National Emergency Number Association
Wide Area / Statewide Emergency Notification Systems
Operational Information Document
(OID)

NENA Wide Area / Statewide Emergency Notification Systems Operational Information Document
56-503
June 6, 2006

Prepared by:
National Emergency Number Association (NENA)
Standard Operating Committee – Wide Area Emergency Notification System Working Group

Published by NENA
Printed in USA

NENA
OPERATIONAL INFORMATION DOCUMENT

NOTICE

This Operational Information Document is published by the National Emergency Number Association (NENA) as an information source for the voluntary use of communication centers and is provided as information pursuant to research conducted by NENA on behalf of its membership.

NENA reserves the right to revise this document for any reason including, but not limited to, conformity with criteria, advances in technology, or standards promulgated by various regulatory agencies, and utilization of advances in the state of operational techniques or services described herein.

It is possible that certain federal, state or local regulations may restrict or require modification of the recommendations and strategies contained in this document. Therefore, this document should not be the only source of information used. NENA members are advised to contact their agency's legal counsel to ensure compatibility with local requirements.

By using this document, the user agrees that NENA will have no liability for any consequential, incidental, special, or punitive damages arising from use of the document.

NENA's Committees have developed this document. Recommendations for change to this document may be submitted to:

National Emergency Number Association
1700 Diagonal Road, Suite 500
Alexandria, VA 22314
202.466.4911
or commleadership@nena.org

Acknowledgments:

This document has been developed by the National Emergency Number Association (NENA) Wide Area Emergency Notification System Working Group.

The following individuals are recognized for their contributions in development of this document.

Working Group Members	**Company/Agency/Organization**
William Barrett, Assistant Coordinator	Johnson County (IL) 911
C D Brown, Director	Switzerland County (IN) 911
Tom Collins, Program Manager	Intrado
Mark Fletcher, Senior Systems Engineer	Nortel Networks
Rick Galway, Regional Vice President	Canada NENA
Verdette Hall, Director	RCC Consultants
David Hopkins, Deputy Director	Steuben County (NY) 911
Gina Knepp, Manager – Special Projects	Sacramento (CA) Police Department
Hershel Kreis, Supervisor	James City County (VA) Central Dispatch
Tom Ling, Director	Johnson County (MO) Central Dispatch
Randy Porter, Chairman	State of Tennessee 911 Board
Susan Seet, 911 Database Program Manager	Commission on State Emergency Communications – Texas
Nick Spiridellis, Chairman of the Board	CIQ, Inc.
Eric Sutliff, Director	21st Century Communications
Richard Taylor, Executive Director	State Wireless 911 Board (NC)
Bill Weaver, Senior Technical Consultant	iXP Corporation Working Group Chair
Graham Wilson, 911 Product Manager	CML Emergency Services
Alan Zander, Product Manager	CML Emergency Services

Table of Contents

1 Executive Overview

This document contains a variety of strategies, points for consideration, and other operational guidance related to Wide Area and/or Statewide Emergency Notification Systems (WA/S ENS). Used hereafter, the terms Wide Area Notification, Statewide Emergency Notification, and Large Area Emergency Notification are used interchangeably.

NENA received information from commercial vendors and practicing members regarding what was believed a "serious disconnect" between what public safety agencies were seeking to purchase and the intended/eventual use of a wide area/statewide emergency notification system. In some instances the solicitation generated by the requesting agency would contradict the end-purpose for which the purchased solution was eventually used. Understandably, the end results were less than desirable and, in some cases, resulted in threats of lawsuits, non-response by vendors to solicitations, loss of jobs, wasted resources, and other negative (unintended) effects.

Because of NENA's success in establishing operational standards for Emergency Telephone Notification Systems (ETNS) and the positive comments received about the ETNS Standards Document[1], NENA agreed to form a working group to research the issues related to wide area/statewide emergency notification systems and, where appropriate, make cogent comments/suggestions in the form of an operational information document. A working group was formed and assigned a specific charge of responsibility.

Charge of Responsibility

The WA/S ENS Working Group was charged with examining the issues, differences, challenges and requirements of statewide and/or wide area emergency notification systems. The eighteen (18) members of the working group have over 300 years collective experience in their respective fields, and included representatives from the private sector, commercial public safety vendors, communications consultants, and public safety/emergency communications practitioners. To that end, the following action items were assigned to the working group:

1. Review existing NENA Standards on ENS systems and understand clearly what these systems capabilities and limitations are.
2. Define the differences between mass emergency notification systems, first responder notification systems, and large area emergency notification systems.
3. Define what a mass emergency notification system, first responder system, and large area emergency systems should do and with whom (or what) they should communicate.
4. Define general functional requirements for each of the above systems.
5. Define general management/oversight requirements for the above systems.
6. Define roles and responsibilities of vendors and local, regional or state-level emergency management personnel.

[1] NENA issued the national standards document "*Operational Standards and Model Recommendations for Emergency Telephone Notification Systems*" in June 2004. The document was produced by the Emergency Telephone Notification Systems Working Group of the Standard Operating Procedures Committee of the National 9-1-1 Operations Committee (Chair – Bill Weaver).

7. Offer other guidance as may be appropriate.

The end product is this comprehensive **Operational Information Document** (OID) that addresses several major issues related to emergency notification systems, including but not limited to, the following:

- PSAP management's responsibility with regard to data acquisition, operations, administration and management of an ENS system (in all forms – see Section 3.4 of this document);
- Raises the critical and essential issue of ENS database accuracy and identifies the five (5) general sources of ENS data (telephone number and geo-coded mapping systems);
- Provides on-point guidance to the practitioner or public safety professional charged with developing technical and functional requirements for ENS systems; and
- General guidance on other issues deemed important by the Working Group's members to the successful acquisition, implementation, and management of an ENS system.

Support for Development of Solicitation Document(s)

This document is intended to be used as a guide for the public safety community by providing on-point guidance to professional practitioners as they develop system requirements, draft solicitation documents, and accurately and concisely specify the intended use(s) of an emergency notification system.

It is also the goal of this OID to add to the body of knowledge related to emergency notification capabilities and facilitate the most expeditious, effective notification response regardless of the intended use(s) of the delivered system.

2 Introduction

2.1 Purpose and Scope of Document

This document is intended to be an informative guide and resource for the public and private sector members of the National Emergency Number Association (NENA) in understanding the nuances and challenges of wide area/large area emergency notification systems and their various uses. It serves to provide information on the differences in the range of these increasingly popular emergency notification systems as a key public safety, emergency communications and emergency management information tool. It is also intended to provide substantive information on the goals and objectives of these systems, and the importance of clearly understanding how these systems may be used, as well as identify (often) overlooked responsibilities of the host agency/system administrator in appropriately specifying, using and managing these systems.

2.2 Reason to Implement

This Operations Information Document (OID) is targeted at Wide Area/Statewide Emergency Notification Systems. It details a wide range of recommended operational and procedural issues deemed necessary for:

- Effective communication of the intended purpose of the emergency notification system being specified by the public safety answering point (PSAP) or other authorized public safety, emergency response or emergency management agency.
- Provides appropriate guidance to the public safety professional regarding the establishment of effective operations, support and management oversight of these systems.
- Establishes appropriate expectations regarding the range of technical and functional requirements of these systems and the need to communicate clearly how these systems will be used, what other applications or systems they must interact with, and other key issues discussed in this document.

The information found in this document is intended to provide a basis for 1) self-assessment and 2) constructive guidance to emergency response professionals in all forms, public and private. Further, the intent of the information is to assist the communications professional in establishing the criteria for the responsible and effective use of wide area/large area emergency notification systems as they relate to an emergency response center's day-to-day operations (PSAP, EOC, Command/Fusion Center, etc.).

2.3 Reason for Reissue

NENA reserves the right to modify the document at any time. Whenever it is reissued, the reason(s) will be provided in this section of the document.

Document Number	Approval Date	Reason For Changes
NENA 56-503	06/06/2006	Initial Document
NENA 56-503.1	07/24/2015	Update web page links

Recommendation for Standards Development Work

No recommendation is made to develop operational standards pursuant to the issuance of this Operational Information Document.

2.4 Benefits

The most immediate benefit to the public safety community is clear communications between the intended user of the system(s) and those in the industry that develop, market, manufacture, and implement emergency notification systems in all its varieties. Secondary benefits include more efficient use of time and energy by those charged with developing system, user and operational requirements and clearly articulating functional and intended use characteristics of the desired system.

2.5 Cost Factors

No additional financial burdens on PSAPs are anticipated as a result of information provided in this Operational Information Document.

2.6 Acronyms/Abbreviations

Some acronyms/abbreviations used in this document have not yet been included in the National Emergency Number Association's Master Glossary. After initial approval of this document, they will be included. Link to the master glossary is located at http://www.nena.org/?page=Glossary.

The following Acronyms are used in this document:	
WAENS	Wide Area Emergency Notification System
LAENS	Large Area Emergency Notification System

3 Operational Description

NENA Wide Area/Statewide Emergency Notification Systems Working Group

The WA/S ENS Working Group was charged with examining the issues, differences, challenges and requirements of statewide and/or wide area emergency notification systems. To that end, this Operational Information Document (OID) was developed by a team of public and private sector emergency communications professionals who, collectively, have over 300 years' experience in their respective fields. The document, issued primarily as an information resource for public safety practitioners, has at its base the goal of providing on-point guidance to emergency communications, public safety and emergency management peers in four (4) key areas:

Goal	Purpose
1. What is the **PURPOSE** of the system	What is the **CORE INTENT** of the system being specified? What must it **DO**? Community alert / notification, mass notification, first responder coordination, or a combination of the above
2. **HOW** does it accomplish its purpose	What **TOOLS, TECHNOLOGIES** and **TECHNIQUES** are used by the system to achieve its intended purpose? Telephone communications (traditional/VoIP) mobile data, dynamic message signs, IP-messaging, email, commercial broadcast media, or a combination of the above
3. Who is the **RECIPIENT**	Who is the **TARGET AUDIENCE** (s)? Community residents, first responders, geographically dispersed contacts, special needs personnel, etc.
4. How are they **TARGETED**	What **MECHANISM** (s) is/are used to identify potential recipients? 9-1-1 database data[2], user compiled lists, third party sources or extracts, map-linked data or a combination of the above.

Though there are clearly other issues to consider, once the above goals are thoughtfully, completely, and appropriately addressed, the likelihood that a PSAP administrator will be successful in obtaining

2 Unless otherwise indicated, the term "9-1-1" is intended to mean Enhanced 9-1-1 systems.

an ENS system to meet his/her agency's emergency notification objectives increases **substantially**. The remainder of this document supports that purpose.

3.1 Emergency Notification System Defined

An emergency notification system is a communications system designed to deliver information (action or knowledge related) regarding a public safety, public service or emergency management event. Message recipients may include first responder staff from multiple jurisdictions, residents living in a small segment of a neighborhood/community or an entire county, motorists traveling on freeways or major thoroughfares[3], or, quite simply, almost anyone anywhere.

For the purpose of this OID, emergency notification systems are confined to communications systems that use verbal and written (text) information to communicate with intended recipients.

3.2 This Operational Information Document's Primary Goal

The primary goal of this OID is, to the extent possible, to provide appropriate guidance to the public safety practitioner/emergency management professional as he/she specifies the intended use of an emergency notification system. Then, having clearly established the intended use, appropriately specify functional and technical requirements of the desired system so that responsible vendors may match their system's capabilities (current and planned) to the agency's specified needs.

3.3 Potential Emergency Notification Delivery Methodologies

Literally every type of communications medium can be used to deliver emergency messages. Some messages are necessarily brief because of the method employed and the activity of the recipient, such as dynamic message signs on freeways. The message must take into account the speed of the driver and the fact that the driver must pay attention to the road. Other messages can be detailed as necessary, such as email and Internet postings. Finally, still others can be somewhere in between.

An example is a voice (telephone) message: Too much information overloads the recipient, and can cause the recipient to make an incorrect decision or take an improper action. The intent is to deliver the core message as clearly and succinctly as possible, with enough detail for the recipient to take appropriate action or take the recommended/suggested action.

Finally, an alternative to extensive telephone messages is to provide a message recipient with a "bulletin board" location (website or telephone number) where he/she can choose to retrieve additional information[4], if desired.

---

[3] These dynamic message system (DMS) signs are typically operated by state departments of transportation, and would not interface directly to an emergency notification system. The preferred notification methodology would be to include state DOT personnel in a "first responder" notification path. Depending on the need and event, state DOT personnel would decide if activation of dynamic message signs would be appropriate.

[4] See Section 5.14: Optional Dedicated Referral Line for additional information.

3.4 Potential Uses of an Emergency Notification System

There are many potential uses for an emergency notification system, just as there are many methodologies for the delivery of an emergency notification message. Ultimately, the requirements issued for the proposed system are unquestionably linked to how well the agency representative (or consultant) defines the uses for which the system could be deployed. The following is a short list of potential uses:

3.4.1 First Responder Notification

First responder notification systems are communication systems designed to alert first responder personnel, traditionally local police, fire and emergency medical services of an emergency event using one of many available methods. First responder notification systems allow for the coordinated notification of multiple field resources (on and off duty personnel), and may include staff from multiple jurisdictions that either:

1. Share communications resources and are able to alert multiple jurisdictions simultaneously using a common communications medium (i.e., trunked radio system, shared radio channel, common mobile data), or
2. Have access to communications technologies that allow notification of first responder personnel by other than radio communications (i.e., alpha-numeric pager, digital phone, PDA, email, auto-dialers, statewide messaging systems like NLETS).

NOTE:

Typically, first responder notification systems allow for greater control of data sets, and message delivery to a more diverse array of communications devices. The data collected should be classified as **persistent** data and would be collected and managed by the system administrator or PSAP manager[5].

3.4.2 Emergency Alert System

National Emergency Alert System - Formerly the Emergency Broadcast System, the national Emergency Alert System (EAS) is designed to provide the President of the United States with a means to address the American people in the event of a national emergency. Through the EAS system, the President would have access to thousands of broadcast stations, cable systems and participating satellite programmers to transmit a (emergency) message to the public.

The EAS and its predecessors, CONELRAD and the Emergency Broadcast System (EBS), have never been activated for this purpose. But beginning in 1963, the President permitted state and local level emergency information to be transmitted using the EBS. See https://www.fcc.gov/guides/emergency-alert-system-eas for additional information on EAS systems.

Local EAS Systems - A locally managed emergency alert system uses different locally available media to communicate important public safety, public service or emergency management messages

[5] See Section 5.3: Persistent Data for additional information.

to the public. Common media includes, but is not limited to, telephone communications, email, alphanumeric pagers, dynamic message signs (also called changeable message signs), Internet, and commercial radio and television broadcasting spectrum.

3.4.3 Emergency Notification System

Emergency (telephone) notification systems are most commonly used for high-volume notification of the public based on the need to distribute time-sensitive/critical information rapidly by calling the recipient's landline or wireless phone. Notification targeting can also be based on a specific geographically linked dataset (e.g. ZIP codes, physical streets, proximity from a certain point).

Emergency notification systems are communication systems designed to notify local community recipients of an emergency event using one of many methods to deliver messages (telephone, Internet, email, etc), though traditionally the telephone is the preferred and most often used method. Message recipients may include population centers and community residents living in a projected or targeted geographical area. Generally, notifications are made using voice communications and include VoIP and conventional telephone resources (dedicated or pooled, premise based or off-site). Some systems may be integrated with custom developed and/or locally managed databases that deliver information to a wide range of devices and recipients (PDA, email accounts[6], cell phones[7], digital pager, web sites, landline telephone numbers, etc). Finally, ENS systems may also be integrated with digital mapping technology that, using map tools, allows the user to draw a polygon around an area on the map, collect phone numbers associated with residences and businesses in the target area, and initiate the notification process.

Some systems allow for one-way delivery of information only, other systems may support acknowledgement by the recipient via interactive voice response (IVR). The intent is to deliver actionable information to target area recipients to be aware of, look out for, or take some kind of action (close windows, stay inside, shelter in place, etc) in response to some emergency, public safety or public service event.

3.4.4 Mass Notification Systems

Mass notification systems are emergency notification systems designed to notify a large number of people (e.g., thousands, tens and hundreds of thousands), usually in a large / wide area of an emergency event using one of many methods to deliver communications (telephone, Internet, email, message displays, etc). Typically, message recipients are residents in a large targeted area, such as

---

6 The delivery of emergency notification system messages to individual/corporate email accounts and wireless (cellular) telephones is typically dependent on a citizen providing that data to the public safety agency for inclusion in an emergency notification database (i.e., persistent data). It would be the responsibility of the PSAP manager or system administrator to ensure both email data and cellular phone number databases are properly maintained and kept current.

7 Ibid.

population centers involving large urban areas, multiple counties or large metropolitan areas, where immediate delivery of an emergency message is the primary objective:

1. Alert information (i.e., Amber alert),
2. Emergency information (i.e., evacuate), or
3. Actionable information (i.e., stay inside/close windows)

In general, mass notification systems are (usually) not integrated with digital mapping technology. Instead, the system relies on prepared and ad hoc databases (including residential and business phone numbers, digital pagers, email accounts, LAN/WAN networks) to relay information. Dynamic message signs may also be used to communicate specific information of importance (evacuation route, Amber alert, etc.).[8]

Other key points to consider when specifying capabilities of mass notification systems include:

1. The maximum area possible for which an emergency notification event would apply (multiple counties, quadrants of a state, the entire state),
2. The resources to which the mass notification system has access (telephone lines, T-1, LAN/WAN, etc),
3. The databases(s) used for the outgoing message delivery (email, telephone numbers, etc),
4. The number of agencies involved and their communications capabilities and limitations (i.e., as in First Responder Notification), and
5. The delivery methodology envisioned (radio communications, telephone, Internet, etc. [9]), and
6. The scalability of the system to allow for local agencies (i.e., PSAPs, 9-1-1 Networks) to provide notifications to their constituents only, while allowing County and/or State agencies to deliver notifications to multiple and/or all jurisdictions within its direct responsibility.[10]

---

[8] Mass notification systems, particularly those at the state level, usually fall under the domain of the state department of emergency management. These specialized divisions may be subordinate units of state police agencies, or may report directly into a highly visible state official's office (i.e., Governor).

[9] Although not addressed as a technology within this document, obviously commercial television and associated news broadcasts are also commonly used methods for Mass Notification.

[10] Mass notification systems, particularly those at the state level, usually fall under the domain of the state department of emergency management (or homeland security). These specialized divisions may be subordinate units of state police agencies, or may report directly into a highly visible state official's office (i.e., Governor).

3.5 Emergency Notification System Configurations

It is important for the system administrator to understand that – in general – there are two configurations of ENS systems. Both have advantages and disadvantages, good points and bad ones. The following provides very basic information on the two most common configurations:

1. Premise-based: Stand-alone PSAP based equipment. Like other locally installed CPE equipment, these are usually seat-based licenses serving a defined geographical area. Database maintenance is (generally) the responsibility of the PSAP, unless professional services contracts dictate otherwise. The PSAP would be responsible for resources needed to support the volume of calls anticipated. Telephone circuits, toll charges, database updates and other associated costs with owning, operating and maintaining a system would apply.
2. Off-Premise: Usually a network-based solution. Services delivered to the PSAP are articulated in the contracted provider's service level agreement (SLA) and may include supplier and customer responsibilities, applicable fee structures for database updates (usually by number of records), frequency of updates, toll charges, monthly recurring fees, activation fees and other applicable charges (annual maintenance fees, software updates, feature enhancements, etc).

4 System Administration

This section describes the major system administration issues one should consider when specifying or purchasing an Emergency Notification System. The information provided is not an exhaustive list and local system administration personnel should perform an assessment of their individual needs and capabilities and incorporate them into any procurement document(s) issued (e.g., RFI/RFP/RFQ).

4.1 Management's Responsibility

It is the sole responsibility of management to provide staff with appropriate guidance on the use of any agency provided system used to support operations, including emergency notification systems. Regardless of the use, it is the responsibility of the PSAP administrator (or network administrator) to provide effective guidance in using, managing and maintaining an ENS system. For detailed information on standards and model recommendations regarding proper administration and management of emergency (telephone) notification systems, see NENA Operational Standards Document 56-003 (June 2004). [11]

4.2 Written Procedures Required

The intent is to provide guidance on the appropriate use of the agency's emergency notification system. These procedures should be developed in consultation with others responsible for public safety/emergency management/emergency response matters within the community (i.e. emergency management, public health, public safety).

4.3 Authorized Use Defined

The intent is for the system administrator to define appropriate use of an emergency notification system. Generally, emergency notification systems should not be used for political events of any kind or any other non-emergency/non-public safety related announcement that would not be considered a potential threat to life, property or public safety (e.g.., "get out the vote" campaigns). ENS systems that use BESP-ANI/ALI 9-1-1 data for public safety emergency notifications of telephone subscribers may similarly be limited by statutes/rules of state regulatory agencies as noted in standard 3.3.4 of NENA OSD 56-003.

4.4 Authorized Activation Required

The intent is to ensure that PSAP managers or system administrators designate in writing personnel authorized to activate the agency's emergency notification system. Personnel authorized to activate their agency's ENS system should take appropriate safeguards to protect system and user passwords, system security, and prevent any unauthorized use of the system.

11 See http://www.nena.org/?page=Std_EmergNotificat for more information.

4.5 Acquisition of ENS Data

As with any system, the source, reliability and update frequency of ENS data is critically important. What follows is a brief commentary on the five (4) most common sources of ENS data. The value of developing and administering a public education program in conjunction with these data sources cannot be overlooked. See Section 4.19 for additional information on Public Education Campaigns:

- **9-1-1 Data:**

  The source of this data should be the targeted PSAP(s) MSAG database with regular updates to the database from the serving telephone company or 9-1-1 database provider. This also includes most recent updates to geo-coded mapping information (See Section 4.11) and telephone number data.

- **Third Party Sources:**

  These include mailing list distributors, the White Pages, and other commercially collected data sources. Key concerns should include the accuracy of the database, how often the third party provider updates their data sources, and how often the local ENS database is updated with new, accurate data.

- **Local/National Opt In/Opt Out Lists:**

  These are usually web-based applications that allow a customer to enter their telephone number(s) for inclusion/exclusion into a locally managed emergency notification system. The process can also be as simple as leaving complete contact information on an "answering machine" set aside to collect participant information. Regardless of the method used to collect the data, the collection, update and maintenance of this information is the responsibility of the PSAP or system administrator (see Persistent Data).

- **PSAP Collected Data:**

  This includes any data collected by the PSAP and used by the system administrator for the purpose of emergency notification or other official use. It is the PSAPs responsibility to establish processes to collect and validate the information they receive is accurate (see Persistent Data).

- **Voice over Internet Protocol (VoIP) and Wireless:**

  Nomadic VoIP and Wireless telephone number data sources would include those made available from 1) third party sources and/or 2) PSAP collected data. Until such time that nomadic VoIP 9-1-1 data becomes part of the standard ALI database updates[12], other reliable sources of the data must be explored by the PSAP (i.e., VoIP service provider - VSP). If used as a notification data source, wireless data would have to be collected by the PSAP from individual subscribers in their community or targeted ENS service areas (see Section 5.3 Persistent Data).

[12] Static VoIP services data, such as Time Warner, are part of standard ALI database updates; whereas Nomadic VoIP services, such as Vonage, provision the location information dynamically at the time of the call.

4.6 Accurate Telephone Number Database

Unless specifically prohibited by state law, the data comprising the outbound telephone number database should have its origins from the region's 9-1-1 database. Only 9-1-1 databases provide access to non-published / unlisted numbers that comprise about 30% of all telephone subscribers nationally. By extension, NENA believes it is clearly unacceptable to be unable to notify 30% of a given population in an affected area because of database accuracy issues.

Moreover, such 9-1-1 databases are most likely to reflect most recent updates and changes thereby reaching a higher percentage of telephone subscribers.[13] Agencies are encouraged to contact and work with their local telephone service provider(s) to obtain regular, timely updates to their outbound ENS database.[14]

The PSAP administrator should consider the value of requiring of the system vendor or database provider the following with regard to telephone number data:

1. A method of comparing the level of accuracy of the available telephone number data in the on-site ENS system against the current 9-1-1 database with results shown in percent of telephone number records judged as accurate (e.g., 98%), along with a listing of those records that are not correct with the corresponding correct information for each record.
2. A method of manually updating incorrect telephone number records in the ENS system with corrected telephone numbers from the 9-1-1 database (or other reliable source).
3. A report on the total number of telephone records in the system database and the total number of records in the current 9-1-1 database for the PSAP's service area.
4. A proposed fee structure(s) for updating ENS system telephone number data with the vendor's or telephone company's most recent 9-1-1 telephone number information (along with a recommended update frequency).

NOTE:

The process of comparing an ENS system's outbound calling number database to an area's 9-1-1 telephone number database can be a **significant undertaking**. PSAP administrators should keep this in mind when considering this issue.

The data that comprises the "first responder" data subset would be created and maintained by the PSAP (or other administrative agency) and would not be created from external data sources (i.e., 9-1-

[13] It is important to note that as subscribers change from traditional wireline services to nomadic VoIP services, previously issued wireline telephone numbers are deleted from the 9-1-1 database. Over time, notification coverage could be reduced unless nomadic VoIP data is separately collected and merged into an amalgamated ENS database.

[14] Some have interpreted the Wireless Communications Act of 1999 as authorizing the use of 9-1-1 database information for the purposes of emergency notification services (e.g., *to providers of information or database management services solely for purposes of assisting in the delivery of emergency services in response to an emergency*.) See http://www.fcc.gov/911/basic/releases.html for additional information.

1 database). As with any locally managed dataset, it is the responsibility of the PSAP manager or system administrator to establish processes to collect, maintain and manage locally collected data.

There exists a patchwork of states that allow the use of 9-1-1 database information in emergency notification situations, and still others that strictly prohibit the use. Lacking an unambiguous ruling by the Federal Communications Commission (FCC) on the subject, the use of 9-1-1 database information – in conjunction with emergency notification systems – will continue to be spotty at best.

4.7 Map-linked Telephone Number Database

If a desired component of the delivered application, the intent is to ensure that the emergency notification system is capable of linking a telephone number to a specific physical location on a geo-coded map database (i.e., an X/Y). The system should be capable of performing location "look-ups" via address and/or telephone number, and returning appropriate responses based on the inquiry.[15]

NOTE:

With regard to first responder notification systems and mapping technology, emergency notification system "first responder" data subsets are typically geography agnostic and such records would not be linked to a geo-coded map database. Such first responder message recipients should be able to be contacted regardless of the actual location of their communications devices (using previously compiled and locally managed persistent data).

4.8 24 X 7 X 365 Support

The intent is to ensure the entity responsible for maintenance services of the ENS system (i.e., manufacturer, reseller) provides continuous support for PSAP emergency communications personnel in the event problems are experienced in operation of the system. Ideally, this should be via a toll-free number with 24 X 7 X 365 coverage for resolution of technical and operational problems by properly trained and equipped personnel.

4.9 Pre-Defined Events

If a desired component of the delivered application, the intent is to ensure that the emergency notification system has the ability for the system administrator to create pre-defined events with pre-configured messages and associated event and/or agency contact lists.

4.10 Self-Test Capability

The intent is to ensure the system has the ability to perform self-diagnostic reliability tests, including telephone circuit availability, telephone and map database integrity, point-to-point connectivity with aligned and/or critical systems (i.e., map, CAD, telephone switch), and can provide a written report listing the PASS or FAIL status of each tested segment.

[15] With regard to wireless devices, a desired ENS system capability would be to select an area on a geo-coded map, collect known cellular tower sites information along with "registered" subscriber data for local wireless service providers, and import that data to a "*dynamic*" calling list for ENS uses.

NOTE:

This feature may be a desirable requirement in developing technical and functional specifications for a CPE, premise-based system. It could also be required from a network-based, off premise solution in the form of periodic system test reports available remotely by the PSAP system administrator.

4.11 Geo-Coded Map Database

If used in conjunction with a geographic information system:

The intent is to ensure the emergency notification system can be integrated with a Geo-coded[16] map database (preferably in an ESRI map database format).

NOTE:

The PSAP administrator should consider the value of requiring the system vendor or mapping database provider the following with regard to the system's geo-coded map database:

1. A method of comparing the level of accuracy of the installed mapping database in the on-site ENS system against the most current mapping database with results shown in percent of records judged as accurate (e.g., 98%), along with a listing of those records that are not correct with the corresponding correct information for each record.
2. A method of manually updating incorrect mapping records in the ENS system with corrected information.
3. The delivered mapping system should provide the system administrator with all the tools necessary to update mapping data, including street lines and other information essential to the system.
4. Proposed fee structures for updating mapping system data with the vendor's or telephone company's most recent map database.

4.12 Audit Trail Report

The intent is to ensure the system is capable of providing a detailed audit trail/after action report for each event for which the ENS system was used. Suggested report elements include:

1. Activation date and time,
2. Initiating authority,
3. Initiating user,
4. Event type,
5. Total number of telephone numbers called,
6. Total number of "first-try" successful connects,
7. Total number of unsuccessful connects and number of re-tries for each unsuccessful connect,

[16] Defined as *a location in geographic space converted into computer-readable form; making a digital record of the point's coordinates; the conversion of analog maps into computer-readable form.*

8. Percentage of successful connects,
9. Percentage of unsuccessful connects,
10. An exception report detailing each unsuccessful attempt and number, and
11. If integrated to a geo-coded map, the preferred update exception method would be to update the user's map display with an icon indicative of an unsuccessful attempt.[17].

4.13 System Capacity / Delivery Issues

Almost all emergency telephone notification systems use the Public Switched Telephone Network (PSTN) for message delivery. During times of a large-scale disaster, the serving Central Office (CO) in the affected area may receive a high volume of both internal and external calls.

Call Blocking and ENS Message Delivery

Other potential impediments to delivery of ENS messages include "call blocking" features used by subscribers to prevent unwanted telephone calls. While some ENS systems are able to override some "call blocking" features, a steady stream of new privacy features prevent most systems from being able to override all of them. Individual subscribers may have to request their local telephone service provider remove the feature(s) from each subscriber's phone in order to receive ENS messages.

NOTE:

It is important that the PSAP manager or end-user consult with engineers from the host telephone network for appropriate system sizing recommendations, as opposed to taking a "hope-for-the-best" approach. Further, the ENS vendor should be directed to work with local telephone network engineers to understand areas of potential capacity constraints prior to the actual deployment and activation of **ANY** emergency telephone notification system, as well as conduct joint telco/vendor/PSAP pre-implementation testing and analysis.

4.14 Authorized User Levels Defined

The intent is to ensure that the system/PSAP administrator has the ability to create user access levels commensurate with operational requirements. Generally, these include users, supervisors, administrator, and database administrator level (though the latter two may be combined).

4.15 Immediate Jurisdiction Defined

It is important that the agency clearly describes the immediate boundaries of its jurisdiction, and any extra-territorial boundaries outside its immediate service area. Events involving overlapping or ambiguous jurisdiction should be avoided at all costs. Alternatively, the ENS system administrator should consider installing in the PSAP a detailed official map outlining the boundaries of the jurisdiction for reference by communications personnel.

[17] In lieu of updating a map with an icon/indicator, another methodology would be to provide the tabular address of an unsuccessful emergency notification message delivery in a text box (for example). Errors in mapping databases could potentially cause a false indicator on a map without the actual tabular address, thereby resulting in false feedback errors.

NOTE:

The agencies involved in a wide area/statewide emergency notification system (i.e., a consortium) and the vendor should work collaboratively to identify the largest geographic boundary to be covered by the system, as well as all jurisdictional sub-boundaries. The system should allow participating consortium agencies to be able to initiate notifications to constituents within their area(s) of responsibility, while allowing oversight agencies the ability to deliver notifications across local boundaries (i.e., governing boards, networks, councils of government).

4.16 Mutual Aid, Inter-local Agreements and Contractual Service Agreements

It is important that the agency's boundaries and any extra-territorial boundaries outside an agency's immediate service area be described. Events involving overlapping or ambiguous jurisdiction should be avoided. The ENS system administrator should consider installing a detailed official map outlining the boundaries of its jurisdiction and jurisdictions to which ENS services may be provided for reference by communications personnel. Ideally, such jurisdictional limits should be color coded on any integrated mapping system used by the agency in conjunction with their ENS system.

4.17 Management Information System Capability

The intent is to ensure that the delivered system is capable of producing a wide range of user and event based reports. Report variations should include standard and ad-hoc reporting capabilities, with extensive search capabilities on any element or combination of elements in the database (address, zip code, beat, district, zone, event type, user, etc). The ability of the system to export management, system and user performance reports in a range of results (i.e., tables, charts, graphs) and formats (i.e., EXCEL, WORD) should not be overlooked.

4.18 Continuous Operational Readiness

The intent is to ensure that the user agency designates in writing that the ENS system should be maintained in a state of operational readiness at all times, and that the user/host agency designates the position(s) or unit(s) / division(s) responsible for maintaining the system's readiness state. Spares, replacement parts, service technicians, database administrators, contingency plans, remote activation and the like are an integral part of this consideration.

4.19 Public Education Campaign

The intent of the public education campaign is to properly inform the recipient community of the following:

1. The existence of the ENS system and what agency administers it;
2. Which agency may authorize activation of the ENS system for an emergency notification event;
3. The capabilities of the ENS system to support community-wide public safety notification efforts;
4. The purposes for which the ENS system will be activated, along with a list of example events for which ENS system use would be appropriate;

5. Anticipated/Appropriate actions of notification recipients when notified by their ENS system of a specific emergency event;

6. Alternate telephone contact number(s) community members might call to replay a specific/relevant ENS provided message; and

7. Local media roles and responsibilities in relation to the ENS system and its activation/use including, but not limited to, public information officers, media relations specialists, and community relations personnel.

NOTE:

Public education is not a one-time occurrence. The system administrator/PSAP manager should ensure an effective public education campaign is developed and interact with variable outlets throughout the calendar year in informing the community of the ENS system and its capabilities, as well as providing other emergency information germane to specific natural or man-made events (action plans for tornadoes, hurricanes, explosions, etc) applicable to the community's geographic location.

4.20 PSAP Self-Assessment Recommended

The intent is to ensure the system/PSAP administrator considers the value that a pre-solicitation site technology and capabilities assessment would serve in operating, managing and supporting an ENS system. Key points to be considered when performing such an assessment include:

1	Database administration
2	Technical support personnel and their respective skills
3	Current / projected technical support staff workload capacity
4	Existing facilities support capabilities
5	Future facilities requirements and projected costs (i.e., UPS, surge suppressors, telephone lines)
6	System integration requirements with other customer premise equipment (CPE)
7	Other equally important aspects of the system

In brief, the assessment should answer the following general question: Do we have the people, skill sets, and technical and functional resources needed to support (another or) this system?

5 System Operations

This section describes the major system operations issues one should consider when specifying or purchasing an Emergency Notification System. The information provided is not an exhaustive list and local system administration personnel should perform an assessment of their individual needs and incorporate them into any procurement documented issued (e.g., RFI/RFP/RFQ).

5.1 Telephone Number Data

If the ENS System has a method for someone to enter data manually, it should have the ability to maintain those manual entries even after an automatic or bulk data load (i.e., persistent data).

5.2 Additional Data Sources

The intent is to allow the import/use of locally managed or collected datasets (e.g. telephone number, name, address, geographic area, language, special needs) from more than one source. In practice, this may be a simple, locally developed list of community members with special needs.

5.3 Persistent Data

The intent is for the system to enable the system administrator to designate certain data as persistent, such that a new download or automatic update of data from one data source does not overwrite data that originates from a different source.

The PSAP may undertake a campaign to locally register cell phone users, non-English speaking residents, shut-ins, persons with special needs, or telephones which are not ordinarily listed in the telephone number source data in use with the ENS system (e.g. phones in an office building).

If this data is captured in the ENS database, it should not be overwritten by a subsequent load of standard name/address records. The ENS system should allow the system administrator to assign "write-protection" of specific locally developed database(s).

5.4 Classifying Events

It is recognized that not all vendors' systems may provide system controls to classify notification events. Where system controls are not available, classification is an administrative procedure. Further, if the classification of the event does not have any bearing on how the system handles the event, then the classification is purely an administrative function.

5.5 System Message Identification

NENA recognizes that the capabilities of telephone switches within the public switched telephone network (PSTN) infrastructure vary greatly, even within a single jurisdiction. The intent is to ensure that the delivered system has the means of identifying the type of event to the receiving party as soon as possible, and provides clear, concise "actionable" information.

NOTE:

Caller ID uses the Listed Name on the telephone company record. It might be helpful operationally for the PSAP manager/system administrator to establish a separate billing account for ENS telephone lines with a listed name of ***"Emergency Notification System"*** or some other appropriate, easily-recognizable designator.

5.6 Targeting Capabilities

The intent is for the system to allow "targeting" - the process of selecting the group or groups of recipients who are to be notified with a particular message. Though ENS systems vary from manufacturer-to-manufacturer, available targeting mechanisms are found to generally fall into three (3) broad categories: Static lists - Geographic criteria - Associative lists. They are defined as follows:

List Type	Definition
Static List	A set of data that does not change (generally). This might include members of a static group (first responders, special response teams), members with certain skill sets (tactical emergency response teams), and emergency contacts (political or executive leadership).
Geographic Criteria	A geographically referenced dataset that allows targeting a population within a defined geographic area[18] (i.e., polygon, rectangle).
Associative List	Associative lists are defined as lists based on some common criteria among list members: • School or facility • Residents in a certain community or zip code • Special datasets based a certain criteria (deaf, special needs, etc)

NOTE:

As with any PSAP developed database, list development, update and maintenance is an administrative function and should be assigned to a properly trained individual. Aside from compiling a master database, any lists or sub-lists developed is the responsibility of the ENS system manager / PSAP administrator.

5.7 Security and Confidentiality

The intent is to ensure that the system administrator develops and enforces procedures that ensure that the confidentiality of data such as unlisted phone numbers or constituents' medical conditions is strictly maintained throughout any data transfer and load process.

[18] The ENS system must be interfaced to / integrated with a regional geo-coded map database.

5.8 Event Activation Linked to Agency Policy

The intent is to provide a mechanism (i.e., policy, procedure) to ensure that when a calling event is requested, the person who triggers the event activation (local government or agency representative) has the authority to do so.

5.9 Audit Trail: Recording of Data/Voice Elements

The recording of data regarding the triggering and execution of a notification event should be such that a post-event auditor is able to view the map, data, selection criteria, event classification, targeted numbers, and all other items that were used by the organization that executed the notification event, as they appeared to the operator when the event was executed. Furthermore, the message that was delivered to each targeted telephone number should be recorded.

5.10 Event Evaluation Criteria

The intent is to ensure that the PSAP administrator develops written procedures providing appropriate guidance on applicable event priority or escalation procedures.

5.11 Retrying Failed Calls

The intent is to have the ability to retry calls to telephone numbers that were busy or did not answer. Additionally, the ENS system should be able to distinguish between various intercepts to retry calls that failed due to lack of capacity in the destination telephone dialing area. Clearly, it is important that the agency work collaboratively with the local service provider(s) to define how best to manage call volumes to target recipients.

5.12 Private Business Exchange (PBX) or Multi-Line Telephone Systems (MLTS)

Private Business Exchange or Multi-Line telephone systems are prevalent in many communities serving a variety of businesses, hotels, schools, government agencies, multiple unit apartments/housing developments, etc., and represent a challenge for ENS systems to be able to reach individual PBX/MLTS telephone subscribers directly if subscriber phone numbers are not resident in the 9-1-1 or other ALI data base.

Such systems may range from very small to extensive (e.g., a University with 15,000 PBX subscribers). System programming should have the ability to manage call initiation so that the system does not spend an inordinate amount of time attempting calls to one large PBX customer and thus does not place calls to other users.

5.13 Voice over Internet Protocol (VoIP) Subscribers and ENS Notifications

Voice over Internet Protocol (VoIP) service is becoming more prevalent in public and private sector applications. Care must be taken to ensure that VoIP telephones can also be accessed via the 9-1-1 ANI/ALI database and associated geographic coordinates in order to deliver ENS messages to VoIP subscribers known to be in a target notification area.

5.14 Optional Dedicated Referral Line

A 9-1-1 PSAP may encounter a large number of calls from recipients resulting from a notification event, particularly from those who did not hear or understand the message from the ENS system. Having a dedicated "referral" telephone number (or bulletin board) for persons to call and rehear the recorded message can reduce this traffic and increase the effectiveness of the PSAP and its operations. This call back number should be the same number displayed in the recipient's caller ID unit and should have sufficient capacity to support anticipated demands.

NOTE:

The value of other "information conduits" cannot be overlooked. PSAP and emergency management web sites are equally excellent information portals for expanded information related to an emergency event, and the suggested action(s) community residents should take.

5.15 Relevant Information

The intent is for the system administrator to develop written procedures for obtaining and recording relevant information for each eligible event category.

5.16 Special Needs Procedures

The intent is for the agency to draft written procedures outlining actions taken by communications personnel, field personnel, and/or other agency/response personnel in relation to known individuals and/or locations in the community that require special needs handling or follow up (i.e., hospitals, hospice care facilities, residential care centers). This includes deaf/hearing impaired, incapacitated, non-mobile, bed-ridden, and other special needs constituents.

5.17 System Language Diversity

The intent is for the system to support the ability of the host agency to communicate with other than English-speaking constituents. The host agency may undertake a community assessment of the most common languages spoken in their service area(s) to determine the different language requirements of their community. Agencies should seek the assistance of public and private sector agencies and the news media when performing this assessment.

NOTE:

Community outreach programs should target non-English speaking communities well in advance of emergencies to acquaint the non-English speaking population with where to go for emergency information in their native language (i.e., alternate telephone number, web site URL).

5.18 Alternate Emergency Notification Distribution Sources

Public education campaigns should be undertaken by a coalition of public safety, emergency management, private sector, and volunteer organizations (e.g. American Red Cross) to inform the public of the existence of the ENS system and how it will function. Such information can be published in local telephone directories near the emergency information page and educational or

other informational outreach venues [e.g., local cable/community television public safety announcements (PSAs), newspaper articles, training videos, web portals].

Similarly, community disaster education programs - such as that provided by the American Red Cross and the Federal Emergency Management Agency (FEMA) - can be shared with local populations to help them prepare for and respond to such emergencies appropriately. The demographics and population bases of each community served by the ENS system should be considered and efforts made to reach out to those populations to prepare them for appropriate response(s) to warning messages from area ENS systems.

NOTE:

Public education is not a one-time occurrence. The system administrator/PSAP manager should ensure an effective public education campaign is developed and interacts with variable outlets throughout the year (i.e., community interests groups, media, local governments) in informing the community of the ENS system and its capabilities, as well as providing other emergency information germane to specific natural or man-made events (action plans for tornadoes, hurricanes, explosions, etc.).

5.19 Composition and Public Response to Emergency Warning Messages

Red Cross Community Disaster Education and other emergency management experts suggest there is a tendency on the part of the public to "deny" or "minimize" any sense of danger until it may be too late to react and avert serious injury or death. Proper structuring of the to-be-delivered emergency message plays an integral role in obtaining compliance by the public with the recommended action plan.

When dealing with non-English speaking populations or those from different cultures, the ability to understand or perceive the nature of a natural or man-made hazard may be very limited. For example, those who may have emigrated from a dry arid country may have little understanding of the dangers and challenges of flash floods in mountainous areas.

NOTE:

PSAP administrators and emergency management professionals should be aware of the impact and potential unforeseen consequences "other emergency events" may have on their community, even though the "other emergency event" did not directly impact their areas of responsibility (i.e., September 2005 Houston area Hurricane Rita evacuations).

5.20 Accessibility to Deaf/Hearing Impaired Individuals

Emergency notification systems may include the ability to identify the existence of a device for the deaf via a tone emitted by the device. When the calling platform encounters that tone, the system may deliver a TTY/TDD text message. The intent here is to specify what methodology the user requires (or is acceptable) in communicating with the deaf/hearing impaired community during an emergency event.

Emergency notification systems may also have the ability to identify users in the community who are deaf and/or hearing impaired via an attribute element or other system "tag." Such identification may

be via a locally maintained database with a listing of an alternate contact number (i.e., TTY/TDD number), or via an icon indication on the system's linked geo-coded map.

NOTE:

The PSAP manager/system administrator is reminded that certain applicable local, state and/or federal guidelines may impact delivery of emergency notification services to constituents, such as the Americans with Disabilities Act (ADA), and are advised to conduct an impact assessment on how such statutory or regulatory guidelines / regulations may influence system specifications, user needs definitions, operational requirements and other ENS system components.

5.21 Trained Operators

The intent is for the system administrator to identify user level appropriate training for all system users, and ensure that each user has access to required features and functions commensurate with their respective user requirements. Each user should also be provided complete documentation on system features/function commensurate with their user/access level (i.e., user manual, training manual).

6 Information Systems and Support

This section describes the major maintenance and support mechanisms that an agency should consider when specifying or purchasing an Emergency Notification System. It does not contain detailed communication protocols and other purely technical information for the operation and/or interoperability of these systems.

6.1 Customer Data

Customer database update frequency should be set by the host agency administrator via written administrative procedures, and in direct consultation with the local telephone service provider and the ALI database provider (usually the telephone company). Update frequency can be determined by measuring the impact (in percent of changes) the telephone number daily database's moves, adds, and changes (MACs) has on the locally listed and unlisted telephone number database. The greater the percent of change, the more frequently the ENS system database should be updated.

In addition, the frequency of extract updates of the 9-1-1 database is often set by state tariff. However, **any agency that purchases an ENS system should be aware of the need for current and accurate telephone number data**. The user agency is principally responsible for the procurement and maintenance of local and regional telephone number information within their jurisdiction (unless otherwise specified in maintenance contracts, professional services contracts or other legally enforceable agreements).

NOTE:

Industry research indicates that the 9-1-1 database changes at the rate of approximately 0.4 percent every single day, or the equivalent of approximately 4.2 million households each day getting new

wireline telephone service, relocating existing wireline services, changing wireline telephone numbers or disconnecting their wireline telephone service.

6.2 Data Maintenance

The intent is for the system to locate in process and completed events by agency name, community name, operator name/ID, PSAP ID, responding agency name, event type, dispatch record/incident number (if any) and name of jurisdiction(s) involved. Note that locating data by a telephone subscriber's name may violate the privacy requirements for unlisted telephone numbers and thus, must be done with appropriate security controls and audit mechanisms intact.

NOTE:

In addition to processes/procedures issues (the What, How and When), the PSAP administrator should consider **WHO** will be responsible for managing and maintaining all system databases of an ENS system, particularly those that are premise based.[19] Among the many issues to be explored are:

1. Does the agency have sufficient full-time-equivalent (FTE) staff on hand to support the additional responsibilities of an emergency notification system?
2. Has the PSAP administrator taken into account the potential additional costs related to an ENS system in terms of people, facilities, and support equipment?
3. If no additional staffing is envisioned, does the person targeted to support the ENS system have sufficient positional bandwidth to assume responsibility for ENS data maintenance duties and still complete the other duties/assignments required of him/her?
4. Does he/she have the requisite technical skills?
5. What will be the initial and continuing funding source (some grants only support year-one costs)?

6.3 Mapping Data

The intent is to ensure an emergency notification system that is integrated with geographic information systems/mapping systems should use the most current and comprehensive geo-coded map database available for their region(s). Key capabilities of the mapping database may include:

1. The mapping system should be able to convert latitude and longitude data for a specific geographic point into a street name. Optionally, the converted latitude and longitude query may also contain the two (2) nearest cross streets to the queried location.
2. The mapping system should be able to isolate a single address on a street and be directed to call surrounding homes and businesses without contacting the isolated/targeted address.
3. The user agency (public or private entity) should obtain periodic updates of map data from the map database supplier, as appropriate for the area.

[19] It must be noted that this is not an endorsement for/against any type of system. Both premise and off-premise solutions have their pros and cons. It is the system administrator's responsibility to be aware of each and make a selection based on their individual needs, capabilities, technical ability, budgets, etc.

NOTE:

Having out-of-date map data may prevent the system from locating and notifying locations that are new to the map, and may result in incomplete or inconsistent notification coverage. Individual states or jurisdictions may require the use of mapping data already available from state agencies responsible for maintaining GIS information.

6.4 Considerations Where State Law Prohibits the Use of 9-1-1 Data for Notification

The availability and use of a pre-existing 9-1-1 telephone number database for the purpose of emergency notification is subject to state law[20]. An agency or PSAP operating in states where the use of the area's 9-1-1 telephone number database is legislatively prohibited for use with ENS systems must acquire their telephone number data from alternate sources (i.e., private third party service).

Regardless of the alternate data source, the agency should have a process for understanding how accurate is the data they acquire. This could involve regularly "scrubbing" the host agency acquired data against the known 9-1-1 telephone number database and determining the percent of accuracy between the two databases (with the 9-1-1 database being the more accurate). Ideally, a 100% match is desirable. Anything less than 95.0% to 99.0% accuracy should be considered unacceptable (depending on the volume of churn in the community).

The intent is to emphasize the importance of the data that drives any system in this case, the ENS system. The source of this information ideally should be independent of the vendor of the system. Generally, commercially available data comes from only one primary source, the white pages, as well as some secondary sources (e.g. direct marketing lists) and coverage or location information can have significant holes. State and national "do not call" lists can significantly impact the accuracy and reliability of commercially acquired data.

NOTE:

The ability of any emergency notification system to achieve a "high level" of accuracy largely depends on the local (or state) agency's ability to provide mapping updates that reflect current configurations of streets, addresses, street names, and other geographic information. If a local community or state agency is unable or unwilling to assist in verifying and correcting errors, achieving a high level of accuracy would be difficult. This is similar in nature to the 9-1-1 database itself: If a PSAP does not maintain the Master Street Address Guide (MSAG) appropriately, the accuracy, reliability and usefulness of the 9-1-1 database will suffer.

6.5 Confidential Information

Because of the sensitive nature of the contact information contained in an emergency telephone number database, all information access will be secure and password-protected. Users should take precautions to maintain appropriate personnel and technology controls are in place in relation to the emergency notification system.

---

[20] Many have interpreted the Wireless Communications and Public Safety Act of 1999 as authorizing/allowing the use of a 9-1-1 database "`to providers of information or database management services solely for purposes of assisting in the delivery of emergency services in response to an emergency."

The intent is to ensure that the ENS system provides sufficient mechanisms to audit and report on individual user accesses to the database of telephone numbers, contact lists and other recipient/target information.

6.6 Contact Lists

Contact lists should preferably be maintained by the emergency notification system in a separate directory structure from other databases. At a minimum, contact information should include name and primary phone number, a secondary phone number, and a back-up secondary number. The system should also be capable of selecting the primary number first. If no primary number is listed, the system should be able to automatically select an available secondary number **without** user intervention. Additionally, the system should be able, at the direction of the system user, to override device priorities (i.e. primary, secondary) and attempt to contact all recipient devices simultaneously.

Further, the system should allow the callout database to be constructed such that each field in the database is "reserved" for a specific data element (primary number, secondary number, cell phone, email address, etc). The system administrator should be able to select a specific element from the database and export the data to other applications (i.e., email engine) as may be required.

6.7 Recording Emergency Event Data

The intent is to support the recording of both voice and data elements (as appropriate) related to an emergency notification event.

6.8 Data Retention and Retrieval

The intent is for the system administrator to develop policy toward the applicable retention periods of information related to an emergency notification event. PSAP administrators should refer to their jurisdiction's retention policy or their state recommend archival period. The ability to **"indefinitely quarantine"** an archived event should be considered an essential functional element of the system, as well as applicable policy and procedure guidance on the agency's quarantine process.

IMPORTANT:

The system administrator should confirm responding and selected vendors' data backup and data retention procedures and policies. The system administrator should also ensure that such procedures are aligned/comply with jurisdictional or state archival standards/procedures.

6.9 Operator Intervention

The intent is to provide the user with full flexibility in using and interacting with the ENS system, as well as full user accountability for their actions via detailed audit trail documentation.

6.10 Playback from Archive

The intent is to ensure that the emergency notification system has the ability to play back event activations initiated by the system for post event review and assessment (i.e., after action analysis). If the emergency notification system is linked to a geo-coded map, the system may also provide visual indication on the linked system map of how the event "played-out" from initiation to conclusion.

If a multi-user system (as in a consortium), the system should have the ability to partition archived data in such a manner that participating local agencies cannot view notifications and reports for other

local agencies. However, this limitation should not apply to the host/oversight agency. The host/oversight agency should be able to view all activations and reports.

6.11 Records and Security

The intent is for the system to provide the system administrator with the ability to establish appropriate privacy and security controls for any system record.

6.12 Unique Event Numbering System

The emergency notification system should be capable of generating a unique event or activation number (i.e., case number, incident number) associated with a single emergency activation event, regardless of the size or duration of the event.

The intent is to ensure a complete audit trail exists for each event, including information not normally stored in/on an ENS system. It may also be necessary for an emergency activation event to occur without having a prior investigative event or other incident of concern (escaped prisoner, missing child, etc.).

6.13 System Interface Points

ENS systems can be used for a number of different emergency and non-emergency applications. In specifying the intended use and performance expectations of the "to-be-delivered" system, it is important that the system administrator specify **in detail** those on- and off-premise applications with which the emergency notification system must interface (both public and private).

For instance: ENS systems used as a ***first responder notification system*** may require integration to or interface with a range of paging systems, radio communications systems, mobile data systems, and web based messaging systems and literally any communications medium. It is the responsibility of the system administrator to provide as much information as possible to potential responding vendors/system integrators about the technical capabilities of these "secondary" systems. This includes identification of the system manufacturer, make, model and serial number, communication protocols, and other technical information as may be appropriate (i.e., programming language, operating system, network topology).

NOTE:

It is also the responsibility of the system administrator to determine – **before the solicitation is issued** – if the to-be-interfaced application manufacturer will support integration and what limitations/restrictions – if any - the manufacturer may place on integration/interface requirements (i.e. diluted or voided warranty, co-location of applications on common computer equipment, black box solutions).

7 Facilities and Support Systems

This section describes the facilities and support system requirements/concerns an agency should consider when specifying or purchasing an Emergency Notification System. As with other sections of this document, this is not an exhaustive list and the system administrator should perform an assessment/inventory of their local facilities and support system capabilities.

7.1 Facilities and Equipment

The intent is to ensure that the delivered emergency notification system vendor offers 24X7X365 technical and operational support provided by properly trained and experienced staff. The emergency notification system should be capable of meeting as many of the following as possible:

1	Geographic redundancy of all critical components (e.g., CPU, database, line cards, mapping systems)
2	Multiple and diverse means of system activation access which may include, but are not limited to the telephone, dedicated computer console, Internet and PDAs, 24 hours a day, 365 days of the year.
3	System monitoring and "alarm condition" notification (local and remote)
4	Sufficient testing of system data and components to ensure system performance and uptime requirements are met.
5	Diverse long-distance carriers and circuits.

7.2 Electrical Power

The intent is to ensure that the ENS system administrator works with agency information technology (IT), telecommunications and engineering support staff to determine the electrical power and back-up systems configuration requirements appropriate to their operations and include that information in any forthcoming solicitation document.

7.3 System Redundancy

The intent is to ensure that the delivered ENS system has access to back-up systems, data back-up and restore procedures, failover procedures, and component and system testing methods to ensure a high level of availability[21].

[21] NENA recognizes that system costs increase considerably the more "redundant" a system is made. Individual community leaders should evaluate their ENS functional needs and risks when specifying a system designed to meet community needs balanced against their financial capability.

7.4 Software Back Ups

The intent is to ensure that the system supports scheduled data back ups to stable media by the emergency notification system operations center personnel or system administrator (depending to access rights). Archived incident data should be stored in a secure facility.

7.5 Data Security

The intent is to require development of managed best practices to restrict access to private telephone number data to only authorized system users, and exercise reasonable cautions to prevent customer and event history databases from being corrupted or overwritten.

7.6 Disaster Recovery

The intent is to ensure the system administrator opens a dialogue and works cooperatively with the region's emergency management professionals and develops contingency plans applicable to the geographic area that could impact the ability of the ENS host facility to support operations (i.e., flooding, earthquakes, hurricanes, public safety events).

7.7 Systems Test

The intent is for the system administrator to establish regularly scheduled tests conducted on all emergency notification systems. Sample testing elements include, but are not limited to:

1. Emergency power systems, including uninterruptible power supplies (UPS) with alarm,
2. Mapping systems,
3. Telephone switch,
4. Databases,
5. Message recording system
6. Calling platform
7. Critical systems applications and
8. Associated workstation hardware and support equipment.

7.8 Systems Test Exercises for Public

The intent is to stress the importance of regional Systems Test Exercises during periods of heightened awareness (e.g. flash flood threats during spring runoffs, seasonal threats). If periodic test exercises using the ENS system to call subscribers in affected areas are possible, the community becomes more aware of the manner in which real ENS calls would be made to them. Similarly, problems with notification of subscribers during "live-fire" tests can result in procedural or technical changes that prevent real failures during true emergencies. Some costs may be associated with such tests but sometimes the ENS provider may host limited test calls gratuitously as a public service.

7.9 Physical Security

The intent is to limit access to the system to only authorized personnel. Such protective measures should be taken to restrict unauthorized access to key ENS workstations and system components (access control, user ID and password, etc).

7.10 Access to Critical Information

The intent is to ensure authorized users have continuous access to all ENS components, including emergency contact lists, event activation lists, security codes and other information essential to the successful activation, management, oversight and completion of an emergency telephone notification event.

7.11 Computer Systems

The intent is to ensure all desktop computer programs are properly licensed for agency, PSAP, or call center use and software used according to applicable copyright statutes.

7.12 Technical Support/Service Escalation Model

In addition to the vendor providing a 24 X 7 X 365 toll free number for support issues, the intent is to stress the responsibility of the vendor to notify customers/clients of any changes or modification to their service escalation model. Typical escalation model information may include:

Service Level	Entity or Person Responsible
First Tier	Vendor Help Desk / Trouble Ticket Technical Support
Second Tier	Vendor Sales Contact Person (Salesman) Supervisor – Technical Support
Third Tier	Regional Manager / Director of Sales Manager – Technical Support
Fourth Tier	Vice President – Customer Support Vice President – Technical Support

NOTE:

It is the responsibility of the system administrator to both keep and maintain accurate records with regard to support issues. Each called in "trouble ticket" should be assigned a unique service number by the vendor and tracked by the vendor and the system administrator to conclusion. The system administrator should require bi-weekly updates of all outstanding trouble/help desk items, who called in the event at the agency, the vendor support team member to whom the issue was assigned, and the disposition of each service record. Date and time stamping is recommended for each record and each entry in each record. Exception reports should be available from the vendor in various increments (30, 60, 90 days, etc).

7.13 Virus Protection/Firewall Protection

The intent is for the system administrator to ensure all mission critical computer systems are equipped with current anti-virus programs (i.e., Norton Anti-Virus – example only). Technical support personnel should ensure that all relevant computer software virus definitions are installed on all call center agent workstations and other call center computer equipment (i.e., servers, data banks).

All mission critical computer systems/networks should be similarly equipped with computer firewall protection software that protects connected call center workstations, customer premise equipment (CPE) and networks from, among others things, computer hackers and denial of service (DoS) attacks. Ideally, any firewall protection software deployed should preferably include intrusion detection, content filtering (entire domains or web sites), domain name caching, and advertisement blocking (i.e., banner ads) capabilities.

NOTE:

In some instances, individual PSAP firewall configurations may have to be altered to allow for the passing of data from network-based systems to local PSAP equipment. Care should be taken that such alterations to the agency's firewall configurations do not compromise the security of the local user network. The PSAP's technical support team should be consulted.

7.14 Technical Support Documentation

The intent is to ensure that appropriate vendor supplied technical documentation (SCADA diagrams, network diagrams, technical component information, etc) is available on-site and that written procedures establishing proper control over the unauthorized installation, removal, upgrade, or downloading of computer software and/or computer files are developed and distributed to all personnel.

7.15 Internal Information Systems

The intent is to ensure the user agency (PSAP, call center, etc) establishes appropriate written policies regarding access to and use of these internal systems, and outline written policies and procedures.

7.16 Inspection Compliance

The intent is to ensure that the host agency establishes written procedures for inspection of emergency notification computer systems and data for user access violations and inappropriate use of equipment and/or company and/or customer information. Compliance inspections should be routinely conducted with a written report delivered to management or oversight board (i.e., commission).

7.17 ENS Contingency Plan

The intent is to ensure that the PSAP/call center publishes and makes available to all personnel a system operations contingency plan in the event of unusual occurrences that prevent the ENS system from being used. At minimum, the plan should address:

1. Availability and location of current plan
2. Periodic (e.g. quarterly) review of plan
3. Plan Update procedures
4. Periodic testing
5. Alternate location and transportation to relocation center.
6. PSAP/call center security

Also, the ENS contingency plan should provide appropriate guidance to personnel if any of the following circumstances are encountered:

1. Loss of electrical power
2. Loss of computer systems
3. Loss of telephone systems
4. Loss of individual call center computer workstations
5. Loss of partial or complete communications facility
6. Relocation of call center personnel to other facilities

7.18 Common Time Sync Device

The intent is for the system administrator to consider the value of networking all PSAP computers, workstations, mapping systems and other associated equipment (as appropriate) to a continuous synchronized time service such as the Network Time Protocol (NTP), or be connected to PSAP/call center equipment by way of a common device (e.g., Netclock – used for example only).

8 Training

This section describes the major training issues one should consider when specifying or purchasing an Emergency Notification System.

8.1 Initial Training

The intent is to ensure that all system users be supplied emergency notification system training manuals provided by the vendor or service provider specifically addressing their areas of responsibility (e.g., system user, system supervisor, system administrator, database administrator).

Personnel should be trained and tested to demonstrate proficiency in key performance areas in relation to proper use of an emergency notification system. Minimally, personnel should receive training in:

1. Operation of all workstation equipment, including computer systems and telephone equipment
2. Proper use of all mission-critical support applications, including mapping programs, databases, and dispatching programs
3. Disaster recovery/activation plans
4. Appropriate situations for use of the ENS
5. Inappropriate use of ENS data

8.2 System Controlled Tutorial and Simulator Training

Training personnel in the appropriate use of ENS systems can be difficult and costly, particularly when events occur infrequently and use of and interaction with the system is reduced. The intent of this feature is two-fold:

1. Enable the system administrator to place the ENS system in "training mode" and simulate an event with complete control of the event by the user. Interaction with the system by the user would be recorded and available for review by the system administrator at the completion of a training session. Simple tests should be incorporated into the design to ensure the user/trainee possesses the requisite knowledge of/about the system and its uses.
2. For those agencies that conduct table top exercises, the system should have the ability to simulate complete activation and control of a desktop exercise, except for actually completing calls to target recipients (or other notification methods). The system should use the database selected by the user (i.e., 9-1-1, persistent data) and provide the Exercise Coordinator with information on the number of potential notifications by class of service, affected population projection, etc if available. Class of service indicates residential, commercial and other types of telephone service.

8.3 Continuing Education/Documentation

The intent is to ensure training documentation elements include training topic, delivery method (roll call, CBT, one-on-one, train-the-trainer, etc), instructor name, any grades or evaluations related to the delivered training, and remedial actions taken by management to assist the user in mastering the material or required task (if warranted).

NOTE:

In states that provide continuing education and/or professional development credits for telecommunications personnel, the system administrator should develop policy toward recording all courses completed by PSAP personnel in support of their duties or otherwise approved by management, as well as establish a procedure for forwarding training certification information in sufficient detail to be accepted by the state's certifying agency (such as Texas' TCLEOSE and California's POST boards)

8.4 Curriculum Required

The intent is to ensure the system administrator develops and administers a training curriculum specifically addressing the emergency notification system of a length and duration deemed appropriate for proper operation and use of the system.

Training elements should include information contained in vendor and/or telephone or service provider supplied user manuals and other information deemed appropriate to accomplish specified training objectives (i.e., scripts, tutorials, drills).

8.5 Management and Administrative Personnel

The intent is to ensure that emergency notification system support staff including management and administrative support personnel and system supervisors, are trained in key system performance areas, including but not limited to:

1. Proper operation of their site's emergency telephone notification system.
2. Disaster recovery plans for their host facility
3. Impact of improperly referred requests for public safety response requests

Supervisors and senior management may also be trained in the following processes, if appropriate:

1. System back up procedures
2. Research and retrieval of on-line and archived data

8.6 ENS Project Manager

The intent is to ensure that the PSAP system administrator appoints a single project manager responsible for representing the PSAP or user agency in all meetings, conference calls and such, as well as being responsible for the following activities relating to the planning, installation, implementation and maintenance of the Emergency Notification System:

1. Act as single point of contact for ENS vendor during planning, installation and maintenance of ENS system
2. Coordinate training sessions of all PSAP personnel
3. Act a principal point of contact with the agency's local telephone service provider
4. Coordinate personnel functional competency activities
5. Develop customer service and maintenance/support escalation procedures
6. Develop policies and procedures associated with ENS system implementation

NOTE:

In a Wide-Area/Statewide Emergency Notification System, there may be more that one point of contact to represent state-level and/or local agencies due to the need to address regional variances in notification capabilities, methodology and applicable law. Consideration should be given to each agency's operating requirements/restrictions and, to the extent possible, an operational consensus document/standard should be reached.

9 References

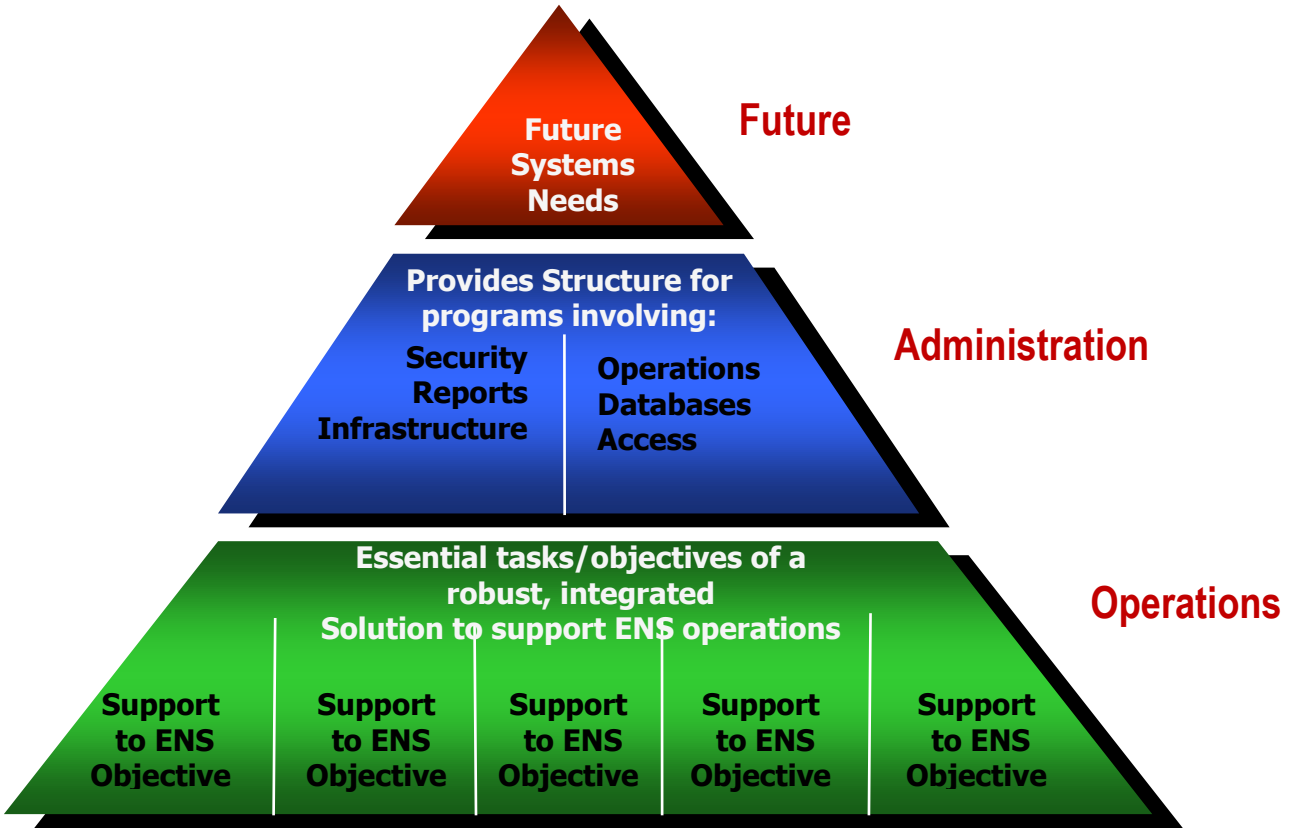
www.nena.org

National Emergency Number Association (NENA) Operational Standards Document 56-003: Emergency Telephone Notification System Standards.

10 Exhibits

10.1 Exhibit 1:

The following graphic depicts three key elements a needs assessment should entail when determining system requirements and functional capabilities of an ENS system (or any system or process for that matter). The operations level involves task objectives and features; the administration level encompasses system/user security, operational databases and management reporting; the future level projects current requirements and offers a forward looking perspective on the evolution in operations, technology, capacity, etc.



10.2 Exhibit 2:

The following graphic depicts general steps involved in developing a requirements document for, in this case, an emergency notification system. Starting clockwise, the first step is to understand how the system will be used and what functional requirements are needed, defining what the user's organizational and social needs are (integration points, desirable features, functions, preferred user interface, etc), moving all the way through to the development of a draft Requirements Document (in red).