1.   Executive Summary

The General Assembly formed the E-911 Border Response Workgroup (the "Workgroup") to assess the deficiencies related to the timely routing of 911 calls to the appropriate public-safety answering point (PSAP) across either state or county borders. The Virginia Secretary of Public Safety and Homeland Security (the "Secretary") appointed individuals to the Workgroup representing the following stakeholder groups:

- Virginia Office of Secretary of Public Safety and Homeland Security
- Virginia General Assembly
- Virginia Residents
- Virginia 9-1-1 Services Board
- 9-1-1/PSAP Community
- Emergency Management Community

The Workgroup's objective was to complete a report by April 1, 2021 that contains recommendations to improve the routing and processing of 9-1-1 calls to the appropriate PSAP across state borders and/or county boundaries based on lessons learned. To develop this report, the Workgroup met virtually and collaborated with the Virginia Department of Emergency Management's (VDEM's) 9-1-1 and Geospatial Services (NGS) Bureau staff to collect information on problems with the current system and processes; review mitigation solutions already implemented by localities and citizen groups; and, determine best practices. The Workgroup investigated the five functional areas related to 9-1-1 systems and processes:

- Governance
- Technology/NG9-1-1 Deployment
- Equipment, Operations and Mitigation Strategies
- 9-1-1 Personnel and Training
- Funding and Compensation

The Workgroup had an extensive list of Findings and the following recommendations:

- Develop a cross border 9-1-1 call processing best practice
- Improve wireless 9-1-1 location accuracy
- Address telecommunicator reclassification, recruitment, and retention
- Form a NG9-1-1 Leadership Commission

2.   Introduction

Problem Statement

The General Assembly formed the E-911 Border Response Workgroup (the "Workgroup") to assess the deficiencies related to the timely routing of 911 calls to the appropriate public-safety answering point (PSAP) across either state or county borders. At a minimum, the workgroup had the following tasks to complete:

- Work with stakeholders to collect information on problems with the current system and processes
- Review mitigation solutions already implemented by localities and citizen groups
- Determine best practices
- Provide inputs and recommendations on technology, training, and compensation that would be necessary to address the identified deficiencies

Workgroup Membership

The Virginia Secretary of Public Safety and Homeland Security (the "Secretary") appointed the following individuals, representing a variety of stakeholder groups, to the Workgroup:

- **Deputy Secretary Shawn Talmadge, Chair**
- **Delegate David Reid, General Assembly**
- **Delegate Tyler, General Assembly**
- **Pastor Michelle Thomas, citizen representative**
- **Sherry Herzing, citizen representative**
- **Christian Yohannes, youth citizen representative**
- **Grant Sheets, youth citizen representative**
- **Curtis Brown, 9-1-1 Services Board**
- **Devon Clary, PSAP Representative, Brunswick County Sheriff's Office**
- **Theresa Kingsley-Varble, PSAP Representative, Washington County**
- **Eddie Reyes, PSAP Representative, Prince William County Government**
- **Sonny Saxton, PSAP Representative, Charlottesville-UVA-Albemarle County ECC**
- **Patty Turner, PSAP Representative, Loudoun County Fire and Rescue**
- **Melissa Meador, Emergency Management Representative, Greene County**
- **Elizabeth Vargas-Jackson, M.D., COVID 19 Health Equity Group**
- **Dorothy Spears-Dean, Ph.D., Deputy State Coordinator, VDEM**

3.   Objectives, Scope, and Method

Objective

The objective for the Workgroup is to provide a report to the Secretary. This report should contain recommendations to address the conditions identified in the Problem Statement. The

Secretary shall provide the Workgroup's Report to the Governor and General Assembly no later than April 1, 2021.
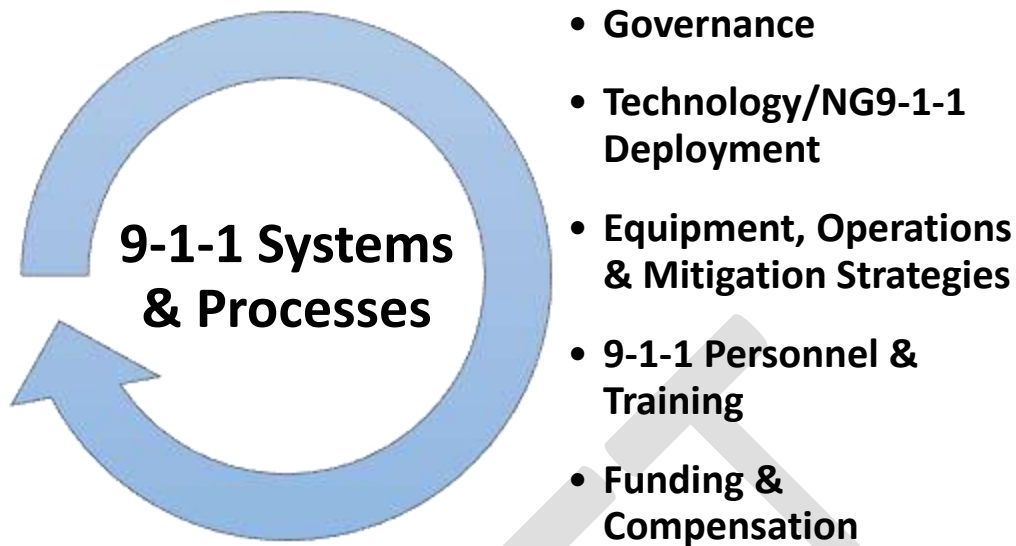
Scope

The Workgroup collaborated with stakeholders and VDEM's 9-1-1 and Geospatial Services (NGS) Bureau staff to collect information on problems with the current system and processes; review mitigation solutions already implemented by localities and citizen groups; and, determine best practices.

Method

The Workgroup met virtually on an agreed upon schedule to focus on 9-1-1 systems and processes key functional areas to develop recommendations that addressed identified gaps within the 9-1-1 ecosystem, unmet needs within PSAPs, and areas requiring mitigation and/or improvement. Members of the Workgroup discussed these functional areas as discrete topics in separate meetings to ensure they achieved adequate depth of these key functional areas.

4.   Background

The graphic below identifies the five functional areas related to 9-1-1 systems and processes recommended by NGS Bureau staff for the Workgroup to investigate:

9-1-1 Systems & Processes

- **Governance**
- **Technology/NG9-1-1 Deployment**
- **Equipment, Operations & Mitigation Strategies**
- **9-1-1 Personnel & Training**
- **Funding & Compensation**

9-1-1 Systems and Processes Functional Areas

The Workgroup had less than 10 weeks to complete its report and relied on NGS Bureau staff to coordinate presentations to provide members with substantive information on the above 9-1-1 systems and processes functional areas. Presentations provided by NGS Bureau staff and 9-1-1 professionals provided an overview of 9-1-1 call processing in Virginia to enable Workgroup members to identify where problems may exist with related current systems and processes.

Governance

A PSAP is the entity responsible for receiving and processing 9-1-1 calls according to its governing body's operational policies and must adhere to any applicable federal or state mandates. A primary PSAP is a facility to which 9-1-1 calls are routed directly, and will be staffed 365 days per year, 24 hours a day, 7 days a week. A secondary PSAP has 9-1-1 calls transferred to them from a primary PSAP and cannot receive 9-1-1 calls directly.

The governance of a PSAP must be defined by the jurisdiction(s) served by the PSAP. While there is no, one best governance structure, it must be established in writing to ensure the governance structure is known by all. PSAPs may be governed by any government entity such as a law enforcement, fire, EMS, emergency management agency, a sheriff's office, or a board/authority. A PSAP may also be a stand-alone agency within a local government, but regardless of the governance structure, one person or entity must be responsible for the

operations of the PSAP. Below is a breakdown of the PSAP organizational models of Virginia across the states:

- Sheriff's Office - 59
- Standalone Department - 24
- Police Department - 23
- Regional Partnership / Commission / Authority - 11
- Emergency Management - 4
- Fire Department - 3

Technology

The Commonwealth's 9-1-1 system is dependent on legacy architecture built in the 1970s and based on decades-old circuit switched technology originally built to process landline calls. A caller's location from a landline phone is determined through the Automatic Location Identification (ALI) function. In the mid-1990s, with the proliferation of wireless technologies, Virginia's 9-1-1 system faced a new challenge – receiving 9-1-1 calls from cell phones and identifying the location of the caller.

Out of the approximate four million calls made to Virginia PSAPs, around 80 percent are made from wireless devices. However, wireless calls make the emergency response process more difficult. Cell phones are not tied down to any one location, so telecommunicators don't know your exact whereabouts when you call from a mobile device. Instead, the call goes to the PSAP associated with the cell tower your phone is using. This can result in the routing of a 9-1-1 call to the wrong PSAP, particularly if a cell tower is close to a PSAP boundary.

The Commonwealth is moving forward to evolve 9-1-1 and ensure quality service to its citizens and visitors. To accomplish this, the Board has begun moving to a Next Generation 9-1-1 (NG9-1-1) system. NG9-1-1 is a modern internet protocol (IP) network, that has the ability to deliver calls to the appropriate PSAP faster, transfer 9-1-1 calls and associated data anywhere needed, interconnect with other public safety systems and databases, and in the future, securely receive multimedia communications like text, photos and videos. As service providers begin abandoning the legacy circuit-switched technology, the urgency to update the 9-1-1 infrastructure to NG9-1-1 increases tremendously. Actions to transform outdated system into a digital network that is faster, more efficient, and has greater capabilities to serve Virginia residents is currently underway.

Equipment, Operations, and Mitigation Strategies

PSAP service areas must be established to ensure that 9-1-1 calls made from any address or location are routed to the correct PSAP. The routing of wireless 9-1-1 calls may initially be

based on the cellular sector receiving the call. The routing of wireline and VoIP calls to 9-1-1 will be based on the registered address for that telephone. In either case, 9-1-1 calls for service are usually routed through local exchange carriers' (LECs') selective routers to get to the appropriate PSAP. An Emergency Services IP network (ESInet) will replace this routing configuration utilizing selective routers with the deployment of NG9-1-1.

All PSAPs must install and maintain the following technical systems:

- 9-1-1 call handling equipment to receive and process 9-1-1 calls. PSAPs should establish a service and maintenance contract for the call handling equipment to ensure rapid response to system failures and routine, periodic preventive maintenance.

- A CAD system to receive and process public safety calls for service. PSAPs are encouraged to consider utilizing a shared CAD system with one or more other PSAPs. This shared services approach increases interoperability, situational awareness, and data shared between localities.

- A mapping display system to plot 9-1-1 calls. This equipment must have the capability to automatically plot the address or latitude and longitude (lat/long) of a 9-1-1 call on a map as well as capable of replotting the location information and update the map as the caller may be mobile. If a wireless 9-1-1 call is routed based on a cellular sector, the location of the tower and direction of the sector should also be plotted. The mapping display system may also accept and plot location and incident data from the CAD system. All data in the mapping display system should be updated on an established scheduled that ensures accurate, up-to-date data.

Workgroup PSAP representatives and other 9-1-1 professionals presented on the following migration strategies and best practices:

- CAD2CAD
- No-Call Transfer Projects
- Northern VA Emergency Response System (NVERS)
- Available options to address carrier gaps with location accuracy
- Carrier/service provider outage notification strategies
- Regional workgroups
- One-button transfers for 9-1-1 direct or emergency 10-digit numbers to each adjacent locality's PSAP
- The telecommunicator should stay on the line until the connection is complete and all pertinent information, as determined by the PSAP, has been relayed
- Blind transfers (when the call is sent to another location and the initial call taker drops off before connection is complete and information relayed) of emergency calls should never occur

9-1-1 Professionals and Training

All personnel that dispatch for law enforcement are required to complete the Department of Criminal Justice Services (DCJS) Basic Telecommunicator program within the first two years of their employment (§ 9.1-102.10). PSAP management must identify in SOPs, General Orders, or Policies all other training that is required of their personnel. Other critical areas of telecommunication training recommended by the Board includes the following:

- NG9-1-1
- Wireless 9-1-1
- Text-to-9-1-1
- GIS
- Dispatch Training (Fire, Rescue and Law Enforcement)
- Critical Incident Stress Management (CISM)
- Technical Systems used by the PSAP (CHE, CAD, mapping, etc.)
- Continuing Education/In-service Training

The Board has accepted the following best practices previously published by NGS Bureau staff:

- 9-1-1 Addressing Operational and Administrative Best Practice
- 9-1-1 Call for Service Dispatching Best Practice
- Public Safety Call Processing Best Practice
- Wireless 9-1-1 Call Routing Optimization
- Optimal PSAP Staffing Structure Best Practice v1.1

Funding and Compensation

The Wireless E-911 Fund collects about $60 million annually through pre- and post-paid 9-1-1 surcharges on Virginia residents' service bills. This funding is used to support Virginia's 9-1-1 Program. The entry-level pay range for Virginia telecommunicators is from $26,185 to $48,070.

5.   Analysis

A qualitative analysis approach that employed individual interviews and groups discussions was used to develop the Findings and Recommendations contained in this report.

6.   Findings

An amendment from the 2020 General Assembly Special Session directed the Secretary of Public Safety and Homeland Security to establish an E-911 Border Response Workgroup to make recommendations based on the guidance of the budget amendment related to Virginia's existing 9-1-1 system. The goal of the Workgroup is to improve the routing and processing of 9-1-1 calls to the appropriate PSAP across state borders and/or county boundaries based on lessons learned from experiences in order to prevent future tragedies. The Findings below are the basis for the Recommendations contained in the report:

1. Virginia residents need visibility into local operations and the statewide 9-1-1 ecosystem to understand current gaps in order to advocate for positive change.

2. Statewide 9-1-1 planning efforts must be holistic and include stakeholders and disciplines that are representational of the residents served to maximize problem solving, establish strong relationships, and build trust with all Virginia resident groups.

3. To improve upon 9-1-1 wireless location accuracy, the carrier community must be engaged in stakeholder discussions and involved in the remediation process to have confidence in the accuracy of data provided by carriers.

4. Telecommunicators must have culturally responsive scripts to build trust with 9-1-1 callers.

5. In order to provide effective 9-1-1 call handling, telecommunicators must possess personal and professional maturity to handle complex issues, understand applicable technologies, and have knowledge of the geographic area served by the local PSAP.
6. Telecommunicators need to be able to relate to diverse resident populations (e.g. – culture, language, sex, sexual orientation, generational).

7. PSAP managers must recruit a diverse work force that is representation of the communities served by their local PSAPs. A method to monitor and evaluate this diversity is critical, as well as a means to measure progress on closing identified gaps.

8. There is a widespread perception among Virginia residents that telecommunicators have all the knowledge, situational information, and resources needed to do their jobs effectively. Residents do not realize that for some telecommunicators there are training and resource gaps. Oversight agencies often expect telecommunicators to carry out non-9-1-1 operational related tasks.

9. All emergencies and responses to emergencies start with a 9-1-1 call. A successful emergency response outcome begins with the telecommunicator. Virginia PSAPs

process most 9-1-1 calls effectively, but when the processing of a 9-1-1 call is compromised, there is the potential for significant negative outcomes.

10. Virginia PSAPs should be able to locate all 9-1-1 callers.

11. DCJS Basic Dispatcher training, by itself, is not sufficient. Virginia telecommunicators require training on additional topics, and levels of training, that supports public safety disciplines other than law enforcement. This training should include procedural safeguards.

12. Virginia state leadership needs to invest in the 9-1-1 industry to avoid having experienced telecommunicators leave PSAP employment. The focus of this investment must be on reclassification, recruitment, and retention.

13. A 9-1-1 caller is in crisis when seeking help and may not know where they are. To help the callers orient themselves, water signage and markers with QR codes may be helpful.

14. All 9-1-1 call systems and processes should be interoperable. For example, if PSAPs could see each other's CAD systems, telecommunicators and responding agencies could share situational awareness related to events at county and state borders.

7.   Recommendations

1. Cross Border 9-1-1 Call Processing Best Practices (September 2021)

The NGS Bureau will produce a Cross Border 9-1-1 Call Processing Best Practice with the assistance of Bureau interns. The report will leverage information presented by 9-1-1 professionals in the National Capitol Region (NCR) and Southwest Virginia. The Workgroup will meet on August 24, 2021 to review and accept the best practice. Board members will review and vote on this document during their September 9, 2021 meeting.

2. Wireless Location Accuracy Improvement Project (December 2021)

The NGS Bureau will develop a project plan to improve wireless location accuracy in Virginia. This project will involve the carrier community and focus on improving the routing of 9-1-1 calls based on the increased accuracy of caller location data.   The Workgroup will meet on April 20, 2021 to review and accept the project plan. Board members will review and vote on this document during their May 13, 2021 meeting.

3. NG9-1-1 Telecommunicator Reclassification, Recruitment, and Retention Initiative (Dec 2021)

The NGS Bureau will work with the Board's Regional Advisory Council (RAC) to address comprehensively the reclassification recruitment, and retention of the NG9-1-1 telecommunicator. The Workgroup will meet on June 15, 2021 to review and provide input on the project plan.

4. Long-term: NG9-1-1 Leadership Commission (July 2022)

Establish a NG9-1-1 Leadership Commission to facilitate the transition to NG9-1-1 statewide and identify ways to increase the reliability and accuracy of emergency services to all Virginia residents by utilizing this new infrastructure.