



METROPOLITAN EMERGENCY SERVICES BOARD 9-1-1 TECHNICAL OPERATIONS COMMITTEE AGENDA

November 21, 2019, 10:00 a.m.

- 1. Call to Order**
- 2. Approval of Minutes – October 17, 2019 Meeting**
- 3. Approval of Agenda**
- 4. Action Items**
 - A. Election of Officers – 2020
- 5. Discussion Items**
 - A. Winter Storm-Related Incident Coordination with State Patrol – Tabled
 - B. Fraud / Identity Theft Procedure
 - C. SECB Grant Proposals
 - D. System Outage Reports
 - E. 9-1-1 System Security
 - F. Review the Unassigned Future Issue list
- 6. Reports**
 - A. PSAP Operations Round Table Work Group
 - B. SECB NG9-1-1 Committee Report
 - C. 9-1-1 Network Report
 - D. 9-1-1 Data Report
- 7. Adjourn**

**Metropolitan Emergency Services Board
9-1-1 Technical Operations Committee
Meeting Notes
October 17, 2019**

Members Present:

Laura Anderson, Sherburne
Carrie Bauer, Scott
Jon Eckel, Chisago
Heidi Hieserich, MAC
Tony Martin, Hennepin
Deb Paige, Carver

Nancie Pass, Ramsey
Cheryl Pritzlaff, Dakota
Jim Scanlon, Bloomington PD
Val Sprynczynatyk, Anoka
Victoria Vadnais, Allina

Guests Present:

Susan Bowler, Carver-alternate
Marcia Broman, MESB
Pete Eggimann, MESB
Tracey Fredrick, MESB
Jake Jacobsen, CenturyLink
Dustin Leslie, ECN
Chad Loeffler, Metro Transit

Mike Melby, North Memorial Ambulance
Curt Meyer, HCSO
Kari Morrissey, Anoka-alternate
Lauren Petersen, MAC-alternate
Jill Rohret, MESB
Scott Wosje, Northland Business Systems
Martha Ziese, MESB

1. Call to Order:

Cheryl Pritzlaff, 9-1-1 TOC Vice-Chair called the meeting to order at 10:02 AM.

2. Approval of Minutes:

M/S/C – Val Sprynczynatyk moved to approve minutes from September 19, 2019. Heidi Hieserich seconded. Motion carried.

3. Approval of Agenda:

Pete Eggimann asked that two discussion items be added to the agenda; 5.D. 9-1-1 TOC Committee Member Appointments, and 5.E. 9-1-1 System Outage Notifications.

M/S/C - Jon Eckel moved to approve the October 19, 2019 amended agenda. Scott Haas seconded. Motion carried.

4. Action Items:

A. Finalize Issues for SECB Grant Proposals

Kari Morrissey said she spoke with Sergeant Harris of Washington County about “The Mandt System” training that is mandated for all Washington Co. employees. The training focuses on de-escalation skills and wellness. “The Mandt System” has an instructor certification program which Sgt. Harris attended so that he can provide the training to the other county employees. The initial employee training is eight hours; with ongoing training throughout the year. Family training is also an option. Sergeant Harris extended an invitation to anyone interested to sit in on a training session scheduled for October and November. Morrissey suggested that grant

funding could be used to send 5 or 6 of the metro area PSAP trainers to the instructor certification program, and then have them conduct training sessions for all metro area TCs over the next several months.

Eggimann reminded the committee that the other two grant suggestions on the list are establishing a cache of equipment / software to enable a PSAP to remain in operation at a designated alternate location in the event the PSAP must be abandoned. That proposal outline is included in the meeting packet for review by the committee members. The other grant suggestion involved hosting the "Is the Caller the Killer" training for PSAP trainers and TCs. Tracey Fredrick advised the committee to prioritize the grant suggestions and that all three items be submitted for consideration by the grant application review committee.

M/S/C – Nancie Pass moved to submit three SECB grant requests prioritized as 1) Backup PSAP equipment / software cache; 2) resiliency training; and 3) "Is the Caller the Killer" training course. Sprynczynatyk seconded. Motion carried.

Jill Rohret asked if there was going to be grant money available for PSAPs to upgrade their 9-1-1 answering applications to support direct SIP connectivity to the ESInet. Dustin Leslie said that there will be SECB grant money for PSAP 9-1-1 answering equipment / software upgrades. Leslie said it isn't known yet if there will SHSP grant money available for PSAP upgrades.

Pass said that she had worked with Rohret and Scott Haas on the draft Metro Area Portable Backup PSAP Resources plan included in the meeting packet. She asked the committee members for feedback, particularly if any of the committee members felt the proposed solution would not be workable for their PSAP. None of the committee members voiced disagreement with the proposed solution in principle. There was consensus that the project should be pursued with the understanding that there may be issues to resolve as more details become available on the ongoing costs to the PSAPs and the availability of the cache equipment for training, planned events, etc. in addition to being included in a PSAP's COOP. Victoria Vadnais verified with the group that the secondary PSAPs would be included in the backup PSAP resource plan.

B. Telecommunicator Training Curriculum Update

Morrissey reported that the PSAP Roundtable training group had reviewed the metro area Telecommunicator Training Curriculum and recommended that the updates included in the draft provided in the meeting packet be approved by the committee. Pass suggested that the phrase "RTT is now available" be removed because it dates the document noting that RTT has been available for callers to use for several months now. Rohret said that it is important that the TCs be trained to document CPR transfers. Jon Eckel suggested using a reference to actual statute numbers rather than hyperlinks which become problematic to maintain over time. Regarding the CPR transfer issue to comply with the new telephone CPR provisions in the law, Pass noted that the secondary PSAPs were recognized in statute as CPR approved PSAPs. Morrissey told the committee that the Roundtable group was committed to reviewing the curriculum content quarterly.

M/S/C – Motion made by Hieserich to approve the recommended updates to the Telecommunicator Training Curriculum including the committee's feedback. Pass seconded. Motion carried.

Eckel reminded the committee that the curriculum document needed to be made ADA compliant if it was going to be published. Rohret said the MESB would make those edits needed for compliance.

5. Discussion Items:

A. Winter Storm-Related Coordination with State Patrol – Tabled - (No Action)

B. Fraud / Identity Theft Procedure - (No Action)

C. Review the Unassigned Issue List

Eckel reported that Chisago Co. had recently adopted a network cyber security policy that is similar to ARMER's processes and policies, and suggested the committee add this to the Unassigned Issue List for consideration on developing a metro network cyber security standard.

D. 9-1-1 TOC Committee Member Appointments

Eggimann reminded the committee that as leadership changes occur at the committee member's PSAPs this may have an impact on who the governing entity for the PSAP wants to represent them on the 9-1-1 TOC. This may require the governing entity to appoint a new representative. The committee bylaws require that appointment documentation be on file with the MESB.

E. 9-1-1 System Outage Notifications

Eggimann told the committee that there has not been a meeting between ECN, the MESB, and CenturyLink on this issue since September. CenturyLink has filed an answer to the PUC investigation into the incident that triggered the discussions regarding notifications. Rohret reported that the SECB NG9-1-1 Committee was also monitoring the notification discussions and that this was not an issue limited to the metro area.

6. Reports:

A. PSAP Roundtable – (No Report - meeting minutes posted to the MESB website)

B. SECB NG9-1-1 Committee

Pass asked for clarification on where MNGEO fits in the structure of the SECB. She said that Dana Wahlberg had told the NG9-1-1 Committee at last month's meeting that the SECB gets direction from ECN. Rohret told the committee that this governance issue is a current topic of discussion for ECN and the SECB. Marcia Broman offered that ECN has a work arrangement with MNGEO to do GIS data preparation and maintenance related to NG9-1-1. Pass said as she hears more of the GIS discussions it is unclear how in-depth the MNGEO staff knowledge is of 9-1-1 GIS requirements and processes. Pass is concerned about how this confusion or lack of knowledge could impact the PSAPs. Rohret suggested that if there were items discussed at the SECB or at the NG9-1-1 Committee meetings that were unclear or needed further definition, that those items should be brought back here to the 9-1-1 TOC for discussion. This would allow for a metro region consensus to be reached by the 9-1-1 TOC that could then be presented to the NG9-1-1 Committee as well as the SECB.

Broman told the committee that an implementation plan for utilizing GIS-based 9-1-1 call routing has been requested of ECN and that she believes that work has been started. Broman said that if any of the committee members or their GIS staff have specific questions about NG9-1-1 GIS requirements, she will work to get them answered.

Eggimann noted that the statutory language defining the SECB's role in ARMER and the role in 9-1-1 is not identical. This has apparently led to some confusion on what role ECN and the SECB play in defining how NG9-1-1 will be deployed, and this needs to be resolved. This isn't

just a GIS issue, but will become important with other systems such as CAD-to-CAD interoperability, cloud-based applications, and the use of i3 data structures are implemented. Eckel reminded the committee that system security is a critical part of this discussion too.

C. 9-1-1 Network Report – (Written Report Attached)

Eggimann reported that the Ingress RFP responses will be reviewed later this month. There are also on-going discussions with ECN about alternative ESInet connections to the metro PSAPs that will better support the use of mission critical, cloud-based applications such as CAD or even 9-1-1 answering applications.

D. 9-1-1 Data Report – (Written Report Attached)

Broman demonstrated to the committee the online GIS data viewing tool that is now available through the MetroGIS website. She will send the link to the committee members and encouraged them to become familiar with the viewer and the information that is available through its use. Eggimann asked why the PSAPs don't just load the entire regional dataset into their CAD systems, but the committee members reported that amount of data slowed their CAD systems down.

Broman also reported that discussions were underway to try to quantify how much money or resources will be needed to not only develop, but to maintain, the GIS datasets needed to support NG9-1-1. This will become more critical as GIS departments prepare to update data every day and make error corrections within 24-48 hours of receiving notification of the error. This will impact how the GIS departments prioritize and assign work to their staff members. There will be a cost associated with these processes.

7. Adjourn

The meeting adjourned at 12:05

**Metropolitan Emergency Services Board
9-1-1 Technical Operations Committee
Action Sheet
November 21, 2019**

Agenda Number 4.A. – Election of 9-1-1 TOC Chair and Vice-Chair

Recommendation:

It is recommended that the committee members nominate and elect a Chair and Vice-Chair candidate to serve as the 9-1-1 TOC Chair and Vice-Chair for calendar 2020, subject to Board approval.

Background:

The committee chair and vice-chair positions are voted on each year in November with MESB Board approval the following January of those recommended by the committee. The paragraph below describes the normal process for selecting a committee chair and vice-chair each year:

Each year in November the committee members choose Chair and Vice-Chair candidate recommendations to the Board for approval. The Chair and Vice-Chair as defined in the by-laws lead the committee activities and meetings in the coming year. There is no limitation in the by-laws on the number of times that a committee member can serve as the Chair or Vice-Chair. The primary responsibility of the committee chair is to preside over the committee meetings, with the Vice-Chair presiding if the Chair is absent. In addition, the Chair and Vice-Chair assist the MESB staff in preparation of the meeting agendas. The committee Chair may also present the committee recommendations to the MESB Board when board action is warranted.

Issues and Concerns:

None identified.

Financial Impact:

None identified.

Motion:

Unassigned Issue List (not prioritized):

- Working with the MN Sheriff's Association to reach consensus on identity theft / fraud jurisdiction issues
- Leadership mentoring for staff
- Backup and work load sharing options for PSAPs
- Mental health call processing standard
- Cell phone location ping process standard
- 9-1-1 call routing and ALI data error reporting standard
- Telecommunicator licensing
- Telephone CPR Instruction requirements/training
- 9-1-1 System Security

**Metropolitan Emergency Services Board
9-1-1 Technical Operations Committee
Network Report
November 21, 2019**

Agenda Number 6.C.

1. Text-to-9-1-1:

Washington and Scott Co. are the only remaining primary PSAPs in the metro area that have not yet implemented text capabilities on their answering applications. Both PSAPs are planning to implement text messaging concurrent with their next 9-1-1 answering application upgrade.

2. Firewall Implementation:

The team working on the ESInet firewall implementation project is now focusing on turning up some of the greater MN PSAPs. It is not known at this time when the team will come back to the metro area. The MESB will pass on additional firewall implementation dates as they become available.

3. Other PSAP Activity:

North Memorial turned-up a new Solacom 9-1-1 answering application in October. This implementation is geo-diverse with one server at the hospital in Robbinsdale and the other server at the PSAP location. The Solacom application will include text-to-911 capability sometime in 1Q20. Solacom must install the next version of their software to support a change made by Intrado's TCC requiring new PSAPs to have security certificates.

The Metro Transit PSAP is fully operational on the 9-1-1 system as of November 14. They are also using a geo-diverse Solacom answering application. They will take a very limited number of emergency calls from their emergency phones on station platforms but are expected to take a significant number of transferred 9-1-1 calls from the primary PSAPs. Being on the 9-1-1 system will allow the Transit PSAP to receive and rebid for caller location as well as receive the ANI of the caller, provided the primary PSAP transfers the call to the Transit PSAP on the 9-1-1 system.

The U of M is expected to move their PSAP operations to their new location on campus before the end of the month. Their calls will be routed to MECC during the move.

4. NG9-1-1 ESInet:

MESB staff worked with ECN to prepare a 911 System Ingress RFP for re-homing the telecommunications service providers to vendor neutral datacenters and convert the 911 calls to an NG9-1-1 format for delivery to the 911 service provider core services. Negotiations are now underway with the vendor who scored the highest in the evaluation. No formal announcements will be made until negotiations are complete.

The MESB is focusing on giving our PSAPs better continuity of operations (COOP) options as well as enabling workload sharing for the PSAPs that are interested in working together. We want to ensure that our ESInet infrastructure can support shared/hosted and cloud-based applications and not limit the use of the ESInet to just handling 9-1-1 traffic. We are working now with ECN to consider ESInet options that would rehome our PSAP ESInet connections to redundant, diverse datacenters that can become the hubs for delivery of shared/hosted and

cloud-based applications to all the metro PSAPs such as CAD, CAD-to-CAD interoperability, logging, as well as 9-1-1 answering applications.

In April 2018, NENA published a new NG9-1-1 ESInet Design document that outlines new modifications to the existing ESInets in use today. The new design focuses on increasing reliability and resiliency by incorporating multiple network service providers using different network protocols (e.g. MPLS, Ethernet, cable broadband Internet, wireless carrier broadband Internet). The MESB will continue to work with ECN to develop an implementation strategy to bring the metro area ESInet configuration into compliance with the NENA design recommendations.

Metropolitan Emergency Services Board
9-1-1 Technical Operations Committee
9-1-1 Data Report
November 21, 2019

1. Importance of GIS for 9-1-1:

- a. MESB encourages continued **communication and planning between PSAPs and County GIS Departments** for ongoing geospatial dataset maintenance (road centerline and address points) to be used in statewide NG9-1-1 core services. The datasets also form the foundational data used in PSAP CAD and mapping systems, as well as multiple other uses beyond public safety. PSAP managers are strongly encouraged to assist their GIS counterparts in communicating to key decisionmakers and county leadership what a **vital role GIS has to their current and future PSAP operations.**

2. Statewide GIS Data Standards:

- a. The metro county GIS departments are targeting the end of 2019 to trial migrating the regional road centerline to the **Minnesota Centerline Data Standard v1.0** schema approved by the Minnesota Geospatial Advisory Council (GAC). Full regional dataset availability in the GAC schema is targeted for Q1 2020.
- b. MnGeo has said it is reevaluating its approach for aggregating statewide emergency service boundaries. At MnGeo's request, the GAC Standards Committee chair has consideration of proposed state **Emergency Service Provider Boundary Polygon schema standard** on hold to give MnGeo more time for their internal discussions.
- c. The SECB NG911 Committee has created a workgroup to develop **standardized statewide emergency service agency names** which MnGeo will then incorporate into domains for the emergency service provider boundary polygon dataset. The workgroup has not yet met.

3. Regional GIS Data Aggregation:

- a. **Centerline (MRCC):** The MetroGIS/Met Council continues to process updates of the MRCC nightly to the MN Geospatial Commons website. Each metro county's most recent centerline data that has been uploaded to the portal and passed validations is included in the regional dataset. All ten metro counties are using this process for MRCC updates.
- b. **Address Points:** The MetroGIS/Met Council continues to process updates of the Regional Address Point dataset (in the statewide schema) nightly to the MN Geospatial Commons website. Each metro county's most recent address points that have been uploaded to the portal and passed validations are included in the regional dataset. All ten metro counties are using this process.
- c. A **MetroGIS project proposal** is under consideration to review key **geospatial data lifecycle processes for addresses and roads.** The project would help document inter-agency data federation models, processes, and roles that support the ongoing production of regional data suitable for NG9-1-1 system consumption. The project will be considered by the MetroGIS Coordinating Committee when it prioritizes its 2020 work plan on November 14, 2019.

4. Regional PSAP/ESZ Boundaries:

- a. The **10-county regional PSAP and Emergency Service Zone boundaries** with metadata are available for download via the Minnesota Geospatial Commons. The datasets will be updated there as boundaries change or at a minimum of quarterly. Mobile Positioning Center, Text Control Center, and VoIP Positioning Center vendors will be directed to the Commons for future downloads of metro's PSAP boundary polygons.

- b. **Recent changes to regional PSAP/ESZ boundary polygons:** Boundary adjustments were made for Emergency Service Zone changes in Isanti County and a minor edgematching along the border with Rice County.

5. Regional 911/GIS Data Synchronization:

- a. MESB, County GIS departments, and PSAP data coordinators continue analysis and investigation of errors resulting from regional geocoding validations.

6. Statewide NG9-1-1 GIS Project:

- a. Sandi Stroud, the new Assistant Director of MnGeo, has committed to developing a documented **roadmap of the statewide NG9-1-1 GIS project** that can be shared with stakeholders. MESB will share MnGeo's roadmap with metro GIS and PSAP partners when it is available from the state.
- b. Metro counties continue to have interest in **availability of normalized collar-county GIS datasets** from MnGeo/ECN. This interest has been shared with MnGeo, however, they do not have a specific date on when they will make the collar county datasets available back on the NG9-1-1 portal (in GAC schemas) for download. MnGeo has not yet provided access information to the viewer it has said it is turning up for the statewide datasets.
- c. Under a **NG9-1-1 Federal Grant**, ECN has received \$2.8 million for GIS data development. ECN's application for that grant included monies for Sherburne County's GIS dataset development, as well similar work in other Greater Minnesota counties. ECN's application also included some monies to support a metro region pilot project surrounding regional GIS-derived MSAG creation and ongoing maintenance processes. Use of the grant funds would involve collaborative efforts between the counties, PSAPs, MESB, MetroGIS/Met Council, and potentially vendor services. As with other grants, MESB would act as fiscal coordinator. MESB is waiting for clarification from the State on details of the data validation requirements of the grant. That information will assist in preparing the GIS grant applications which are currently due 12/2/2019.

7. Regional Data Viewer:

- a. The metro **Regional Data Viewer** prototype developed by MetroGIS/Met Council continues to undergo user testing and was demonstrated to PSAP managers at the last 9-1-1 TOC meeting. The data viewer will facilitate communications and QA/QC of the regional geospatial datasets central to the business needs of E9-1-1 and NG9-1-1. It will also be a reference tool for PSAP Data Coordinators in MSAG maintenance 9-1-1 address validation work.

- 8.** The State has set the **activation date of 12/16/2019 for the four new Class of Service Codes (WDL2, WDL1, WCVC, and VNOM)**. Metro PSAPs have been aware of these updates since early summer and, if they have not done so already, should have any necessary adjustments for the new codes in their CAD/mapping systems. Darlene Pankonie has prepared an informational video for PSAPs and calltakers about the changes. The video is to be available via the ECN and MESB websites.

9. Wireless Cell Sector/Routing Data:

- a. **MESB is processing wireless routing updates for all carriers on behalf of the metro PSAPs.** Should PSAPs want the routing for a specific cell sector or 9-1-1 call reviewed, just email mesbgis@mn-mesb.org and MESB staff will investigate.
- b. The process of **standardizing and validating wireless cell sector routing and display data** for the four metro-area wireless carriers, as well as building out a regional tower/antenna geospatial dataset, is complete.

- c. It has been observed that, on some calls, **Verizon Wireless** is providing **caller location as a dispatchable civic address**, rather than just as Phase 2 coordinates. Activation of the new wireless class of service codes should aid in identifying when Verizon is forwarding dispatchable addresses to the PSAPs.



The Future of Emergency Response

Understanding the GIS Data Requirements for the Shift to NG911

By Lisa Caldwell and Ashley Buzzeo

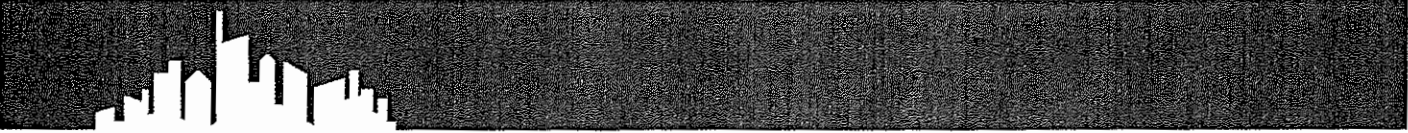
The public safety community is experiencing a monumental shift as the transition to NG911 occurs. One significant shift is that by deploying NG911 solutions, geographic information systems (GIS) become paramount to supporting geospatial call routing. Once these systems deploy, properly maintained geospatial data at the local level will be responsible for determining which 911 center will receive the emergency call, which will reduce the number of transfers and in turn help ensure a timely response from the appropriate first responders.

The value of deploying NG911 is threefold: 1) improved call routing using local GIS data, 2) having access to data-rich call information and 3) benefiting from new ways of communication. GIS data in NG911 is life-critical and can provide data-rich call information using

an improved geospatial call routing system. Additionally, dispatchers will have access to complete, consistent and high-quality addressing information so they can direct first responders to the proper emergency location. Each end result requires complete and accurate GIS data, only achievable by taking the proper steps. And it all starts with understanding the data requirements.

The National Emergency Number Association (NENA) works with professionals in public policy and public safety to facilitate the creation of NG 911. They also help establish industry standards, training, and certifications. The most recent GIS data standards were released in June 2018.

The NENA Standard for the NG911 GIS Data Model provides a framework and describes the structure (such as field names, field data types and domains) of GIS data. It provides requirements on the field names used, the properties of each field, and specific



guidance on the attribution to be placed within the fields of an entity's chosen GIS data file format.

The actual data model document provides fields, for example, that are mandatory, conditional and optional. Accordingly, the GIS data must be "transformed" into the data model schema and populated, if necessary, prior to provisioning. The result is a common standard used across the nation for interoperability and data sharing, which reduces confusion and ambiguity from unstandardized data, and provides the data structure that allows the NG911 functionality that routes calls to the correct destination.

The NENA Standard for the Provisioning and Maintenance of GIS Data to Emergency Call Routing Functions (ECRF) and Location Validation Functions describes the data quality assurance checks that should be performed on GIS data prior to provisioning into the ECRF/LVF and once you are in maintenance mode. The LVF and ECRF rely on and use GIS data for address validation with caller locations and spatial queries so calls are directed to the correct responding NG911 PSAP. Put simply, the ECRF is used to properly route 911 calls to the appropriate PSAP, while the LVF validates the location prior to a 911 call and mandates the use of the ECRF to route calls to the ESI.net.

NENA's NG911 standards also include synchronizing the Master Street Address Guide (MSAG) and Automatic Location Information (ALI) tabular databases used in today's 911 environments with the GIS data to a 98 percent match rate. Many believe that the 98 percent match rate is good enough, however DATAMARK highly recommends going beyond the 98 percent match rate because it enables public safety organizations to support all 911 systems moving forward.

According to NENA, the primary benefits of implementing these standards include the following:

- A standardized, interoperable GIS data model that can be used nationwide.
 - The validation of locations (the full street number, full street name and municipality) before a 911 call is made.
 - A data structure that allows the NG911 functionality to route calls to the correct destination.
 - Maintained or improved support for accurate plotting of 911 calls in public safety mapping applications for call handling purposes.
 - Consistent provisioning of data to ECRF/LVFs.
 - Streamlined data maintenance.
 - Synchronized datasets between MSAG, ALI, and GIS in agreement to support the shift from E911 to NG911.
- As a leader in government, you can and should

be involved in the process of preparing for NG911 to help create a successful outcome. Here are a few recommendations you can initiate:

- Educate yourself by having a conversation with your public safety and GIS staff surrounding NG911 technology and encourage collaboration among all stakeholders.
- Understand the current health of your local GIS to identify the level of effort it will take to produce public safety grade NG911 data across all sections of GIS.
- Investigate the impacts on the local budget and explore alternate funding opportunities.
- Explore workflows across departments and breakdown unnecessary silos in order to create efficiencies and cost savings.
- Engage the public and private sector NG911 experts to seek guidance and explore services that will provide the right fit for your community.

Taking an in-depth look at the objectives and requirements of GIS in NG911 doesn't have to be overwhelming. To create the most accurate and up-to-date GIS data, begin to form partnerships with the public safety community stakeholders at all levels of government, and be sure to collaborate with public safety and GIS industry experts to guide you in transitioning GIS data to meet the requirements of NG911.

Lisa Caldwell is the strategic planning sub-committee chair to the Washington State 911 Advisory Board, a logistics team member of the Southeast Washington Incident Management Team and former first responder with a career spanning more than three decades.

Ashley Buzzeo, is adjunct faculty at Towson University and the Community College of Baltimore County. She has over 15 years of experience in project management and the GIS industry, and is seasoned in utilizing geospatial products to achieve cost-efficient, effective, and relevant outcomes. In several roles with the State of Maryland, she has extensive experience with multi-jurisdictional coordination and data sharing efforts, GIS data creation and maintenance, and software development.