NORTH CAROLINA
2021 STATE 911 PLAN

Approved by North Carolina 911 Board:
December 3, 2021

Prepared by:

Ritter Strategic Services, LLC

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EXECUTIVE SUMMARY

North Carolina General Statues ("GS") §143B-1402(a)(1) requires the Board to publish and maintain a comprehensive plan for the provision of 911 service in the state. GS §143B-1402(a)(1) further requires the Board to monitor trends in 911 and enhanced 911 technology, incorporate GIS mapping and other resources into the plan, ensure that each Public Safety Answering Point (PSAP) in the state has a back-up; and implement strategies for the efficient and effective delivery of enhanced 911 services.

The 2018 Plan gave way to the implementation of a single statewide digital network which was the most effective and efficient way to provide enhanced 911 services, rather than on a county-by-county basis. Implementing a single statewide digital network required a new level of statewide planning and coordination. Creating a three- to five-year strategic plan was a critical tool to help the Board and staff plan for and prioritize resources, amend governance, and address all needs associated with Next Generation 911 (NG911), including but not limited to technology, funding, operations, and training. The 2021 State 911 Plan will continue down the path of the NG911 journey with a new set of goals and objectives to take them to the next level.

Goals and objectives are important in strategic planning because they turn the Board's vision for NG911 into specific measurable targets or steps. Goals build on the vision and mission by defining and prioritizing the broad direction in response to specific priorities. Goals describe the general accomplishments to be achieved if the vision is to be achieved. Objectives articulate specific steps that are needed to complete each goal and include the owner-agency and the planned timeline. The following 8 goals are not placed in order of priority. They have been implemented to continue North Carolina's current path to roll out NG911 and to ensure successful operation of the State's 911 system.

Goal 1:   Provide and pay for a statewide hosted Next Generation 911 system.

Goal 2:   Manage Board staff to provide for the reorganization and expansion of job responsibilities to better serve PSAPs.

Goal 3:   Amend state law (G.S. §143B-1400 et seq.) to reflect changes in 911 service, PSAP operations, and Board responsibilities in the Next Generation 911 environment.

Goal 4:   Develop a revenue and funding model for 911 service, NG911 service, PSAPs, and 911 Board operations.

Goal 5:   Implement outreach and public education programs to keep the public, NG911 stakeholders, and industry partners informed about the Board's NG911 efforts.

Goal 6:   Facilitate the consolidation or regional collaboration of PSAPs.

Goal 7:   Explore and investigate the interconnection of PSAP users of the ESInet with other ESInet users and with other partners and networks serving public safety.

Goal 8:   Prioritize mental health/wellness programs for Telecommunicators.

Goal 9:   Facilitate stakeholder discussions to assist in establishing PSAP levels of service.

1 INTRODUCTION

1.1 Background & Project Overview

North Carolina General Statues ("GS") §143B-1402(a)(1) requires the North Carolina 911 Board ("the Board") to publish and maintain a comprehensive plan for the provision of 911 service in the state. The Board is further required to describe the allowable uses of 911 revenue in the State 911 Fund.

GS §143B-1402(a) (1) further requires the Board to monitor trends in 911 and enhanced 911 technology, incorporate GIS mapping and other resources into the plan, ensure that each PSAP in the state has a back-up; and implement strategies for the efficient and effective delivery of enhanced 911 services.

1.2 Purpose of the 2021 North Carolina State 911 Plan

This document represents an official update to the 2018 North Carolina State 911 Plan ("the 2018 Plan"). The Board decided in 2018 to update the 2010 Plan which was then implemented and approved in December 2018. With the complexity of NG911 technology and the inherent economies of scale, implementation of a single statewide NG911 system is the most effective and efficient way to provide enhanced 911 services, rather than on a county-by-county basis. It was realized in 2021 there was again a need for an update to the North Carolina State 911 Plan to reflect the progress made in the implementation of NG911 in North Carolina and to set further goals and guidelines in completing this transition.

Implementing a single statewide digital network requires a level of statewide planning and coordination not previously required. Creating a three- to five-year strategic plan is a critical tool to help the Board and staff plan for and prioritize resources, amend governance, and address all needs associated with NG911, including but not limited to technology, funding, operations, and training. The 2021 North Carolina State 911 Plan ("the 2021 Plan") will provide the Board, Board staff, PSAPs, public safety personnel, and state and local officials a continued roadmap in the efforts toward completing the implementation of NG911 and will assure equal access to enhanced 911 services to every resident of and visitor to North Carolina, regardless of the telecommunications service, device, or technology used.

The 2021 Plan also documents the status of NG911 in North Carolina and the continued vision for NG911 in North Carolina. The 2021 Plan sets forth the top priorities identified by the Board and its PSAP stakeholders, with the main goal of completing the implementation of their NG911 system. It is vitally important to continue the path of implementing the NG911 system—a disparate collection of circuit-switched analog technology and non-integrated 911 call delivery operations—to an integrated and secure Internet Protocol (IP)-based call-routing system using GIS. North Carolina has been in process of this implementation for several years and it is the State's expectation to complete this transition by early 2022.

The 2021 Plan is intended to continue the plan or vision for the statewide implementation of NG 911 services. Because the 2021 Plan serves as a strategic planning guide for the future, the 2021

Plan must remain flexible to account for unforeseen circumstances or events and should be reviewed and amended at least annually to account for and adjust to any such changes. The 2021 Plan is also intended to foster collaboration and should be used on an ongoing basis. Overall, the 2021 Plan will:

- Serve as a tool to communicate the continued strategy for the migration to NG911 services statewide while informing key decision makers where priorities exist;
- Serve as a tool to examine and explore new technologies and trends in 911 service;
- Ensure the effective and efficient use of 911 resources (e.g., revenue, Board or PSAP personnel, and equipment) by focusing resources on the key priorities;
- Provide focus for the Board, Board staff, and the 911 community by providing an opportunity for interested parties to collaborate and provide their input in a structured format, resulting in greater efficiency and effectiveness in the continued efforts to move forward with their NG911 implementation; and
- Demonstrate the value of having the Board coordinate and facilitate statewide provision of enhanced 911 services.

1.3 Updating the State 911 Plan

The goals established in the 2021 Plan are high-level, general directions, and the objectives for achieving the goals are concise, specific, and measurable. As goals and objectives are achieved, they should be documented. Any changes to the 2021 Plan should be documented in the following manner:

- The Plan is given a new version number following an annual review or following any interim update that was necessary. The number assigned at the time should be a full number, i.e., 1.0; 2.0; or 3.0.
- Any changes made to the Plan on an interim cycle are given a fractional number, such as 1.1; 1.2; or 1.3.
- The date of the official change to the Plan should be documented.
- There should be a description of what changes were made to the Plan, including the page and section numbers.
- The footer of the revised Plan should be updated to indicate a new Plan number.

Appendix A—Document Change History provides the form to use to document any updates to the 2021 Plan.

1.4   Methodology

In February 2021, the Board awarded a contract from a proposal submitted by Ritter Strategic Services, LLC (RSS) to update the existing 2018 State 911 Plan, and in June 2021, the contract was executed. On July 20, 2021, RSS facilitated a kickoff meeting with Staff to review the 2018 goals and objectives in the Plan and identify the accomplishments achieved therein. The kickoff meeting also provided Staff an opportunity to brainstorm ideas for the 2021 Update.

RSS attended (virtually) the four regional PSAP Mangers meetings in August 2021. In collaboration with Staff, RSS highlighted the accomplishments achieved in the 2018 Plan and requested attendees' suggestions for new goals and objectives for consideration.

RSS facilitated virtual work sessions with Study Group members to draft the 2021 State 911 Plan Update. The group identified goals and objectives that would carry forward from 2018 and then prioritized new goals and objectives for the updated Plan.

Table 1—2021 Regional PSAP Meetings

Date	Location
Aug 18	Western Region PSAP Managers Meeting
Aug 25	North Central Region PSAP Managers Meeting
Aug 25	South Central Region PSAP Managers Meeting
Aug 26	Eastern Region PSAP Managers Meeting

1.4.1   2021 Study Group

The 2021 Plan was developed in close conjunction with Board staff and Legal Counsel as well as members of the 2021 Study Group. As part of the update process, Board and staff members appointed professionals across the state to represent the various stakeholder groups in public safety and 911. The RSS team worked with Board staff to incorporate stakeholder input and feedback into the 2021 Plan.

For the most part, Board meetings and workshops were held virtually due to restrictions because of the COVID mandates and protocols followed by the state of North Carolina.

Table 2 contains a list of the 2021 Study Group members, along with each member's affiliation.

Table 2—2021 Study Group

Name	Title	Association	
Mr. Scott Alderman	Fire Chief	Town of Kernersville	North Carolina State Firefighters' Association
Mr. Tony Brown	County Manager	Halifax County	North Carolina Association of County Commissioners
Mr. John Connet	City Manager	City of Hendersonville	North Carolina League of Municipalities
Mr. Allen Cress	Chief	Rowan County Emergency Services	North Carolina Chapter National Emergency Number Association
Mr. Grayson Gusa	Training Supervisor	Davie County 911	North Carolina Association of Public Safety Communications Officials
Mr. Greg Hauser	NC Statewide Interoperability Coordinator (SWIC)	NC Department of Public Safety (DPS)	North Carolina Department of Emergency Management/ESF2
Mr. Phil Howell	Sheriff	Ashe County	North Carolina Sheriff's Association
Mr. Topper Hightower	Universal Service Executive	AT&T	North Carolina Local Exchange Carriers (LEC)
Mr. Tim Johnson	Director	Center for Geographic Information and Analysis (CGIA)	North Carolina Center for Geographic Information and Analysis (CGIA)
Mr. Joe Ramey	Chief of Police	Gaston County Police	North Carolina Association of Chiefs of Police
Mr. Jimmy Stewart	Director	Hoke County Emergency Communications	North Carolina Association of Rescue and EMS
Mr. Todd Young	Chief Partner -Business Development	Verizon Business Group	North Carolina Commercial Mobile Radio Systems (CMRS)
Awaiting Confirmation: Mr. Richard Sneed	Chief, Eastern Band of Cherokee Indians	Eastern Band of Cherokee Indians	Eastern Band of Cherokee Indians

1.5   The Federal E911 Matching-Funds Grant Program

The E911 Implementation Coordination Office (ICO) was created in 2004 as a joint effort of the U.S. Department of Transportation National Highway Traffic Safety Administration (NHTSA) and the U.S. Department of Commerce National Telecommunications and Information Administration (NTIA). The ICO was created pursuant to the ENHANCE 911 Act of 2004, which also authorized grant funding to assist PSAPs in implementing NG911.

In August 2019, the NC 911 Board was one of 36 recipients awarded Federal funding from the U.S. Department of Commerce National Telecommunications and Information Administration (NTIA) and the U.S. Department of Transportation National Highway Traffic Safety Administration (NHTSA) through the national 911 Grant Program. The award of $3,941,384 has helped fund the NG911 initiative in North Carolina with approved use of grant funding for special installation charges for diversity, GIS data development for i3 geospatial call routing, and the cybersecurity assessment. The Board provided matching funds in the amount of $2,627,589, which was allocated from the NG911 account established by G.S. 143B-1407.

In June 2018, the ICO announced the availability of $110 million in grants, and final rules were published in the Federal Register in July 2018. The deadline to file certifications of compliance was September 10, 2018. It is anticipated that the application process will open in the first quarter of 2019. The rules for this round were largely unchanged from those adopted in 2009. The most significant change was the inclusion of tribal nations in states' NG911 plans. According to the Office of Emergency Communications (OEC) in DHS, tribal nations represent a unique and important sector of the emergency communications environment in the US.[1] Although many tribal nations have cooperative arrangements and relationships with their neighboring counties and PSAPs, tribes have historically been excluded from statewide NG911 plans. Including tribal nations and governments in NG911 planning will enhance the readiness and ability of tribal, state, and local emergency responders to communicate and coordinate effectively during any sort of emergency or incident.

The Board's inclusion of the Eastern Band of Cherokee Indians in the delivery of enhanced 911 service is discussed in a subsequent subsection of this Plan.

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[1] Department of Homeland Security, Office of Emergency Communications, *Emergency Communications Case Study: Tribal Communications Partnerships—The Missing Piece in the Emergency Communications Landscape*, August 2013, p. 1.

2 THE 911 ENVIRONMENT IN NORTH CAROLINA

North Carolina is the tenth largest state in the U.S. with a population of 10,439,388 in 2020. The state's population grew 9.5 percent between 2010 and 2020 increasing their residents by 903,905. Since 2000, the state's population has grown over 25 percent.

With respect to land size, North Carolina is the 28th largest in the nation. Having a relatively large population and relatively low land area means that the population per square mile in the state is 196 people, compared to 87 per square mile for the nation.[2] According to the 2010 US Census, 66 percent of the state's population lived in an urban area and 34 percent lived in a rural area.

There are 100 counties in the state and over 500 municipalities. As of 2020, the two largest counties were Mecklenburg and Wake, with populations, respectively, of 1,143,570 and 1,152,740. The next largest county is Guilford, with a population of 546,308. The least populated county in the state is Tyrell, with 3,818 people. Table 3 below provides a breakdown of the various population ranges for 2020.[3] Appendix B—North Carolina Population by County: contains the state's population by county (listed by population) for 2020 with the percentage of growth since 2010.

Table 2—Breakdown of North Carolina Population, 2020

Population Range	No. of Counties	% of Total
Less than 10,000	4	4%
10,001 - 24,000	21	21%
24,001 - 50,000	22	22%
50,001 - 100,000	25	25%
100,001 - 500,000	25	25%
500,001 - 1 million	1	1%
Over 1 million	2	2%
Totals	***100***	***100%***

The ten largest cities in North Carolina, in order of population, are Charlotte; Raleigh; Greensboro; Durham; Winston-Salem; Fayetteville; Cary; Wilmington; High Point; and Greenville. North Carolina has the largest state-maintained highway system in the United States, exceeding 77,400 miles of roads. The state has over 1,500 lakes and over 37,000 miles of freshwater

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[2]US Census Bureau, American Fact Finder: Annual Estimates of the Resident Population: April 2021: North Carolina,. https://data.census.gov/cedsci/table?q=north%20carolina%20&tid=DECENNIALPL2020.P1, as of November 5, 2021

[3] Ibid.

streams. Tourism is an important source of revenue for the state, and in 2020 visitors spent more than $1 billion in the state.

Some of the major attractions in North Carolina are year-round golfing; snow skiing at ski resorts; fresh- and salt-water fishing; hunting; the Great Smoky Mountain National Forest; the Blue Ridge Parkway; Wrightsville Beach; the Cape Hatteras and Cape Lookout National Seashores; and the Wright Brothers National Memorial in Kitty Hawk. The vast differences in geography, population, and attractions place a unique demand on the 911 systems across North Carolina and underscore the importance of a single statewide digital network for E911 service.

Table 4 provides information on statewide 911 call volume.

Table 3—Statewide 911 Call Volume in 2019 and 2020

Class of Service	2019 Totals	Percentage of 2019 Call Total	2020 Totals	Percentage of 2020 Call Total
WRLS	5,729,376	78%	5,713,316	79%
WRLN	1,013,029	14%	898,161	12%
VoIP	615,337	7%	587,174	8%
Incoming Text-2-911 Sessions	3048	.0004%	9782	.001%
Total Incoming Texts	6802	.0009%	34462	.004%
Total 911 Calls	7,367,592		7,198,651	

2.1 Statutory Framework for 911 Service

North Carolina General Statutes (G.S.) Chapter 143B, Article 15, Part 10, Section §143B-1400 *et seq.*, establishes the statutory provisions and requirements for 911 service at the state and local levels. The statutory provisions for 911 service in the state include, but are not limited to, the creation of a state 911 Board, the monthly 911 service charge, and eligible uses of 911 revenue.

2.2 State-Level Governance for 911 Service—the 911 Board

North Carolina adopted 911 by legislative act in 1989, and authorized local governments to adopt ordinances to fund 911 operations. In 1998, the North Carolina General Assembly created the Wireless 911 Board, pursuant to S.L. 1989-587; as codified in Chapter 62A of the N.C. General Statutes. The Wireless Board was originally established to provide a wireless E911 system in response to FCC Order 94-102 mandating wireless E911 service.

In 2007, the North Carolina General Assembly further amended the 911 statutes to create the 911 Board and charged the 911 Board with responsibility for landline 911 as well as wireless 911 service. The General Assembly also consolidated the 911 service charge into a single statewide

uniform charge effective January 1, 2008 and disallowed any other 911 fee or tax by local governments. The initial rate was 70 cents ($0.70) per connection for any type of voice communication service provider. This was done to consolidate North Carolina's 911 system under the Board with a uniform 911 service charge to integrate the state's 911 system, enhance efficiency and accountability, and create a competitive playing field among voice communication technologies. In Fiscal Year (FY) 2010,[4] the Board lowered the rate to sixty cents ($0.60), effective July 1, 2010.[5]

2.2.1 911 Board Composition

The Board is comprised of 17 members, as established in G.S. §143B-1401. The Secretary of the Department of Information Technology (referred to as the State Chief Information Officer) serves as Board Chair. The Governor appoints four members, and the General Assembly appoints 12 members. Of the legislative Board member appointments, six are appointed based on the recommendation of the Speaker of the House of Representatives, and six are appointed based on the recommendation of the Senate President Pro Tempore.

The four appointments by the Governor are as follows:
- One municipal representative with a primary PSAP, based on a recommendation from the North Carolina League of Municipalities;
- One county representative with a primary PSAP, based on a recommendation from the North Carolina Association of County Commissioners;
- One representative of a VoIP provider; and
- One representative from the NC Chapter of the National Emergency Number Association (NENA).

The six appointments by the General Assembly upon the recommendation of the House Speaker are as follows:
- One Sheriff, based on a recommendation from the NC Sheriff's Association;
- One representative of a CMRS provider operating in the state;
- One representative from the NC Chapter of the Association of Public Safety Communications Officials (APCO);
- Two representatives from LECs operating in the state, one of whom represents a carrier with fewer than 50,000 access lines;
- One Fire Chief with PSAP supervisory experience based on a recommendation from the North Carolina Firefighter's Association.

The six appointments by the General Assembly upon the recommendation of the Senate Speaker Pro Tempore are as follows:

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[4] In North Carolina, the Fiscal Year starts on July 1 and ends June 30 the following year.
[5] NC Department of Information Technology, *the NC 911 Board: About the NC 911 Board*, https://it.nc.gov/about/boards-commissions/911-board/about-nc-911-board, as of August 31, 2018.

- One Chief of Police, based on a recommendation from the NC Association of Chiefs of Police;
- Two representatives from CMRS providers operating in the state;
- One Rescue or Emergency Medical Services (EMS) Chief with experience operating or supervising a PSAP, based on a recommendation from the NC Association of Rescue and Emergency Medical Services; and
- Two representatives from LECs operating in the state, one of whom represents a carrier with fewer than 200,000 access lines.

One State Official:
- Secretary of the NC Department of Information Technology, who also serves as Board Chair

Eight Local and Public Safety Officials:
- Municipality with a primary PSAP (NC League of Municipalities)
- County with a primary PSAP (NC Association of County Commissioners)
- Sheriff (NC Sheriff's Association)
- Chief of Police (NC Association of Chiefs of Police)
- PSAP (NC Chapter of Association of Public Safety Communication Officials)
- PSAP (NC Chapter of National Emergency Number Association)
- Fire Chief with PSAP experience (NC Firefighter's Association)
- Rescue or EMS Chief with PSAP experience (NC Association of Rescue and Emergency Medical Services)

Eight Providers:
- Three CMRS representatives
- Four Local Exchange Carrier (LEC) representatives
- One VOIP representative

Board members serve terms of four years, are limited to two terms, and serve until their respective successor has been appointed. The Governor may remove any Board member, regardless of appointment, "…for misfeasance, malfeasance, or nonfeasance…" pursuant to G.S. §143B-13(d).[6] Board members serve without compensation, but receive per diem, subsistence, and travel allowances at the rate established in state law. Nine members constitute a quorum at a Board meeting, and the Board meets upon the call of the Chair. Board members are considered public servants and as such, are subject to the provisions of the State Government Ethics Act.

2.2.2 Powers and Duties of the 911 Board

G.S. §143B-1402 establishes the Board's powers and duties, which include the following:
1. Develop a 911 State Plan;

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[6] This subsection of the Executive Organization Act of 1973 concerns provisions for the appointment, qualifications, terms, and removal of members of boards or commissions.

2. Administer the 911 Fund;
3. Distribute revenue in the 911 Fund to CMRS providers and PSAPs pursuant to requirements established by the Board;
4. Establish cooperative purchasing agreements or other contracts for the procurement of goods and services;
5. Establish policies and procedures to fund advisory services and training for PSAPs;
6. Set operating standards for PSAPs and back-up PSAPs;
7. Investigate revenues and expenditures associated with the operation of PSAPs to ensure compliance with Board rules, regulations, requirements, and policies;
8. Make and enter into contracts and agreements as needed to fulfill its statutory obligations;
9. Use funds to pay for statewide 911 projects;
10. Accepts gifts, grants, or other money for the 911 Fund;
11. Undertake its duties in a manner that is competitively and technologically neutral to communication service providers;
12. Design, create, or acquire printed or Web-based public education materials regarding the proper use of 911;
13. Adopt rules to implement G.S. §143B-1400 *et seq.*;
14. Take other necessary and proper action to implement the provisions of G.S. §143B-1400 *et seq.*; and
15. Pay private sector vendors for provisioning a communications network for providing access to 911.

G.S. §143B-1402(b) strictly prohibits the Board (or any state agency) from constructing, operating, or owning a communications network for the provision of 911 service. The Board is permitted to pay private sector firms for such networks.

2.2.3   The 911 Service Charge

G.S. §143B-1403 provides for the monthly 911 service charge that is imposed on "…each active communications service connection that provides access to the 911 system through a voice communications service…." The rate established in statute, which excludes pre-paid wireless service but includes all other communications services, is seventy cents ($0.70) per month per access line, which was effective July 1, 2008.[7] The Board is permitted to lower the service charge and lowered the rate to sixty cents per month effective July 1, 2010.[8] Providers of these services are required to remit the service charge to the 911 Board by the end of the calendar month following the month in which the charge was collected. Providers are entitled to retain as an administrative fee either one percent of the amount collected or $50, whichever is greater.

The 911 service charge on prepaid wireless service was established by statute to be the same rate for each retail transaction and is assessed at the retail point of sale. Pursuant to G.S. §143B-1414, retail sellers are entitled to retain up to five percent of the amount collected as an

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[7] The inflation-adjusted rate (in July 2018 dollars) is 80 cents.
[8] The inflation-adjusted rate (in July 2018 dollars) is 69 cents.

administrative fee. Retail sellers must remit the amount collected to the NC Department of Revenue either monthly or semiannually. For sellers that remit monthly, the amount collected is due by the 20th day of the month following the calendar month in which the fee was collected. For sellers that remit semiannually, the amount collected in the first six months of the calendar year is due by July 20, and the amount collected in the second six months of the calendar year is due by January 20.

It is important for there to be parity between or among the various types of voice communications devices and providers with respect to remittance and assessment of the 911 service charge. There should be parity in how often the 911 service charge is remitted; that is, if one group is required to remit the service charge monthly, then all groups should remit monthly. Disparate remittance periods could make it more difficult to accurately estimate 911 revenue and to efficiently manage cash flow. It is also important to maintain parity with respect to the amount providers are entitled to withhold to cover their administrative costs; that is, if one provider or group is entitled to withhold one percent, then all providers or groups should withhold the same percentage amount. Lack of parity with respect to the administrative fee could result in a lack of a competitive playing field.

2.2.4   The 911 Fund

G.S. §143B-1404 provides for the creation and administration of the 911 Fund, which is an interest-bearing special revenue fund within the State treasury. The Board administers the Fund and funds may only be used as provided for in §143B-1400 *et seq*. The statute allows the Board to retain up to two percent of the revenue for administrative expenses. Currently, the Board is setting aside only one percent for its administrative costs.[9] Ten percent of the service charge must be allocated to the Next Generation 911 Reserve Fund. The remainder of the funds are distributed between CMRS Providers and primary PSAPs. Primary PSAPs are defined as the "…first point of reception of a 911 call by a public safety answering point…."[10]

Wireless, or rather CMRS, providers receive a percentage of 911 revenue, excluding 911 revenue from wireless pre-paid retail sales, for cost recovery. PSAPs receive a percentage of all 911 revenue, including wireless pre-paid. The Board must determine the specific percentage that each group receives to ensure full cost recovery to wireless carriers; any excess funds not used for cost recovery are available for distribution to PSAPs.

G.S. §143B-1405 establishes the statutory process for CMRS cost recovery along with requirements with which wireless carriers must comply to be eligible for reimbursement of their costs to provide wireless E911 service. If there are excess funds from cost recovery at the end of a fiscal year, the Board has the authority to reallocate those funds to the PSAP Grant and

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[9] North Carolina Department of Information Technology, the North Carolina 911 Board, *911 Fund*, https://it.nc.gov/about/boards-commissions/911-board/911-fund, as of August 31, 2018.

[10] G.S. §143B-1400(23). A public safety answering point (PSAP) is further defined in G.S. §143B-1400(25) as the "…public safety agency that receives an incoming 911 call and dispatches appropriate public safety agencies to respond to the call…."

Statewide 911 Projects Account, pursuant to limitations and other requirements in G.S. §143B-1407.

2.2.5 The 911 Board Staff & Committees

The Executive Director of the 911 Board is responsible for the day-to-day operations of the Board and its staff. Board staff also provide staff assistance to the Board's six committees, which are comprised of Board members. Following are the committees:

Standing Committees:
- Education Committee
- Executive Committee
- Funding Committee
- Grant Committee
- Standards Committee
- Technology NG 911 Committee

Additional Groups:
- Study Group (State 911 Plan) and Ad Hoc Groups as approved by the Board.

2.2.6 Accountability

In February of each odd-numbered year, the 911 Board must report to the Joint Legislative Committee on Governmental Operations and the Revenue Laws Study Committee on the receipts and expenditures of all funds received by the Board during the reporting period. The report must also contain the status of the 911 system and the results of any investigation of PSAPs by the Board.

The State Auditor is required by statute to audit the 911 Board at least every two years pursuant to Part 5A of Chapter 147 of the General Statutes. The audits are conducted to ensure that the 911 Fund is properly managed.

2.2.7 Intergovernmental Coordination

The responsibilities of the Board and its staff require intergovernmental coordination and collaboration for the delivery of 911 service to residents of and visitors to North Carolina. Historically, the primary purpose of coordination has been based upon the distribution of revenue from the 911 Fund and its subsequent verification and auditing. The Board's decision to provide and pay for the NG911 system will require additional coordination and collaboration with PSAPs, and other local government and public safety officials.

In continuing with the action plan put in place in 2018, the Board continues to enhance customer service, improve educational and outreach programs, and continues to conduct 911 meetings across the state to obtain input from PSAPs and the public.

The Board continues to use the Study Groups and hosts regional meetings for local officials and PSAP directors to assist in updating the State 911 Plan.

2.2.7.1   GIS Current Status and Near Future Plans

The 911 Board has established a cooperative agreement with the North Carolina Center for Geographic Information and Analysis NC CGIA) to obtain robust GIS data from PSAPs that will support NG911 service. The NextGen 911 (NG911) GIS team consisting of 911 Board staff, CGIA, and GeoComm is bringing the last 10 PSAPs to i3 ready status with their GIS data. This effort will be completed by the end of 2021. Once complete, North Carolina will have seamless coverage for address points, street centerlines, emergency services boundaries (fire, law, and EMS), PSAP boundary, and provisioning boundary. These datasets have been prepared in cooperation with PSAPs and local government GIS offices. Communications have occurred across state boundaries as well with Georgia, South Carolina, Tennessee, and Virginia.

The challenge going forward will be sustaining each dataset as the data changes locally. Either monthly or quarterly updates of the core GIS datasets are needed. The frequency of those updates will vary across the state as growth and change in individual jurisdictions occurs. Continued outreach and communication with PSAPs and local government GIS offices is essential. Simultaneously, there should be an ongoing effort to monitor changes in the NENA standards related to GIS that could impact the future state of the datasets. For example, the NG911 team knows that a standard for unique ID's will be emerging through the NENA standards activity and that 3D requirements to capture the elevation component of the data is also on the horizon.

2.2.7.2   Coordination of 911, Enhanced 911, and NG911 Services with Native American Tribal Nations and Governments

Section 2.1 of this Plan provided a high-level summary of the Federal 911 Grant Program and new rules established for the round of grants in 2018. To reiterate, the new rules required state applicants to include Native American Tribal Nations and governments in statewide NG911 planning and efforts. Including tribal nations and governments in NG911 planning will enhance the readiness and ability of tribal, state, and local emergency responders to communicate and coordinate effectively during any sort of emergency or incident. Including tribal governments in NG911 planning and implementation ensures equal access to enhanced 911 services.

As part of the Board's distribution of funds and the offering of the NG911 system, inclusion of the Eastern Band of Cherokee Indians is statutorily required. The Eastern Band is the local governing body and is included as all other units of local government in North Carolina.

The inclusion of Native American Tribal Nations and governments has been addressed in the 911 general statutes. G.S. §143B-1406(g) defines the Eastern Band of Cherokee Indians as a PSAP, thereby including this tribal government in the funding and planning of all 911 service in the state, including NG911. A representative of the Tribal Council of the Eastern Band of Cherokee Indians serves on the Study Group for the 2021 State 911 Plan.

2.2.8   Board Programs and Initiatives

The state of North Carolina has entered two contracts to create a fully functional NG911 ecosystem compliant with National Emergency Numbers Association i3 standards and best practices. The first was with AT&T to provide the state's IP-enabled NG911 system, which includes the ESInet, Next Generation 911 Core Services (NGCS), and hosted call-handling solution for primary PSAPs in North Carolina. As of November 30, 2021, 116 PSAPs have joined the ESInet with 2 more expected to complete the transition by the end of 2021 leaving only 9 remaining to complete the process. All PSAPs are expected to have made the migration to the ESInet by early 2022.

The second was with GeoComm, for managed geographic information system services. The Board is developing a statewide geodatabase within the Next Generation 911 system to accurately identify 911 callers' location and route them to the appropriate PSAP. GeoComm is aggregating and validating the required geographic information system data from all 127 PSAPs in North Carolina for the geodatabase. The GIS data is used for emergency call routing functions and location validation functions.

Along with the ESInet and GIS projects, the State opened the Network Monitoring and Assistance Center (NMAC) in September 2019 which was the first of its kind in the nation. It enables seamless 911 coverage so that emergency responders can help North Carolina residents as quickly as possible. The NMAC supports an uninterrupted flow of communication between Next Generation 911 PSAPs and AT&T. The center is staffed 24/7 and equipped to monitor service and performance on North Carolina's digital emergency services network, ESInet. NMAC technicians immediately troubleshoot network issues and help behind the scenes. For example, technicians monitoring ESInet can identify increasing emergency calls and quickly reroute emergency calls to other 911 centers – particularly during severe weather and major events that draw many people to an area.

Another initiative by the Board is to deliver outreach and public education programs to keep the public, stakeholders and industry partners informed about the NC 911 Board's Next Generation 911 efforts. Public education and outreach include the general public, appointed/elected officials, and stakeholders. The Board makes every effort to know their target audience and identify the specific message being delivered.

The COVID 19 pandemic of 2020 presented many challenges for the Board to be able to reach out to the communities and stakeholders. The staff adjusted their outreach approach by creating and publishing one-page White Sheets detailing information related to the ESInet, GIS, and NMAC services. Additionally, webinars were created and placed on the Board's website for NG911 and GIS training.

The Staff created and hosted (3) three one day Webinars focusing on Continuity of Operations Planning for PSAPs.

The COVID Pandemic also impacted staffing in the PSAPs. The Board looked for an approach to get the message out to the public. The Board's Education Committee in collaboration with Spectrum Reach were able to put into production and air a Public Service Announcement developed as a recruiting tool for PSAP telecommunicators. The PSA aired from September 6, 2021, through November 7, 2021, with 6,837 airings on 49 networks. The PSA campaign was delivered in two different television zones spanning 10 counties. To connect applicants to their desired locality, a website page was created on the Board's website with a link to all the PSAPs in the state. The PSA was shared with the local chapters of NC NENA, APCO, and the PSAPs so it could be used locally and on social media. The PSA can be found on the Board's website. The PSA will continue to air in select markets in North Carolina to assist PSAPs in their recruitment efforts.

Local-Level Governance for 911 Service

In North Carolina, PSAPs are operated, managed, and staffed by local governments, either at the municipal or county level. These same local governments are responsible for funding PSAP operations. In the current analog 911 environment, 911 service has typically been delivered via a contract between a PSAP (or municipality or county) and the 911 system provider, which traditionally has been the Incumbent Local Exchange Carrier (ILEC). The 911 system provider supplies the 911 network, network monitoring, network maintenance and repair, and static ALI database as part of the contract. The PSAP purchases or leases the 911-related equipment (e.g., CPE, CAD, mapping) and is responsible for equipment maintenance and repairs. As a result, it was not typical for counties or municipalities to coordinate the provision of 911 service on a regional basis except for back-up arrangements.

NG911 will create an environment where coordination among multiple counties is possible and beneficial. In other states that have implemented NG911, regional consortia have been established for procurement advantages and redundant operating purposes. Regardless, the delivery of 911 services to the public is a local matter, although PSAPs are accountable to the Board with respect to the use of 911 funds.

2.2.9   Monthly Distribution of 911 Revenue to PSAPs

G.S. §143B-1406 provides for the process of the monthly distribution of 911 revenue to primary PSAPs. To be eligible to receive such distributions, a PSAP must provide E911 service, comply with all provisions of state 911 law, and must have received distributions in FY 2008-09. Subsection (a)(1) through (3) provides specific requirements the Board must follow concerning monthly distributions, such as setting a base amount for each PSAP. In addition, the Board "…must determine a method for establishing distributions that is equitable and sustainable and that ensures distributions for eligible operating costs and expected increases for all funded PSAPs…." The Board is further required to consider the following six factors:

1. Population served by each PSAP.
2. PSAP reports, budgets, prior disbursements, and prior costs.

3. PSAP operations, technologies used by the PSAP for 911 service, compliance with operating standards established by the Board, and level of service a PSAP delivers dispatching fire, law enforcement, and EMS and providing Emergency Medical Dispatch (EMD).
4. The tier designation of the county in which the PSAP is located.[11]
5. Any current existing interlocal agreement between a primary PSAP and a secondary PSAP, provided that the secondary PSAP was in existence as of June 1, 2010, receives funding from the primary PSAP under the agreement, and is within the primary PSAP's service area.
6. Any other information the Board deems relevant.

Standards for eligible and prohibited uses of 911 funds are provided in subsection (d). PSAPs are prohibited from using 911 funds for the following:

- The lease or purchase of real estate;
- Cosmetic remodeling of 911 Centers;
- Personnel costs for 911 Telecommunicators; and
- The purchase of mobile communications vehicles, ambulances, fire engines, or other emergency vehicles.

PSAPs may use 911 revenue only for the following:

- The non-recurring costs of establishing a 911 system;
- Expenditures for in-state training of 911 personnel regarding the maintenance and operation of the 911 system (within specific guidelines);
- Charges associated with the provision of 911 service by the 911 service supplier; and
- The lease, purchase, or maintenance of the following:
  - ➢ 911 call-taking equipment, including necessary computer hardware, software, and database provisioning.
  - ➢ Addressing.
  - ➢ Telecommunicator furniture.
  - ➢ Dispatch equipment located exclusively within the building where the PSAP or back-up PSAP is located, except for select radio-dispatch equipment.

2.2.10 Accountability

The fiscal officer of a PSAP to whom a distribution from the 911 Fund is made must deposit the funds in a special revenue fund as defined in G.S. §159-26(b)(2), designated as the Emergency Telephone System Fund. Annually, a participating PSAP must submit to the Board an approved budget detailing the revenues and expenditures eligible for reimbursement.

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[11] G.S. §143B-437.08 concerns development tier designations, which are based on factors such as unemployment; income; percent change in population; and per capita adjusted assessed property values.

In accordance with G.S. §143B-1408, the Board is empowered to provide notice to any communications service provider or PSAP found by the 911 Board to be using fees from the 911 Fund for purposes not authorized by statute. The provider or PSAP must stop making any further unauthorized expenditures but may petition the Board for a hearing on the matter. If the Board determines at the hearing that the expenditure does not represent an eligible use of 911 revenue, the provider or PSAP will be required to reimburse the 911 Fund. If reimbursement is not made, the Board is authorized to suspend future distributions.

2.3   Current 911 PSAP Technology

In North Carolina, all 911 calls are answered at a primary PSAP, which is legally defined as the first agency that receives a 911 call. Primary PSAPs must be capable of receiving and processing E911 calls from all voice communications service providers. There are currently 115 primary PSAPs in the state. There are also 12 secondary PSAPs in the state, which the Board has defined as a PSAP that is able to receive voice and data of an E911 call that has been transferred from a Primary PSAP for dispatch of law enforcement, emergency medical services, firefighters, or other responders. PSAPs range in size from two-position centers up to almost 60-position PSAPs.

In addition to the Public Switched Telephone Network (PSTN), there are several pieces of equipment at a PSAP that play a crucial role in the answering and processing of E911 calls. Common equipment includes the call-taking equipment, or Customer Premise Equipment (CPE); Computer Aided Dispatch (CAD); voice logging recorders; Uninterruptable Power Systems (UPS); generators; GIS/Mapping; and radio.

Typically, PSAPs enter into agreements or contracts with their 911 System Service Provider (SSP), which provides the 911 network, database, and network monitoring and maintenance. The PSAP typically enters into a separate lease/purchase agreement with the SSP for the call-taking equipment. The PSAP also provides and is responsible for the equipment mentioned above. As in most states, the level of technology in place and used varies from PSAP to PSAP, which results in varying levels of capability with respect to the provision of 911 service.

2.4   Current 911 Infrastructure

The Board provides and pays for a managed NG911 system provided from AT&T. The NG911 capable ESInet is available for all North Carolina PSAPs. The ESInet provides connectivity from the Ingress (OSPs) to the Next Generation Core Services (NGCS), and Egress (PSAPs).   AT&T has implemented the system compliant with NENA standard functional elements. The NGCS supplies the connections to hosted call handling solution(s) that PSAPs may utilize for their call handling. All interconnections, whether to the core, the PSAPs, or to outside resources, are redundant and diverse and provide survivable features to meet the 99.999% service availability.

The NG911 system interconnects to six geographically redundant core sites for call routing and two in state data centers for hosted call handling. Through this network design, every PSAP is

connected to the six core elements to allow increased diversity and redundancy of communication between the end sites and the NG911 functional elements.

The Board established the Network Monitoring and Assistance Center (NMAC) to serve the instate network and operations center. In addition to monitoring the health of the ESInet, the staff provides Tier 1 and Tier 2 PSAP support.

In collaboration with local authorities and the North Carolina Center for Geographic Information and Analysis, the Board has established a statewide authoritative dataset for call delivery services on the ESInet. Through contracting with the Board, GeoComm serves as the aggregator of data and upon validation provides the dataset to AT&T and Intrado for production.

3   THE FUTURE ENVIRONMENT: NEXT GENERATION 911

3.1 The Drive to Next Generation 911

The current 911 systems in place in the US were built in the 1970s and were based on circuit-switched technology. A circuit is a connection or line between two points, using various media such as copper, coaxial cable, fiber, or radio wave. A circuit-switched network is one that establishes a physical circuit temporarily on demand and keeps the circuit open and reserved for the user until the user disconnects. The current 911 systems were designed to handle only one type of communications device: analog landline telephone service.

The explosive growth in communications technology is forcing 911 Authorities at every level of government to change the way they operate in order to provide equivalent services to constituents. To support these trends, PSAPs must migrate to a platform that enables new and emerging communications services and devices to access E911.   The evolution of communications technology provides an opportunity for the 911 Board and PSAPs to make major improvements in the current E911 infrastructure. These improvements include the capability for multimedia services that will enhance public safety, reduce response times, and save lives.

Residents and businesses no longer live or operate in small, isolated communities, and telecommunications services are no longer local-only offerings. People's lives take place in widespread areas with a multitude of communications options, and communications are no longer constrained to a fixed location. Traditional communications companies are transforming their circuit-switched networks into packet switched networks to accommodate the transport of voice, data, and video. The trend is only going to accelerate in the coming months and years.

Consumers and businesses are increasingly using and depending on new communications technologies and devices, such as VoIP devices, instant messaging, text messaging, Short Message Service (SMS), and email. These new technologies and devices enable the transfer of huge amounts of data. In addition, consumers and businesses are increasingly giving up their landline phone service for wireless phone service only. The deaf and hard-of-hearing community is increasingly using text messaging to communicate. Many have given up use of TTY/TDD machines in favor of text messaging. Consumers expect that they should be able to communicate with 911 using their smart phones and smart devices, including sending photos and videos or by texting.

As the rest of the world moves to Internet Protocol (IP)-based networks, the current E911 system will continue to lag further behind technologically, will continue to degrade, and will be unable to meet the needs and demands of consumers requesting emergency assistance. Every time a new technology is introduced (e.g., wireless, VoIP, texting) or system functions are expanded (e.g., location determination), the existing E911 network and equipment must undergo significant, convoluted, and costly engineering changes. These changes result in significant time delays and solutions that are not completely effective.   The current 911 network and infrastructure cannot effectively or adequately support the network and technology needs of the future. The state's 911 systems must transition to a digital/IP-based network and must prepare for future technological changes.

The way PSAPs operate and provide 911 service is changing rapidly, but currently, PSAPs attempt to respond to today's requests for service using yesterday's technology. Delivering additional data with a 911 call requires a digital network to provide the speed and data capacity to properly route and deliver a 911 call based on the call's location (rather than the location of the wireless tower, for example) to the appropriate PSAP. The existing analog, circuit-switched 911 networks in the state must be upgraded to a single, statewide 911 IP-based network. Such a network will improve call set-up time, increase the speed at which voice and data arrive at the PSAP, and improve response time, thereby saving lives. A single statewide IP-based network will also provide for call load sharing and host equipment sharing; the latter will allow local governments to retain control over how 911 calls are processed and dispatched, while minimizing 911 costs through centralizing network, equipment, and software.

The technology associated with a digital network cannot be implemented on a county-by-county and on an "as a local government can afford it" basis. There must be a plan and funding that provide for the implementation of a single IP-based statewide network to transport 911 requests for service to the appropriate PSAP. The funding source for NG911 must be technology neutral, provide parity across all devices and carriers, and must cover the complete cost of the NG911 system. The plan must account for the fact that while telecommunications and access to E911 service are becoming increasingly borderless, emergency response is, and always will be, a local response; that is, if something goes wrong during a 911 call, local authorities are held accountable to their constituents.

It is nationally accepted that 911 call-takers and dispatchers in local 911 centers are the true first responders to any incident, whether isolated or widespread, human-caused, or natural, accidental or deliberate. Yet, 911 service, infrastructure, training, and operations are rarely included in any federal government appropriations or homeland security grant programs. It is simply not good enough to merely implement or facilitate the implementation of a NG911 system without considering the impacts to PSAPs to prepare and train their 911 employees for answering, processing, and dispatching calls in a NG911 environment. PSAPs need a road map to implement NG911 to ensure that every resident can access and obtain the same level and quality of 911 service.

3.2   What is Next Generation 911?

Much work has been done in many forums to design a 911 system to meet consumer expectations and technological changes. In the future, consumers will be able to access 911 from any networked communication device, with location automatically provided at the beginning of the call.

Internet Protocol (IP) is the technology that will be used for the future 911 network, which is being called Next Generation 911, or NG911. According to the National Emergency Number Association (NENA), NG911 is

"An Internet Protocol (IP) based replacement for E9-1-1 features and functions that supports all sources of emergency access to the appropriate PSAPs, operates on reliable, secure, managed, multi-purpose IP networks, and provides expanded multimedia capabilities for PSAPs and other emergency responders."

According to the Association of Public Safety Communications Officials (APCO) Project 43, NG911 is:

"A secure, nationwide, interoperable, standards-based, all-IP emergency communications infrastructure enabling end-to-end transmission of all types of data, including voice and multimedia communications from the public to an Emergency Communications Center."

In other words, NG911 is

- A secure and open architecture that uses a reliable and managed IP network to allow new communications devices such as text messaging, data, pictures, and video to access 911 service.
- A system that enables call access, transfer, and backup among and between PSAPs without geographic or technical restrictions.
- An architecture that will facilitate an interoperable system of systems for all emergency response organizations.
- A system that will contain the same functions of the legacy 911 system, such as redundancy and reliability (e.g., 99.999% up time), while providing for greater accessibility, interoperability, functionality, and a more efficient use of 911 resources.

When fully implemented, NG911 will enable:

- Transfers of 911 calls between geographically dispersed PSAPs, and from PSAPs to remote public safety dispatch centers, if necessary;
- Increased sharing of data, resources, procedures, and standards to improve emergency response;
- Reductions in capital and operating costs for the state and PSAPs; and
- Improved coordination and partnerships within the emergency response community.

3.3   The NENA i3 Standard

The National Emergency Number Association ("NENA") is an ANSI-accredited Standards Developer and is at the forefront of developing standards for emergency calling services. NENA follows the Internet Engineering Task Force (IETF) standards[12] and adds specific service-related features that apply to 911 service. In addition, NENA publishes 911 information documents that often contain recommended best practices.

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[12] The Internet Engineering Task Force (IETF) is the entity that creates and defines IP standards. The IETF also defines related protocols used on the public Internet and that may be adopted for use on private IP networks, including public safety IP networks.

The NENA i3 standard details the network, components, and interfaces required for NG911 service. Specifically, the term "i3 standard" generally refers to NENA Standard 08-003, *Detailed Functional and Interface Standard for NG9-1-1 (i3)*, or NENA STA 010.2-2016, *Detailed Functional and Interface Standards for the NENA i3 Solution*. According to NENA the i3 Standard

> *"…describes the 'end state' that has been reached after a migration from legacy Time Division Multiplex (TDM) circuit-switched telephony, and the legacy E9-1-1 system built to support it, to an all IP-based communication system with a corresponding IP-based Emergency Services IP network…."*[13]

The NENA i3 Standard has the following 11 critical underlying assumptions:
1. All calls entering the Emergency Services IP Network (ESInet) are Session Initiation Protocol (SIP)-based.
2. Access network providers operate a location function for their networks.
3. All calls entering the ESInet will normally have location data in the signaling with the call.
4. The 911 authorities have converted their tabular Master Street Address Guide (MSAG) and Emergency Service Numbers (ESNs) to a GIS-based Location Validation Function (LVF) and Emergency Call Routing Function (ECRF).
5. The 911 authorities have accurate and complete GIS data, which are used to provision the LVF and ECRF. In addition, a change to the GIS system automatically updates the ECRF and LVF, which may affect routing.
6. All civic locations are validated by the access network against the LVF prior to an emergency call being placed (analogous to MSAG-validation).
7. All civic locations are periodically revalidated against the LVF to ensure that the location remains valid as the GIS system changes.
8. Legacy PSAP Gateways (LPGs) are included in the i3 architecture as the interface between i3 ESInets and legacy PSAPs, and between i3 PSAPs and legacy PSAPs.
9. Legacy Network Gateways (LNGs) are included in the i3 architecture as the interface between legacy originating networks and i3 ESInets.
10. Federal, state, and local laws, regulations, and rules are modified to support NG911 system deployment.
11. The specific protocol mechanisms, especially interworking of legacy telecom and ESInet/NGCS protocols are North-America specific and may not be applicable in other areas.

Figure 1 provides a basic diagram of the NENA i3 architecture.

The green shaded areas denote areas that are considered within the i3 domain and covered by NENA STA 010.2-2016. The main purpose of the NENA STA 010.2-2016 is to define the end operating state of a new 911 delivery system that replaces the existing legacy 911 system with

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[13] National Emergency Number Association, *NENA STA 010.2-2016 Detailed Functional and Interface Standards for the NENA i3 Solution, p. 15.*

the same features and capabilities of the legacy system but with modern, IP- and SIP-based components and technologies, which provide greater capabilities beyond the current legacy 911 system. While the i3 architecture encompasses many areas, much of it is devoted to the treatment of a 911 call in the SIP format, through the i3 architecture, using the functional elements defined in NENA STA 010.2-2016.
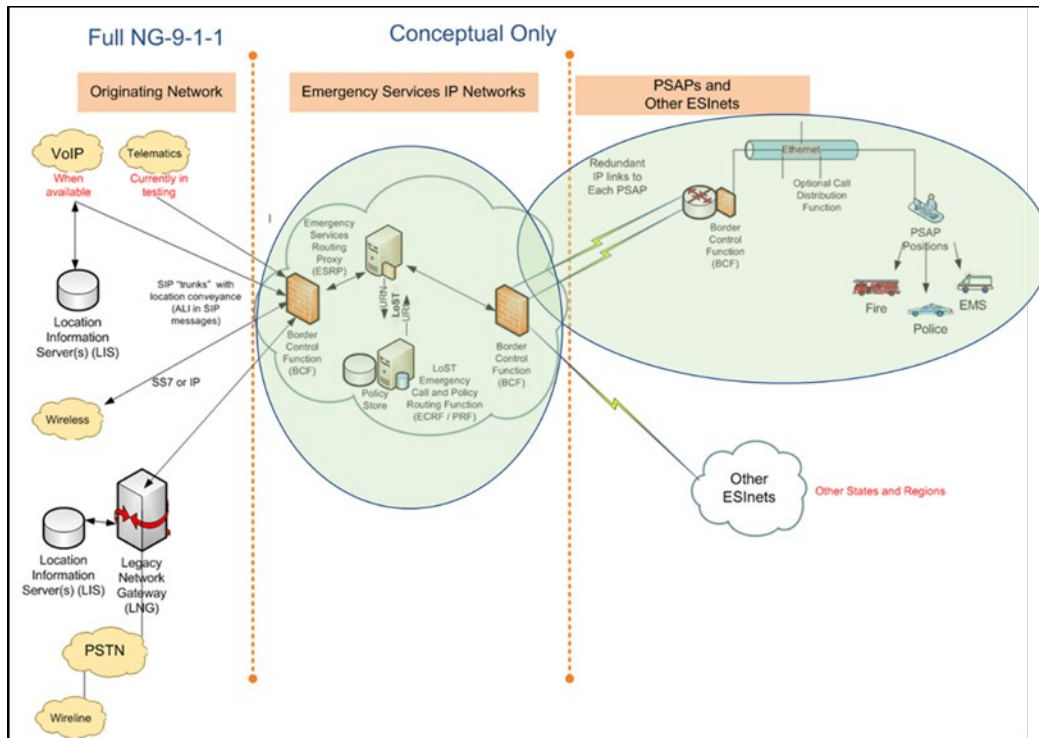
Figure 1 - Simplified NENA i3 NG911 Conceptual System Diagram

NENA STA 010.2-2016 encompasses requirements for many physical and logical elements of NG911 service, including the ESInet, the Border Control Function (BCF), the Session Border Control (SBC), the Emergency Service Routing Proxy (ESRP), the Emergency Call Routing Function (ECRF), Location Validation Function (LVF), Session Initiated Protocol (SIP), and Security.

3.3.1 i3v3 Accelerates the Drive Toward 21st-Century 9-1-1 Services

In July 2021, NENA released a new version of the i3 Standard for Next Generation 911. As North America's leading 9-1-1 standards-development body, NENA approved a landmark new version of its Next Generation 9-1-1 standard in order to accelerate the transition to smarter, faster, and more resilient emergency response. Version 3 of NENA's *i3 Standard for Next Generation 9-1-1* includes key updates to NG9-1-1 infrastructure, paving the way for interoperability on a national and international scale.

The new version will serve as the foundation of a 21st Century, broadband-based 9-1-1 ecosystem. Version 3 changes include:

- New REST/JSON architecture, following modern best practices for interface design;
- Cybersecurity improvements;
- Major updates to call bridging;
- Discrepancy Reports;
- Outgoing Call Interface Function;
- Blind transfer support;
- Updates to handle novel call types (including non-interactive calls and Advanced Automatic Crash Notifications); and
- Harmonization with European specifications.

Beyond these changes, the new version of i3 includes many more feature improvements and updates.

3.3.2 i3 ESInet Standards and Best Practices

According to NENA, an ESInet is a managed IP network that is used for emergency services communications and that can be shared by all public safety agencies.[14] NENA addresses the ESInet through a combination of specific standard language in STA-010.2-2016 and a best practices document titled *NENA Emergency Services IP Network Design for NG9-1-1 (NID), NENA 08-506* (released in December 2011).

The ESInet is the core of NG 911 and is needed to provide NG911 services to the PSAP. The ESInet is the IP transport infrastructure upon which independent application platforms and core functional processes will be deployed. An ESInet will provide for broadband speed transmissions and allow prioritized, efficient, and prompt delivery of texts, videos, pictures, and other data that will be used by 911 Telecommunicators at the PSAP and by responding units for safer and more effective emergency responses in the field.

Following are highlights from the i3 standard related to ESInets:
- Each PSAP must be connected to an ESInet.
- Origination networks are not included as part of the ESInet.
- ESInets must be accessible from the global Internet, with calls going through the Border Control Function (BCF).
- Connection to the Internet is acceptable, preferably through a Virtual Private Network (VPN).
- Access to ESInets must be controlled. Only public safety agencies and their service providers may be connected directly to the ESInet.
- Elements connected to the ESInet should not be referred to by their IP address, but through a hostname using DNS.
- There must be no single point of failure for any critical service or function hosted on the ESInet. Certain services designated as non-critical may be exempt from this requirement. However, the BCF, internal ECRF, ESRP, logging service, and security

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[14] *National Emergency Number Association, NENA Master Glossary of 9-1-1 Terminology NENA-ADM-000.24-2021, June 22, 2021, p. 73.*

services should never be exempt from this requirement. Services must be deployed to survive disaster, deliberate attack, and massive failure.

3.3.3 NG911 Security Standard

Out of necessity, PSAPs will be connected (indirectly through the ESInet) to the global Internet to accept calls. As a result, PSAPs will likely experience deliberate attacks on their systems. The types of vulnerabilities that NG911 systems must manage and protect against will fundamentally change and will require constant vigilance to create a secure and reliable operating environment. NG911 systems must have robust detection and mitigation mechanisms to deal with such attacks.

Cyber risks are inherent in systems such as the ESInet that are open to the internet. Safeguarding the NG911 system, including the PSAPs, from cyber-attacks is yet one more reason why it makes sense to have a singular statewide system that is managed and monitored by the Board; cyber security is costlier and more difficult to provide if done PSAP-by-PSAP.

The NENA i3 standard provides overall security requirements for NG911. There is also a separate standard, *NENA Security for Next-Generation 9-1-1 Standard (NG-SEC)*, NENA 75-001, which addresses security requirements.

The i3 security standard deals with authentication and authorization functions. Pursuant to this standard, all transactions must be protected with authentication, authorization, integrity protection, and privacy mechanisms specified in the i3 document. In addition, common authentication (single sign-on) and common rights management and authorization functions must be used for all elements in the network.

The NENA NG-SEC standard establishes minimum guidelines and requirements for the protection of NG911 assets and elements, and to provide a basis for auditing and assessing levels of security and risk. Certain applications may require access from external, public transport networks such as the Internet. These applications are placed on special, external network segments referred to as Demilitarized Zones (DMZs). The DMZ provides an intermediate environment for interaction with external domains without permitting access to internal domains or networks. This layering technique can improve the security posture of a system that requires an application to face the Internet without exposing the internal network. When applications require access from external, public transport networks (i.e., Internet), they shall be placed on a DMZ, or shall employ network-based encryption and authentication mechanisms such as a VPN.

The equipment supporting virtual or logical networks can pose a unique risk. All guidelines for the use of firewalls, intrusion detection, remote access, and all other relevant security principles shall be followed when designing interaction between virtual networks. The routers and switches supporting these networks can be used as "islands" to hop between networks of different security classification. The NENA NG-Sec standard lists the various ways that these risks can be managed.

Appendix C—NENA NG911 Standards and Best Practices Reference Chart contains a spreadsheet with the various NENA Standards as they relate to NG911.

3.4 NG911 Considerations

Internet Protocol and broadband technologies will have tremendous beneficial impacts to current 911 service and PSAP operations. At the same time, these new technologies have the potential to pose significant challenges to PSAPs. It is important for policy makers and elected and appointed officials at all levels of government to understand that the Board and PSAPs must have the resources needed to maximize benefits, minimize costs and challenges, and effectively incorporate and use NG911 technologies.

In 2017, APCO published the report, *PROJECT 43™ Broadband Implications for the PSAP: Analyzing the Future of Emergency Communications,*[15] and identified the following six areas of impact:

- Operations
- Governance
- Cybersecurity
- Technology
- Training
- Workforce

3.4.1 NG911 & Operations

According to APCO, NG911 will have its biggest impact on 911 operations because of the PSAP's role as the first layer in emergency response. NG911 will allow PSAPs to leverage information sharing resources such as electronic health records; building records and floor plans; camera systems and detectors; body-worn cameras; and video from surveillance systems. As a result, PSAPs will need to amend their Standard Operating Procedures (SOPs) to account for new sources of information, increased call processing times, and more mutual aid incidents, to name a few. The revised SOPs must ensure that the handling, disseminating, and storage of all the information received with a call meets statutory requirements.

Increased call processing times, in turn, have the potential to increase call answering times, which in turn, could require the hiring of more 911 call-takers. In addition, PSAPs may need to create new positions to process and analyze all the various pieces of data that will arrive with a 911 call. Obviously, training PSAP personnel for the changes resulting from NG911 service is critical. 911 Telecommunicators will need to be trained on how to process all the new additional information in a fast-paced, stressful, and high-emotion environment.

When wireless E911 was implemented, PSAPs experienced an increase in multiple 911 calls about a given incident. This trend is expected to continue, and PSAPs will need to be prepared to handle multiple pictures, videos, texts, and calls to 911 about any given incident. Finally, the potential exists for non-emergency calls to increase, due to the increased use of social media applications. PSAP staff will have to balance the need to focus on emergencies with the public's expectation for an immediate response to those non-emergencies. In other words, in today's environment,

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[15] Association of Public Safety Communications Officials, *PROJECT 43™ Broadband Implications for the PSAP: Analyzing the Future of Emergency Communications*, 2017.

PSAPs may get complaints about it taking longer than expected for a 911 call to be answered. In the future, PSAPs should expect to receive complaints about long waits for responses to non-emergency texts, for example.

3.4.2 NG911 & Governance

APCO emphasized that states that have established a state 911 authority have made the most progress in implementing NG911, provided there is input from PSAPs and other stakeholders. Such state authorities must remove statutory or regulatory barriers that can impede the modernization of 911 service. Examples include regulations that treat 911 service as a single-provider system accompanied by legacy requirements; 911 system service provider (SSP) certification restrictions; references to tariffs and Local Access Transport Areas (LATAs); lack of parity among carriers regarding liability; and rules that implicitly prohibit the use of IP-routing and NG911 architecture.

State authorities must also enact or amend laws and rules that will ensure that NG911 can be implemented statewide with seamless and secure interoperability. Examples include liability parity across all communications and NG911 providers; mutual aid agreements; and records retention laws, public records, and public information requests, because a 911 call will involve more than just voice.

One of the key lessons learned from past 911 implementation is the importance of statewide coordination to maintain focus and priorities for funding and support of 911 emergency services. Other benefits of statewide coordination include improved service uniformity and quality across the entire state, along with a potential reduction in costs associated with implementation of a NG 911 system. Statewide coordination and management of the NG911 system will help ensure the security and reliability of the ESInet. Statewide coordination will focus efforts; maintain priorities; ensure the timely achievement of NG911 goals; and ensure that every resident in the state will have equal access to NG 911 services. Finally, the presence of state-level standards and requirements will help ensure that desired future interoperability will be achieved and will provide economic incentives for host-sharing and regional collaboration, while simultaneously ensuring local autonomy and control of emergency response.

3.4.3 NG911 & Technology

As stated previously, the ESInet is the building block of NG911 and will replace the traditional network transport mechanisms. The ESInet provides interoperability between and among PSAPs on the same ESInet. The ESInet also facilitates hosted CPE solutions, which have the potential to bring about a higher level of reliability by placing core systems at redundant hosted locations. Doing so, in turn, provides operational continuity in local- or large-scale disasters. Hosted CPE solutions also reduce costs for the affected PSAPs because they are sharing equipment and could tend to minimize the need for hot back-up PSAPs. It is important for the 911 Board to work with the NG911 system vendor and PSAPs to establish interconnection policies, procedures, and best practices, including cyber-security, based on applicable NENA standards.

NG911 also provides opportunities for interconnectivity with other entities or agencies that are not PSAPs, and with other networks that serve public safety. Interconnectivity with entities not on the 911 ESInet or with other ESInets or public safety networks is complex and is associated with significant cybersecurity risk. It is important for the Board to investigate such possibilities in the future after the NG911 system has been implemented and accepted. The Board will need to work with the NG911 vendor, PSAPs, and the entities considering interconnection. The Board and NG911 vendor will need to define the interconnection terms, responsibilities, technical requirements, conditions, and costs to address how agencies will join the network, along with interconnection policies, shared responsibilities and costs, and cyber-security, for example. In addition, the Board will need to work with the NG911 system vendor to establish Service Level Agreements (SLAs) for allowed interconnections.

NG911 requires a GIS system that includes a GIS database with a map layer that defines the geographical jurisdictional boundaries of each PSAP in the state. One of the major administrative tasks in NG911 is the maintenance of the GIS database, which will largely replace the MSAG. In addition, the GIS system must be able to reliably convert civic or street addresses to coordinate locations (e.g., lat/long) to plot or map the caller's location accurately. It is important for the 911 Board to ensure that the GIS data development and maintenance associated with NG911 meets NENA standards.

In the NG911 PSAP, 911 calls (or, rather, 911 requests for assistance) will need to be answered, processed, dispatched, and stored using equipment that is capable of receiving and interpreting the data that will be delivered with the call. The CPE must also provide standard interfaces to existing CAD and mapping applications. At the same time, until the legacy 911 system is decommissioned, the CPE must be capable of handling legacy 911 calls as well.

In NG911, CAD systems will need to be capable of exchanging data with the CPE using open standards, which means future CAD systems will need to be XML-capable. Another major component of the NG911 PSAP will be logging and storing all data and new data streams, which will require logging recorders that are capable of recording data in addition to voice, as well as recording keystrokes of the CAD and CPE systems.

3.4.4   NG911 & Training

911 Telecommunicators provide the only link for the public to access or request emergency services; these essential PSAP employees are the true first responders. It is well-established that training 911 Telecommunicators is fundamental to the success of 911 service. The ability to maintain quality services for both the public and emergency responders is dependent upon the training provided, both at initial hire and on-going.

According to APCO, NG911 will provide a more immersive environment for 911 call-takers and dispatchers, who may see much of what responders see while on scene. While this additional information will ultimately improve or enhance emergency response, PSTs will be exposed to even more stress than they currently face. Both APCO and NENA have reiterated the importance of establishing a comprehensive stress management program. In 2013, NENA issued *NENA Standard on 9-1-1 Acute/Traumatic and Chronic Stress Management, NENA-STA-002.1-2013* to

provide awareness of the serious risks posed by work-related stress on the mental and physical health of 911 Telecommunicators in their role as the nation's first first-responders.[16] The NENA standard also establishes best practices for PSAP comprehensive employee stress management programs.

It is essential for the long-term success of NG911 that state and local elected and appointed officials and PSAP authorities view training as a necessary and required investment to provide a consistent level of 911 service across the state. Without adequate training of PSAP personnel, even the best technical solution will fail. NG911 will require additional training of all 911 Telecommunicators to learn how to process different types of requests for assistance, such as texting, videos, social media, and other applications yet to be invented. Regardless of PSAP size, training across PSAPs in the state should include minimum baseline training so that 911 call-takers and dispatchers can proficiently answer, process, and dispatch calls from other jurisdictions in the NG911 environment, as well as maintain proficiency with legacy technology. Finally, because of the nature of NG911 service itself, all PSAP personnel must receive basic training in cybersecurity.

3.4.5 NG911 & the Workforce

Currently, PSAPs across the nation are faced with high-turnover and burn-out. Relatively low pay, limited career growth opportunities, and a fast-paced, life-or-death stressful environment have limited the ability of PSAPs to recruit and retain qualified 911 Telecommunicators. The critical nature of 911 service requires a special kind of employee with a unique set of knowledge, skills, and abilities; NG911 will add to the workforce challenges.

PSAPs may need to modify their hiring processes, may have to hire additional 911 Telecommunicators, may have to add new positions, such as data analyst, and may have to increase job requirements for 911 Telecommunicators, as they will now have to manage and analyze all the additional data that will arrive with the request for service.

At the same time, NG911 may provide more options for career growth and enhancement for PSAP personnel, due to the role they will play in aiding, enhancing, and improving emergency response in the field. According to APCO, in addition to current knowledge, skills, and abilities, the 911 Telecommunicator in a NG911 PSAP will need to have the following:

- Basic knowledge of IT systems, technology administration, cybersecurity, and GIS and related mapping tools;
- Proficiency with social media tools;
- Ability to examine various types of data for quality, authenticity, and reliability;
- Ability to interpret the meaning of arriving data and determining the best agency to respond and the type of response; and
- Ability to collaborate with counterparts in other PSAPs, EOCs, or jurisdictions.

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[16] National Emergency Number Association, *NENA Standard on 9-1-1 Acute/Traumatic and Chronic Stress Management, NENA-STA-002.1-2013*, August 5, 2013, p. 8.

3.5 NG911 Funding Considerations in North Carolina

Local governments receive monthly distributions (per G.S. §143B-1406) for eligible 9-1-1 expenses. Local governments must allocate funds for other expenses associated with PSAP operations, such as personnel costs, physical facilities and other expenses excluded from eligible expenses by G.S. §143B-1406.

Upgrading PSAP CPE and CAD systems is as important as building out the NG911 network; it will not serve the state's residents to have a robust, secure ESInet that can deliver a plethora of data when PSAPs and emergency responders are limited by outdated analog equipment. It is not clear if the current 911 service charge revenue can support the necessary upgrades to NG911-capable CPE and CAD systems. Adding to this challenge for PSAPs is how to pay for the training that will be required of all PSAP employees in a NG911 PSAP. Currently, PSAPs pay for on-the-job training, but this training does not include the standardized training that will be needed for NG911. 911 Telecommunicators will need extensive one-time and on-going training to process this new and unfamiliar content, such as photos and videos. The implementation of NG911 service will require PSAPs to revise their current standard operating procedures and provide training on those changes. Effective public policy must recognize these realities and the statutory framework must assure adequate and sustainable funding to support equal access to a consistent level of 911 throughout the entire state.

It is important to repeat that the Board and PSAPs will be paying for both the current legacy 911 system and the new NG911 system until transition is 100 percent complete statewide. Because the existing legacy 911 network will have to co-exist with the NG911 network, operating costs during the transition will be higher. Due to the parallel cost associated with the implementation of the NG911 network, the current funding model is being and will continue to be evaluated to ensure available funding for 911 services, NG911 services, PSAP Operations, and Board operations. A 3-year forecast is completed and presented to the Board for decision making related to possible changes in the service charge rate necessary for the upcoming fiscal years. The information is provided through various reports to the Board and General Assembly. It is anticipated that Board staff responsibilities and job requirements will increase with the responsibilities of implementing NG911. Funding a statewide NG911 implementation can be a challenge for a variety of reasons, such as limited Board resources; competing budgetary requirements; increased PSAP costs; the unwillingness of elected officials to approve service charge increases; and a concern that 911 revenue will be used for non-911 purposes.

The tables below and on the following pages provides historical information on 911 revenues and expenditures between FY 19-20 (FY ending June 30, 2020) and FY 20-21 (FY ending June 30, 2021). The data has not been adjusted for inflation and does not include expenditures for PSAP grants.

Cash basis of reporting:						
REVENUE	**July-20**	**August-20**	**September-20**	**October-20**	**November-20**	**December-20**
CMRS Wireless	0.00	0.00	0.00	0.00	0.00	0.00
CMRS (PSAP) Wireless	3,703,957.11	3,037,143.02	2,887,243.71	3,161,764.33	2,991,754.65	244,161.92
Wireline	614,662.16	499,831.63	465,005.38	392,418.16	458,439.36	257,467.79
VoIP	1,000,935.69	787,998.26	733,878.84	688,776.70	737,779.53	283,473.29
Prepaid Wireless	1,499,829.23	1,020,790.25	779,694.47	816,971.03	792,212.33	769,253.18
NG 911 Fund	1,395,092.02	2,085,230.33	2,230,932.17	2,319,928.70	2,283,366.72	712,657.19
Admin Account	68,882.67	74,021.73	74,098.80	77,054.77	75,840.41	23,670.41
Grant Account	435,966.27	731,569.56	796,761.49	828,545.97	815,488.11	254,520.43
Revenue Total (no	8,719,325.15	8,236,584.78	7,967,614.86	8,285,459.66	8,154,881.11	2,545,204.21
NG911 Fund Interest	64,893.33	57,000.91	48,171.13	41,868.24	36,337.94	29,666.57
CMRS Account Interest	5,916.18	4,942.46	4,058.58	2,876.10	2,470.26	1,931.48
PSAP Account Interest	15,933.15	16,542.96	14,575.60	425.36	868.41	1,026.14
Admin Account Interest	1,461.25	1,301.50	1,066.08	754.93	661.79	525.94
Grant Account Interest	29,501.97	26,026.83	21,904.13	18,801.78	16,568.52	13,357.96
Total Interest	117,705.88	105,814.66	89,775.52	64,726.41	56,906.92	46,508.09
Combined Total:	8,837,031.03	8,342,399.44	8,057,390.38	8,350,186.07	8,211,788.03	2,591,712.30
BD701 Report Total w/Interest	8,837,031.03	8,342,399.44	8,057,390.38	8,350,186.07	8,211,788.03	2,591,712.30
Difference:	0.00	0.00	0.00	0.00	0.00	0.00
EXPENDITURES	**July-20**	**August-20**	**September-20**	**October-20**	**November-20**	**December-20**
NG911 Fund Interest	-2,615,169.69	-210,751.08	-1,224,925.34	-2,797,496.25	-115,207.19	-1,232,491.74
CMRS Account Interest	-397,838.09	0.00	0.00	-90,502.16	-91,226.45	0.00
PSAP Account Interest	-4,246,371.10	-3,983,693.48	-3,993,019.11	-3,954,415.97	-4,040,728.69	-3,997,572.33
Admin Account Interest	-76,077.32	-77,691.71	-75,168.03	-71,012.90	-76,314.07	-77,473.17
Grant Account Interest	-863,302.27	-725.00	-525,473.50	-486,455.81	-299,036.50	-443,264.03
Total Expenditures	-8,198,758.47	-4,272,861.27	-5,818,585.98	-7,399,883.09	-4,622,512.90	-5,750,801.27
BD701 Report Total Expend	-8,198,758.47	-4,272,861.27	-5,818,585.98	-7,399,883.09	-4,622,512.90	-5,750,801.27
Difference:	0.00	0.00	0.00	0.00	0.00	0.00

Cash basis of reporting:							
REVENUE	January-21	February-21	March-21	April-21	May-21	June-21	Totals
CMRS Wireless	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CMRS (PSAP) Wireless	5,193,795.98	3,165,184.02	3,195,068.11	2,856,300.49	3,223,001.30	3,054,839.72	36,714,214.36
Wireline	606,566.46	427,329.44	458,240.31	413,456.35	415,330.67	465,485.07	5,474,232.78
VoIP	1,228,238.54	710,994.99	782,177.83	745,060.29	804,025.02	741,657.59	9,244,996.57
Prepaid Wireless	646,668.61	445,726.50	1,272,817.50	778,185.35	743,522.60	829,617.89	10,395,288.94
NG 911 Fund	3,519,036.33	2,177,477.96	2,617,201.67	2,197,544.95	2,377,675.25	2,334,449.11	26,250,592.40
Admin Account	116,882.28	72,323.37	86,928.49	72,989.88	78,972.78	77,537.06	899,202.65
Grant Account	1,256,798.69	777,670.69	934,714.88	784,837.49	849,169.74	833,731.83	9,299,775.15
Revenue Total (no	12,567,986.89	7,776,706.97	9,347,148.79	7,848,374.80	8,491,697.36	8,337,318.27	98,278,302.85
NG911 Fund Interest	26,004.53	21,844.43	17,447.95	17,220.13	13,744.57	14,048.05	388,247.78
CMRS Account Interest	1,703.72	1,397.86	1,002.38	867.83	625.08	577.29	28,369.22
PSAP Account Interest	135.36	1,117.14	1,032.67	1,340.76	1,166.44	1,357.83	55,521.82
Admin Account Interest	447.03	398.35	311.24	298.54	237.39	233.68	7,697.72
Grant Account Interest	11,723.34	10,432.80	8,280.82	7,825.42	6,328.49	6,137.69	176,889.75
Total Interest	40,013.98	35,190.58	28,075.06	27,552.68	22,101.97	22,354.54	656,726.29
Combined Total:	12,608,000.87	7,811,897.55	9,375,223.85	7,875,927.48	8,513,799.33	8,359,672.81	98,935,029.14
BD701 Report Total							
w/Interest	12,608,000.87	7,811,897.55	9,375,223.85	7,875,927.48	8,513,799.33	8,359,672.81	98,935,029.14
Difference:	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EXPENDITURES	January-21	February-21	March-21	April-21	May-21	June-21	Totals
NG911 Fund Interest	-5,755,069.03	-416,408.60	-356,037.62	-1,957,427.52	-421,540.60	-3,602,483.30	-20,705,007.96
CMRS Account Interest	-268,942.79	-424,458.48	-465,328.68	-404,195.21	-290,746.14	-244,283.05	-2,677,521.05
PSAP Account Interest	-3,997,090.43	-3,998,607.54	-3,998,607.54	-4,181,355.04	-3,998,607.54	-5,087,805.85	-49,477,874.62
Admin Account Interest	-71,408.32	-72,860.80	-88,868.94	-74,292.04	-100,407.76	-79,233.95	-940,809.01
Grant Account Interest	-114,023.59	-182,426.09	-1,563,377.00	-167,737.23	-1,986,466.62	-883,939.88	-7,516,227.52
Total Expenditures	-10,206,534.16	-5,094,761.51	-6,472,219.78	-6,785,007.04	-6,797,768.66	-9,897,746.03	-81,317,440.16
BD701 Report Total Expen	-10,206,534.16	-5,094,761.51	-6,472,219.78	-6,785,007.04	-6,797,768.66	-9,897,746.03	-81,317,440.16
Difference:	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Cash basis of reporting:						
Revenue	**July-19**	**August-19**	**September-19**	**October-19**	**November-19**	**December-19**
CMRS Wireless	640,474.96	624,531.55	610,275.75	544,846.45	524,639.06	583,723.66
CMRS (PSAP) Wireless	3,629,358.02	3,539,012.09	3,458,229.18	3,087,463.16	2,972,954.72	3,307,767.44
Wireline	651,001.04	763,761.15	879,875.62	635,037.11	591,475.12	595,066.30
VoIP	456,928.78	1,779,813.51	1,089,001.59	958,352.07	1,001,973.89	975,367.60
Prepaid Wireless	1,166,402.91	1,078,474.33	1,137,254.99	933,418.58	974,915.16	863,957.58
NG 911 Fund	734,474.29	873,803.90	805,234.27	1,155,665.13	1,138,185.19	1,186,956.11
Admin Account	66,102.70	78,642.33	72,471.08	62,213.30	61,272.32	63,897.81
Grant Account				327,438.46	322,485.81	336,304.24
Total (no interest)	7,344,742.70	8,738,038.86	8,052,342.48	7,704,434.26	7,587,901.27	7,913,040.74
NG911 Fund Interest	75,178.79	78,596.00	108,991.56	101,651.90	108,419.48	105,053.85
CMRS Account Interest	12,045.76	13,263.93	8,481.51	8,683.72	9,869.57	9,971.61
PSAP Account Interest	34,146.02	37,814.50	2,148.12	5,495.85	8,137.84	9,965.62
Admin Account Interest	2,784.74	2,862.46	2,906.93	2,687.02	2,771.85	2,633.61
Grant Account Interest	39,336.51	39,763.18	57,737.63	49,226.64	50,843.31	49,202.68
Total Interest	163,491.82	172,300.07	180,265.75	167,745.13	180,042.05	176,827.37
Combined Total	7,508,234.52	8,910,338.93	8,232,608.23	7,872,179.39	7,767,943.32	8,089,868.11
BD701 Report Total w/Interest	7,508,234.52	8,910,338.93	8,232,608.23	7,872,179.39	7,767,943.32	8,089,868.11
Difference:	0.00	0.00	0.00	0.00	0.00	0.00
EXPENDITURES	**July-19**	**August-19**	**September-19**	**October-19**	**November-19**	**December-19**
NG911 Fund Interest	-21,085.01	-687,515.79	-108,831.74	-27,680.92	-483,975.31	-86,813.29
CMRS Account Interest	-137,613.04	-500,809.07	-78,524.26	-89,750.24	-213,308.42	0.00
PSAP Account Interest	-4,353,456.68	-4,209,706.59	-4,394,082.08	-4,209,706.59	-4,209,706.59	-4,209,706.59
Admin Account Interest	-67,969.80	-87,325.84	**-68,813.18**	-87,915.27	-76,722.37	-77,680.59
Grant Account Interest	-415,482.99	-767,766.82	-2,485,701.43	-761,468.07	-54,115.37	-490,124.52
Total Expenditures	-4,995,607.52	-6,253,124.11	-7,135,952.69	-5,176,521.09	-5,037,828.06	-4,864,324.99
BD701 Report Total Expend	-4,995,607.52	-6,253,124.11	-7,135,952.69	-5,176,521.09	-5,037,828.06	-4,864,324.99
Difference:	0.00	0.00	0.00	0.00	0.00	0.00

Cash basis of reporting:							
Revenue	**January-20**	**February-20**	**March-20**	**April-20**	**May-20**	**June-20**	**Totals**
CMRS Wireless	572,880.09	559,622.37	0.00	0.00	0.00	-132,623.65	4,528,370.24
CMRS (PSAP) Wireless	3,246,320.54	3,171,193.47	3,536,245.83	3,446,250.84	3,712,022.35	2,950,362.29	40,057,179.93
Wireline	651,442.82	485,936.78	594,382.37	485,272.50	642,545.28	446,757.26	7,422,553.35
VoIP	962,702.90	905,725.47	969,988.58	922,936.00	982,492.54	703,258.20	11,708,541.13
Prepaid Wireless	1,060,931.45	862,004.01	1,128,199.90	1,008,626.51	899,015.73	297,227.91	11,410,429.06
NG 911 Fund	1,218,552.94	1,133,424.68	1,274,275.27	1,199,454.95	1,275,760.32	1,939,739.32	13,935,526.37
Admin Account	65,598.76	60,449.32	62,917.35	59,223.10	62,990.67	43,080.66	758,859.40
Grant Account	345,256.65	377,808.45	398,211.02	374,829.67	398,675.11	1,128,361.39	4,009,370.80
Total (no interest)	8,123,686.15	7,556,164.55	7,964,220.32	7,496,593.57	7,973,502.00	7,376,163.38	93,830,830.28
NG911 Fund Interest	106,071.96	104,965.54	97,662.42	109,307.11	90,485.71	84,294.03	1,170,678.35
CMRS Account Interest	10,838.93	11,200.80	11,161.75	12,914.61	10,509.57	9,760.86	128,702.62
PSAP Account Interest	12,358.49	14,689.75	15,331.97	21,101.33	19,408.08	21,124.91	201,722.48
Admin Account Interest	2,592.62	2,506.35	2,279.88	2,568.64	2,046.15	1,924.46	30,564.71
Grant Account Interest	48,603.68	47,129.78	43,962.49	51,116.14	41,462.42	38,961.17	557,345.63
Total Interest	180,465.68	180,492.22	170,398.51	197,007.83	163,911.93	156,065.43	2,089,013.79
Combined Total	8,304,151.83	7,736,656.77	8,134,618.83	7,693,601.40	8,137,413.93	7,532,228.81	95,919,844.07
BD701 Report Total w/Interest	8,304,151.83	7,736,656.77	8,134,618.83	7,693,601.40	8,137,413.93	7,532,228.81	95,919,844.07
Difference:	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EXPENDITURES	**January-20**	**February-20**	**March-20**	**April-20**	**May-20**	**June-20**	**Totals**
NG911 Fund Interest	-53,423.60	-703,194.37	-3,492,056.58	-65,035.69	-2,979,044.93	-1,882,261.74	-10,590,918.97
CMRS Account Interest	-149,594.37	0.00	0.00	0.00	-220,734.59	-1,472,025.07	-2,862,359.06
PSAP Account Interest	-4,209,706.59	-4,209,706.59	-4,209,706.59	-4,209,706.59	-4,243,180.00	-4,715,671.19	-51,384,042.67
Admin Account Interest	-75,066.86	-86,311.56	-104,539.81	-91,858.94	-87,312.20	-62,228.00	-973,744.42
Grant Account Interest	-430,766.65	-107,034.77	-248,224.17	-474,317.63	-919,002.84	-1,597,929.63	-8,751,934.89
Total Expenditures	-4,918,558.07	-5,106,247.29	-8,054,527.15	-4,840,918.85	-8,449,274.56	-9,730,115.63	-74,563,000.01
BD701 Report Total Expen	-4,918,558.07	-5,106,247.29	-8,054,527.15	-4,840,918.85	-8,449,274.56	-9,730,115.63	-74,563,000.01
Difference:	0.00	0.00	0.00	0.00	0.00	0.00	0.00

4   GOALS AND OBJECTIVES FOR 911 SERVICE

At the end of 2021 the ESInet will serve 118 of 127 PSAPs in the state. The remaining PSAPs are scheduled to join during the first part of 2022, culminating a three-year build and implement phase of the ESInet. The Board and staff are transitioning to the "run and manage" phase of the ESInet, an operational phase that exist indefinitely. During the "run and manage" phase the Board and staff will also be required to consider emerging technologies, services, and operational methodologies as additional services on the ESInet.

Goals and objectives are important in strategic planning because they turn the Board's vision for NG911 into specific measurable targets or steps. Goals build on the vision and mission by defining and prioritizing the broad direction in response to specific priorities. Goals describe the general accomplishments to be achieved if the vision is to be achieved. Objectives articulate specific steps that are needed to complete each goal and include the owner-agency and the planned timeline. Objectives should be SMART: Specific; Measurable; Actionable; Realistic; and Time-Bound.

GOAL 1			
Provide and pay for a statewide hosted Next Generation 911 system			
Objective Number	**Description**	**Ownership**	**Timeline**
1	Transition the NG911 system from the build and implementation phase to the operation and management (run and manage) phase for governance, maintenance, and interoperability	911 Board 911 Board Staff *Technology Committee Goal 1A & 1B*	Ongoing
2	Implement a comprehensive Cybersecurity program for the fundamental security of the ESInet, interconnected networks, software, applications, and PSAP users of the ESInet.	911 Board 911 Board Staff *Technology Committee Goal 4*	Ongoing
3	Explore and investigate future possible interconnection of PSAP users of the ESInet with other ESInet users, with entities and agencies not on the ESInet, and with other networks after complete acceptance of the NG911 System from the NG9 1 1 System Vendor	911 Board Staff *Technology Committee Goal 2*	Ongoing
4	Sustain the statewide GIS database that is used as a core service of the NG911 System, to be based on the NENA i3 Standard and other NENA NG911 Standards as they relate to GIS	911 Board 911 Board Staff GIS Vendor	Ongoing
5	Facilitate the development, framework, and timeline for statewide data sharing between PSAPs	911 Board 911 Board Staff PSAPs *Technology Committee Goals 1A and 1B*	Ongoing

GOAL 2			
Manage Board staff to provide for the reorganization and expansion of job responsibilities to better serve PSAPs			
Objective Number	**Description**	**Ownership**	**Timeline**
1	PSAP Review – The lack of volunteer peer reviewers has adversely impacted the PSAP review process. Consideration will be given to the best methods of resuming PSAP reviews following the COVID-19 pandemic and to sustaining continuity and effectiveness of PSAP reviews. Methods may include transitioning the PSAP review process to Board staff, or other agents	911 Board 911 Board Staff *Standards Committee Goal 1 & 2*	2022
2	Continue evaluating the responsibilities required of the administrative, technical, and NMAC staff in providing services to PSAPS and other network partners and the role of the Board in future development	911 Board 911 Board Staff	Ongoing

GOAL 3			
Amend state law (G.S. §143B-1400 et seq.) to reflect changes in 911 service, PSAP operations, and Board responsibilities in the Next Generation 911 environment			
Objective Number	**Description**	**Ownership**	**Timeline**
1	In consideration of the 911 Fee Diversion Rules (47 CFR 9.1 et seq.) set forth by the Federal Communications Commission, the Board will evaluate acceptable expenses, as identified in §9.23, and the current state law to identify potential legislative initiatives	911 Board 911 Board Staff *Funding Committee Goal 1*	2022
2	Identify changes in technologies that improve or enhance 911 call taking and whether legislative initiatives or regulations may be needed to implement such new technologies	911 Board 911 Board Staff *Technology Committee Goal 3*	Ongoing

GOAL 4			
Develop a revenue and funding model for 911 service, NG911 service, PSAPs, and 911 Board operations			
Objective Number	**Description**	**Ownership**	**Timeline**
1	Continue reviewing the funding model, taking into consideration the ongoing implementation of new and emerging 911 technologies.	911 Board 911 Board Staff *Funding Committee* *Goal 3*	Ongoing

GOAL 5			
Implement outreach and public education programs to keep the public, NG9 1 1 stakeholders, and industry partners informed about the Board's NG911 efforts			
Objective Number	**Description**	**Ownership**	**Timeline**
1	Improve communications between the Board, PSAPs, public safety officials, and industry partners to ensure that all stakeholders are kept informed and that the information is provided in a timely manner	911 Board 911 Board Staff *Education Committee* *Goal 1*	Ongoing
2	Use the CRM to create a database of PSAP profile elements that can be shared with PSAP Managers to assist with continuity of operation planning and other PSAP operations	911 Board 911 Board Staff PSAPs	2022
3	Explore strategies and develop procedures, implement, and provide PSAP outreach to assist with management of low/high PSAP fund balances using the financial planning tool.	911 Board 911 Board Staff *Funding Committee* *Staff Goal*	Ongoing
4	Expand the Recruitment Public Service Announcement initiative based on data collected during the pilot program.	911 Board Staff *Education Committee* *Goal 3*	Ongoing
5	Explore additional methods for public outreach utilizing nontraditional media outlets.	911 Board Staff *Education Committee* *Goal 4*	Ongoing
6	Explore the feasibility of creating a voluntary telecommunicator training certificate and/or certification in collaboration with the Community College system	911 Board Staff *Education Committee* *Goal 2*	2022

GOAL 6			
Facilitate the consolidation or regional collaboration of PSAPs			
Objective Number	**Description**	**Ownership**	**Timeline**
1	Explore ways to further expand the NG911 system in support of PSAPs and other public safety partners	911 Board 911 Board Staff PSAPs *Funding Committee* *Goal 4*	Ongoing
2	Identify consolidation alternatives available in NG911 operations, e.g., co-locations, virtualization, shared systems, etc	911 Board 911 Board Staff PSAPs *Funding Committee* *Goal 2*	Ongoing

GOAL 7			
Explore and investigate the interconnection of PSAP users of the ESInet with other ESInet users and with other partners and networks serving public safety			
Objective Number	**Description**	**Ownership**	**Timeline**
1	Transition the NG911 system from the build and implementation phase to the operation and management (run and manage) phase for governance, maintenance, and interoperability	911 Board Staff	Ongoing
2	Explore ways to further expand the NG911 system in support of PSAPs and other public safety partners	911 Board 911 Board Staff	Ongoing
3	Work with NG911 system vendors to determine and define technical requirements, responsibilities, conditions, costs, and Service Level Agreements (SLAs) for future interconnectivity with the ESInet	911 Board 911 Board Staff	Ongoing
4	Facilitate a plan for integration methodologies and standards for extension of calls to non-traditional PSAP environments to ensure the integrity of the ESInet, to ensure integrity, security, and regulatory standards and align with the Statewide Communications Interoperability Plan (SCIP).	911 Board 911 Board Staff *Technology Committee Goal 2*	2022
5	Collaborate with other State agencies to coordinate public safety projects, e.g., systems, services, and grants to minimize duplicate efforts and ensure all jurisdictions can provide the same of level of service to 911 callers	911 Board 911 Board Staff	Ongoing

GOAL 8			
Prioritize mental health/wellness programs for Telecommunicators			
Objective Number	**Description**	**Ownership**	**Timeline**
1	Collaborate with public safety associations (i.e., APCO, NENA) to increase the awareness and place importance on the mental health and wellness of telecommunicators	911 Board 911 Board Staff PSAPs	2022
2	Facilitate a stakeholder working group to develop a strategic plan for the Board and staff's role in facilitating awareness and educational opportunities in telecommunicator mental health and wellness	911 Board 911 Board Staff PSAPs	2022

Goal 9			
Explore the feasibility of establishing PSAP levels base on operation and technical capabilities			
Objective Number	**Description**	**Ownership**	**Timeline**
1	Facilitate stakeholder discussions to assist in establishing PSAP levels of service	911 Board Staff *Standards Committee Goal 3*	2022

5 MECHANISM FOR MANAGING AND COORDINATING NORTH CAROLINA'S 911 SYSTEM

The purpose of this section is to provide a brief description of the mechanisms that are in place to ensure that local, regional, and state-level system functions are coordinated, mutually supportive, comprehensive in scope, and efficient in operation.

Board staff are responsible for executing the Plan and taking the lead in updating the Plan as progress is made on achieving the Board's goals. Goals and objectives that are achieved should be documented, and any new objectives should be added.

The Board has allocated its resources to successfully implement its goals, with the focus on NG911. The Board is also held accountable for its activities and operations. The Board is required to report to the Legislature every two years and is subject to audit by the State Auditor. As an agency of state government, the Board is subject to state open meetings laws and the Public Records Act. Rulemaking takes place under the Administrative Procedures Act, which involves a public process that allows stakeholder and public input.

APPENDIX

Appendix A—Document Change History

Version	Publication Date	Description of Change

Appendix B—North Carolina Population by County: 2020

County Name	2020 Population	Growth Rate Percentage Since 2010
Wake County	1,152,740	27.11
Mecklenburg County	1,143,570	23.86
Guilford County	546,308	11.58
Forsyth County	388,453	10.55
Cumberland County	339,667	3.81
Durham County	330,506	21.80
Buncombe County	265,055	11.02
Union County	247,917	22.67
New Hanover County	238,907	17.52
Gaston County	228,327	10.78
Cabarrus County	226,165	26.66
Johnston County	222,633	31.21
Onslow County	199,984	7.01
Iredell County	188,754	18.14
Pitt County	183,076	8.42
Alamance County	175,499	15.89
Davidson County	170,111	4.47
Catawba County	161,279	4.23
Brunswick County	154,700	43.15
Orange County	149,468	11.56
Randolph County	144,503	1.77
Rowan County	144,008	4.10
Harnett County	139,256	20.30
Robeson County	128,107	-4.75
Wayne County	122,919	0.03
Henderson County	119,251	11.56
Moore County	105,030	18.55
Craven County	101,741	-2.33
Cleveland County	98,803	0.90
Nash County	94,706	-1.13
Rockingham County	91,796	-1.99
Burke County	90,645	0.07
Lincoln County	90,149	15.38
Wilson County	82,619	1.63
Caldwell County	82,482	-0.65
Chatham County	77,156	20.85
Franklin County	73,805	21.32
Surry County	71,431	-3.18
Carteret County	69,543	4.26
Wilkes County	68,110	-1.67
Rutherford County	67,537	-0.30
Pender County	65,146	24.29
Stanly County	64,058	5.74
Sampson County	63,903	0.58
Haywood County	63,171	7.19
Lee County	62,921	8.72
Granville County	61,371	6.41
Duplin County	58,241	-0.72
Watauga County	56,463	10.77
Hoke County	56,312	18.56

County Name	2020 Population	Growth Rate Percentage Since 2010
Lenoir County	55,867	-6.09
Columbus County	54,886	-5.36
Edgecombe County	50,448	-10.90
Halifax County	48,762	-10.48
Beaufort County	46,870	-1.99
McDowell County	46,338	2.74
Stokes County	45,751	-3.36
Richmond County	44,711	-4.13
Jackson County	44,614	10.52
Vance County	44,335	-2.11
Davie County	43,412	5.23
Pasquotank County	40,306	-0.79
Person County	39,598	0.47
Yadkin County	38,039	-1.03
Alexander County	37,829	1.60
Dare County	37,813	11.27
Macon County	37,026	9.03
Scotland County	34,967	-3.04
Transylvania County	34,809	5.21
Bladen County	31,864	-9.43
Currituck County	29,257	23.58
Cherokee County	29,098	6.06
Ashe County	27,411	0.67
Montgomery County	27,365	-1.31
Anson County	24,398	-9.14
Hertford County	23,275	-6.01
Caswell County	22,544	-5.08
Martin County	22,000	-10.23
Madison County	21,935	5.57
Greene County	20,995	-1.24
Polk County	20,836	1.76
Warren County	19,555	-6.82
Northampton County	19,053	-13.55
Bertie County	18,629	-12.31
Yancey County	18,461	3.68
Avery County	17,615	-1.03
Mitchell County	14,900	-3.95
Swain County	14,315	2.21
Chowan County	13,699	-7.05
Perquimans County	13,627	1.09
Pamlico County	12,912	-1.50
Gates County	11,560	-4.97
Clay County	11,445	7.89
Camden County	11,249	12.39
Washington County	11,202	-14.61
Alleghany County	11,135	-0.02
Jones County	9,031	-10.96
Graham County	8,401	-5.26
Hyde County	4,759	-18.10
Tyrrell County	3,818	-13.5221

Appendix C—NENA NG911 Standards and Best Practices Reference Chart

DATA STRUCTURES DOCUMENTS (including NG911)		
02-010	Standard Legacy Data Formats For 9-1-1 Data Exchange GIS Mapping	2011/03/28
02-501	Wireless (Pre-XML) Static and Dynamic ALI Data Content Information Document	2006/10/16
02-503	XML Namespaces Information Document	2007/02/23
04-005	ALI Query Service Standard	2006/11/21
71-001	NG9-1-1 Additional Data Standard	2009/09/17
NENA-STA-004.1-2014	NENA Next Generation United States Civic Location Data Exchange Format (CLDXF)	2014/03/23
NENA-STA-008.2-2014 (orig. 70-001)	NENA Registry System (NRS) Standard	2014/10/06
NENA/APCO-INF-005	NENA/APCO Emergency Incident Data Document (EIDD) Information Document	2014/02/21
DATA MANAGEMENT DOCUMENT (including NG911)		
02-011	Data Standards for Local Exchange Carriers, ALI Service Providers & 9-1-1 Jurisdictions	2012/05/12
02-013	Data Standards for the Provisioning and Maintenance of MSAG Files to VDBs and ERDBs	2008/06/07 Reviewed 9/12/2014
02-014	GIS Data Collection and Maintenance Standards	2007/06/17
02-015	Standard for Reporting and Resolving ANI/ALI Discrepancies and No Records Found for Wireline, Wireless and VoIP Technologies	2009/06/06
02-502	NENA Company ID Registration Service Information Document	2008/11/12
06-001	Standards for Local Service Provider Interconnection Information Sharing	2004/08/01
71-501	Synchronizing Geographic Information System Databases with MSAG & ALI Information Document	2009/09/08
71-502	An Overview of Policy Rules for Call Routing and Handling in NG9-1-1 Information Document	2010/08/24
NENA-INF-011.1-2014	NENA NG9-1-1 Policy Routing Rules Operations Guide	2014/10/06
NENA-INF-014.1-2015	NENA Information Document for Development of Site/Structure Address Point GIS Data for 9-1-1	2015/09/18
NENA-STA-003.1.1-2014	NENA Standard for NG9-1-1 Policy Routing Rules	2014/12/01
NENA-REQ-002.1-2016	NENA Next Generation 9-1-1 Data Management Requirements	2016/03/10
NG911 TRANSITION PLANNING DOCUMENTS		
NENA-INF-008.2-2014 (originally 77-501)	NG9-1-1 Transition Plan Considerations Information Document	2013/11/20

SECURITY DOCUMENTS		
04-503	Network/System Access Security Information Document	2005/12/01
75-001	Security for Next-Generation 9-1-1 Standard	2010/02/06
75-502	Next Generation 9-1-1 Security Audit Checklist Information Document	2011/12/14
VOICE OVER INTERNET PROTOCOL (VoIP) DOCUMENTS		
08-001	Interim VoIP Architecture for Enhanced 9-1-1 Services (i2) Standard	2010/08/11
08-503	VoIP Characteristics Information Document	2004/06/10
08-504	VoIP Standards Development Organization Information Document	2004/06/08
57-503	Procedures for Notification of ERDB & VPC Operators of ESN Changes by 9-1-1 Administrator Information Document	2008/01/08
58-502	VoIP Funding and Regulatory Issues Information Document	2006/06/06
NEXT GENERATION 9-1-1 (NG911) DOCUMENTS		
08-002	Functional and Interface Standards for Next Generation 9-1-1	2007/12/18
08-003	Detailed Functional and Interface Standards for the NENA i3 Solution	2011/06/14
08-501	Interface between the E9-1-1 Service Provider Network and the Internet Protocol (IP) PSAP Information Document	2004/06/15
08-505	Methods for Location Determination to Support IP-Based Emergency Services Information Document	2006/12/21
08-506	Emergency Services IP Network Design for NG9-1-1 Information Document	2011/12/14
08-751	NENA i3 Requirements Document	2006/09/28
08-752	Location Information to Support IP-Based Emergency Services Requirements Document	2006/12/21
57-750	NG9-1-1 System and PSAP Operational Features and Capabilities Requirements Document	2011/06/14
NENA-INF-003.1-2013	Potential Points of Demarcation in NG9-1-1 Networks Information Document	2013/03/21
NENA-INF-006.1-2014	NG9-1-1 Planning Guidelines Information Document	2014/01/08
NENA-INF-009.1-2014	Requirements for a National Forest Guide Information Document	2014/08/14
NENA/APCO-REQ-001.1.1-2016	NENA/APCO NG9-1-1 PSAP Requirements Document	2016/01/15
WIRELESS 9-1-1 INTEGRATION DOCUMENTS		
57-001	Wireless E9-1-1 Overflow, Default, and Diverse Routing Standard & A PSAP Manager's Guide to GIS & Wireless 9-1-1	2004/11/18
57-002	E9-1-1 Wireless Maintenance Call Routing & Testing Validation Standard including Call Routing & Testing Validation Worksheet & Sample Non-Disclosure Agreement	2007/06/09