Commonwealth of Pennsylvania
Statewide 911 Plan

March 2019

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Executive Summary

Background and Purpose

Chapter 53, 911 Emergency Communication Services, of Title 35 (Health and Safety) of the Pennsylvania Consolidated Statutes, requires the Pennsylvania Emergency Management Agency (PEMA) to establish, in consultation with the 911 Advisory Board (Board), a Statewide 911 plan that plans for next generation 911 (NG911) technology and sets forth priorities for 911 systems in Pennsylvania. This Statewide 911 Plan represents the first revision to the Statewide 911 Plan initially adopted in September 2016.

The purpose of the Statewide 911 Plan is to:

- Function as a collaborative tool for the advancement of 911 across Pennsylvania.
- Facilitate the migration of public safety answering points (PSAPs) to a NG911 capability.
- Articulate plans for a sustainable, statewide NG911 enterprise among all stakeholder agencies.
- Establish statewide priorities and action steps with a focus on sustaining current 911 systems and implementing NG911 systems.
- Educate and inform stakeholders.

NG911 in Pennsylvania

911 is a vital part of public safety and is often the first point of contact in emergency situations. Pennsylvania PSAP's processed over 8.6 million requests for emergency service in 2017. Today, our 911 system is facing technical challenges that have a direct impact on the ability of PSAPs to continue providing critical services to both the public and first responders. Across the country, consumer communications technology has outpaced improvements and capabilities in 911 and the public safety community in general. Pennsylvania's 911 system must be enhanced to meet the public's needs and expectations, and provide equal access to emergency services for at-risk communities such as the deaf and hard of hearing.

NG911 is a necessary transition from Pennsylvania's current, decades old legacy 911 system infrastructure to an internet protocol (IP) based 911 system. Communication to a PSAP today is primarily limited to a voice call with very little data. NG911 will support all modes of communication from the traditional wireline telephone to most recent sensor or device. A NG911 system has the ability to deliver calls to the appropriate PSAP faster, transfer 911 calls and associated data anywhere needed, and interconnect with other public safety systems and databases such as FirstNet. NG911 also allows for cost and operational efficiencies through regional or statewide system-sharing solutions and the retirement of expensive legacy technologies.

To facilitate the implementation of NG911 in Pennsylvania, PEMA intends to procure a statewide Emergency Services Internet Protocol Network (ESInet) and Next Generation Core Services (NGCS) system as a service. The ESInet and NGCS system will include all systems, components, and functions necessary to deliver all 911 calls in Pennsylvania from the demarcation points of originating service providers to the designated terminating network point of interconnection (POI) using IP based infrastructure. In actual practice, this may be from the legacy network gateway (LNG)/border control function (BCF) to the router/switch located within the same physical structure that houses a PSAP's call-handling equipment (CHE). The initial focus of the NG911 solution is to upgrade Pennsylvania's dated 911 infrastructure for 911 call delivery. After 911 call delivery is established using the statewide ESInet,

the focus can shift to incorporating additional statewide and regional 911 related systems and applications onto the statewide system where possible. The introduction of additional systems and applications onto the network must be completed in a coordinated manner using an established governance framework.

During the initial implementation of NG911, 911 personnel should notice very little change to PSAP operations. Also, training requirements for 911 personnel will be minimal since equipment and processes will not be changed by the replacement of the legacy 911 infrastructure. Once additional forms of communication are enabled for 911 and additional communication platforms are integrated with NG911, the training requirements and duties for 911 personnel will increase and may become more complex.

Pennsylvania 911 Priorities

The Statewide 911 Plan identifies priorities and action steps for 911 systems in Pennsylvania to facilitate continued improvement in 911 service and to serve as a foundation for statewide decisions related to 911. The successful implementation of the priorities and action steps will result in our ability to address the changing needs of the public and PSAPs in a coordinated, sustainable manner. The anticipated result will be a 911 system that provides the public with unparalleled capabilities to contact emergency services through a variety of communications devices at any time within the Commonwealth.

Pennsylvania 911 System Priorities:

1. Adopt uniform 911 system requirements for 911 system technology, 911 system operations, geospatial information systems (GIS), telecommunicator training/certification/quality assurance, and administration/funding to ensure all Pennsylvania PSAPs achieve a minimum standard level of service and to guide planning efforts and progress towards NG911.
2. Establish the County 911 System Planning process to serve as the foundation for coordinated and detailed planning statewide.
3. Develop common GIS processes to support NG911 statewide.
4. Procure a statewide ESInet and NGCS system as a service to develop interconnectivity of 911 systems and implement NG911 in cooperation with county and regional 911 systems.
5. Establish governance to support NG911 and statewide 911 initiatives.
6. Develop and implement fiscally responsible policies and procedures to ensure funding is available to maintain current 911 systems and implement NG911.
7. Implement a statewide management information system focused on 911 call data.
8. Expand public education and outreach efforts.
9. Develop and implement a strategy to support county 911 telecommunicator recruitment and retention.

Actions Needed to Implement the Plan

- Continuation of supporting 911 legislation.
- Stakeholder education and outreach on plans to implement NG911 and 911 system priorities.
- Stakeholder engagement with planning, coordination, and implementation efforts related to the priorities and plans for NG911.
- Develop the capability, in conjunction with the Board, PSAPs, vendor community, and 911 service providers, to address 911 system priority needs and implement NG911 in a coordinated, sustainable manner.

1. Introduction

Chapter 53 of Title 35 of the Pennsylvania Consolidated Statutes, requires PEMA to establish, in consultation with the Board, a Statewide 911 plan that sets forth priorities for 911 systems in Pennsylvania and plans for NG911 technology. The Statewide 911 Plan contains five sections.

- Section 1 provides an introduction to the Statewide 911 Plan and an overview of Pennsylvania's 911 legislation.
- Section 2 documents Pennsylvania's plans to implement NG911 technology statewide.
- Section 3 focuses on current priorities for Pennsylvania 911 systems and accompanying action steps to sustain current 911 systems and implement NG911 systems in a coordinated and sustainable manner.
- Section 4 provides an overview of accomplishments of the Pennsylvania 911 community under the current legislation.
- Section 5 provides a summary of the statewide strategic priorities and goals to implement NG911 in a sustainable manner.

The Statewide 911 Plan is intended to establish a vision with a supporting framework of actionable objectives to advance 911 technological capabilities and associated services in a coordinated and sustainable manner. The purpose of the Statewide 911 Plan is to:

- Function as a collaborative tool for the advancement of 911 across Pennsylvania.
- Facilitate the migration of Pennsylvania PSAPs to a NG911 capability.
- Educate and inform stakeholders.
- Establish statewide priorities and action steps with a focus on sustaining current 911 systems and implementing NG911 systems.
- Articulate plans to create a sustainable, statewide NG911 enterprise.

Serving as a charter for the future, the Statewide 911 Plan must remain flexible as circumstances and technologies change. The Plan will be reviewed and updated annually to identify current 911 system priorities and maintain a relevant NG911 vision during this time of transition. In establishing NG911 plans and 911 system priorities and an approach to successfully realizing those items, the Statewide 911 Plan is intended to facilitate continued improvement in 911 service and to serve as a foundation for statewide decisions related to 911.

The Commonwealth seeks to progress toward a more holistic 911 system and an operational model that meets the needs of PSAPs and the people they serve. The anticipated result will be a 911 system that provides the public with unparalleled capabilities to contact emergency services through a variety of communications devices, at any time and from any place within the Commonwealth. PEMA invites all 911 professionals to take an active role in helping Pennsylvania achieve its vision for the future of 911, by actively participating in implementing these plans and priorities.

1.1.Historical Perspective

In August 1990, the *Philadelphia Inquirer* reported that suburban residents outside Philadelphia mistakenly dialed 911 seeking emergency services, having seen the 911 emergency number posted in buses and touted on the popular television show *Rescue 911*. Unfortunately, those calls were routed to a Bell of Pennsylvania operator who then searched a paper file to route the call to the proper emergency dispatcher. At the time, a Bell spokesman stated, "It's understandable, but regrettable that those people make the mistake of dialing it." He added, "You can't imagine how many hundreds of calls we handle a day from people dialing 911 or 0 who shouldn't be."[1] 911 communications were about to change dramatically for Pennsylvania.

Act 78 of 1990 facilitated the implementation of a statewide emergency telephone number "911" system. Under the original Act, the Department of Community Affairs administered the program while PEMA provided technical oversight. At the time, only 36 of Pennsylvania's 67 counties had implemented 911 service, and only a third of those counties were equipped with Enhanced 911 (E911) systems, which enable the address of the caller to be displayed automatically.

Act 78 eventually required some revisions to adjust to the changing technological landscape, funding models and operational needs that have impacted the 911 community since 1990. Act 78 underwent several significant changes to make course adjustments appropriate for the challenges that faced Pennsylvania's 911 community over time, including the following:

- Act 17 of 1998 - Amended Act 78 of 1990 to provide additional duties and powers to PEMA and the Pennsylvania Public Utility Commission (PUC). The Act also provided definitions for regulations to be developed for county 911 plans, training and quality assurance, and access to telephone records.
- In August 2000, regulations defined in Act 17 of 1998 were implemented. 4 PA Code Chapter 120(b), (c) and (d) established various requirements appropriate for 911 centers at that time.
- Act 56 of 2003 - Amended Act 78 to allow for the collection of a $1 per line, per month surcharge on wireless telephones. The Act also defined requirements to collect and distribute wireless 911 surcharge revenue.
- Act 72 of 2008 – Amended Act 78 of 1990 to allow for the collection of $1 per month for each telephone number or successor dialing protocol assigned by a Voice over Internet Protocol (VoIP) provider or telecommunications carrier to a VoIP service customer that has outbound calling capability. The Act also defined requirements to collect and distribute VoIP 911 surcharge revenue.
- Act 118 of 2010 – Amended Act 78 of 1990 to allow for the collection of $1 per transaction on prepaid wireless service. The Act also directed the Legislative Budget and Finance Committee to study the 911 funding system. The resulting report, "Pennsylvania's 911 Emergency Telephone System Funding, Expenditures, and Future Challenges and Opportunities" was released in May 2012. Within this report, 23 specific findings and corresponding recommendations were outlined with a focus on the effectiveness of 911 funding processes, revenue collection methods, PSAP consolidation feasibility, cost-saving measures, national initiatives and NG911 implementation efforts. The report served as one of the driving forces toward a comprehensive rewrite of Act 78, which in turn led to the enactment of Act 12 of 2015 (Act 12).

[1] Byrd, Jerry W. (1990, August 10). Dial 911: Surprise, It's Wrong Number for Many Pennsylvania Towns. *The Philadelphia Inquirer.* pA1

1.2.Current Legislation

Recognizing the urgent need to improve 911 services to better serve our citizens, Governor Tom Wolf and the Pennsylvania General Assembly took proactive measures to increase the capabilities of the 911 system and to facilitate the implementation of NG911 in Pennsylvania by passing Act 12. The legislation provides a framework of requirements related to planning, standards, funding, and oversight to guide Pennsylvania's transition to NG911 in a coordinated and sustainable manner. Act 12 makes it possible to enhance emergency communications throughout Pennsylvania, which will result in the implementation of advanced technology to support emergency services statewide and to enable public safety professionals to perform their critical roles more effectively and efficiently.

Act 12 has been foundational since its enactment to the success and progress achieved in the early stages of the transition to NG911 technology. Goals and objectives facilitated by the enactment of Act 12 since 2015 are notated in this plan along with the strategy and priorities that will guide our transition to a NG911 system. With an impending sunset of this law in June 2019, it is imperative that invested stakeholder groups understand the importance of continuing supporting 911 legislation during these crucial years of NG911 system implementation.

2. NG911 in Pennsylvania

Today, our 911 system is facing technical challenges that have a direct impact on the ability of PSAPs to continue providing critical services to both the public and first responders. Consumer communications technology has outpaced improvements and capabilities in 911 and the public safety community, in general. Pennsylvania's 911 system must be enhanced to meet the public's needs and expectations, and provide equal access to emergency services for at-risk communities such as the deaf and hard of hearing. At the core of the technology evolution will be a Commonwealth-wide migration from legacy 911 systems to NG911 technology.

2.1.What is NG911?

The National Emergency Number Association (NENA),[2] defines NG911 as a system comprised of hardware, software, data and operational procedures to:

- Provide standardized interfaces from call and message services to support emergency communications.
- Process all types of emergency calls including voice, text, data and multimedia information
- Acquire and integrate additional emergency call data useful to call routing and handling.
- Deliver the emergency calls, messages and data to the appropriate PSAP and other appropriate emergency entities based on the location of the caller.
- Support data, video, and other communications needs for coordinated incident response and management.
- Interoperate with services and networks used by first responders to facilitate emergency response.

NG911 is a necessary transition from Pennsylvania's current, decades old legacy 911 system infrastructure to an IP based 911 system. NG911 will require a complete upgrade of the E911 network to a shared IP

[2] NENA Master Glossary of 911 Terminology NENA-ADM-000.22-2018, 04/13/2018
https://cdn.ymaws.com/www.nena.org/resource/resmgr/standards/NENA-ADM-000.22-2018_FINAL_2.pdf

network called an ESInet. There may be more than one ESInet within Pennsylvania; PEMA recognizes there has been great progress in various regions across the Commonwealth, particularly in establishing fiber or microwave connectivity between counties. Pennsylvania's NG911 system may be a system of systems, much like the Internet is a collection of many smaller networks that are referred to as a single network. Within the ESInet, there are a number NG911 core services that will be responsible for validating location information and routing the 911 call to the proper PSAP.

2.2. How a NG911 System Works for 911 Call Delivery

Pennsylvania's NG911 system will consist of three main components for 911 call delivery: the originating network, the statewide ESInet and NGCS system, and the terminating network. Figure 1 below outlines a logical view of the architecture for Pennsylvania's NG911 system. This figure illustrates the originating networks and vendor interconnection points into the NG911 system [far left of the diagram], the statewide ESInet and NGCS system utilized to deliver 911 calls to the PSAP [middle or blue-highlighted section], and the hand-off to local or regional agencies that receive the 911 calls and manage their local GIS data [far right of the diagram]. Please refer to Appendix A – Glossary of Terms for definitions of the elements identified in the figure. For clarification purposes:

- **Originating Network** - The portion of Pennsylvania's NG911 system, established and managed by the originating service providers, that delivers the 911 call from the 911 caller (the call-maker) to the ingress point of the statewide ESInet.
- **Statewide ESInet and NGCS System** - The portion of the Pennsylvania NG911 system that transports, via IP, the 911 call from the Originating Network to the Terminating Network. In actual practice, this may be from the legacy network gateway (LNG)/border control function (BCF) to the router/switch located within the same physical structure that houses a PSAP's call-handling equipment (CHE). The statewide ESInet would include all IP-based connectivity and transport between the Originating and Terminating Networks.
- **Terminating Network** - While not a network by itself, the terminating network is representative of the PSAPs, including standalone PSAPs and PSAPs with a host-remote CHE configuration.

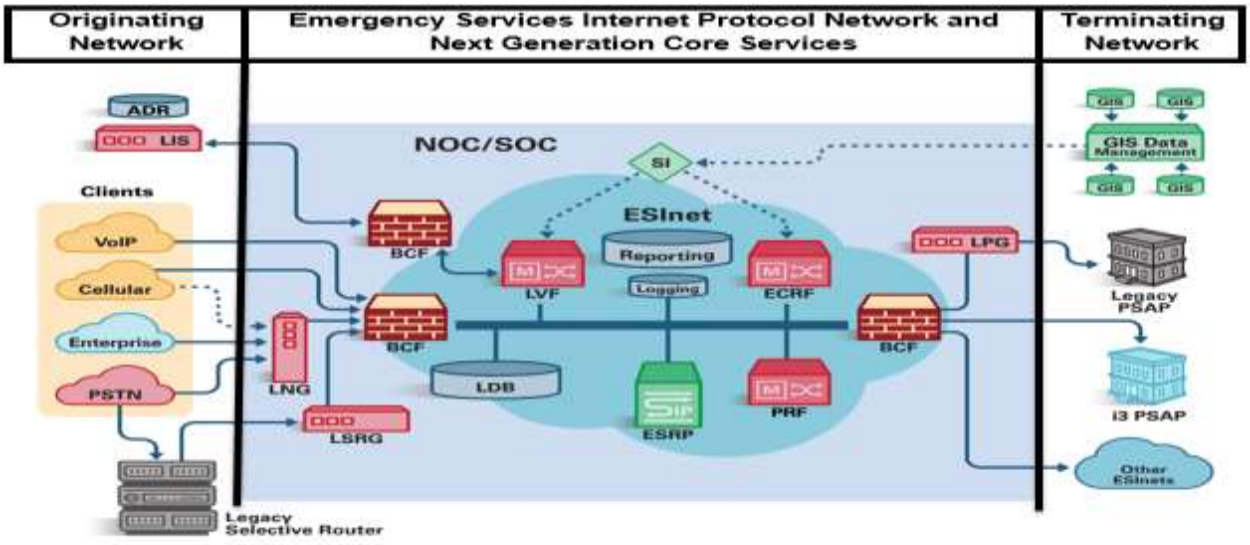

Figure 1. Commonwealth of PA Logical NG911 System Model

Originating service providers (OSPs) will access the Commonwealth's NG911 system in a similar manner to how they access the current E911 network. In processing a traditional voice call, the OSP recognizes when the consumer dials the digits 911, but when using NG911 technologies, instead of routing the call to a selective router, the OSP routes the call to a point of interconnection (POI) to the statewide ESInet and NGCS system. It is anticipated these POIs will be located strategically throughout the Commonwealth to allow cost effective access to the statewide ESInet and NGCS system. After the OSP passes a security check to enter the ESInet, it will provide the call and all available data about the call. A NG911 core service receives that data and determines the PSAP that should receive the call, and another service routes the call and data to that PSAP. The PSAP's CHE receives the call and the data which is presented in the same manner as a telecommunicator receives it today.

2.3. Components of Pennsylvania's NG911 System

NG911 system components include the ESInet, NGCS, a network operations center (NOC) and security operations center (SOC), and the applications that add value to the mission of public safety agencies. Separately, these components advance 911 services, but when brought together to provide NG911 service, new opportunities are made possible at local, regional, state, and national levels. The NG911 system components requires a strong, overarching support structure to include governance, security, and standards that are jointly adopted and implemented in Pennsylvania. Figure 2 below provides an overview of the NG911 system components and support structure.

Figure 2: NG911 System Components and Support Structure

NG911 System Components	
Network	• ESInet • Security • Network monitoring and management
Core Services	• GIS • Functional elements
NG911 System Support Structure	
Operational Support	• Governance • 911 System Requirements • Communications/Public Education
Shared Systems	• Call handling • Computer-aided dispatching • Management information system/call accounting • Logging/recording

Network

ESInet

One of the first steps in preparing for NG911 is the replacement of the legacy network with a high-availability, high-reliability public safety-grade ESInet. ESInets are developed and designed with the security, redundancy and resiliency required to establish a public-safety grade of service. They must be able to withstand natural and manmade disasters and system outages to ensure continuity of 911 service. Service providers and other vendors have established network and security operations centers (NOCs/SOCs) that monitor the security of the network as well as the stability and availability of the network.

Transitioning to an IP-based network to provide 911 service requires detailed planning to ensure seamless service. OSPs must establish a connection into the ESInet through designated POIs. It is best practice to provide two or more POIs within each local access and transport area (LATA) boundary to ensure cost-effective transitions while carriers continue to use time-division multiplex (TDM) or signaling system 7 (SS7) ingress trunks. As OSPs transition to SIP circuits, the need for multiple POIs per LATA decreases (minimum of two are recommended) given that LATA boundaries no longer apply to IP circuits. Once OSP interconnections are established and testing the POI validates the OSP traffic, the voice and data associated with the 911 call progress into the ESInet for routing.

Regions within Pennsylvania have deployed, are deploying, or are planning to deploy, IP networks to support interoperability functions that include data exchange, system sharing, and backhaul. It is anticipated established regions will take different approaches to integrating with the statewide ESInet. Established regions may request to migrate existing functionality from their regional ESInet to the statewide ESInet. Close coordination between PEMA, counties, and the selected statewide ESInet vendor will be needed to plan for and facilitate the migration of PSAPs and existing functionality from a regional ESInet to the statewide ESInet. Other established regions may request to integrate established regional networks into the design of the statewide ESInet. Requirements for regional ESInets will need established and regional ESInets will need to be assessed to determine compliance with applicable requirements and standards and needs to facilitate a successful integration. These standards and requirements will ensure that the Commonwealth-wide ESInet remains secure and provides the level of service necessary for 911 call delivery. Close coordination between PEMA, counties, regional ESInet vendors and the statewide ESInet vendor will be required to design, plan, and carry out the integration. PEMA's intent is to support both approaches with the procurement of the statewide ESInet. Still others, who have regional ESInets, may opt to not provision their networks to carry 911 calls. They may keep their networks for non-critical communication, like data transfer, and will rely on brand new state ESInet infrastructure for their 911 services. However, further investments in regional ESInets with statewide interconnectivity funds will be closely scrutinized until the statewide ESInet solution is defined through the procurement process.

Security

Security is an important factor in any public safety network, but in the NG911 environment, identifying and resolving security and cybersecurity threats is vital to network sustainment. While IP-based networks are more cost-effective, flexible and scalable, they also are more susceptible to network-based threats compared with traditional TDM/SS7 networks. However, IP network design provides for added redundancy and resiliency.

An established ESInet, although isolated from commercial or public use, is still vulnerable to the threat of a security breach at any network ingress or egress point. A Commonwealth-wide security policy will be developed based on nationally accepted standards and best practices established by organizations such as NENA and the National Institute of Standards and Technology (NIST). For an example of security measures, intrusion protection may be established utilizing a two-layer approach. A border control function (BCF) would be deployed at the outermost edges of the ESInet. Each BCF would independently conduct security interrogations on all incoming calls and data to prevent deliberate and malicious attacks on PSAPs. Subsequently, data and calls traversing an ESInet would also pass through a secondary firewall that would be deployed at each individual PSAP. The BCF and other security devices, such as firewalls, play an integral role in protecting the NG911 network and ensuring a public-safety grade of service, high-

availability solution. The BCF validates ingress calls and queries to prevent malicious activity from occurring on the network and across the core services into the PSAP.

Monitoring and Management

The critical nature of 911 calls and data traversing the ESInet requires uninterrupted service availability. An IP-based platform provides the ability to view the entire network holistically, rather than on a component-by-component basis. Monitoring the Commonwealth-wide ESInet and all associated components will be conducted by a NOC/SOC that is contracted by PEMA as part of the statewide ESInet and NGCS hosted service. The status of all network components will be reported to the NOC/SOC, and relevant notifications distributed to designated points of contact within the PSAP community, based on severity and service level agreements (SLA). PSAP and regional network administrators will reciprocate in this process and notify the NOC/SOC of any network interruptions they identify.

Core Services

NG911 call-routing reflects the transition from static, tabular-based routing to dynamic geospatial call routing as enabled through the development of a strong GIS foundation and utilization of NGCS. The technology that supports today's legacy call-routing process is at, near, or past its "end of life" status, with communications service providers in the process of decommissioning the circuit switched networks in favor of IP and wireless technologies.

The implementation of the Commonwealth-wide ESInet will provide the necessary architecture to support several critical NG911 call-routing components. NGCS are defined as, "the base set of services needed to process a 911 call on an ESInet." Core services do not include the network—ESInets can exist without core services, but NG911 is not possible without an ESInet and core services. NGCS fall between the originating service providers (OSPs) and the PSAPs and support call routing and data delivery to the PSAP.

Functional Elements

The Emergency Call Routing Function (ECRF), emergency services routing proxy (ESRP), location validation function (LVF), and policy routing function (PRF) are integral components needed for NG911 call routing. During the transitional period, these NGCS elements will be phased into operation. It should be expected that this transitional period could last 18-24 months. During this time, call routing will leverage both legacy and IP components. This is necessary to enable the transition between the legacy tabular-based data model and workflow processes and the IP-based data processes enabled by the LVF. Further, in most cases, GIS data at the local, regional, and Commonwealth levels may not have matured sufficiently to transition immediately to geospatial routing functions. Therefore, NG911 service providers have built in transitional functionality to allow the ESRP to function as an IP selective router (IPSR) while interfacing with the legacy ALI and selective-routing database (SRD) structure to support this integration phase.

As OSPs achieve functionality outlined in the National Emergency Number Association's NG911 i3 standard (i3), the GIS data is uploaded to the LVF, which is used to validate subscriber addresses, and the ECRF, which is responsible for determining the correct PSAP to which the call should be routed. The ESRP is the component that determines the routing based on input from the ECRF and routes the call based upon identification of the proper location or policy. The PRF contains routing rules that are set based on pre-established rules or variables that determine where a call should route in overflow or special predefined

scenarios. Once these components are enabled, the Commonwealth will be performing i3-compliant geospatial routing.

GIS

GIS data is a foundational element of NG911 and replaces the use of static, tabular data to determine caller location. Pennsylvania's NG911 system will rely heavily on locally developed GIS data for routing 911 calls to the correct PSAP. Each county and local jurisdiction is responsible for developing and maintaining accurate mission critical GIS data layers including: road center lines, address points, PSAP boundaries, provisioning boundaries, and emergency service boundaries are accurate, available, and meet NG911 requirements. Each PSAP boundary layer must align with adjoining PSAP boundaries to assure there are no gaps or overlaps, and local road centerline and address point data will need to be maintained to perform in the NG911 environment.

Providing counties with support for NG911 GIS initiatives continues to be a top priority for PEMA. GIS has been a focus of the statewide interconnectivity grant program for the past two years. PEMA is supporting a statewide NG911 GIS data gap analysis to focus on NG911 GIS education, NG911 GIS requirements development, local data assessment, and future NG911 GIS planning. Continued investment in GIS data will not only have positive impacts on public safety but will also provide valuable information for decision makers in all levels of government in areas such as economic development, planning, zoning, land use, tax assessments, emergency management, etc.

Operational Support

PEMA, in consultation with the Board, PSAPs, and 911 stakeholders, is developing and implementing the necessary operational support to ensure a stable transition to a NG911 environment. This will include governance, 911 system requirements, and public education.

Governance

Planning and coordination between all stakeholders is essential to a successful NG911 transition. At the heart of the planning and coordination efforts is the development and execution of a memorandum of understanding (MOU) between PEMA and any entity connecting to the Commonwealth-wide ESInet. The MOU will be used to outline roles, responsibilities, policies, and procedures that are essential to the successful operation of a statewide NG911 system.

911 System Requirements

Act 12 requires PEMA to establish and publish annually uniform requirements relating to technology, next generation 911 technology, administration and operation of 911 systems in consultation with the Board (35 Pa.C.S. § 5303 (a) (8). A current priority is to adopt and maintain current uniform 911 system requirements in the following areas to ensure all Pennsylvania PSAPs achieve a minimum standard level of service and to guide planning efforts and progress towards NG911.

- 911 system technology and operations
- Telecommunicator training, certification, and quality assurance/quality improvement
- Public safety GIS
- Administration/Funding

Communications/Public Education

Continued efforts to engage all 911 stakeholders and educate them on NG911 and Pennsylvania's plans for implementation are critically important to success. PEMA has developed an internal NG911 Communications Plan. The Plan maps out specific outreach messages, methodologies, and frequencies based on the stakeholder audience to ensure that they understand, benefit, and engage in the migration to NG911. Along with messages crafted for specific stakeholders, such as legislators or the PSAP community, the Plan includes a public education component, which will provide the public with accurate information and a reliable source for NG911-related information. PEMA is in the process of hiring public education personnel to implement the Communications Plan.

Shared Systems

The NG911 environment opens many new opportunities to provide shared application services that enhance the functional capabilities of a PSAP. The evolution of the Internet of Things (IoT) has created many avenues for non-human-initiated communication including heart monitors, gunshot detectors, and personal safety alerts. Additionally, some applications have been developed to leverage system and data-sharing abilities among the PSAP community in an NG911 environment. For example, an additional data repository (ADR) can be implemented to provide enhanced location information and other critical data to PSAPs.

Shared or integrated applications, hosted call-handling equipment and ADRs are examples of items that will continue to be a focus for PEMA to gain cost and operational efficiencies. Shared system projects will not be integrated with the statewide ESInet during the initial implementation. However, this implementation work for the statewide ESInet and NGCS system lays the foundation for both regional and Commonwealth-supported services. A new county 911 System Plan process is currently under development to provide the necessary support for the PSAP community to successfully plan and deploy value-add applications in a NG911 environment.

With numerous emerging applications and technologies entering the public safety community, careful consideration must be made when adopting them to determine the operational, technical and financial implications of integrating these features into the Commonwealth's NG911 solution. As part of the governance development process, policies and procedures for integrating applications and technologies must be established.

2.4. Implementation of NG911

Communication to a PSAP today is primarily limited to a voice call with very little data, which was sufficient when calls were placed on a wireline phone inside a business or residence. Today, more than three-quarters of all 911 calls are placed on mobile devices, and the trend of communication currently includes, or will soon include, other modes of media such as livestreaming video, photos, text messages, and data from digitally connected items such as alarms, sensors, and video monitors. NG911 has the ability support all modes of communication from the traditional wireline telephone to most recent sensor or device. NG911 also provides a more robust and interconnected infrastructure than today's legacy 911 systems that can support quick and efficient data-sharing throughout the entire 911 community. In addition, pre-planned or on-the-fly call routing will allow PSAPs to share the call volume load during large scale incidents, or transfer calls if a PSAP is physically damaged or otherwise incapable of answering 911 calls. NG911 also

allows for cost and operational efficiencies through regional or statewide system-sharing solutions and the retirement of expensive legacy technologies.

To facilitate the implementation of NG911 in Pennsylvania, PEMA intends to procure a Commonwealth-wide ESInet and NGCS system as a service. The ESInet and NGCS system will include all systems, components, and functions necessary to deliver all 911 calls in the Commonwealth from the demarcation points of originating service providers to the designated terminating network POI. In actual practice, this may be from the (LNG)/BCF) to the router/switch located within the same physical structure that houses a PSAP's CHE. The initial focus of the statewide ESInet and NGCS project will be to upgrade Pennsylvania's current legacy 911 infrastructure for 911 call delivery. Once call delivery is established, the focus will shift to incorporating additional statewide and regional 911 related systems and applications onto the statewide ESInet where applicable.

The planning and deployment of NGCS will occur in parallel with the ESInet deployment. Network connectivity will be established for each PSAP through a direct POI with the Commonwealth-wide ESInet or through a POI with a regional ESInet. Redundant NGCS systems then can be connected to the PSAPs via the ESInet. These implementation steps can occur concurrently regardless of whether the ESInet and NGCS providers are the same or disparate.

The deployment of the ESInet and NGCS will require a methodical and phased approach to support the buildout and successful transition to NG911. If the ESInet and NGCS providers are different, PEMA will require a central point of contact to ensure alignment across the different efforts. A high-level overview of the steps required to implement NG911 in PA are included in Figure 3 below.

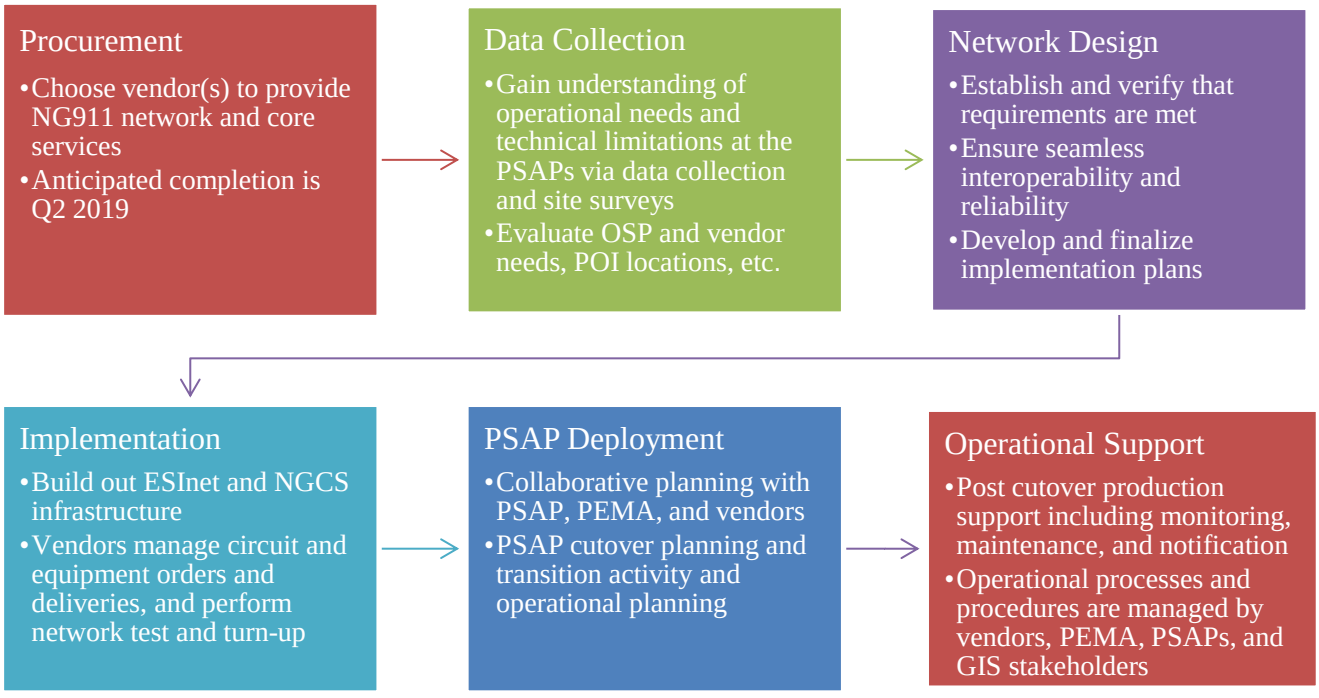

Figure 3: ESInet and NGCS High-Level Transition Steps

During the initial implementation of NG911, 911 personnel should notice very little change to PSAP operations. Also, training requirements for 911 personnel will be minimal since equipment and processes will not be changed by the replacement of the legacy 911 infrastructure. Once additional forms of communication are enabled for 911 and additional communication platforms are integrated with NG911, the training requirements and duties for 911 personnel will increase and may become more complex.

2.5.Funding NG911

Under Act 12 of 2015, a uniform monthly surcharge fee of $1.65 in in effect for each 911 communications service or prepaid wireless device for which a subscriber or consumer is billed by a provider or seller.

911 surcharge revenue is distributed through two primary methods under Act 12:

1. **Eighty-three percent (83%)** of the surcharge revenue collected quarterly is distributed to PSAPs using a formula based calculation. These funds are commonly referred to as "83% funds".
2. **Fifteen percent (15%)** shall be used by PEMA to establish, enhance, operate or maintain statewide interconnectivity of 911 systems. Statewide interconnectivity funding made available to counties is distributed through a grant process in accordance with the guidelines and application procedures published by PEMA. These funds are commonly referred to as "15% funds."

A PSAP has discretion over how 83% funds are spent; provided the funds are used for expenses that meet the eligibility criteria established by PEMA in consultation with the Board. The intent is to provide PSAPs with the flexibility to prioritize and spend funds as they see fit to meet the specific needs of the county or regional 911 system. It is the responsibility of the PSAP to manage their formula based 911 funding to meet current and future needs.

PSAPs currently fund call delivery costs using 83% funds. Once the statewide ESInet and NGCS system is implemented, PEMA intends to fund call delivery costs using 15% funds. This will allow counties to use 83% funds that were traditionally used for call delivery costs to be used for other purposes.

Looking at 911 funding holistically across Pennsylvania, PEMA's focus is to ensure funding is available to maintain current 911 systems and implement NG911. 911 surcharge collections have averaged $316 million annually under Act 12. In 2017, the total reported expenditures for 911 in Pennsylvania were $361 million. As seen in prior years, the surcharge revenue collected in 2017 was not sufficient to cover the cost of 911 operations, leaving the balance to be funded by other revenue sources.

It is expected that current 911 costs will continue to rise and new costs will be introduced to the 911 Fund with the implementation of NG911. The Commonwealth 911 community must take a different approach to ensure funds are available to sustain current 911 systems and implement NG911.

A current set of 911 system requirements is being developed that will serve as the foundation for detailed statewide planning. Statewide planning efforts will be used to identify technological and operational gaps, facilitate proactive statewide budgeting, and find opportunities for efficiencies and cost savings. Statewide planning efforts will serve as a means to make decisions on how limited 911 funds are used in the most effective manner such as cost savings through statewide purchases or state contracting vehicles. Detailed planning will allow for data-driven and process driven funding decisions for the 911 Program; which must be the focus of PEMA, Board, and PSAPs moving forward.

The effect will be to transition the allocation of 911 funds to a coordinated, data and process driven environment rather than the complex, competitive, and uncoordinated environment that has been associated with 911 funding from a statewide perspective since its inception.

3. Pennsylvania 911 System Priorities

The planning and transition to NG911 is an extensive, multi-year effort, and completely dependent upon the availability of funds. Pennsylvania's ability to fund the various stages of migration and implementation of NG911 will determine our success and timeline. A coordinated effort between all stakeholders in areas such as standards, planning, governance, finance, and oversight is required to ensure financial resources are available to sustain current 911 systems and implement NG911 systems. A collaborative relationship between PEMA, the Board, and county partners has allowed Pennsylvania to make considerable progress in those areas. The following priorities have been established for Pennsylvania 911 systems to facilitate continued improvement in 911 service to meet the changing needs of the public in a coordinated, sustainable manner.

3.1 Uniform 911 System Requirements

Goal

Adopt uniform 911 system requirements in the following areas to ensure all Pennsylvania PSAPs achieve a minimum standard level of service and to guide planning efforts and progress towards NG911.

- 911 system technology
- 911 system operations
- Telecommunicator training, certification, and quality assurance/quality improvement
- Public safety GIS
- Administration/Funding

Background:

Act 12 requires PEMA to establish and publish annually uniform requirements relating to technology, NG911 technology, administration, and operation of 911 systems in consultation with the Board (35 Pa.C.S. § 5303 (a) (8). The legislation also requires PEMA to adopt, in consultation with the Board, minimum training and certification requirements for emergency dispatchers, call takers and supervisors (35 Pa.C.S. § 5303 (a) (15). Requirements for administration/funding are published on an annual basis. PEMA anticipates the completion of a statewide NG911 GIS data gap analysis in 2019. A task of the gap analysis will be to formalize NG911 GIS requirements for Pennsylvania 911 Systems.

PEMA, in consultation with the Board, is in the process of updating current requirements for technology, operations, training, certification, and quality assurance. The result will be a comprehensive framework of current 911 system requirements published annually in a master requirements document. A current framework of 911 system requirements is critical to the success of the 911 Program and having a sustainable funding source. The framework of requirements will serve as the foundation of 911 Program activity going forward in areas such as planning, allocating funds, and oversight.

Action Steps:

- Replace current requirements for 911 system technology and operations (4 Pa Code 120b)
- Replace current requirements for Telecommunicator training, certification, and quality assurance/quality improvement (4 Pa Code 120c)

- Adopt Pennsylvania NG911 GIS data standards to include required data layers, GIS data model, and accuracy requirements for synchronization of county master street address guide (MSAG), automatic location information (ALI), and GIS data.
- Publish a 911 system master requirements document covering administration, GIS, operations, technology, training, and quality assurance.

Anticipated Results:

A comprehensive framework of 911 system requirements will be established and maintained on an annual basis. The framework of 911 system requirements is intended to:

- Ensure all Pennsylvania PSAPs achieve a minimum standard level of service.
- Facilitate data and process driven management of the 911 Program.
- Guide planning efforts to maintain current 911 systems and progress towards NG911 systems.
- Ensure compliance of 911 systems with industry standards.
- Provide PEMA and PSAPs with information to make informed funding decisions.
- Allow for effective oversight to measure compliance with 911 system requirements and programmatic guidelines.
- Promote NG911 technology.

3.2 County 911 System Plan Process

Goal

Establish the County 911 system planning process to serve as the foundation for coordinated and detailed planning statewide.

Background:

Under Act 12, each county has the duty to develop and adopt a 911 plan that meets the requirements promulgated by PEMA (35 Pa.C.S. § 5304 – 5305). A primary goal of PEMA is to ensure funding is available to sustain current 911 operations and implement and maintain NG911. Coordinated and detailed planning between PEMA, Board, and PSAPs is the foundation for achieving this goal. PEMA intends to implement a County 911 System Planning process using PSAP inventory data, the adopted framework of 911 system requirements, and the FCC's Task Force on Optimal Public Safety Answering Point Architecture (TFOPA) *NG911 Readiness Scorecard*[3] as the foundation for a new county 911 system planning process. The county 911 system planning process will allow for transparent data driven decisions across the Commonwealth and mitigate uncoordinated competition for limited 911 funds.

In December 2016, the FCC's TFOPA Working Group 2 published its *Phase II Supplemental Report: NG911 Readiness Scorecard*[4] As illustrated on the next page in Figure 4, the scorecard identifies six maturity states to help evaluate progress towards NG911:

[3] Federal Communications Commission, *Task Force on Optimal Public Safety Answering Point Architecture (TFOPA) Working Group 2 Phase II Supplemental Report: NG911 Readiness Scorecard, December 2, 2016*.

Figure 4: TFOPA Scorecard Continuum Maturity States

The six maturity states are defined below and can be used to assess Pennsylvania's and each PSAP's progress towards NG911.

Legacy State: The legacy state is characterized as the point in time where 911 services are provided by the traditional incumbent local exchange carrier (ILEC) with circuit-switched infrastructure and automatic location identification (ALI) circuits.

Foundational State: As the name implies, the Foundational State is where the groundwork and planning for NG911 implementation is initiated. NG911 feasibility studies are performed, GIS data preparation commences, and IP networks may be implemented. NG911 systems are not yet operational and system procurement is either planned or underway.

Transitional State: The Transitional State is the point at which services have migrated partially from the legacy environment and the 911 services are enabled by an IP infrastructure. An ESInet is in place, but emergency service number (ESN)-based routing still is being utilized. This is the first state in which certain NGCS elements may be implemented. At this point, a governance model has been established. Systems in this state are said to be "NG911 transitional."

Intermediate State: In the Intermediate State, the 911 authority has implemented and made operational all i3 core functions within their control, and the capability to route calls per GIS boundaries and location information exists, using i3 algorithms. Additionally, an i3-compliant, multimedia call-handling system is implemented in the PSAP. Infrastructure and applications are being refined to incorporate advanced call- and data-delivery interfaces. Business and performance elements are maturing and are reviewed in regular intervals to optimize operations. Governance agreements are in place and the model is functioning. Systems in the Intermediate state are said to be "NG911 ready."

Regional End State: In the Regional End State, PSAPs are served by i3 standards-based systems and/or elements, from ingress through multimedia call handling. OSPs are providing Session Initiation Protocol (SIP) interfaces and location information during call setup, and ESInets are interconnected, providing interoperability that is supported by established agreements, policies and procedures. Systems in the Regional End State are said to be "NG911 compliant."

National End State: This state is not applicable to a state implementation of NG911; however, it is described as the state in which PSAPs are served by i3 standards-based systems and/or elements, from ingress through multimedia call handling. Nationally, ESInets are interconnected providing interoperability, which is supported by established agreements, policies and procedures. All systems in the National End State are NG911 compliant.

In addition to the maturity model continuum, the TFOPA working group created an NG911 Readiness Scorecard as a part of its report to help identify the essential elements in each maturity state listed above. The scorecard includes nine areas of interest:

- Governance
- Routing and location
- GIS data
- NGCS elements
- Network
- PSAP call-handling system and applications
- Security
- Operations
- Optional interfaces

This model identifies key milestones for the advancement of NG911. PEMA is assessing potential models that will leverage the effort and subsequent work product of the TFOPA working group. Identifying the status of each essential element within each PSAP will build a more valuable and unified planning process across Pennsylvania.

Action Steps:

- Utilize PSAP inventory data, adopted 911 system requirements, and the TFOPA NG911 Readiness Scorecard to develop requirements for the County 911 System Plan process.
- Implement a statewide county 911 system plan solution.

Anticipated Results:

- 911 system inventory data that is maintained on a regular basis
- Ensure compliance with 911 system requirements
- Identify gaps and opportunities to coordinate allocation of funds
- Allow for transparent data driven decisions across Pennsylvania
- Transition the 911 Program funding processes to a coordinated, process driven environment rather than a competitive environment
- Coordinate efforts at the county, regional, state and eventually federal levels
- Assess efficiencies to be achieved from regionalization and consolidation
- Assess progress towards NG911

3.3 Statewide GIS Processes for NG911

Goal:

Develop GIS datasets and common GIS processes to support NG911 statewide.

Background:

NG911 will rely heavily on locally developed GIS data for routing 911 calls to the correct PSAP. Significant effort must be made by each jurisdiction to ensure that mission critical GIS data layers are accurate, maintained on a regular, frequent basis and conform to established standards for NG911.

Common GIS processes must be implemented statewide wide to aggregate local GIS data into a statewide dataset, ensure the data meets NG911 requirements, and provision the data into the NG911 system for call delivery.

Action Steps:

- Complete the statewide NG911 GIS data gap analysis that will include:
    - Formalizing NG911 GIS requirements, best practices, and GIS accuracy benchmarks
    - Education for 911 stakeholders on GIS requirements
    - County GIS data assessment to determine compliance with established requirements
    - Planning for statewide GIS processes to support NG911
- Obtain and maintain a statewide orthoimagery data set
- Continued support with statewide interconnectivity funds for local GIS data development
- Planning and coordination between PEMA, Board, PSAPs, and Commonwealth GIS stakeholders to implement the infrastructure and processes to gather county data, ensure it meets requirements, compile into a statewide data set for use in the NG911 system
- Support county efforts to develop PSAP, provisioning, and emergency service boundary layers

Anticipated Results:

- Statewide GIS framework in place to support NG911
- Each county has access to current orthoimagery
- Infrastructure and processes implemented to support NG911 in an efficient and cost-effective manner between all levels of government
- Statewide PSAP, provisioning, and emergency service boundary layers that meet NG911 requirements

3.4 NG911 Governance

Goals:

Establish roles, responsibilities, policies, and procedures to support the implementation and operation of NG911 and statewide 911 initiatives.

Background:

Act 12 has been successful in creating a collaborative, proactive approach to advancing 911 service in Pennsylvania toward the next generation. Pennsylvania's 911 systems clearly have progressed from a county focus, prior to Act 12, to a regional focus supported by the passage and thoughtful implementation of Act 12. The next logical progression is to identify areas related to 911 within a maturing statewide approach that would be technically, operationally, financially and programmatically beneficial to the citizens, visitors and first responders of Pennsylvania. The implementation of NG911 and other statewide initiatives will enhance PEMA's partnership with county partners for 911 related services.

Governance must be established to formalize roles and responsibilities as part of Pennsylvania's transition to a statewide NG911 system. Identifying the primary stakeholders in the NG911 transition and understanding their roles and responsibilities is essential to the success of NG911. The participation

and investment in NG911 will span all levels of governance—local, regional, and Commonwealth—and include some non-traditional stakeholder groups, such as GIS data stewards and vendors in the network and IT markets. Success will be realized when each stakeholder group accepts and carries out its defined role in the deployment process.

Action Steps:

- Working with the selected ESInet and NGCS provider(s), identify requirements, policies, and procedures for NG911 system operation in PA.
- Develop and execute a MOU with any PSAP, public safety agency, or critical infrastructure facility that is requesting connectivity to the Commonwealth-wide ESInet
- Establish a management model for all ESInet and NGCS elements deployed and integrated within the Commonwealth's NG911 environment

Anticipated Results:

- Roles, responsibilities, policies, and procedures are implemented to support the operation of the statewide NG911 system across PA.

3.5 Sustainable Funding Policies and Procedures for NG911

Goal:

Develop and implement fiscally responsible policies and procedures to ensure funding is available to maintain current 911 systems and implement NG911.

Background:

The 911 Fund is the primary funding source for the critical 911 systems and personnel that assist in saving lives every day in Pennsylvania. A $1.65 surcharge is levied on communications services capable of two-way communication to a PSAP to support 911 operations in Pennsylvania. 911 surcharge collections have averaged $316 million annually under Act 12.

In 2017, the total reported expenditures for 911 in Pennsylvania were $361 million. As seen in prior years, the surcharge revenue collected in 2017 was not sufficient to cover the cost of 911 operations, leaving the balance to be funded by other revenue sources.

It is expected that current 911 costs will continue to rise and new costs will be introduced with the implantation of NG911. The Pennsylvania 911 community must act to ensure funds are available to sustain current 911 systems and implement NG911.

Action Steps:

- Identify and implement procurement strategies or state contracting vehicles to leverage economies of scale.
- Incentivize regionalization and consolidation of 911 systems.
- Define base level costs common to all PSAPs.
- Enhance compliance processes for entities remitting the 911 surcharge or receiving disbursements from the 911 fund.

- Further clarify eligible uses of 911 funds for radio systems and determine eligible uses of 911 funds, if any, for emerging communication systems such as FirstNet.

Anticipated Results:

- Cost savings through statewide purchases, statewide contract vehicles, consolidation and regionalization of 911 systems.
- Defining base level costs common to all PSAPs will have many benefits for 911 funding:
    - Allow PSAPs to make informed decisions on costs for equipment, services, etc.
    - Sets expectations and mitigates competition for 911 funds
    - Provide useful and reliable data for planning, budgeting, eligibility determinations, grant application review, and anti-windfall provision management.
- Enhancing compliance processes will ensure:
    - Revenue collections are optimized from all who should be remitting the surcharge.
    - Collaboration between local and state efforts.
    - Providers and retailers are assessing, collecting, and remitting the 911 surcharge in compliance with Act 12.
    - 911 funds are managed according to 911 Program requirements.
    - Internal controls are in place to mitigate waste, fraud, or abuse of 911 funds.
- Defining specific eligibility criteria for radio systems and clarifying eligibility criteria for emerging communications system will keep expectations for 911 funds manageable and set expectations for 911 funds in advance of emerging technology being introduced to the 911 system.

3.6 Statewide ESInet and NGCS Solution

Goal:

Provide a competitively procured statewide ESInet and NGCS system, as a service, with the initial focus on 911 call delivery with the ability to add future capabilities.

Background:

Act 12 requires PEMA to cooperate with county and regional 911 systems to develop interconnectivity of 911 systems through the establishment, enhancement, operation and maintenance of an Internet protocol network using next generation 911 technology that coordinates the delivery of Federal, State, regional and local emergency services.

Action Steps:

- Procure a statewide ESInet and NGCS system as a service.

Anticipated Results

- Planned and coordinated efforts between all stakeholders to establish connectivity
- Statewide interconnectivity of 911 systems and implementation of NG911 in cooperation with county and regional 911 systems
- Existing legacy LEC/telephony costs borne by the counties today are now funded by statewide interconnectivity funds.

- Enable the seamless transfer of 911 calls and all associated data to any PSAP

3.7 Statewide Call Accounting System

Goal:
Implement a statewide management information system focused on 911 call data.

Background:
PEMA, in consultation with the Board, is implementing a statewide Call Accounting System, also known as a Management Information System (MIS), to accurately capture, manage and analyze 911 call data from all Pennsylvania PSAPs. Every Pennsylvania PSAP is required to report 911 related call volume activity as part of their annual reporting requirements to PEMA. 911 call volume reporting capabilities and functionality varies across the Commonwealth by PSAP. A statewide MIS solution would provide PEMA and Commonwealth PSAPs a comprehensive management and statistical reporting tool that provides both real time and historical information for 911 activity. In addition to call accounting, a goal of this initiative is to utilize the data for NG911 planning and implementation to optimize call routing and delivery, and to monitor the overall efficiency of the 911 network. Data collection and analysis will lead to a better understanding of the operational characteristics and trends associated with the delivery of 911 calls, and will provide a foundation of data to compare against, as NG911 functionality is implemented and maintained.

Action Steps:
- Procure a statewide MIS
- Execute a data sharing MOU with each PSAP

Anticipated Results**:**
- A statewide standardized dataset of current 911 call data
- Standardized call information that may be considered as a factor for the 911 funding distribution formula
- Standardized reliable data that can be used to plan NG911 and optimize call delivery

3.8 NG911 Public Education and Outreach

Goal:
Expand public education and outreach efforts

Background:
Education and outreach about the transition to NG911 is a top priority for PEMA, and these efforts likely will touch a variety of stakeholder audiences. It is critical to a successful NG911 implementation that these audiences to understand NG911, why the transition is necessary, and its impact.

The migration to NG911 will result in a multitude of technological and operational changes. A primary focus for PEMA is for stakeholder audiences to understand the Commonwealth's progress during the NG911 transition, in particular timelines and milestones, and how the milestones will be achieved. To

that end, PEMA, Board, and all stakeholders will need to convey messages geared toward the NG911 environment and architecture, the value of the 911 system plan, and NG911 operational impacts. With the transition to NG911, finance and administration will play a key role. There will be prospects for PEMA and counties to plan future needs, identify joint purchasing opportunities, and coordinate efforts to help manage or reduce costs. PEMA, Board, and all stakeholders will need to communicate about plans for the NG911 migration from a financial perspective.

Action Steps:

- Develop a statewide NG911 communication and public education plan
- Hire public education and outreach personnel in the 911 Office

Anticipated Results:

- PEMA, Board, PSAPs, public, and all stakeholders have firm understanding of NG911 and plans for implementation.
- PEMA, Board, and PSAPs have a firm understanding of funding policy and procedures to support NG911.

3.9 Support County 911 Telecommunicator Recruitment and Retention Efforts

Goal:
In consultation with the Board and PSAPs, develop and implement a strategy to support counties with 911 telecommunicator recruitment and retention as NG911 is implemented in PA.

Background:
As NG911 is implemented across the country and additional forms of communication are introduced to the 911 system, Pennsylvania PSAPs will need to rethink their organizational structures, hiring practices, training regimens and policies. This is to ensure that they can triage a significant increase in data generated by citizens and a plethora of communications systems —both inside and outside the public safety realm—to determine what data is actionable and then identify the appropriate response.

Pennsylvania PSAPs must maintain operations 24x7x365 regardless of circumstances. A common issue in PSAPs across Pennsylvania and across the country is decreasing personnel levels to support 911 operations.

Action Steps:

- Working with the Board and PSAPs, study the 911 personnel environment across PA to identify trends, issues, and to formulate recommendations to recruit and sustain personnel to successfully and sustainable operate in NG911 environment.
- Identify opportunities to reduce the workload of 911 telecommunicators

Anticipated Results:

- Education of state and local elected officials of NG911 personnel requirements
- Recommendations for Pennsylvania PSAPs to recruit and retain qualified telecommunicators

4. Accomplishments

Act 12 of 2015 has allowed PEMA, Board, PSAPs, and all 911 stakeholders to achieve many accomplishments in preparation for NG911 in Pennsylvania. Below is a summary of significant achievements since the inception of Act 12.

Date Completed	Initiative	Results
3rd Quarter – 2015	Implemented new 911 revenue collection and distribution procedures to meet Act 12 requirements.	Collaborative effort between PEMA, counties, service providers, PA Treasury Department, and PA Office of the Budget over a three-month timeframe. Over $1 billion in 911 surcharge revenue has been collected under Act 12.
4th Quarter - 2015	The 911 Program was changed to operate on a calendar year cycle.	The 911 Program operated on a state fiscal year basis prior to Act 12 which was not conducive to effective planning, budgeting, and oversight.
4th Quarter – 2015	Implemented a single set of eligibility rules for 911 funds	Prior to Act 12, wireline and wireless 911 surcharge revenue had different eligibility rules.
4th Quarter - 2015	Implemented a single, automated reporting requirement for counties under Act 12	Prior to Act 12, counties had multiple reporting requirements for 911 funds that produced minimal useful information for statewide planning, budgeting, or oversight.
1st Quarter - 2016	Completed a physical inventory of each Pennsylvania PSAP	Act 12 required PEMA to complete a physical inventory of each Pennsylvania PSAP and submit a report summarizing inventory results by March 2016.
1st Quarter - 2016	Adopted standardized accounting procedures for 911 funds	All PSAPs must report 911 revenue and expenditures to PEMA using a standard chart of accounts and the modified accrual basis of accounting. The result is standardized financial information for 911 that can be used to make informed decisions on planning, budgeting, and oversight.
2nd Quarter - 2016	Implemented a new grant program that incentivized 911 system consolidation and regionalization.	Awarded $123 million from 2016 – 2018 for 186 fully funded projects for 911 system consolidation and regionalization, connectivity, and GIS in preparation for NG911.
3rd Quarter - 2016	Adopted a Statewide 911 Plan that plans for NG911	The previous statewide 911 Plan was adopted in February 2009.
4th Quarter - 2016	Adopted a Statewide NG911 GIS Strategic Plan	Collaborative effort between PEMA, State Geospatial Coordinating Board, State agencies, and County GIS Professionals Association.

Date Completed	Initiative	Results
4th Quarter - 2016	Published 911 System Standards	Published a comprehensive list of 911 system standards applicable to Pennsylvania 911 systems on an annual basis.
1st Quarter - 2017	Implemented PSAP audit process	Act 12 requires PEMA to audit each PSAP every 2 years.
2nd Quarter - 2017	Implemented the Emergency Advance Process to assist PSAP with recovering from system outages or preventing imminent failure.	Purpose is to provide PSAPs a level of insurance to recover from 911 system outages or failure as NG911 is implemented and less 15% funds are available for grants.
2nd Quarter - 2017	Published PSAP consolidation funding policies	PSAP consolidation funding policies are intended to provide counties with information needed to guide a successful consolidation and clarify expectations for 911 funds.
3rd Quarter - 2017	Published legislative report regarding: • Impacts of technological and market changes on 911 service. • The structure and adequacy of the surcharge and fund provided for under this chapter. • Other local revenue options to support 911 services; • Any benefits that could be derived from dispatching all 911 calls from county PSAPs.	Act 12 required the legislative report to be submitted to the General Assembly by 8/1/2017.
3rd Quarter - 2017	Established the NG911 GIS Working Group consisting of representatives from PEMA, PSAPs, State Geospatial Coordinating Board, State Agencies, and County GIS Professionals Association.	Working group has facilitated collecting GIS data sets from all Pennsylvania counties and will be instrumental to establishing GIS policies and procedures to support NG911 in PA.
4th Quarter - 2017	Completed a Request for Information to the vendor community to gather information on options for statewide ESInet and NGCS solutions.	Response were received from 13 respondents to provide information on ESInet and/or NGCS solutions.
1st Quarter - 2018	Executed a 4-year contract to obtain statewide orthoimagery.	This initiative will not only benefit 911, but all levels of government. In addition to GIS data development for NG911, counties local partners will be able to use this data for many things such as tax assessment, land use mapping, review of development proposals, storm water assessment, flood plain management, etc.
2nd Quarter - 2018	Implemented service provider audit process. Act 12 requires PEMA to audit entities remitting the 911 surcharge to the 911 Fund.	PEMA partnered with the PA Dept. of Revenue to conduct the provider audits. Two audits were successfully completed in 2018.

Date Completed	Initiative	Results
3rd Quarter - 2018	Implemented a process for counties to purchase additional imagery services from the Statewide Aerial Imagery contract.	County and state agency partners are able to use leverage the imagery contract to obtain other mapping services potentially at a reduced rate. The intent is to leverage economies of scale for stakeholders to obtain these services at a reduced rate rather than entities purchasing these services individually.
3rd Quarter - 2018	Released a Request for Proposal to the vendor community to conduct a statewide GIS data gap analysis for NG911.	The purpose of the gap analysis is to formalize NG911 GIS requirements for PA, assess each county's GIS data for NG911 compliance, and future planning for statewide GIS processes to support NG911.
4th Quarter - 2018	Released a Request for Proposal to the vendor community to obtain a statewide MIS for 911 call data.	The purpose of the statewide MIS is to standardize 911 call measurement across PA and obtain data to plan for NG911.
4th Quarter - 2018	Draft requirements for telecommunicator training, certification, and quality assurance have been released to the Board and PSAPs for review and comment.	The current requirements for telecommunicator training, certification, and quality assurance are provided in 4 PA Code 120 c and d which were adopted in 2000.

5. Strategic Goals

Note: Strategic Goals will be further defined for 2019 and subsequent years once a contract is executed with the selected statewide ESInet and NGCS vendor.

2019 Strategic Goals

Goal/Priority	Initiative	Estimated Date of Completion	Status Notes
3.1 911 System Requirements	Adopt undated requirements for 911 telecommunicator training, certification, and quality assurance/quality improvement.	1st Quarter - 2019	Updated requirements will serve as a replacement for 4 PA Code 120 c & d.
3.6 Statewide ESInet	Release RFP for a statewide ESInet and NGCS system as a service.	1st Quarter - 2019	
3.2 Planning	Adopt updated Statewide 911 Plan	1st Quarter - 2019	
3.3 GIS	Adopt updated NG911 GIS Strategic Plan	1st Quarter - 2019	
3.3 GIS	Define NG911 GIS requirements outlining: • Required GIS data layers • PA NG911 GIS data model • GIS synchronization and accuracy benchmarks Best practices for creating and maintaining road centerline and address point data layers	2nd Quarter - 2019	Formalizing Pennsylvania NG911 GIS requirements is part of the statewide NG911 GIS data gap analysis project that is expected to begin in early 2019.
3.8 Education and Outreach	• Update PEMA website to include a NG911 informational repository for all stakeholders • Engage the deaf and hard-of-hearing/special needs communities as advocates and codevelopers of NG911 educational tools for members of their communities and the public • 911 Coordinator/PSAP Leadership information session.	2nd Quarter - 2019	• Communications Plan developed • PEMA working to hire resources
3.5 Funding	Obtain National 911 Program Grant award	2nd Quarter - 2019	

Goal/Priority	Initiative	Estimated Date of Completion	Status Notes
3.3 GIS	Obtain statewide orthoimagery dataset	2nd Quarter - 2019	It is anticipated imagery for the entire state will be completed in Spring 2019.
3.1 911 System Requirements	Development of online platform to support telecommunicator, training, certification, and QA/QI processes.	2nd Quarter - 2019	
3.8 Education and Outreach	Plan state-to-state summit for NG911 transition between neighboring states	2nd Quarter - 2019	
3.3 GIS	Accept and process statewide imagery contract buy-up requests for the Fall 2019 imagery collection season	2nd Quarter - 2019	PEMA will receive buy-up requests for Fall 2019 from June 1st – June 30th.
3.1 911 System Requirements	Adopt 911 System requirements for PSAP technology and operations.	2nd Quarter - 2019	Requirements are intended as a replacement for 4 PA Code 120 b.
3.5 Funding	Define base level costs common to all PSAPs	3rd Quarter - 2019	
3.3 GIS	Complete assessment of each county's GIS dataset for compliance with PA NG911 GIS requirements.	3rd Quarter - 2019	The assessment of county GIS data is part of the statewide NG911 GIS data gap analysis project that is expected to begin in early 2019.
3.4 Governance	Develop MOU to be used with any PSAP, public safety agency, or critical infrastructure facility that is requesting connectivity to the statewide ESInet.	3rd Quarter - 2019	
3.7 Call Accounting	Deploy Commonwealth management information system (MIS) to all PSAPs	3rd Quarter - 2019	
3.2 Planning	Implement County 911 System Planning Process	3rd Quarter - 2019	Under Act 12, each county has the duty to develop and adopt a 911 plan that meets the requirements promulgated by PEMA (35 Pa.C.S. § 5304 – 5305). Planning process is intended as the replacement for the Triennial Plan PSAPs filed prior to Act 12.
3.6 Statewide ESInet	Execute contract for the statewide ESInet and NGCS system.	3rd Quarter - 2019	

Goal/Priority	Initiative	Estimated Date of Completion	Status Notes
3.3 GIS	Accept and process statewide imagery contract buy-up requests for the Spring 2020 imagery collection season	4th Quarter - 2019	PEMA will receive buy-up requests for Fall 2019 from Nov. 1st – Nov. 30th.
3.1 911 System Requirements	Publish 911 System Master Requirements for 2020	4th Quarter - 2019	
3.5 Funding	Implement PSAP Compliance Program	4th Quarter - 2019	Purpose of the program is to coordinate efforts between counties and State, further develop a cooperative relationship between PEMA and counties, ensure PSAPs are in compliance with technical and operational requirements, ensure 911 funds are being managed in compliance with 911 Program guidelines.
3.3 GIS	Create statewide PSAP, provisioning and ESB boundary layers	4th Quarter - 2019	
3.5 Funding	Complete ten service provider audits to very compliance with Act 12 requirements	4th Quarter - 2019	

Appendix A – Glossary of Terms

Term	Definition/Description
Additional Data Repository (ADR)	A storage facility for additional data
Border Control Function (BCF)	A functional element that provides a secure entry into the ESInet for emergency calls presented to the network. The BCF incorporates firewall and admission control, and may include anchoring of session and media, as well as other security mechanisms, to prevent deliberate or malicious attacks on PSAPs or other entities connected to the ESInet.
Emergency Communications Routing Function (ECRF)	A functional element that routes an emergency call toward the appropriate PSAP for the caller's location or toward a responder agency.
Emergency Services Routing Proxy (ESRP)	A Session Initiation Protocol (SIP) proxy server that selects the next-hop routing within the ESInet based on location and policy.
Emergency Services Internet Protocol Network (ESInet)	A managed IP network that is used for emergency services communications, and which can be shared by all public safety agencies. It provides the IP transport infrastructure upon which independent application platforms and core services can be deployed, including, but not restricted to, those necessary for providing NG911 services.
Geographic Information System (GIS)	A system for capturing, storing, displaying, analyzing and managing data and associated attributes which are spatially referenced.
Legacy Network Gateway	Provides an interface between a non-IP originating network and a Next Generation Core Services (NGCS)-enabled network.
Legacy PSAP Gateway (LPG)	A signaling and media interconnection point between an ESInet and a legacy PSAP. The LPG plays a role in the delivery of emergency calls that traverse an i3-compliant ESInet to get to a legacy PSAP, as well as in the transfer and alternate routing of emergency calls between legacy PSAPs and NG911 PSAPs.
Legacy Selective Router Gateway (LSRG)	Provides an interface between a 911 selective router and an ESInet, enabling calls to be routed and/or transferred between legacy and NG911 networks. A tool for the transition process from legacy 911 to NG911.
Location Database (LDB)	A server that retains all current information, functionality, and interfaces of the automatic location identification (ALI) database, but can utilize the new protocols required in an NG911 deployment.
Location Information Server (LIS)	A functional element in an IP-capable originating network that provides locations of endpoints (i.e., calling device).
Location Validation Function (LVF)	A functional element where civic location information is validated against the authoritative GIS database information.
Policy Routing Function	The functional component of an ESRP that determines the next hop in the SIP signaling path using a policy.

Source: National Emergency Number Association (NENA) Master Glossary.