- The following code points and Per Hop Behaviors (PHB) must be used on ESInets:

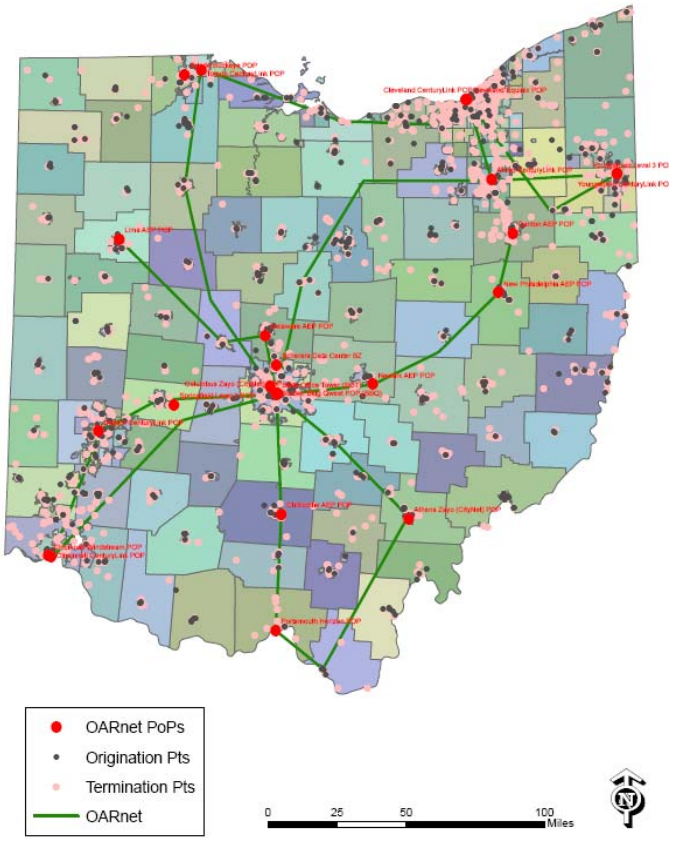
DSCP	Use	PHB
0	Routine Traffic	Default
1	9-1-1 Signaling	AF12
2	9-1-1 Text Media	AF12
3	9-1-1 Audio Media	EF
4	9-1-1 Video Media	AF11
5	9-1-1 Non human initiated Call	AF21
6	Intra ESInet Events	AF21
7	Intra ESInet Other 9-1-1 Traffic	AF22

2.1.9 Network Architecture

Ohio has the infrastructure available to support a state-wide ESInet. It is not to say this is a ready-made service. Planning and design are required to address PSAP connectivity. Some geographical locations will be able to connect with minimum distance, while others will require a lengthier transit to reach the state-wide ESInet. Network design

requirements and specifications are needed. The following map demonstrates the OARnet fiber optic reach as well as the points of presence to each county in Ohio.

Additional services or means of consolidating current services should be established to maximize efficiencies with services such as ALI and call routing functions. A variety of network designs are employed by other states today. Each design has been customized to meet the specific needs of the states, takes into consideration connections by regional ESInets, and provides for individual PSAPs. It is recommended that Ohio consider its options and choose a design that meets the needs of their current environment while allowing for future needs and capabilities.

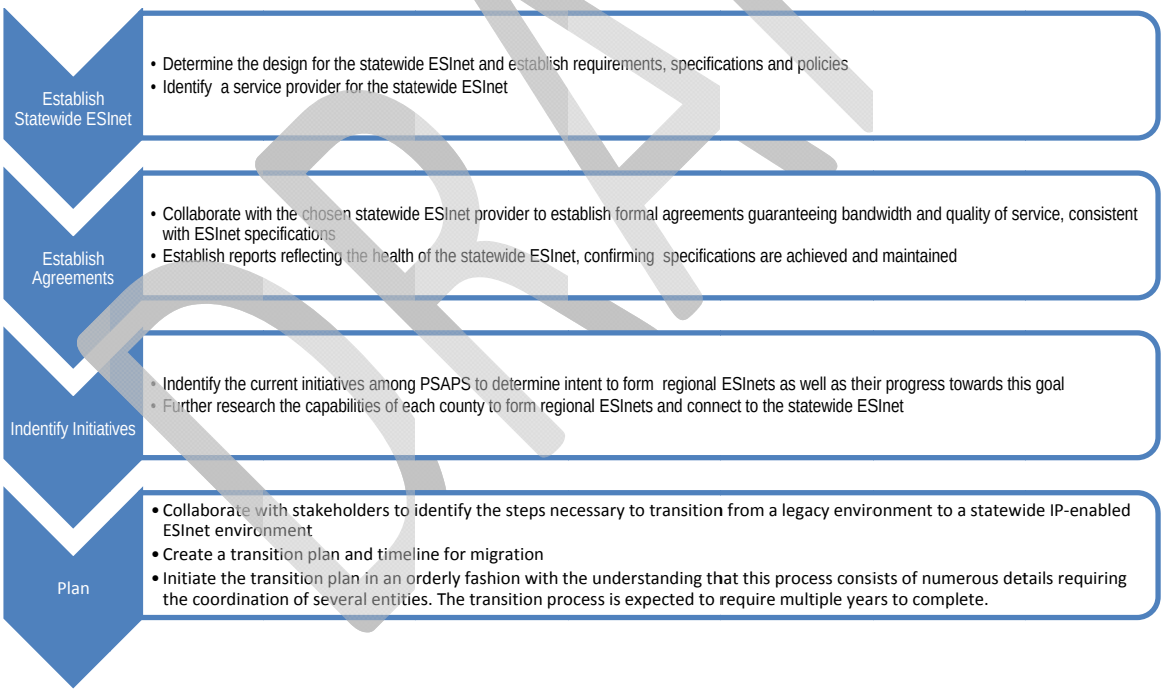


3. SUMMARY

Kimball finds overall that Ohio's network options are ESInet capable for both a state-wide ESInet and regional ESInets. Further research and stakeholder collaboration is required to establish a functional and compliant system. Kimball is tasked with a future effort to engage Ohio's NG9-1-1 stakeholders in discussions of network design, as well as the requirements and specifications to support that design. Kimball recommends the requirements and specifications be discussed with OARnet to establish compliance with the Ohio's desired design. Final requirements will become the standard for the state-wide and regional ESInets.

It is not to say that Ohio will choose to adopt all of the NENA standards. It is Kimball's experience that other clients (including entire states) choose to customize their standards to meet their particular needs. For example, some ESInet authorities have adopted stricter or more detailed requirements in some areas and choose less rigid requirements to fit the available infrastructure and services in other areas. Risks associated with such choices should be weighed and the consequences understood. As with any risk, plan should be put in place to revisit decisions and update requirements when the original situation changes.

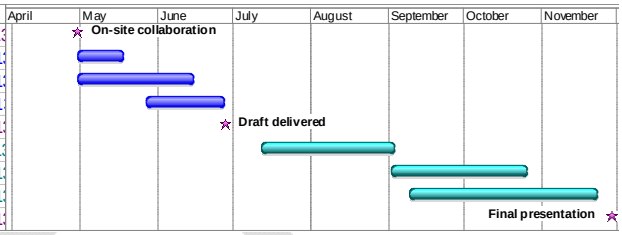
Kimball recommends the following next steps:



4. TIME LINE TO DEVELOP ESINET REQUIREMENTS

Kimball provides the following timeline to complete the next network task, Development of ESInet Technical and Operational Requirements. The timeline will be refined and expanded during the task stakeholder meeting.

ID	Task Name	Duration	Start	Finish
1	Preliminary options discussed with stakeholders	0 days	Tue 4/30/13	Tue 4/30/13
2	Preliminary network design	14 days	Tue 4/30/13	Fri 5/17/13
3	Preliminary network requirements	34 days	Tue 4/30/13	Fri 6/14/13
4	Preliminary network specifications	23 days	Mon 5/27/13	Wed 6/26/13
5	Draft document delivered	0 days	Fri 6/28/13	Fri 6/28/13
6	Final network design	37 days	Fri 7/12/13	Mon 9/2/13
7	Final network requirements	40 days	Mon 9/2/13	Fri 10/25/13
8	Final network specifications	55 days	Mon 9/9/13	Fri 11/22/13
9	Final document presented	0 days	Fri 11/29/13	Fri 11/29/13



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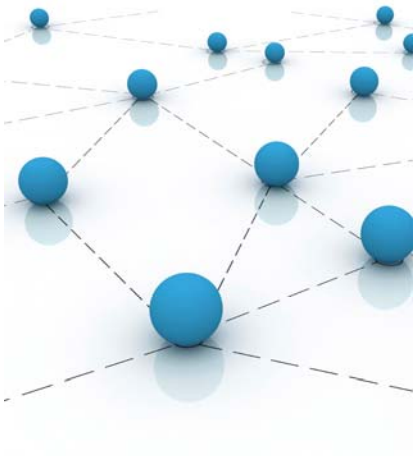

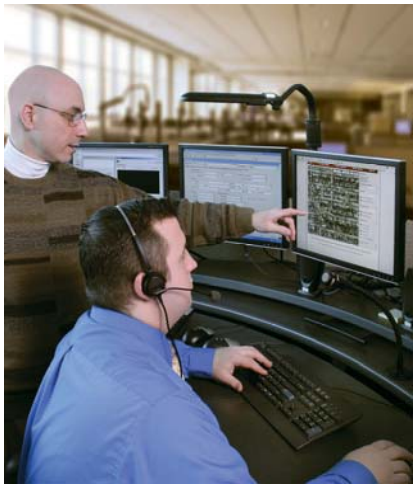

Draft Report for

Funding Review

Prepared for

Ohio Department of Administrative Services

April 2013 ©

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TABLE OF CONTENTS

EXECUTIVE SUMMARY 1
Assumptions 1
Overview of Current Expenditures/Balances 1
Recommendations 2
Next Steps 2
1. INTRODUCTION 4
1.1 Background 4
1.2 Funding Statutes and Administrative Rules 5
1.3 Emergency Services Internet Protocol Network Steering Committee 5
2. METHODOLOGY 7
2.1 Data Collection 7
2.2 Data Analysis 7
2.3 Assumptions 7
3. CURRENT FUNDING PROVISIONS 9
3.1 Funding for Wireline 9-1-1 9
3.2 Local PSAP Operations 9
3.3 Wireless 9-1-1 10
3.4 Current Fund Distribution Laws 10
3.5 Overview of Surcharge Distribution 11
3.6 Overview of Current Expenditures/Balances 11
4. RECOMMENDATIONS 13
4.1 Current Fund Distribution Inefficiencies 13
4.2 Considerations for Funding Next Generation 9-1-1 13
4.3 Recommended Distribution Model 1 15
4.4 Recommended Distribution Model 2 16
5. CONCLUSION 18
5.1 Considerations 18
5.2 Next Steps 18

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EXECUTIVE SUMMARY

The ESInet Steering Committee and its subcommittees have worked hard over the past months to gather and compile information in an effort to provide the Ohio Legislature with an understanding of how 9-1-1 is funded in Ohio and what it will take to adequately prepare for Next Generation 9-1-1 (NG9-1-1). In Ohio, funding for emergency services communications reflects a shared approach between state and local governments with state support to help insure rural communities have access to quality 9-1-1 services. Historically Ohio's 9-1-1 professionals, the telecommunications industry, community service organizations, and state and local government leaders have worked together to develop funding solutions that work for all parties and that have enjoyed broad public support. Future funding approaches must leverage and build on that history.

Assumptions

- Kimball assumes that all information provided by the ESInet Steering Committee, the PUCO and the County and PSAP level survey data is true and accurate.
- Kimball assumes that prior to changing distribution rules; the Ohio ESInet Steering Committee will have an NG9-1-1 roadmap and at least high level network cost estimates in place.
- Both Kimball and the ESInet Steering Committee assume the State will take a more active role in the implementation, operation and maintenance of a statewide NG9-1-1 ESInet, and that the State will aid in the coordination of resource sharing across counties and agencies.
- The funding models also assume that emergency response will remain a local response.
- Kimball assumes that the Ohio ESInet Steering Committee will be provided additional time and funding to continue the analysis needed to craft a comprehensive funding recommendation along with policies and procedures for distribution of funds.

Overview of Current Expenditures/Balances

Kimball is not able to determine the total cost of 9-1-1 in the state of Ohio. It is not known what the system costs are for wireline service as the ILECs do not report those numbers to the PUCO, nor is there any statutory provision that requires them to do so. While all of the counties did report in response to the ESInet Steering Committee's survey, that reporting accounted only for the PSAPs within the County that received a distribution from the Wireless 9-1-1 Fund. In addition, only about 50 percent of the PSAPs responded to the survey. That response level is not large enough to enable Kimball to utilize the data to estimate costs for the remaining PSAPs.

According to the information provided by the counties, it appears as though the wireless E9-1-1 surcharge accounts for approximately 18.32 percent of the total costs for wireless E9-1-1 and PSAP operations. As explained above, an exact figure for total 9-1-1 costs cannot be determined at this time. Although 18.32 percent is the average for all counties; there are several smaller counties that receive the minimum distribution amount, which will have trouble funding the transition to NG9-1-1 without assistance. In addition, those PSAPs that do not accept wireless calls receive no funding from the wireless E9-1-1 surcharge and most likely will not be able to fund the transition to NG9-1-1.

Due to the inadequacy of the available data – or the lack of any data at all in the case of the 'bill and keep' provision – it is not possible without additional time and research to accurately understand what 9-1-1 costs in Ohio. Because this information is

essential to a proper analysis, L.R. Kimball strongly recommends the ESInet Steering Committee gather the information and use it in the development of a comprehensive NG9-1-1 tactical plan. Adequate budget would need to be provided. In addition, we recommend the Legislature take three actions to facilitate this data gathering:

- Require the ILECs to provide the ESInet Steering Committee with information about what it costs them to provide 9-1-1 service for each of their systems or as a statewide aggregate; and to report how much revenue the 'bill and keep' provision generates for each of their systems or as a statewide aggregate. At a minimum require the ILECs to provide the number of access lines within the state.
- Require all PSAPs, not just those that receive state funding, to respond to the ESInet Steering Committee's request for information.
- Impose a penalty for failure to respond such as is found at §5507.02 (D)(2)(a) ORC.

Recommendations

The ESInet Technical Standards Subcommittee recommended that in order to provide the most adequate long-term funding source for 9-1-1 into the future, funding mechanisms should meet the following criteria:

- The funding method should encompass the principle of access, so that anyone capable of accessing the legacy and IP networks should share in the costs of 9-1-1 service.
- The funding method should be technology, vendor, and competitively neutral, so it does not give competitive advantages to one telecommunications, broadband, or data provider at the expense of other providers.
- The funds collected should be used only for their intended purposes and should not be re-allocated at the state or local level for non-9-1-1 purposes.
- The funding method should provide for the total cost of providing 9-1-1 service.
- The funding method should be easy to understand and administer.
- The funding method should be fair and equitable to all individuals and devices capable of accessing the current and future 9-1-1 network.
- The funding method should be stable, and therefore not require frequent legislative adjustments.

Next Steps

Kimball recommends that the ESInet Steering Committee be given permission and funding to complete the remaining work needed prior to making a decision on a new funding model. The ESInet Steering Committee has worked hard to date; and additional work is needed to complete the process.

Kimball recommends the following next steps:

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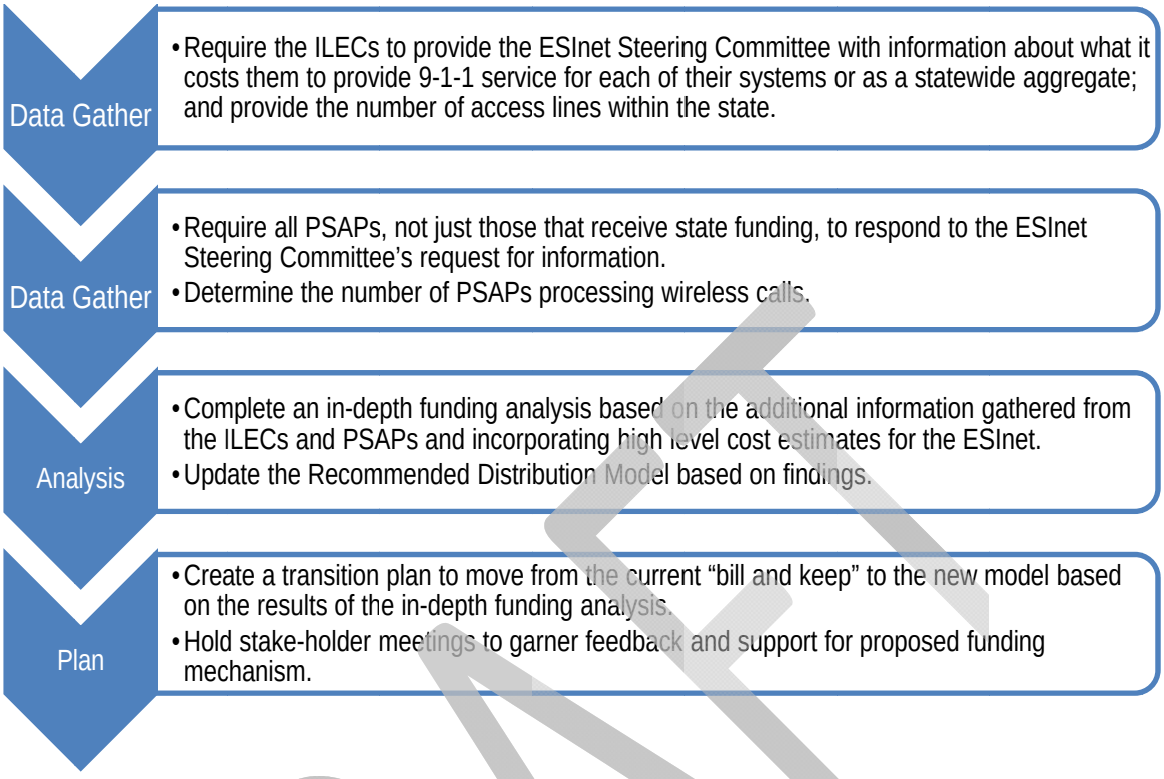

Figure 1—Next Steps

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1. INTRODUCTION

The ESInet Steering Committee and its subcommittees have worked hard over the past months to gather and compile information in an effort to provide the Ohio Legislature with an understanding of how 9-1-1 is funded in Ohio and what it will take to adequately prepare for Next Generation 9-1-1 (NG9-1-1). The Technical Standards Subcommittee prepared a document entitled Tech Committee Recommendations v0.1.docx as a vehicle to organize the information that had been collected.

In Ohio, funding for emergency services communications reflects a shared approach between state and local governments with state support to help insure rural communities have access to quality 9-1-1 services. Historically Ohio's 9-1-1 professionals, the telecommunications industry, community service organizations, and state and local government leaders have worked together to develop funding solutions that work for all parties and that have enjoyed broad public support. Future funding approaches must leverage and build on that history[1].

1.1 Background

In 1985 House Bill 491 established a methodology to allow local governments in Ohio to adopt 9-1-1 plans and put in place a countywide 9-1-1 system. While jurisdiction for 9-1-1 was given to the Public Utility Commission of Ohio (PUCO), 9-1-1 was mainly handled at a local level with the PUCO creating the regulatory framework.

Wireline telephone companies were offered a tax credit for their initial nonrecurring costs to implement 9-1-1. In addition, a "bill and keep" system was established that allowed the wireline telephone companies to bill a tariffed rate to their customers to recover the recurring costs for the 9-1-1 network. The bill and keep system was based on the actual costs of implementing and operating the 9-1-1 network.

With the growing adoption of cellular technology, the funding model was expanded in 2004 by House Bill (HB) 361, which provided for a wireless 9-1-1 surcharge to be collected on each wireless phone number with an Ohio billing address. The funds collected were kept in a dedicated account and made available to counties after they filed a 9-1-1 plan and began to implement enhanced wireless 9-1-1 services.

HB 361 created an Ohio 9-1-1 coordinator position to administer the funds along with the Ohio 9-1-1 Council to create operational and technical 9-1-1 standards. It also created a Wireless Advisory Board to consult with the coordinator and PUCO to create administrative rules and assist in creating a report to the General Assembly. HB 361 placed a sunset provision on the wireless 9-1-1 surcharge for December 31, 2008.

In 2008, Senate Bill 129 lowered the amount of the wireless 9-1-1 surcharge and extended it through December 2012. In addition, it increased the minimum amount distributed per county and created a limit on the number of PSAPs per county eligible for funding.

In December 2012, HB 360 further lowered the amount of the wireless 9-1-1 surcharge and removed the sunset provision, making the wireless 9-1-1 surcharge permanent. HB 360 revised the prepaid wireless surcharge to a percentage of the sales price and stipulated it will be billed at the point of sale. Oversight was moved to the Department of Public Safety and the Department of Taxation.

[1] Tech Committee Recommendations v0.1.docx, page 14

In addition, HB360 created a Next Generation 9-1-1 (NG9-1-1) fund, which is a custodial fund within the State Treasury to fund Ohio's transition to NG9-1-1. HB360 also created an Emergency Services Internet Protocol Network (ESInet) Steering Committee to advise the state on the implementation, operation and maintenance of a statewide ESInet to support NG9-1-1.

1.2 Funding Statutes and Administrative Rules

9-1-1 service in Ohio is governed by Chapter 5507 of the Ohio Revised Code (ORC) and rules 4901:1-8-01 through 4901:1-8-06 of the Ohio Administrative Code (OAC).

ORC 5507 provides direction for countywide 9-1-1 programs, municipal corporations or townships that wish to form a 9-1-1 program; changes to the wireless 9-1-1 surcharge; a new NG9-1-1 fund; instructions on fund disbursement; limitations on the use of funds and the structure of the 9-1-1 Council, Wireless Advisory Board and the ESInet Steering Committee.

The OAC 4901 details accounting practices, records retention requirements, reporting requirements and defines a public emergency for the purposes of outbound emergency notification. OAC 4901 requires wireless providers to follow generally accepted accounting principles and details how providers are to remit monies collected from the 9-1-1 wireless surcharge. In addition, it details the process a county must use in order to obtain permission to utilize funds from the 9-1-1 Government Assistance Fund for personnel costs.

1.3 Emergency Services Internet Protocol Network Steering Committee

HB360 created a Statewide ESInet Steering Committee and assigned responsibility to generally advise the state on the implementation, operation, and maintenance of a statewide emergency services internet protocol network that would support state and local government NG9-1-1 and the dispatch of emergency service providers.[2] The ESInet Steering Committee was tasked with the following:

- On or before May 15, 2013, deliver an initial report to the speaker of the house of representatives, the president of the senate, and the governor providing recommendations for the state to address the development of a statewide emergency services internet protocol network, which recommendations shall include a review of the current funding model for this state's 9-1-1 systems and may include a recommendation for a reduction in wireless 9-1-1 charges;
- Examine the readiness of the state's current technology infrastructure for a statewide emergency services internet protocol network;
- (Research legislative authority with regard to governance and funding of a statewide emergency services internet protocol network, and provide recommendations on best practices to limit duplicative efforts to ensure an effective transition to next-generation 9-1-1;
- Make recommendations for consolidation of public-safety-answering-point operations in this state, including recommendations for accelerating the consolidation schedule established in section §5507.571 of the Revised Code, to accommodate next-generation 9-1-1 technology and to facilitate a more efficient and effective emergency services system;
- Recommend policies, procedures, and statutory or regulatory authority to effectively govern a statewide emergency services internet protocol network;

[2] ORC §5507.02 (C)

- Designate a next-generation 9-1-1 statewide coordinator to serve as the primary point of contact for federal initiatives;
- Coordinate with statewide initiatives and associations such as the state interoperable executive committee, the Ohio geographically referenced information program council, the Ohio multi-agency radio communications system steering committee, and other interested parties.[3]

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[3] ORC 5507.02 Statewide Emergency Services Internet Protocol Network Steering Committee

2. METHODOLOGY

2.1 Data Collection

The ESInet Technical Standards Subcommittee prepared a document entitled *Tech Committee Recommendations v0.1.docx* as a vehicle to organize the information that had been collected. The factual information contained in this report is taken directly from that document; information provided by the PUCO; the Ohio 9-1-1 Council and Advisory Board Website and the Ohio Wireless E9-1-1 Report to the Ohio General Assembly 2011. In addition, Kimball researched the funding statutes, enabling Legislation and wireline tariffs in Ohio.

2.2 Data Analysis

L.R. Kimball performed the funding analysis based on its industry experience and expertise and from having conducted similar projects in other states. In addition, we considered the analysis already performed by the ESInet Steering Committee and its subcommittees and used it to the extent possible.
The primary areas of analysis included:

- State revenue from the wireless 9-1-1 surcharge
- State distributions of the wireless 9-1-1 surcharge revenues to PSAPs
- Telephone company tariffs
- State statutes and regulations
- Data collected from the County and PSAP surveys
- Documents and information the ESInet Steering Committee and its subcommittees provided to Kimball

Analysis was hampered by the lack of certain essential information. For example, financial information about what it costs local government to house and staff a 9-1-1 operation, and what local revenue sources generate in terms of funding was not available for all PSAPs. Again, financial information about what it costs the 9-1-1 System Service Providers (SSP) to provide the network, database and routing elements of enhanced 9-1-1 (E9-1-1) and what their 'bill and keep' funding mechanism yields in terms of revenue was not available. As a result, it was not possible to do a complete analysis. Further data gathering and analysis will be required.

L.R. Kimball made numerous assumptions during the analysis, which are presented in the next section and throughout the report.

2.3 Assumptions

- Kimball assumes that all information provided by the ESInet Steering Committee, the PUCO and the County and PSAP level survey data is true and accurate.
- Both Kimball and the ESInet Steering Committee assume the State will take a more active role in the implementation, operation and maintenance of a statewide NG9-1-1 ESInet, and that the State will aid in the coordination of resource sharing across counties and agencies.
- The funding models also assume that emergency response will remain a local response.
- Kimball assumes that prior to changing distribution rules; the Ohio ESInet Steering Committee will have an NG9-1-1 roadmap and at least high level network cost estimates in place.

- Kimball assumes that the Ohio ESInet Steering Committee will be provided additional time and funding to continue the analysis needed to craft a comprehensive funding recommendation along with policies and procedures for distribution of funds.

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3. CURRENT FUNDING PROVISIONS

3.1 Funding for Wireline 9-1-1

As previously noted, the Incumbent Local Exchange Carriers' (ILEC) costs for wireline 9-1-1 is paid for by a "bill and keep" system that allows wireline companies to assess a tariffed monthly fee on their subscriber's bills. AT&T, Century Link, Cincinnati Bell, Frontier and Windstream Ohio each have approved tariffs on file with the PUCO. The tariffs also permit the wireline companies to recover incremental costs associated with the routing of wireless 9-1-1 calls to the appropriate PSAP[4]. Four companies - AT&T, Embarq, Cincinnati Bell and Verizon - have tariffs to recover incremental costs associated with the routing of wireless 9-1-1 calls.

It is very important to understand that while the tariffed rates are known, it is not known how much revenue is generated by the fee or what it costs the ILECs to provide the service. There is no mechanism in regulation or statute to compel the 9-1-1 system service providers to divulge this information. Kimball believes based on our experience assisting other states prepare to transition to NG9-1-1; that it is essential to have an accurate picture of the true cost of 9-1-1 services prior to creating a transition plan.

3.2 Local PSAP Operations

Local PSAP operations and personnel costs are paid for at the local level. Counties have five options for financing the local operations.

1. Allocation of costs to local political subdivisions according to the formula included in the final County plan,
2. Real property tax levy,
3. Sales and use tax, and
4. Special assessment.
5. Wireless 9-1-1 Government Assistance Funds

A sixth option to impose a telephone access line charge was made available to only a few counties that at the time of their enactment were having difficulty in obtaining a method to finance their 9-1-1 plan.[5]

It is important to note that due to the limited timeframe for this report, and the limited number of responses to the PSAP survey; reliable information on local PSAP operations and funding is not available. Kimball recommends that the ESInet Steering Committee collect additional information from the PSAPs in order to obtain a better understanding of how PSAP operations are funded at the local levels and the true costs of 9-1-1 statewide in order to plan for a transition to NG9-1-1.

---

4 There are additional complexities which exist in transmitting the data associated with a wireless call versus those required in the transmission of a wireline call. In order for a wireline carrier to transmit the information associated with enhanced wireless 9-1-1, the carrier must make certain upgrades to its 9-1-1 system and take on additional maintenance costs. These additions and costs are incremental to the offering of enhanced wireline 9-1-1 and cannot be recovered through the wireline surcharge authorized by Ohio law.

5 County Commissioners Association of Ohio Handbook, section 105.05, page 9.

3.3 Wireless 9-1-1

The Ohio Enhanced 9-1-1 system (E9-1-1) is an adjunct to the legacy wireline 9-1-1 system in operation in Ohio since 1988. The wireless capabilities provided by the E9-1-1 system are funded by a statewide 9-1-1 surcharge assessed on wireless telephones, which the carriers collect and remit to the Public Utilities Commission of Ohio (PUCO). The rate is a flat 25 cents per month for each wireless phone. Wireless carriers collect the fee monthly from their subscribers, and The PUCO places the funds in the Wireless 9-1-1 Government Assistance Fund for distribution to each County according to a funding formula set forth in ORC 4931.64. The funds distributed to a county from this fee may be utilized, in addition to funding enhanced wireless 9-1-1 implementation and training costs, to pay for fees associated with the local wireline company's tariff. [6]

At this time it is unknown how many of the 352 PSAPS in Ohio accept wireless calls. Of the PSAPs that responded to the ESInet Committee Survey, 195 are primary PSAPs that receive at least Phase I wireless calls, redirecting them to the appropriate non-wireless capable PSAP for dispatch. Kimball believes it is essential for the ESInet Steering Committee to determine the exact number of PSAPs processing wireless calls in order to accurately plan for a transition to NG9-1-1. PSAPs that aren't currently capable of accepting wireless calls, also aren't capable of accepting VoIP calls, and are going to be two steps further from NG readiness. In addition, they will require additional personnel training in order to be ready to process NG9-1-1 calls.

3.4 Current Fund Distribution Laws

Currently, the PUCO distributes the wireless 9-1-1 surcharge to the Counties per the funding formula set forth in ORC 4931.64 below. The Counties, in turn, distribute the funds to PSAPs within the County that are designated as primary answering points for wireless 9-1-1.

OCR 4931.64 specifies that the wireless 9-1-1 surcharge is distributed in the following manner:

> § 4931.64. Determination of number of wireless service subscribers in county and of county's share of government assistance fund; disbursements to county and subdivision.
>
> (A) Prior to the first disbursement under this section and annually thereafter not later than the twenty-fifth day of January, until the wireless 9-1-1 government assistance fund is depleted, the Ohio 9-1-1 coordinator shall do both of the following for the purposes of division (B) of this section:
>
> (1) Determine, for a county that has adopted a final plan under sections 4931.40 to 4931.70 of the Revised Code for the provision of wireless enhanced 9-1-1 within the territory covered by the countywide 9-1-1 system established under the plan, the number of wireless telephone numbers assigned to wireless service subscribers that have billing addresses within the county. That number shall be adjusted between any two counties so that the number of wireless telephone numbers assigned to wireless service subscribers who have billing addresses within any portion of a municipal corporation that territorially lies primarily in one of the two counties but extends into the other county is added to the number already determined for that primary county and subtracted for the other county.
>
> (2) Determine each county's proportionate share of the wireless 9-1-1 government assistance fund for the ensuing calendar year on the basis set forth in division (B) of this section; estimate the ensuing calendar year's fund balance; compute each such county's estimated proceeds for the ensuing calendar year based on

[6] ESInet Technical Committee Recommendations

its proportionate share and the estimated fund balance; and certify such amount of proceeds to the county auditor of each such county.

(B) The Ohio 9-1-1 coordinator, in accordance with this division and not later than the last day of each month, shall disburse the amount credited as remittances to the wireless 9-1-1 government assistance fund during the second preceding month, plus any accrued interest on the fund. Such a disbursement shall be paid to each county treasurer. The amount to be so disbursed monthly to a particular county shall be a proportionate share of the wireless 9-1-1 government assistance fund balance based on the ratio between the following:

(1) The number of wireless telephone numbers determined for the county by the coordinator pursuant to division (A) of this section;

(2) The total number of wireless telephone numbers assigned to subscribers who have billing addresses within this state. To the extent that the fund balance permits, the disbursements to each county shall total at least twenty-five thousand dollars annually.

3.5 Overview of Surcharge Distribution

The chart below depicts the surcharges received and distributed by the PUCO for the previous 7 years.

Year	Wireless Surcharge Received	PUCO Percentage	Wireless Surcharge Deposited	Wireless Surcharge Paid
2006	$24,845,865.64	$704,017.35	$24,326,028.53	$20,587,466.63
2007	$28,570,767.33	$570,842.35	$27,971,274.92	$26,689,461.34
2008	$30,206,302.22	$604,125.78	$29,602,163.26	$37,348,761.97
2009	$28,164,049.54	$186,336.70	$27,977,712.84	$29,375,654.27
2010	$29,175,929.75	$40,321.92	$29,135,590.79	$28,903,491.63
2011	$27,904,310.71	$64,132.07	$27,840,178.14	$28,571,604.40
2012	$28,837,121.12	$24,220.72	$28,812,900.40	$29,468,394.81
Totals	$203,754,262.90	$2,435,993.56	$201,473,768.80	$200,953,909.97

Table 1—Surcharges Received and Distributed

Ohio has seen a decline in wireless revenue since 2008, which can most likely be attributed to subscribers moving to prepaid wireless services. With the passage of HB 360 the revenue should go up in 2014. It does however highlight the need to collect a fee from any device that is capable of accessing 9-1-1 in order to ensure a consistent revenue stream.

3.6 Overview of Current Expenditures/Balances

Kimball is not able to determine the total cost of 9-1-1 in the state of Ohio. It is not known what the system costs are for wireline service as the ILECs do not report those numbers to the PUCO, nor is there any statutory provision that requires them

to do so. It is also not known what the 'bill and keep' provision yields in terms of revenue for the ILECs, and, therefore, it is not known whether the ILECs' costs to provide the service are covered adequately or not.

While all of the counties did report in response to the ESInet Steering Committee's survey, that reporting accounted only for the PSAPs within the County that received a distribution from the Wireless 9-1-1 Fund. In addition, only about 50 percent of the PSAPs responded to the survey. That response level is not large enough to enable Kimball to utilize the data to estimate costs for the remaining PSAPs. Those PSAPs may not have responded because there was no incentive for them to do so – they do not receive disbursements from the state Wireless 9-1-1 Government Assistance Fund.

Based on the County Survey responses, it appears as though the wireless E9-1-1 surcharge accounts for approximately 18.32 percent of the total costs for wireless E9-1-1 and PSAP operations. As explained above, an exact figure for total 9-1-1 costs can't be determined at this time. There are several smaller counties that receive the minimum distribution amount, which will have trouble funding the transition to NG9-1-1 without assistance. However, according to the information provided by the counties; there is a balance of $39.359 million in the 9-1-1 reserve account to fund future upgrades or conversion to NG9-1-1. Despite limited funding; the counties have been very diligent in preparing for and saving towards equipment upgrades and conversion to NG9-1-1.

It is not possible to determine a cost per call for the counties as the call volume that was provided in many cases is information from the ILEC's and is not an actual count of calls received. The ILECs in many cases provided a count of the number of times a particular PSAP had sent a request for an Automatic Location Information (ALI). For wireless calls, a minimum of two requests per call is required; and many PSAPs have their equipment set up to automatically request refreshed location information at set intervals. This could result in the call volume appearing to be at a minimum twice as high and in some instances many times higher than actual.

Due to the inadequacy of the available data – or the lack of any data at all in the case of the 'bill and keep' provision – it is not possible without additional time and research to accurately understand what 9-1-1 costs in Ohio. Because this information is essential to what the Legislature charged the ESInet Steering Committee with finding out, L.R. Kimball strongly recommends the Legislature grant the ESInet Steering Committee adequate time to gather the information and use it in the development of a comprehensive NG9-1-1 tactical plan; and adequate budget to carry the process to a successful conclusion. In addition, we recommend the Legislature take three actions to facilitate this data gathering:

- Require the ILECs to provide the ESInet Steering Committee with information about what it costs them to provide 9-1-1 service for each of their systems or as a statewide aggregate; and to report how much revenue the 'bill and keep' provision generates for each of their systems or as a statewide aggregate. At a minimum require the ILECs to provide the number of access lines within the state.
- Require all PSAPs, not just those that receive state funding, to respond to the ESInet Steering Committee's request for information.
- Impose a penalty for failure to respond such as is found at §5507.02 (D)(2)(a) ORC.

4. RECOMMENDATIONS

4.1 Current Fund Distribution Inefficiencies

Today, the Wireless 9-1-1 surcharge provides approximately $28,800,000 to fund wireless 9-1-1 service throughout the state. The remainder of the total cost of providing 9-1-1 services is made up at the local level through the use of county general funds, user fees, and sales tax revenues. In addition, the funds are currently distributed from the PUCO to the counties based on the address of the cell phone subscriber. There are counties within Ohio that have a significant increase in 9-1-1 call volume during certain months of the year due to tourism. The current distribution method does not address their need for increased funds to provide service during those busy months.

Furthermore, users of new technologies may not be required by statute to pay the 9-1-1 fees, even though they are able to access the 9-1-1 system. This means that wireline and wireless carriers, their users, and local government are left to subsidize 9-1-1 system access for providers and users of new technologies.

One predominant new service is Voice over Internet Protocol (VoIP); the Ohio Consumer Counsel lists 19 providers of VoIP services in Ohio. Telephone companies operating in Ohio, both wired and wireless providers collect and pay the required 9-1-1 fees; but many vendors, which operate solely as internet VoIP service providers, do not. As consumers move away from standard wireline phone services in favor of new technologies like VoIP, there is a corresponding loss of revenue. The Ohio Telecom Association estimated that in 2012 there were 925,000 cable VoIP customers in Ohio. This number does not include non-cable VoIP users such as Vonage and MagicJack. Voice over Internet Protocol is but one example of technologies capable of accessing 9-1-1 services that the current body of law does not require to contribute to the support of the state's 9-1-1 system and results in a loss of revenue currently estimated at approximately $2.7 million per year.

With the passage of HB360 prepaid wireless telephone service will be subject to a wireless 9-1-1 surcharge; however, some providers in other states dispute this obligation and do not collect and remit the fees. National estimates put prepaid wireless at 12% of total wireless consumers. With over 8 million wireless subscribers in the state of Ohio, the total number of prepaid wireless customers could approximate 960,000. At the current rate of 25 cents per phone this results in a potential revenue loss of up to $2.9M per year in funds that are not being remitted to the state.[7]

4.2 Considerations for Funding Next Generation 9-1-1

The limitations of the existing revenue model drive the need for a new funding model, as does the NG9-1-1 technology. According to the E9-1-1 Institute, "…the way we do business in the 9-1-1 community nationwide is changing rapidly. Currently, in the vast majority of our 9-1-1 centers, we attempt to respond to today's requests for service using yesterday's technology. The new technology associated with Next Generation 9-1-1 cannot be implemented piecemeal and on an "as a local government can afford it" basis. We must have a plan and funding in place to implement Next Generation 9-1-1…Our

[7] ESInet Committee Recommendations

neighbors in the next county…must have the same technology and ability to process 9-1-1 calls and data on the same level if we are to be successful…."[8]

The public's expectation is that 9-1-1 service is all encompassing, seamless, transparent, and universal for all technologies and devices that are capable of accessing 9-1-1. To meet that expectation, the State needs to upgrade the current piecemeal E9-1-1 networks to a statewide NG9-1-1 Network so PSAPs and response agencies can respond to a 9-1-1 communication anytime, anywhere, and from any device.

The system or model envisioned by the ESInet Technical Standards Subcommittee and other 9-1-1 professionals across this nation is one where networks, databases, and applications are shared among all emergency responders and response agencies. It implicitly assumes that the State will take a more active role in the implementation, operation and maintenance of a statewide NG9-1-1 ESInet, and that the State will aid in the coordination of resource sharing across counties and agencies. As a result, any funding method implemented needs to account for these assumptions and provide a sufficient rate and base to fund the state's long-term needs.

The model also assumes that emergency response will remain a local response. That is, while telecommunications is becoming increasingly borderless, E9-1-1 service and emergency response will always be a local response. It does not matter what the funding source is, as long as the full costs of providing service are adequately funded in the long-run. If something goes wrong with a 9-1-1 call or response, local authorities will still be held accountable to the public. Any funding paradigm implemented in Ohio needs to account for this fact.

This funding model implicitly assumes that broadband access providers will become one entity responsible for determining the location of 9-1-1 calls. In this scenario, funding moves from the calling network to the access network. Regardless of application, the surcharge in this model would capture all devices and points that are or will be capable of accessing E9-1-1 services. As new carriers enter the IP telephony market, surcharges on calling services become more and more limiting and obsolete. By applying the E9-1-1 excise tax on access points, this problem is eliminated. A final reason for this revenue model is that more and more IP telephony services are being provided by international companies over which state and local governments have no control. The access market, however, is always local. In fact, the only limitation to this funding model is that it is new and relatively unfamiliar. NENA expects this model to be cost-neutral to consumers.[9]

It is important to note, that while Kimball agrees the approach above has been discussed at the national level for several years; it is not yet ready to be implemented. Kimball believes that this approach should be kept in mind as a long term goal and not as an immediate solution.

The ESInet Technical Standards Subcommittee recommended that in order to provide the most adequate long-term funding source for 9-1-1 into the future, funding mechanisms should meet the following criteria:

- The funding method should encompass the principle of access, so that anyone capable of accessing the legacy and IP networks should share in the costs of 9-1-1 service.

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8 E9-1-1 Institute IP Issues Committee, Business Operation Subcommittee document. http://www.e911institute.org/ipssuescommittee/Papers/IP%20Operations%20Subcommittee%20Final%20Report%20v3.pdf

9 NENA Next Generation Partner Program, Funding 9-1-1 into the Next Generation: An Overview of NG9-1-1 Funding Model Options for Consideration. March 2007, page 6-7.

- The funding method should be technology, vendor, and competitively neutral, so it does not give competitive advantages to one telecommunications, broadband, or data provider at the expense of other providers.
- The funds collected should be used only for their intended purposes and should not be re-allocated at the state or local level for non-9-1-1 purposes.
- The funding method should provide for the total cost of providing 9-1-1 service.
- The funding method should be easy to understand and administer.
- The funding method should be fair and equitable to all individuals and devices capable of accessing the current and future 9-1-1 network.
- The funding method should be stable, and therefore not require frequent legislative adjustments.

4.3 Recommended Distribution Model 1

Below is the recommended collection and distribution model from the ESInet Steering Committee Vision Document. This document was shared with Kimball at the beginning of the project. The committee recommends establishing a monthly universal device fee for any wireline, wireless, VoIP or IP device that can access 9-1-1 by any means (voice – text – video). The fee should have a range established in law and allow the Ohio 9-1-1 Coordinating Entity[10] to adjust the rate annually based on the needs of the network and future upgrades. The goal would be to keep the fee low and not accumulate excess reserves. The fee should be made permanent.

Revenue generated by the fee would be collected by the Department of Taxation and remitted to the Ohio 9-1-1 Coordinating Entity in the following manner:

- Tax would keep up to .5 percent for administrative costs
- Carriers could retain up to 2 percent for costs to collect the fee
- The Ohio 9-1-1 Coordinating Entity would recommend the biennial budget, based on the fees collected, subject to DAS approval and submission to the legislature.
- The Ohio 9-1-1 Coordinating Entity would allocate those funds necessary to build, maintain and operate the statewide NG9-1-1 network. This includes purchasing/installing connectivity to each qualified PSAP and paying for CPE/Workstations for each PSAP that meet technical specifications set by the board.
- The Ohio 9-1-1 Coordinating Entity would create and fund a capital improvements account to ensure adequate funds for future upgrades.
- The Ohio 9-1-1 Coordinating Entity would create and fund a dispatch consolidation grant fund to assist local PSAPs with expenses related to consolidation.
- The Ohio 9-1-1 Coordinating Entity would place the remaining funds into the PSAP assistance fund that will be disbursed for specific local PSAP operations. Each PSAP would receive a minimum of $25,000 per year with the remaining funds distributed by total number of calls received at each PSAP. These local allocations could be spent on the following:
  - Console/Workstation furniture
  - Computer Aided Dispatch software
  - Telecommunicator training and certification
  - Emergency Medical Dispatching program fees/costs

[10] The ESInet Steering Committee used the term “Ohio 9-1-1 Board” in their document; however, Kimball changed it to the more generic term “Ohio 9-1-1 Coordinating Entity” for consistency throughout the report.

- Staffing costs (some percentage of the annual cost capped at some level to be determined)

4.4 Recommended Distribution Model 2

Kimball agrees with the approach recommended by the ESInet Steering Committee with a few modifications. Ohio should begin to look at all emergency communications as a whole in order to improve communications, interoperability, and information sharing between public safety agencies statewide. Ohio should consider combining 9-1-1 with other public safety departments at the state level in order to allow a unified approach and long term planning. Some states have already begun the process to move in this direction.

Kimball recommends that Ohio establish funding legislation that enacts one statewide fee for any device that can access 9-1-1. The legislation should be crafted to allow for future technologies and flexibility. It should also allow the state to modify the fee (either up or down) if needed within a set range. One fee for all devices will require Ohio to transition from the current "bill and keep" method currently in place for wireline 9-1-1 expenses. Kimball recommends that a "bill and keep" study be performed in order to accurately plan the transition away from this funding mechanism. The transition could occur as the counties move to the NG9-1-1 network and capability, or could be done prior to that. In order to make an informed decision on the transition, it will be necessary to understand what the true current expenses are and to understand what the NG9-1-1 implementation plan and timeline will be.

In addition to a fee on devices that access the 9-1-1 network, the ESInet Steering Committee should ensure statutes, regulations and tariffs enable system components to be shared among the participating agencies and that there is a mechanism for these agencies and entities to share the costs.

The funds from the statewide fee would be collected at the state level and remain in a dedicated account that allows any interest accrued to remain in the dedicated account. As discussed in the "Regulatory Review" section 3.1.1, Kimball recommends that staff will be needed to support the work of the 9-1-1 Coordinator. For purposes of this report, Kimball refers to the 9-1-1 Coordinator and staff as the Ohio 9-1-1 Coordinating Entity. The Ohio 9-1-1 Coordinating Entity should create distribution rules to specify what expenditures would be allowable expenses for money distributed to the counties. Kimball recommends that in order to facilitate the transition to an NG9-1-1 network the funds cover limited expenses initially and are then revisited after the state is operating on the new network. Initially the funds should be distributed for:

- .5 percent of the amount collected to cover administrative expenses for the Department of taxation.
- 2 percent for the carriers to retain to cover the costs of collecting and remitting the fee.
- 2 percent to fund administrative and staffing costs for the Ohio 9-1-1 Department.
- The Ohio 9-1-1 Coordinating Entity should pay the costs to build, maintain and operate the IP network and the PSAP connections to the IP network directly. This will allow the state to obtain better pricing for the network and to ensure a unified approach to deployment of the network.
- The Ohio 9-1-1 Coordinating Entity should establish a Capital Expenditures account for future network upgrades and expenses.
- The Ohio 9-1-1 Coordinating Entity should create a PSAP consolidation incentive account.
- The remaining funds should be allocated to the counties for distribution to the PSAPs that meet the technical standards established by the ESInet Steering Committee and within the statutory PSAP limits of 5507.571.

The PSAP funds should be used for 9-1-1 related expenses, such as costs to design, purchase, implement and maintain equipment (either leased or purchased), hardware or software, maintenance (both equipment and hardware/software), GIS,

GIS maintenance, PSAP training, and UPS. The Ohio 9-1-1 Coordinating Entity might consider allowing additional PSAP expenditures to some areas as part of a consolidation incentive. For example, furniture/work station expenses or a percentage of personnel expenses.

Once the NG9-1-1 network is in place and operational for at least a year; Kimball recommends the Ohio 9-1-1 Coordinating Entity do a distribution study to revisit the distribution of funds; based at least partly on total 9-1-1 call volume. This can't be done until the new network is in place and call statistics are being tracked consistently in the same manner across the state.

Kimball recommends that the Department of Taxation audit service provider fee remittances annually to ensure accuracy and compliance with legislative intent. In addition, the Ohio 9-1-1 Department should audit state and local use of 9-1-1 revenues annually in order to ensure compliance with statute and requirements established by the ESInet Steering Committee.

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5. CONCLUSION

The limitations of the existing revenue model, along with rapidly emerging technology, drive the need for a new funding model in Ohio. Creating a robust funding model that will secure the transition to NG9-1-1 while allowing for future technology changes is a very time intensive process. This is not something that can be undertaken in a matter of months, but rather requires extensive data gathering and analysis. Kimball recommends that the ESInet Steering Committee continue the work begun with this review.

5.1 Considerations

Both of the Funding Distribution Model Options presented rely on a statewide service fee assessed on all devices that are capable of accessing 9-1-1. In addition, both models suggest funds be set aside for both capital improvement and PSAP consolidation incentives. The models differ in the allowable expenditures for 9-1-1 service fee money. Kimball recommends that until the ESInet is in place and PSAPs have transitioned onto the NG9-1-1 platform; 9-1-1 service fee monies should be spent only on those expenditures directly related to 9-1-1. Kimball believes if PSAPs are allowed to pay expenses such as furniture and personnel from the 9-1-1 service fee; the transition to an NG9-1-1 network will take longer and may not ever be deployed statewide.

However, it is important to note that until at least a high level estimate for NG9-1-1 is known; any fund distribution decision is premature. In order to know what the 9-1-1 service fee rate should be, it is essential to know both the true total costs of 9-1-1 in Ohio along with the NG9-1-1 estimate.

5.2 Next Steps

Kimball recommends that the ESInet Steering Committee be given permission and funding to complete the remaining work needed prior to making a decision on a new funding model. The ESInet Steering Committee has done a lot of hard work on this to date; and additional work is needed to complete the process.

Kimball recommends the following next steps:

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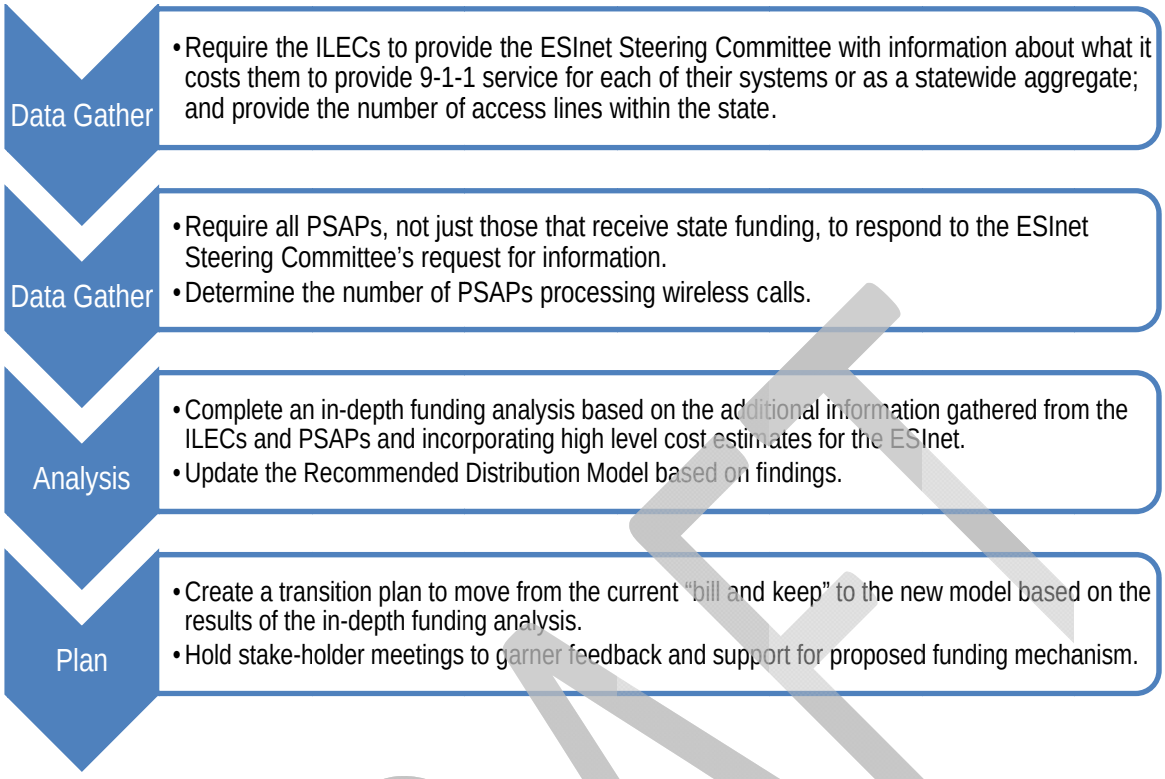

Figure 2—Next Steps

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